Inequitable Infrastructure Investments: An Atlanta Case Study

An Analysis of the Distribution of Atlanta's Infrastructure Investments throughout Local NPUs

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Introduction

America is a country where the rich are getting richer, and the poor are getting poorer. This is an issue affecting cities and their ability to maintain their economic vibrancy while assisting their low-income residents. However, none have been put in the spotlight for income disparities more so than Atlanta. In June 2013, the New York Times published an article about a Harvard University study that found Atlanta to be in the bottom 3 of the 50 largest metro areas for upward mobility. Then in February 2014, the Brookings Institute compared the household income of the top 5% of residents with that of the bottom fifth to find that once again Atlanta appeared at the top in terms of income disparity. These articles reinforce the idea that where a person lives matters and could determine his or her ability to succeed. Therefore, it is important to analyze where cities are investing, and if they are considering equity, especially in cities like Atlanta where the disparity is recognized.

This paper uses data on Atlanta's infrastructure investments from 1999 to 2012 to determine which areas are receiving the most projects and funding in order to evaluate the equity of the distribution. Additionally, this paper seeks to see the extent to which planners are considering equity in their decision-making process. By looking at the distribution of the city's neighborhood plans and plans developed by the Atlanta Regional Commission, this will give insight into which areas are receiving the bulk of the city's planning efforts well as how the plans are translating into actual infrastructure funding. With the gap between the rich and the poor becoming increasingly pronounced and

national attention on Atlanta from Harvard University and Brookings Institute studies, it is important that equity be a consideration within the planning profession. This paper looks to uncover if infrastructure investments are exacerbating this inequity or making an effort to counteract the gap.

Research Questions

How equitable is the distribution of completed infrastructure projects and funding in the City of Atlanta from 1999-2012 based on NPU? How correlated are neighborhood and Livable Centers Initiative (LCI) plans with the infrastructure funding?

Literature Review

This review of the literature on equitable distribution is three-fold, focusing first on the equitable distribution of public services on a city-wide scale, equity in transportation funding, and the connection between distribution and city-initiated plans.

Distributional Equity of Public Services

Planners have used a number of qualitative and quantitative methods to evaluate how equitable cities are at distributing their public services. The topic of equity in the distribution of public services came into the public eye with the landmark court case of *Hawkins v. Town of Shaw* in 1971. This case revealed a significant disparity between the public services, specifically sidewalks, sewer service, and street lamps, provided to the

African American and white residents in this small town in Mississippi, pointing to distributional equity based on race (Savas 1978). The subsequent studies use equity as a basis for evaluating public service distribution.

Guhathakurta and Wichert (1998) focused on the growing city of Phoenix and its capital improvements from 1981 to 1995. Unlike most research that looked at one particular type of public expenditure like libraries or public parks (Mandell 1991; Lucy 1981), these authors evaluated a range of public projects, excluding those involving large-scale sports facilities, airport extensions, and solid waste and wastewater treatment facilities because these facilities may have positive impacts to the city as a whole but negatively affect the areas where they reside. Their area of study consisted of the inner core, middle ring, and suburban edge areas to identify any funding preferences to a particular area. They found that the majority of infrastructure funding was going to suburban areas while the middle area received the lowest per household expenditures. This research indicated that there was a discrepancy in resource distribution with public funds supporting the growth of suburbs while inner city and middle area's facilities were slowly deteriorating and in need of repair. Not surprisingly, the inner city is the area with the highest concentration of low-income and minority populations.

Coulter (1980) and Lineberry (1975) sought to identify inequity within public services and developed an underclass hypothesis that African American and low-income residents were discriminated against in the distribution of public resources. Coulter (1980) created the Coefficient of Inequity to support his underclass theory, studying the

police department of Tuscaloosa, Alabama, using census tracts as his unit of analysis. He analyzed the police department in terms of their delivery of services, like response time and arrest rate. His findings did not support the underclass hypothesis for the different crime and response variables, except in the case of robbery and auto theft rates. Lineberry (1975) took the underclass hypothesis a step further, breaking it into three divisions, the Race Preference, the Class Preference, and the Power Elite hypothesis. Using San Antonio, TX as his area of study, he used two separate public services, parks and fire protection, as his units of analysis. Like Coulter's findings, Lineberry was not able to prove his underclass hypothesis in the case of either fire protection or parks. He did find what he calls 'unpatterned inequality' where some low-income residents lived near poor facilities while others did not (Lineberry 1975, 79). This signals that inequity is difficult to identify because while inequity may exist in some cases, it does not exist everywhere or in enough places to be considered significant.

Another aspect of the distributional equity literature focused on the factors that influence public investment. Hansen (1965) analyzed two different types of capital, "social" overhead capital (SOC) and "economic" overhead capital (EOC), to see how they were distributed by neighborhood. SOC includes community facilities like schools, police and fire, parks, waste disposal, cemeteries, and public housing, while EOC represents transportation, water supply, wastewater, and harbors. While he found that faster growing communities put more priority on EOC rather than SOC and that industrial zones required higher SOC expenditures than the area as a whole, neither the variables of demographics nor types of housing affected the overhead capital. Though

communities and development have significantly changed since Hansen's study in 1965, he did recognize one factor that will never change: that politics plays a significant role in public investment decisions.

Helpman and Pines (1980) looked at public infrastructure funding to answer their research question of whether it is more efficient to invest in low-quality or high-quality areas of a city. They concluded that the decision hinged on transportation costs to the city. In an area with low transportation costs, it made the most sense to consolidate the population into the highest quality area and invest there, similar to a shrinking city strategy currently proposed in Detroit. However, if transportation costs were high, it became more cost effective for the population to be dispersed, and the driver became finding the best housing over the quality of the area. In this case, it was beneficial to invest in the low-quality cities to bring them up to the standard of the high-quality cities since this will benefit more people. In the case of Atlanta, the population is very dispersed, not only throughout the city but the region as a whole. Using Helpman and Pines' results, investment in Atlanta should be focused on low-quality areas in order to raise the quality of life with public investment.

Transportation Equity

There is also a significant amount of literature that focuses on equity within transportation specifically. Transportation is a different type of public investment because of its nature as both a system on its own as well as a connector of people to services and different aspects of their daily life (Taylor and Norton 2009). Transportation

equity becomes a more complicated concept because of the different modes, its effect on a significant number of people in multiple locations, the units of measurement, and the categories of people who need to be taken into account (Litman 2013). While a portion of the literature focuses on the type of model that should be used to evaluate accessibility to transportation (Neutens et. al. 2010), this section discusses the different types of transportation equity that can be utilized in the allocation of transportation funds.

The literature divided transportation into two basic types of equity, horizontal and vertical (Litman 2013). Horizontal equity follows the principle that resources should be distributed equally amongst all individuals. Conversely, vertical equity is the concept that people have varying needs and those should be taken into consideration during distribution. It is subdivided further into vertical equity with regard to income and social class and vertical equity with regard to mobility need and accessibility. Vertical equity with regard to income and social class calls for distribution to favor those with a low socioeconomic status, while vertical equity with regard to mobility need and availability calls for a system that accommodates all people even those with disabilities. Because of the contrasting nature of these two types of equity, the literature strives to determine which is more important in the allocation of public funding.

After defining these types of equity in depth, Litman (2013) discussed different methods of achieving transportation equity. When looking at horizontal equity, he recommended resource allocation be conducted based on a per capita basis with adjustments to take into consideration low-income and special needs individuals. For

planners, he called for improved transportation data to better understand the needs of low-income residents, improved information on transportation costs, and least-cost planning such that alternative modes are considered. From the vertical equity perspective, he advocated for transportation policy and planning decisions that support more affordable options, specifically alternative to automobiles, for car sharing and other strategies to make car ownership affordable, for transportation prices that it are favorable to people with economic, social, or physical disadvantages, and for affordable housing within transit-oriented development. From analyzing Litman's (2013) recommendations, it seems Atlanta does little overall to address transportation equity, especially considering its continued automobile focus and lack of comprehensive public transportation.

In his later work, Taylor (2010) took his analysis a step further to geographic equity and its role in the distribution of funds. Geographic equity represents an equal distribution of funding across jurisdictions. This is especially important to elected officials and can be problematic when deciding funding. From looking at different case studies of cities, Taylor (2010), like Litman, made recommendations on how planners could combat transportation equity. These included focusing projects on central, congested zones, particular travel corridors or market segments, incremental implementation so that equity could be considered throughout the process, and a constant and sincere effort to involve the public in decisions and program design (Taylor 2010).

The final transportation equity literature discussed here identified different models for distributing federal transportation funds through the Urbanized Area Formula

Program (UZA). Sandridge (2012) focused more on stakeholder satisfaction as the marker of success rather than a specific type of equity discussed by Taylor (2010) and Litman (2013). He made no judgment or recommendation on which model was more equitable, but this did provide a good basis for how other cities undergo the process of transportation funding. A potential application of Sandridge's work is taking these models and considering Taylor's principles of vertical equity with regard to income and social class and vertical equity with regard to mobility need and accessibility.

Plan Implementation

The final section of this review focuses on plan implementation and its effect on the distribution of public resources. One way to analyze the effectiveness of area plans is to see if there is a relationship between the plan for facility distribution and the subsequent facility location. Talen's (1996) research sought to answer this question by analyzing the location of parks in Pueblo, Colorado using both a univariate and bivariate analysis. In her univariate analysis, she found that the implementation of Pueblo's comprehensive plan did not increase park access to low-income areas. Similarly, even when the plan called for increased accessibility to renters in specific areas identified in the plan, only a quarter of those areas obtained that result. In conclusion, Pueblo's plan implementation failed to increase park accessibility to specific neighborhoods based on socioeconomic factors. Talen's research demonstrates the ineffectiveness of comprehensive plans at addressing equity issues.

The second main section of literature on plan implementation covers the methodology behind measuring the success of plans. In another article by Emily Talen (1996), she discussed a number of critical issues associated with evaluating the success of plans including the ability of planning to effectuate change, the meaning of success, the issue of multicausality, and the problem of quantitative evaluation in planning. Under planning's ability to effect change, she cited that planners can potentially suspend certain developments, but they cannot predict development or create their own. Talen wrote that in terms of evaluating success, one would have to account for a level of uncertainty and that a linear perspective is infeasible. In terms of multicausality, she believed that the best that can be done in terms of gauging success is looking for associations between plans and outcomes rather than concrete results. She cited that the problem of quantitative evaluation stemmed from a difficulty in acquiring the correct data as well as an inherent dislike of quantitative methodology on the part of planners who believed that this methodology did not explain the realities of implementation and did little more than state the obvious.

Laurian, et. al. (2004) put forward their conformance-based implementation evaluation (PIE) methodology which measures the breadth and depth of plan implementation. The breadth represents the different policies that are implemented during the permitting process, while the depth is the percentage of policies implemented through each permit using the specifications laid out in the plan. Using stormwater management as their unit of analysis, they found that no plan scored well on both breadth and depth though implementation breadth was high for most plans. Laurian et. al. (2004)

conclude by presenting factors that influence plan implementation, including the plan's quality, the feasibility of the policies within the plan, the capacity of the planning staff, and the organizational commitment. These studies provide a number of considerations when evaluating Atlanta's neighborhood plans and their implementation success.

Conclusion

This literature review demonstrates that there are a number of different ways to evaluate equity in relation to the distribution of public services. Despite a lack of one central methodology, planners must take equity into consideration when making plans and implementing them. Further research is needed to better understand the role equity is playing in infrastructure funding and what planners can do to ensure all residents no matter their socio-economic status are receiving the public services they need to lead a healthy and happy life.

Methodology

The data for this research was acquired from two sources both provided by the City of Atlanta. The City of Atlanta's Planning and Community Development Department contributed the original data source with the second provided by the Public Works Department as a supplement. The original data source contains 423 infrastructure improvement projects ranging from 1999 to 2013 and is organized into five main categories of projects. These include community facilities, transportation, urban design, wastewater, and water. After consulting with Jessica Lavandier from the City of Atlanta

Planning Department and analyzing the different projects in each category, formal definitions of each category were drafted and listed below.

- Community Facility projects relate to the improvement and creation of parks and their buildings and property, fire stations, and community centers.
- Transportation projects are those related to the improvements of roads, crosswalks, bridges, and intersections.
- Urban design projects cover streetscape and sidewalk improvements.
- Wastewater projects relate to the rehabilitation and upgrade to the sewer system, initiated by the Department of Watershed Management.
- Water projects deal with stormwater and water treatment plant improvements.

In deciding how best to analyze the data on a neighborhood basis, the scope was narrowed to community facilities and urban design projects because of their direct impact in their surrounding neighborhood. Like in Guhathakurta and Wichert's research, wastewater and water projects were often large-scale, affecting the whole city of Atlanta and having little direct effect on the area where the sewer or treatment facility is located. Environmental justice implications would also have to be considered because of the negative effects of these plants on the immediate surroundings. Though transportation projects do affect the immediate area, residents of other parts of the city and even the surrounding suburbs also benefit from roadway improvements no matter where they are located. Because of the difficulty of weighting the benefits of these projects, only community facility and urban design projects that directly affect the residents of the surrounding area are being used in this analysis. Though the dataset contained projects

classified as active, removed, cancelled, and completed, only completed projects were used in this analysis, so that the effect of the funding could be seen through concrete projects directly affecting the neighborhoods. Additionally, projects without completion dates or cost information were excluded from analysis. This ensured that all completed projects that directly affect an area were used in this study.

The original data source contained detailed information on each project including a description, the project manager, sponsor, priority, cost estimate, and dates of starting and completion. There were also a number of unfamiliar terms that required definitions in order to gain clarification about the projects. Again Jessica Lavandier provided consultation on this process. She assisted in the definition of five terms: a closed out project, completed project, TIP, consent decree, and cost estimate.

- A closed out project is one where a project is complete, but the contractor has not transferred it over to the city.
- A completed project is finished and closed out.
- Projects designated as TIP, or Transportation Improvement Projects, are part of a federally funded program run through the Atlanta Regional Commission.
- Projects with a consent decree are those mandated as part of a Department of Watershed Management program, resulting from a lawsuit over sewer leakage into the Chattahoochee River.
- The cost estimates for each project are based on the budget found in each department's plan. This same definition applies to the cost estimates for the Public Works Department's projects.

Funding for these infrastructure projects comes from public bonds based on the budget laid out in each department's plan. These term definitions were used to better understand the data and to assist in the classification of the project.

Because of missing data on Public Works projects within the original dataset, the Public Works Department was consulted and provided an additional dataset of their projects. This supplemental dataset supplied information on 2,265 projects in such categories as bridge improvements, intersection improvements, parking meter installation, sidewalk improvements, streetscape projects, and street pavings. In order to align with the urban design projects outlined in the original dataset, only sidewalk improvement and streetscape projects were analyzed. This dataset also provided the necessary information on specific dates of project commencement and completion as well as the project's budget. Like in the original dataset, projects lacking completion dates or cost information were excluded. The addition of the data from the Public Works department proved to be instrumental in filling in gaps in the original dataset as well as expanding the number of projects in the analysis to 252.

The study area for this research is based on the City of Atlanta's Neighborhood Planning Unit (NPU) system. The NPU was created in 1974 by Mayor Maynard Jackson in order to satisfy the city's charter requiring citizen participation. This grouped the 200 neighborhoods into 25 NPUs with the hope of bringing different neighborhood leaders together; unfortunately, this goal was not realized in the way Jackson hoped (Stone 1989). It now serves as a citizen advisory council that makes recommendations to the

Mayor and City Council on zoning, land use, and other planning issues (City of Atlanta 2014.) The NPU provides a larger unit of analysis than a neighborhood and has distinct boundaries. Project descriptions were used to associate each project with its neighborhood and assign it to the appropriate NPU. If a project occurred in multiple NPUs, each NPU affected was given equal weight. Large projects listed as applying to all NPUs were excluded from the dataset because there was no way to determine if and by how much each NPU was affected.

To provide a basis for comparison, the results will be analyzed in conjunction with three indexes created by Georgia Institute of Technology's Center for Geographic Information Systems (GIS), the Socio-Economic Conditions (SEC) index, Quality of Life index, and Health index. The SEC index evaluates neighborhood socioeconomic status in Atlanta's NPUs with four indicators, unemployment, education, poverty, and income. The Quality of Life index uses five indicators, public safety, economy, transportation, amenities, and housing, while the Health index is based on a neighborhood's rankings in nutrition, physical activity, mortality, and morbidity. The primary index used will be the SEC index. All indexes use NPUs as their unit of analysis.

In order to see how equitable the city of Atlanta's distribution of infrastructure improvement projects are, the projects were divided into those completed between 1999 and 2005 and those completed between 2006 and 2012. These time periods reflect the collection period for the indexes discussed above. Projects in the first group will be analyzed in comparison to the three indexes discussed above, the SEC index, Health

index, and Quality of Life index. The indexes provide a basis to analyze an NPU's socioeconomic characteristics and their corresponding need for investment. This analysis shows which NPUs are receiving the most funding and a possible correlation to the different indexes. The next step is to look at the second set of projects, those from 2006 to 2012, to analyze the distribution and identify any changes from the previous years. The results are also compared with other factors, including race, density, jobs, walk score, to see if these better explain the distribution. All data will be represented through maps created using GIS to better understand the distribution of the data across the different NPUs.

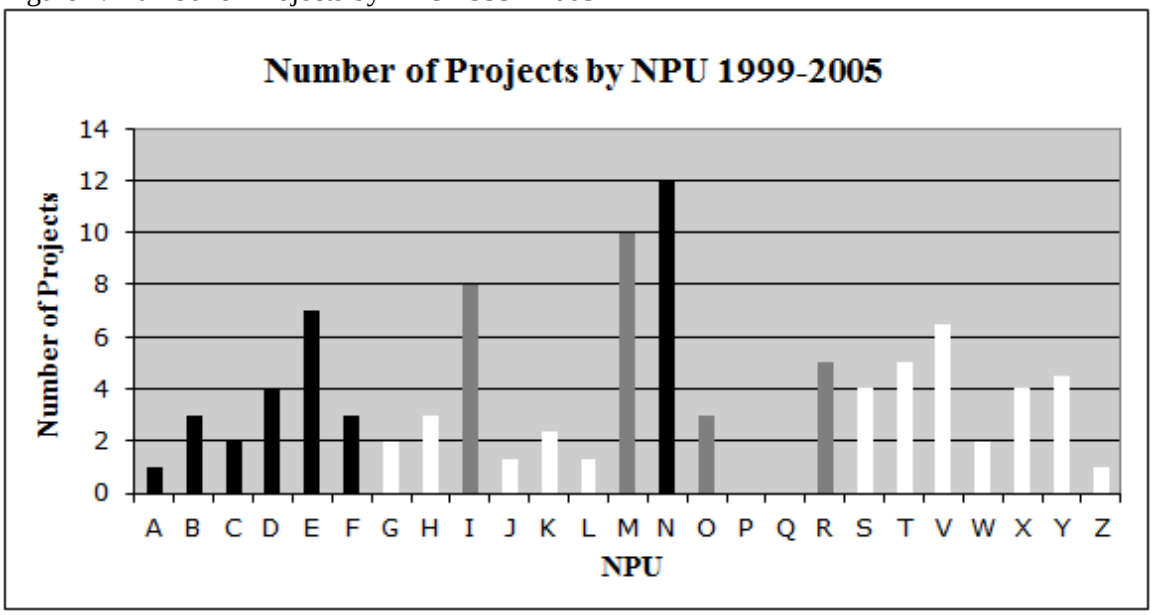
The second piece of this research involves analyzing the City of Atlanta's plans and their ability to influence infrastructure funding. Both neighborhood and small area plans as well as LCI plans are analyzed. The neighborhood plans are those initiated by the City of Atlanta for specific neighborhoods or whole NPUs. 22 neighborhood plans ranging from 2000 to 2011 were analyzed. The Livable Centers Initiative (LCI) is a program run by the Atlanta Regional Commission that "awards planning grants on a competitive basis to local governments and nonprofit organizations to prepare and implement plans for the enhancement of existing centers and corridors consistent with regional development policies, and also provides transportation infrastructure funding for projects identified in the LCI plans" (Atlanta Regional Commission 2014). These 17 plans cover years 2001 to 2013. Each small area plan was assigned their corresponding NPU; a shapefile from the City of Atlanta's GIS was used to assign the NPUs for the LCI plans. Many LCI plans overlapped into multiple NPUs, and percentages were given

based on the total area in each NPU. This data should provide insight into the effectiveness of small area and LCI plans in dictating infrastructure funding.

Results

The data collected from the Planning Department and the Public Works Department yielded 252 total infrastructure improvement projects from 1999 to 2012, spread across 24 of the 25 NPUs. There were 94 projects completed between 1999 and 2005, totaling $9,385,830. Figure 1 represents the distribution of projects across the NPUs.

Figure 1. Number of Projects by NPU 1999 - 2005



The colors represent the NPU's ranking according to the Socio-Economic Conditions (SEC) Index. Black represents a high classification; grey is medium; and white is low.

NPU N had the most projects with 12, followed closely by NPU M with 10 projects. NPU M is Atlanta's central business district, and NPU N is located just east of the CBD which could explain its high number of projects. NPUs P and Q did not have any urban design or community facilities improvement projects between 1999 and 2005.

Figure 2. Number of Projects by NPU 1999 - 2005

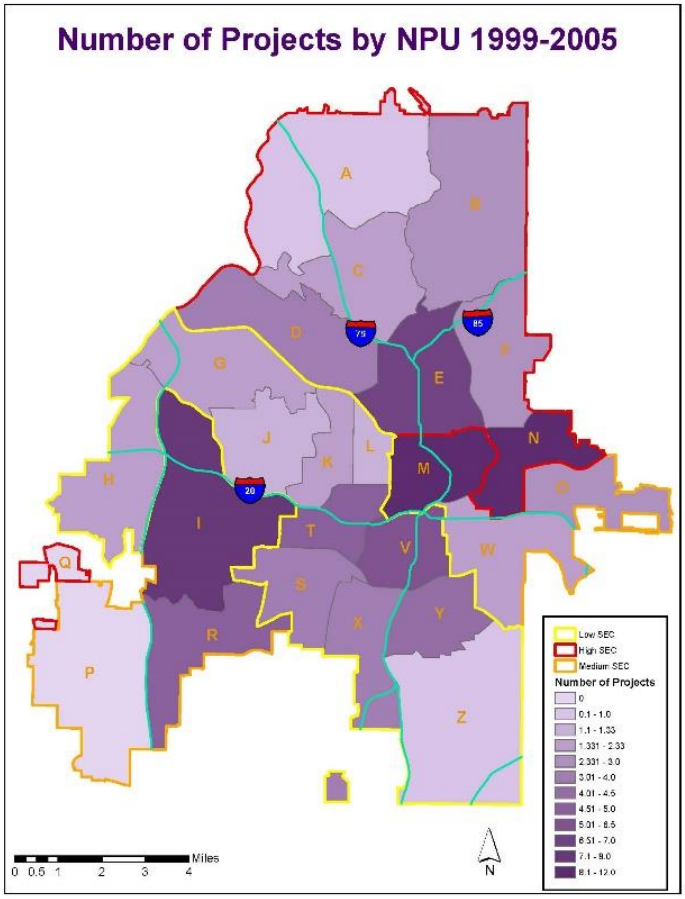


Figure 2 shows the data spatially distributed by NPU. Like in Figure 1, the Socio-Economic Conditions Index is represented by colored outlines, red for high, orange for medium, and yellow for low. From analyzing the figures, there does not appear to be a direct correlation between the number of projects and the NPU's classification according

to the SEC index. There are a good number of NPUs that have a Low SEC classification with a low number of projects, but the same is true of High SEC NPUs.

Figures 3, 4, and 5 represent the distribution of the investment amongst NPUs from 1999 to 2005. Figure 3 is the information represented in a chart, and Figure 4 graphs the infrastructure by the number of projects portrayed in Figures 1 and 2.

Figure 3. Cost of Projects Based on NPU 1999 - 2005

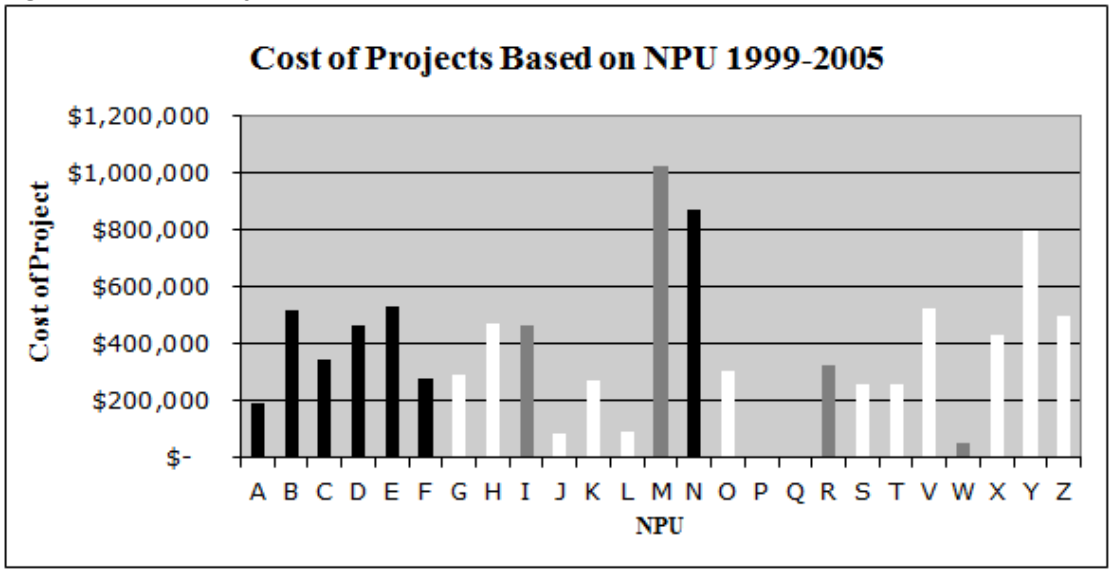
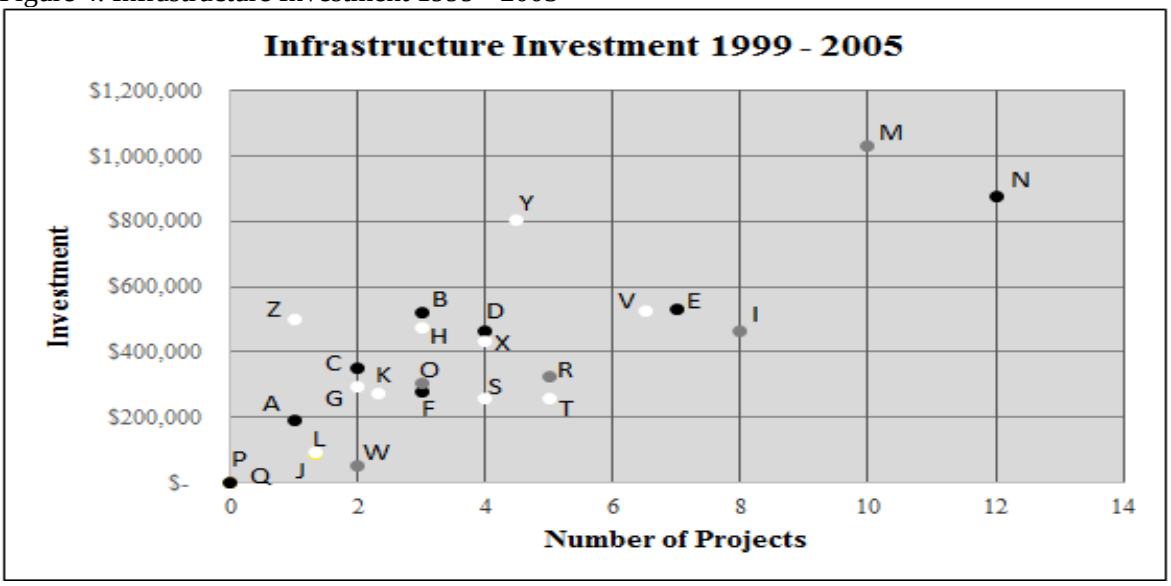
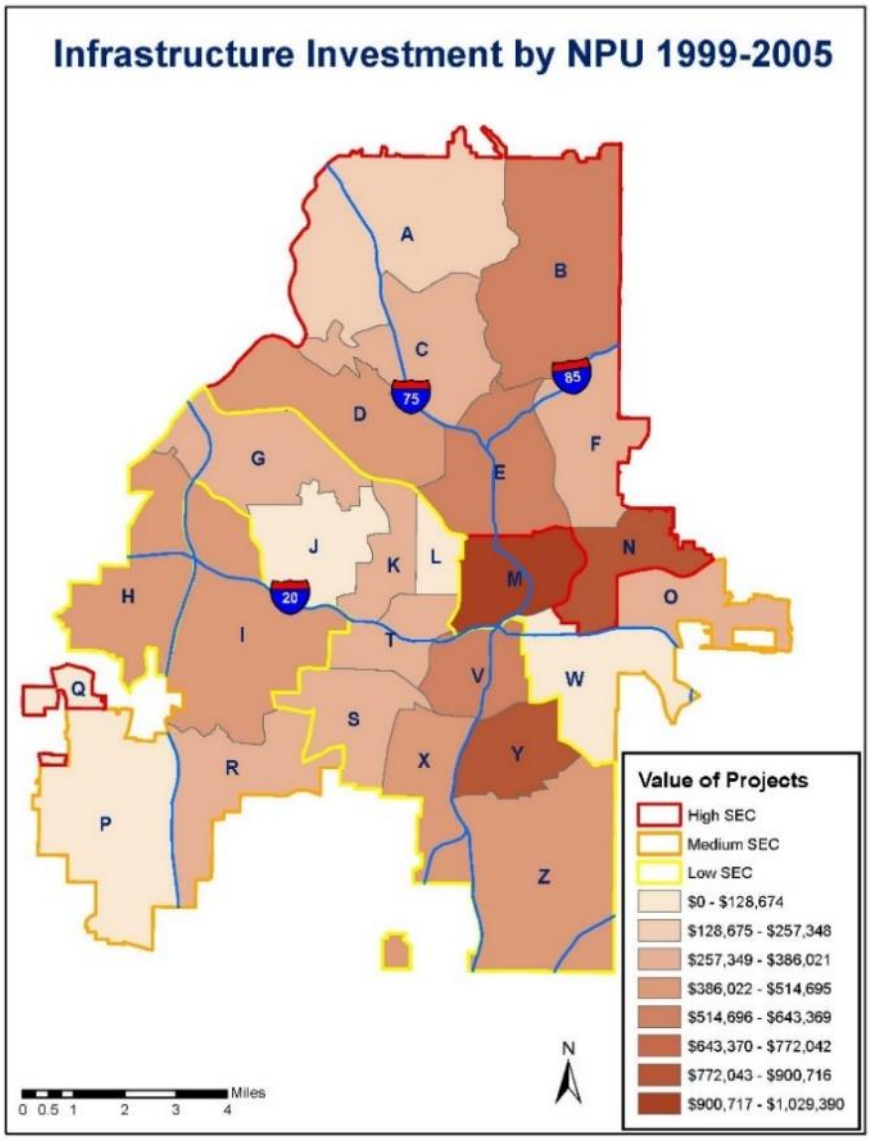


Figure 4. Infrastructure Investment 1999 - 2005



Given the high number of projects, it is not surprising that NPUs M and N have the most investment with NPU M seeing over $1 million worth. Figure 5 shows the data spatially distributed by NPU.

Figure 5. Infrastructure Investment by NPU 1999 - 2005

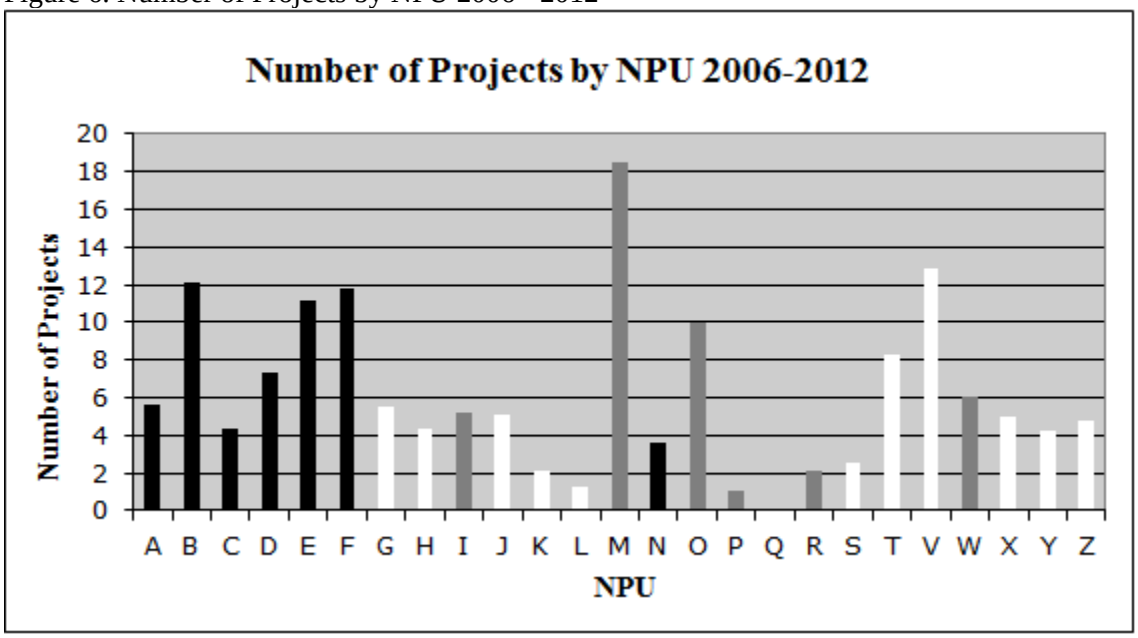


Downtown Atlanta, NPU M, is receiving the most investment which in part could be due to Central Atlanta Progress and Downtown Atlanta's Improvement District. As seen in Figure 4, there are some cases where there are fewer projects but higher investment

dollars due to certain, more expensive projects that are bringing up this total. For example, in NPU Z, all sidewalks were improved on one street; this one project cost almost $500,000. The opposite is true in NPU I where they had more projects, but they were smaller scale and less expensive.

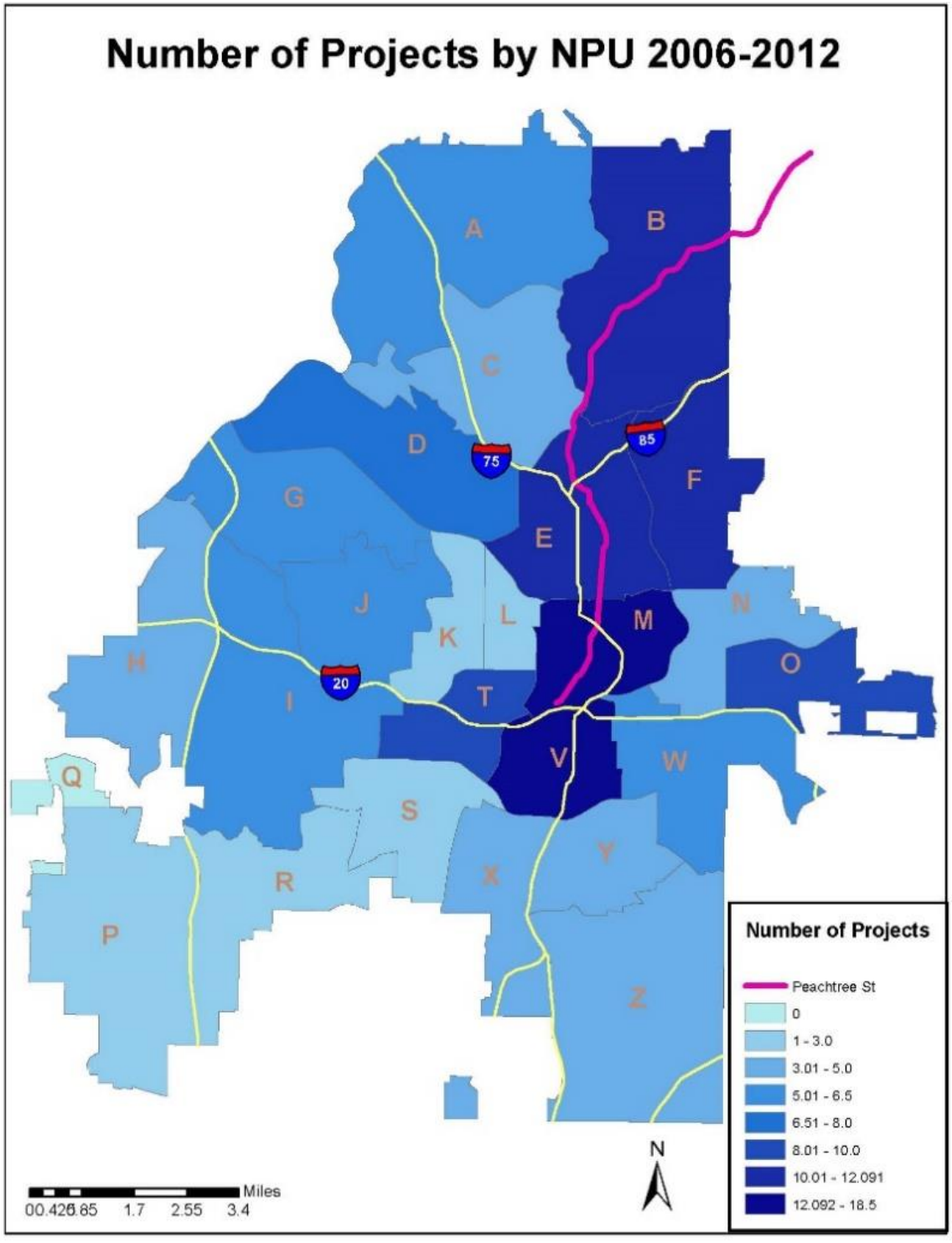
Between 2006 and 2012, the number of projects increased to 157 for a total of $108,761,518. Figures 6 and 7 represent the number of projects based on NPU.

Figure 6. Number of Projects by NPU 2006 - 2012



As with the previous set of years, there are a high number of projects in Downtown Atlanta, NPU M; however, the activity in NPUs B, E, and F has increased. This most likely corresponds with development along Peachtree Street, represented as the pink line in Figure 7, and Interstate 85 which run directly up through these NPUs. Similarly, all of these NPUs rank highly on the Socio-economic Conditions index.

Figure 7. Number of Projects by NPU 2006 - 2012



As seen in Figures 8 and 9, not only do NPUs M, B, and E have the most projects, but they dominate the other NPUs in terms of investment spending.

Figure 8. Cost of Projects Based on NPU 2006 - 2012

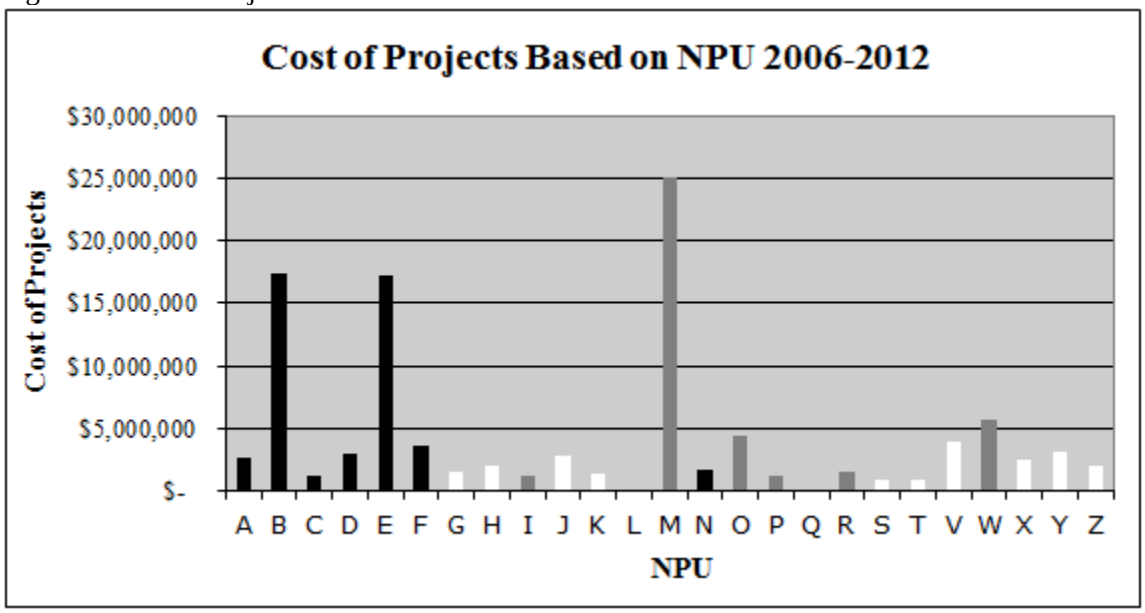
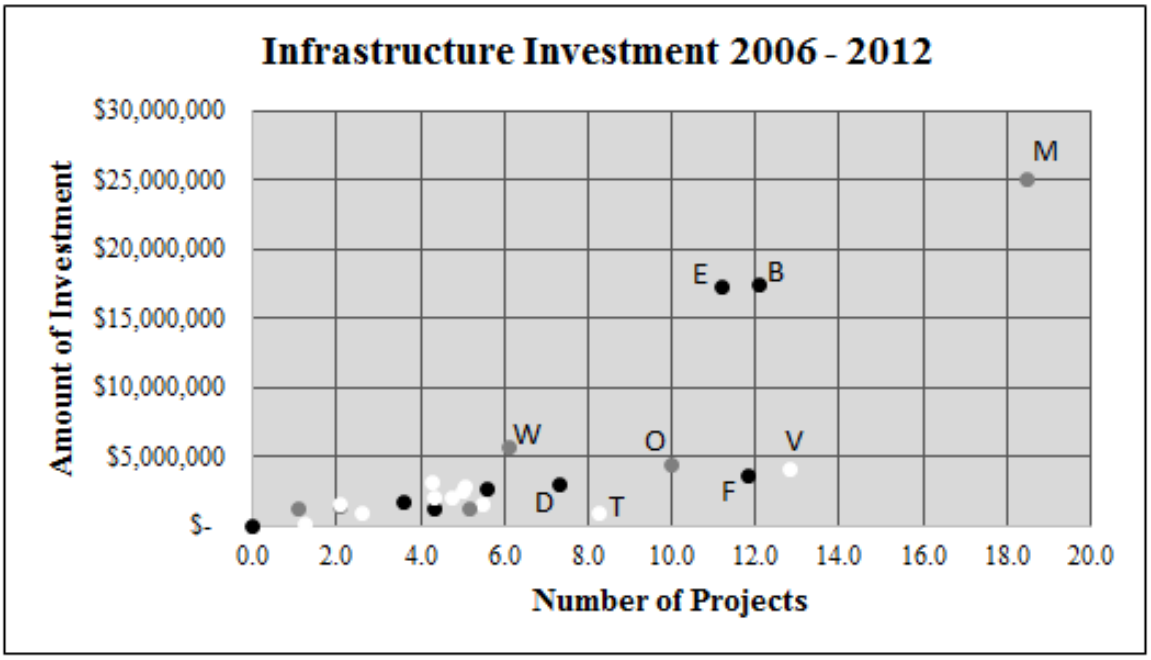
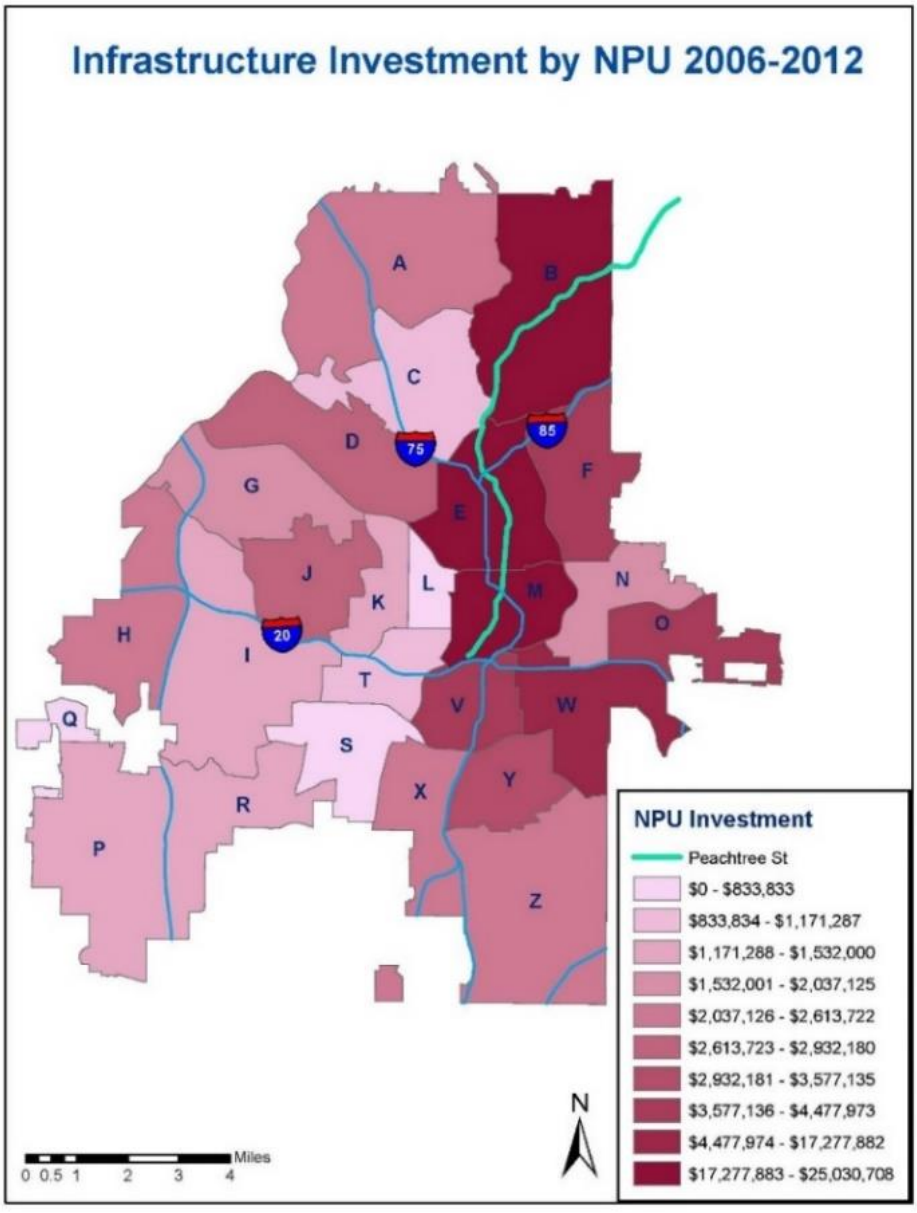


Figure 9. Infrastructure Investment 2006 - 2012



As seen in Figure 10, the distribution of infrastructure funding appears to mirror Peachtree Road. Investment in the other NPUs only varied slightly with NPU Q again seeing no investment.

Figure 10. Infrastructure Investment by NPU 2006 – 2012



Since the Socio-Economic Index does not appear to be the factor driving the infrastructure investment, a number of other factors were considered using the 2006 to

2010 American Community Survey. These factors are represented below, including race, density, jobs, and walk score in Figures 11, 12, 13, and 14.

Figure 11. White Population by NPU

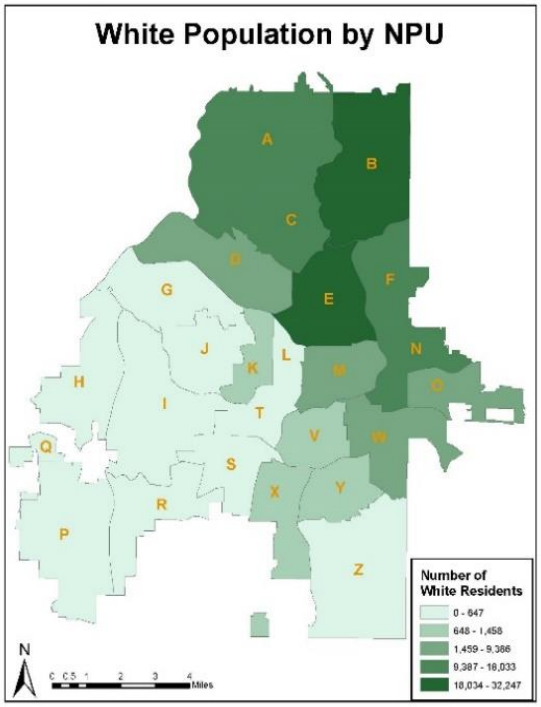


Figure 12. Population Density by NPU

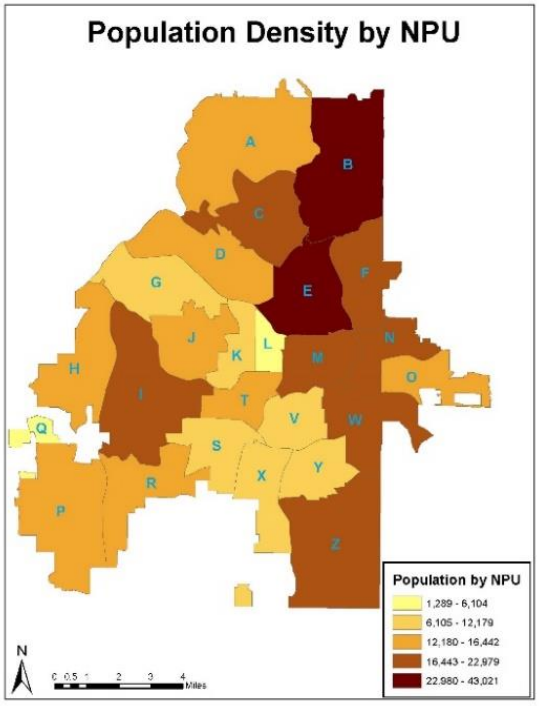


Figure 13. Jobs by NPU

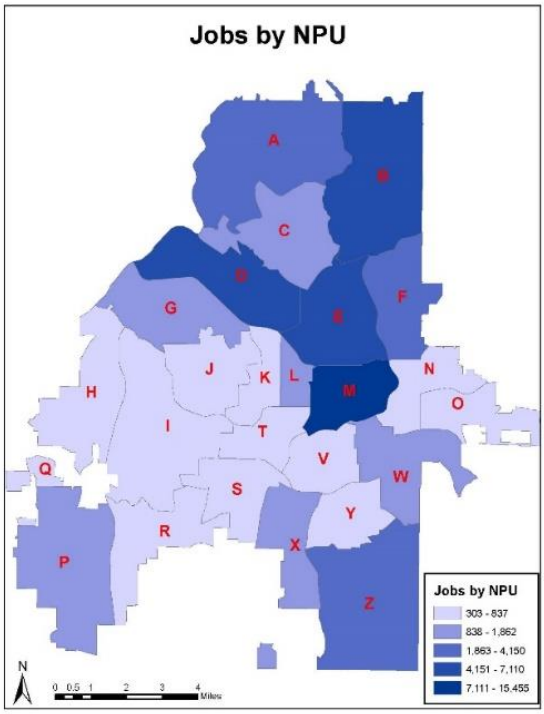
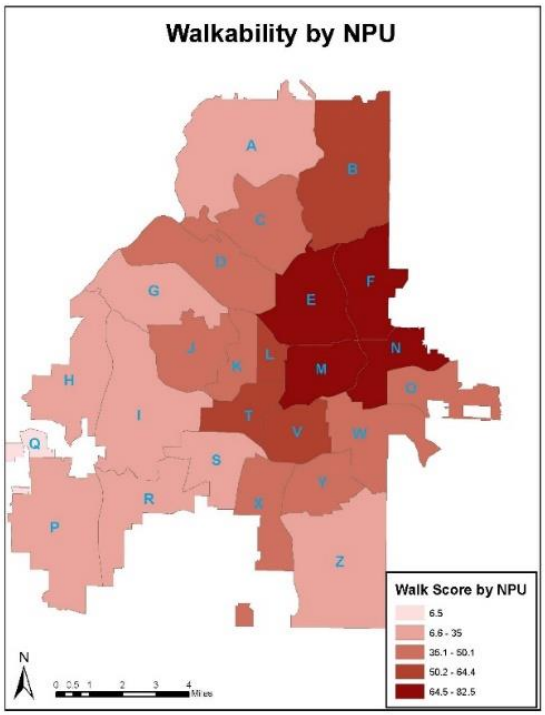
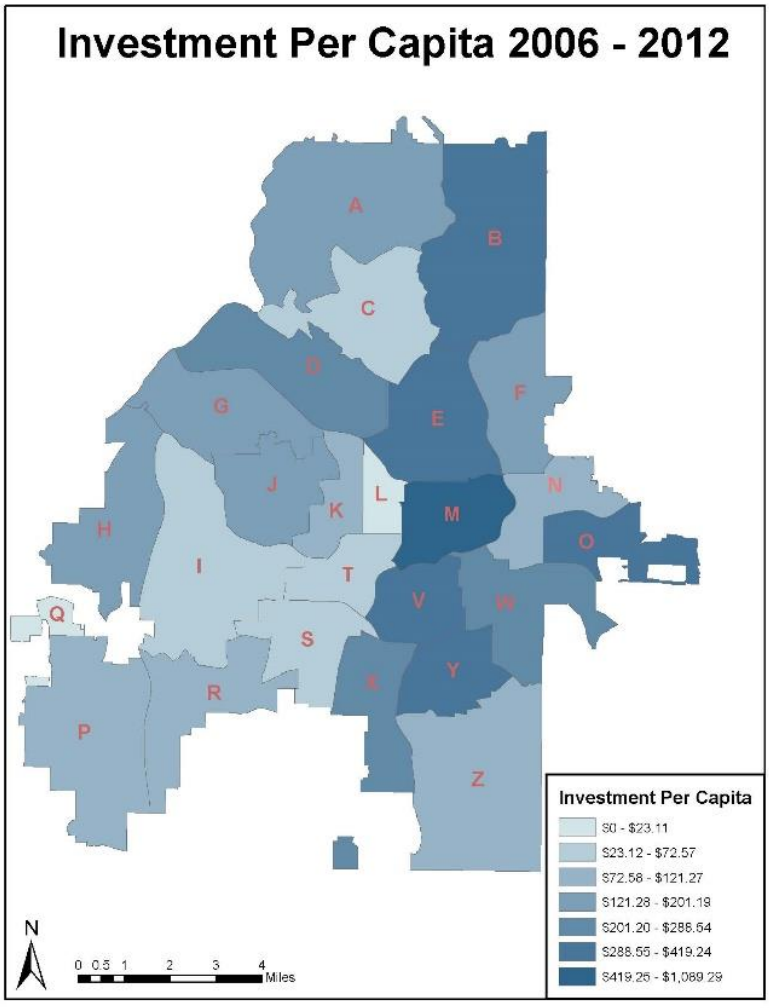


Figure 14. Walkability by NPU



Looking at these figures, NPUs B and E have the highest number of white residents as well as the most population density. NPUs B, E, and M are all areas with a high concentration of jobs with NPU M, the central business district, having the most. Similarly, areas with high walkability like NPUs E, M, N, and F have all seen a high number of infrastructure projects in either one or both set of years which could be because many of these projects are sidewalk improvements.

Figure 15. Investment Per Capita 2006 - 2012



Additionally, infrastructure funding per capita was also analyzed for the projects completed from 2006 to 20112 as pictured in Figure 15. NPUs B and E despite their high number of residents still saw a high amount of investment per capita. NPU M had the highest investment per capita with over $1,000 worth of infrastructure funding per person.

Neighborhood Plans and their effect on infrastructure funding were also considered. Figure 16 represents the breakdown of the 22 neighborhood plans by NPU conducted from 2000 – 2011. Almost half of the NPUs have not had a neighborhood plan conducted. Four neighborhood plans have been conducted in NPU V, more than any other NPU. This NPU, which is categorized as Low on the SEC Index, is the NPU where the Annie E. Casey Foundation has put their focus. This organization's affiliation and resources could account for a higher number of neighborhood plans as well as the high number of projects seen in NPU V from 2006 to 2012.

Figure 16. Neighborhood Plans by NPU

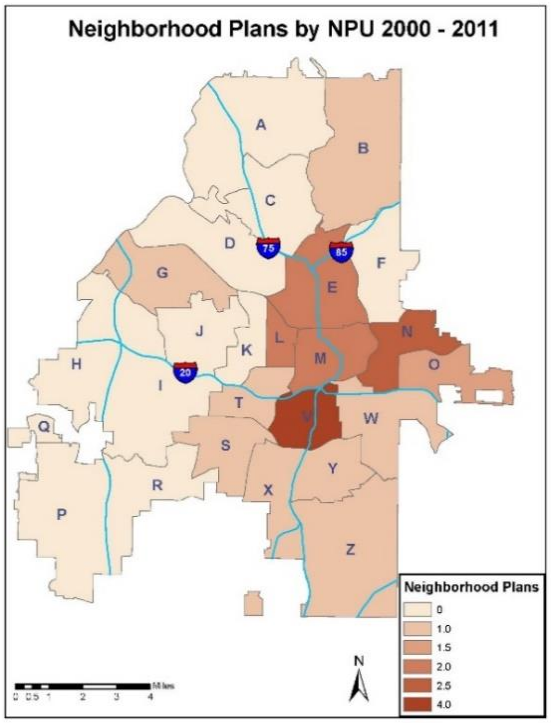
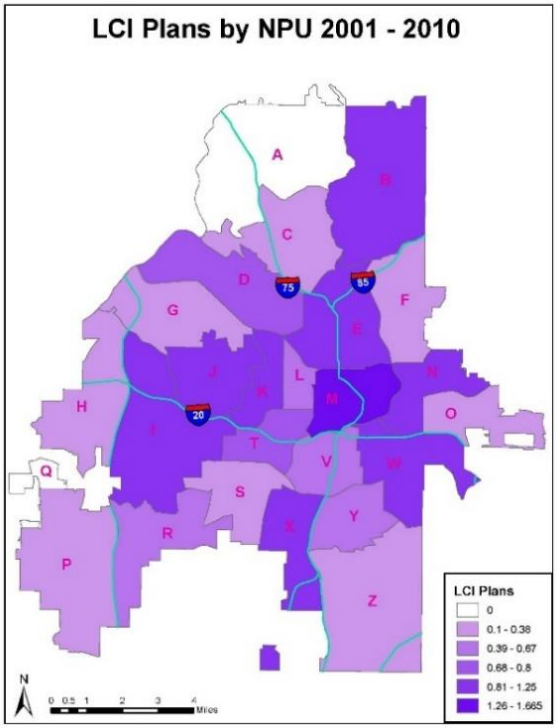


Figure 17. LCI Plans by NPU



Simiarly, the Atlanta Regional Commission's LCI plans were also considered, seen in Figure 17. Because of the small number of LCI plans that covered larger areas than just specific neighborhoods, most NPUs had some part of an LCI plan. The NPUs with the

largest percentage had one full LCI project in its NPU like the Imagine Downtown Encore plan in NPU M and the H. E. Holmes MARTA Station Area LCI in NPU I. NPU I's LCI, completed in 2002, could be corrleated with its high number of infrastructure projects seen from 1999 to 2005, especially since they were all started in 2003 or later. NPU M had the most LCI plans overlapping into its NPU.

Discussion

Infrastructure Distribution

This analysis has revealed some interesting insights into the distribution of infrastructure funding in Atlanta. The distribution of projects in the first set of years, 1999 to 2005, reveals that the central business district, NPU M, is the main receiver of infrastructure projects and funds. The city completed 10 projects in that area when the average is 3.75 per NPU. Central Atlanta Progress (CAP), a nonprofit organization committed to downtown's economic vitality, formed in 1941 and created the Atlanta Downtown Improvement District in 1995. CAP and their business partners could be part of the reason downtown Atlanta has continued to see the most infrastructure investment. NPU N, located directly east of downtown, could also be seeing a high amount of investment as an overflow of the projects serving downtown. NPU N also has a number of residential neighborhoods, Candler Park, Inman Park, and Poncey-Highland for example, that have seen significant population growth which could be paralleled in the city's infrastructure investment. In some cases, there were outliers that contributed to high amounts of investment. As discussed previously, NPU Z's high amount of

infrastructure investment can be contributed to one project, full sidewalk improvements on Cleveland Avenue, costing $500, 000 when the average project costs $98,798. These results prove that infrastructure funding is not being distributed equally by NPU, proving Atlanta lacks horizontal equity amongst its NPUs.

Analyzing the second set of projects from 2006 to 2012, the disparity in distribution by NPU becomes even more apparent. The number of projects increased to 157, and the average by NPU nearly doubled to 6.2 projects per NPU. NPU M, Downtown Atlanta, again received the largest number of projects with over 3 times the average and saw 6 times more funding. NPUs B and E also witnessed significant increases in the number of projects as well as the amount of funding, outpacing the other NPUs. NPU B contains the area known as Buckhead, home to high-income residences, premier malls, and significant office and commercial development. NPU E contains the area of Midtown which has become the new destination for the office market along Peachtree Road. In addition to middle and higher income condominium towers and single-family residences, Midtown is also home to Georgia Institute of Technology and Piedmont Park, the city's largest inner city park. As highlighted in Figures 7 and 10, infrastructure investment seems to follow Peachtree Road straight up from its start in NPU M through NPU E to NPU B.

Another important factor is that these three NPUs contain the city's only Community Improvement Districts (CIDs) which are areas that have voted to pay additional property taxes to provide a 20% match for funds for infrastructure projects so

that they can move forward at a faster rate. Central Atlanta Progress and Midtown Alliance, a nonprofit with similar goals as CAP, run the areas' CIDs. The presence of these CIDs, all of which were established between 1995 and 2000, could be responsible for these NPUs' higher amounts of infrastructure funding. Another potential factor for the concentrated funding is that there are a large number of sidewalk improvement projects in this dataset. The central city and Peachtree corridor have a high concentration of sidewalks receiving regular use; because these areas potentially contain the most or oldest sidewalks, they may be priority areas for infrastructure improvement.

Additionally, NPU F saw a high number of projects which mirrors this same trend of funding following main transportation corridors since Interstate 85 runs through the NPU. An interesting case study here is NPU V which is a lower-income area comprised of mainly residential neighborhoods as well as Turner Field, the current home of the Atlanta Braves baseball team. The Annie E. Casey Foundation, established by one of the founders of the United Parcels Service (UPS) in honor of his mother, focuses its Atlanta efforts exclusively on the improvement of NPU V. The support and initiatives of the Annie E. Casey Foundation could be the driver of the NPU's ability to capture 13 infrastructure projects and over $4 million in funding, especially compared to other low-income residential NPUs. Despite this case, it is clear that infrastructure funding has been concentrated in areas along the Peachtree Corridor.

The Role of Equity

Central to this paper is the question of whether equity is a factor in the allocation of infrastructure improvement projects and funding. From analyzing the data, it appears that equity, either horizontal or vertical, is not a priority consideration that drives infrastructure funding. Using the Socio-Economic Conditions Index as the basis of this equity analysis, 8 NPUs are categorized as High, 6 as Medium, and 11 as Low. When totaling the number of projects within each segment and dividing it by the number of NPUs in that category, the number of projects per NPU is surprisingly similar in the first set of years, 1999 to 2005. There were 4 projects per NPU in the High category, 4.33 in Medium, and 3.27 in Low. When the same calculation was done for the amount of investment, the High category saw $401,638 per NPU, Medium saw $353,400, and Low saw $368,393. Similarly, the NPUs that saw the most funding during the first set of years, E, M, and N, all rank in the top 5 of NPUs according to the Quality of Life index and top 8 using the Health index. Here the High SEC Index NPUs are receiving the most funding per NPU, but the gap between that and the Low SEC NPUs is not as significant.

However, the results become strikingly different when looking at the second set of years, 2006 to 2012. The distribution of projects per NPU based on the SEC Index did not vary drastically from the first set with 6.99 projects per NPU in High, 6.14 in Medium, and 5.64 in Low. However, the divergence comes when looking at the infrastructure funding. High SEC NPUs receive $5,835,436 per NPU, Medium NPUs receive $5,567,328, and Low SEC NPUs see only $2,848,757. High and Medium NPUs are receiving nearly twice the amount of infrastructure funding as Low SEC NPUs. From

comparing these figures to the ones from the previous date range, it appears as if infrastructure funding is actually becoming less equitable. NPU M is classified as Medium on the SEC Index, while NPUs B and E are both classified High. All 3 NPUs rank in the top 4 of NPUs according to the Quality of Life index and top 5 according to the Health index. NPU M's significantly higher funding is the primary contributor to the Medium classification's high numbers; however, that does not negate the fact that less funding is going to Low SEC NPUs. Though this analysis of the community facilities and urban design projects supports Coulter's (1980) underclass hypothesis, there are other factors that seem to be in play.

Other Factors

Since horizontal or vertical equity does not appear to be the primary driver of infrastructure distribution, a number of other factors were considered. As seen in Figures 11 through 14, each NPUs' race, population density, and job distribution were analyzed as well as each area's walk score as a designation of the area's walkabiltiy. The per capita investment using the 2006 to 2012 date range was also calculated as another potential explanatory factor. Race was evaluated based on the number of white residents in each NPU; these numbers generally corresponded with NPUs ranked as High on the SEC index. NPU B and E have the highest number of white residents. Similarly, NPUs B and E also have the highest concentration of residents which could also be a factor in these NPUs' high level of infrastructure investment. When looking at the infrastructure investment per capita, NPU M sees the highest amount with $1,089 per resident, followed by NPU E with $419 and NPU B with $405 respectively. Still, this distribution, seen in

Figure 15, is similar to that of the infrastructure investment map for 2006 to 2012, Figure 10. While NPUs B and E are still receiving the second and third highest infrastructure funding amounts of per capita, the gap between these two NPUs and the rest is not nearly as pronounced as that of the infrastructure investment due to the high number of residents in NPUs B and E.

Despite the exodus of firms to Midtown, Buckhead, and the suburbs, downtown still has the most jobs of any other NPU, most likely due to the city, county, and state government offices. NPUs B and E again see high numbers of jobs, aligning with the results that show that investment is going to business corridors. Finally, walkability was looked at because of the high number of sidewalk improvement projects within the dataset. NPUs M and E are areas with high walk scores which could be contributing to these areas' large amounts of infrastructure investment with the sidewalks receiving a significant amount of traffic on a daily basis. Additionally, Jessica Lavandier cited that the city was sued for noncompliance with Americans with Disabilities Act (ADA). The Public Works Department has since made a special effort to make ADA improvements to meet the court's ruling; these improvements may be concentrated in areas with the most sidewalks or older sidewalks. She elaborates that the central business district or Peachtree corridor may have older infrastructure that could have been given a high priority for improvement. Additionally, the walkable neighborhoods in NPUs F and N could be influencing NPU N's high number of projects from 1999 to 2005 and NPU F's from 2006 to 2012. Though one of the factors discussed above does not appear to

completely explain the distribution, they do assist in understanding other potential drivers.

Plan Implementation

This analysis also looked at the role of the City of Atlanta and the Atlanta Regional Commission's plan creation and if these efforts are translating into infrastructure projects. Of the 22 neighborhood plans conducted from 2000 to 2011, the most in any NPU is 4 which is within NPU V. As mentioned previously, this is most likely correlated with the initiatives of the Annie E. Casey Foundation and other Community Development Corporations such as the Peoplestown Revitalization Corporation and the Pittsburgh Community Improvement Association. Over half of the NPUs have not had a neighborhood plan conducted in over a decade. One point to note is 2 neighborhood plans were conducted in NPU L. NPU L is one of the smallest and most impoverished NPUs made up of two of the city's historically African American neighborhoods, Vine City and English Avenue. As seen on the map, this NPU is directly west of Downtown Atlanta, separated by the Georgia World Congress Center and Georgia Dome which serve as a proverbial wall between the neighborhoods and the amenities of Downtown Atlanta. Redevelopment plans have been conducted for the both the Vine City and English Avenue neighborhoods, demonstrating the City's awareness of this area's need for assistance. However, this is not translating into infrastructure funding. From 1999 to 2005, NPU L only saw 1 and one-third project translating to $90,000. While most NPUs were seeing significant increases in investment between 2006 and 2012, NPU L saw the same number of projects for $141,000. Though plan

implementation and infrastructure funding may be occurring in NPU M and NPU V with the support of public-private partnerships and foundations, plan development has done little for others, especially NPU L.

The Atlanta Regional Commission's LCI plans were more evenly distributed among NPUs. Because of the small sample size and their larger scale, most NPUs had at least one LCI plan overlap into its boundaries. The NPUs with the largest number of plans were the ones with a full plan within its NPU. NPU M had the most plans affecting its NPU, including one focusing exclusively on downtown. Though there were only 17 plans to analyze, LCI plans do an effective job of planning in all types of neighborhoods and NPUs.

Conclusion

How equitable is the city of Atlanta?

The analysis of Atlanta's infrastructure funding has allowed for an in-depth look into which areas are receiving the most funding and what factors are driving these investments. In terms of equity, it does not appear to be a factor in the allocation of infrastructure projects or funding. These results show that funding continues to go to the business districts, namely Downtown, Midtown, and Buckhead. As seen in the data for the projects during the 2006 to 2012 timeframe, the infrastructure investment follows the growth and development around Peachtree Road. While a few NPUs, V, F, and O, have a similar number of projects in those years, the amount of funding is a third of the amount

of NPUs B and E and one fifth of the amount of NPU M. NPUs B and E are both classified as High on the Socio-Economic Index, have the highest number of white residents, and possess the most residents of any NPUs. Despite this being a central location for the population, there are still a good number of NPUs with comparable population numbers that are not receiving the investment of NPUs E and B. Community Improvement Districts appear to be correlated with this investment; however, this does not negate the fact that NPUs with a Low SEC Index classification are receiving significantly less funding. Seeing this correlation, the establishment of more CIDs throughout the city could be a way to drive more funding to middle and low-income areas. The only exception is NPU V whose success of acquiring a higher number of projects is most likely due to the work of the Annie E. Casey Foundation. The infrastructure funding appears to be following the growth and development trends of the city rather than thinking about lower-income areas that may need it the more.

The City of Atlanta's infrastructure funding distribution appears to be getting more inequitable. While the amount of funding going to the High and Medium NPUs was only slightly higher in the first set of years, the gap widened considerably when looking at the infrastructure projects from 2006 to 2012. While the total amount of funding increased during this time period, the Low SEC NPUs saw half of what the High and Medium NPUs received. Similarly, Low SEC NPUs saw $2 million less per NPU than the average amount spent. Infrastructure funding for community facilities and urban design projects are not going to the areas that need them most; they are going to high growth, business corridors. It is understandable that a city would want to invest its

money in the areas seeing the most development; however, it should not be at the expense of other residents, especially low-income ones. Equity does not appear to be a factor in allocating infrastructure improvement funding.

What does this mean for planners?

Knowing that infrastructure funding in the City of Atlanta is going to commercial areas, planners need to be the ones to add equity into the equation. With an abundance of suburbs offering large amounts of land, it is important that high growth areas like the Peachtree corridor of Midtown and Buckhead have the infrastructure improvements necessary to support the new development and to maintain the areas' emergence as dominant office and retail centers within the city limits. However, low-income areas should not be receiving such a significantly smaller share of the investment. On a positive note, the number of projects per NPU for Low SEC Index NPUs is only slightly less than that of the Medium and High NPUs, but it is clear the money is not flowing evenly. Of course, different projects are going to cost different amounts, but three NPUs are receiving 56% of funding over a seven-year period.

In terms of neighborhood and LCI plans, planners are doing their part to look at a variety of neighborhoods in a range of NPUs. For neighborhood plans, NPU V had the most with 4 and even NPU L, one of the most neglected NPUs in projects and funding, had 2. However, nearly half of the NPUs have not had a small area plan conducted between 2000 and 2012; this includes High, Medium, and Low SEC NPUs. Though there were less plans actually conducted, the LCI program distributed its work to almost

every NPU. Though neighborhood plans and LCI plans are valuable planning tools, they do not appear to be correlated with the infrastructure improvement funding. The role of the planner as purely a plan-maker is not enough to make an impact on infrastructure funding.

Planners could be more involved in the distribution of infrastructure funding, so that they can recognize distributional discrepancies. This is difficult because these projects are coming from a number of separate departments – Public Works, Parks and Recreation, Fire and Rescue to name a few. However, someone needs to be conscious of equity and the many disadvantaged neighborhoods in the City of Atlanta. Planners are in a position to step up and be that person because of their in-depth knowledge of individual neighborhoods and the specific needs of each. The next section will discuss how to potentially make the distribution process more equitable and the role the planner should play.

Recommendations for Allocating Funding on a Citywide Scale

Allocating funding on a citywide scale is no easy task, especially with the many different departments at work. In order to get a comprehensive look at all projects, the city planners could conduct a yearly oversight of all infrastructure improvement projects to see how the funding is being distributed. Since planners in Atlanta attend NPU meetings and are familiar with the needs of each NPU, they can make recommendations on projects for NPUs that are not receiving as much funding. Even without a neighborhood level participation outfit like Atlanta's NPU system, city planners still have

extensive knowledge on the different parts of their city. They can recommend projects that will have the most positive impact on the area or those that the residents feel would be most beneficial. Of course, these would only be recommendations, but it is coming from individuals who understand the direction of the city's growth as well as the needs of those who may not have a voice. Georgia Tech's Center for Quality Growth and Regional Development created a decision and planning support tool to assist decision makers in evaluating goals and specific projects; a system like this could be developed specifically for planners' analysis of a city's infrastructure funding. By having planners oversee the funding on a citywide scale, equity and a more equal distribution are being considered as part of the infrastructure improvement process.

If Atlanta wants to be a world-class city, it cannot continue to be hindered by its income inequality. This same disparity is appearing in the distribution of Atlanta's infrastructure improvement projects and has only gotten worse. The high-powered commercial corridors and job centers are getting the majority of the funding while low-income and even middle-income areas are seeing few projects and even fewer dollars. Just as income inequality is an equity issue, equity must be considered within the infrastructure distribution process. Yes, Atlanta's central business district should receive a good amount of infrastructure improvement funding, but that increase should not result in a decrease of funding for adjacent low-income neighborhoods. If planners were to be a part of the process as an overseer to analyze all the projects from all the different departments, they can recognize where inequities are occurring and make recommendations on projects for areas on the lower end of the distribution. Complete

equality of infrastructure funding across all NPUs is obviously unachievable and frankly not necessary, but planners need to be more than plan-makers if they want to impact the system. Atlanta's income inequity is a problem the city will be wrestling with for years, but improving the equity of the city's infrastructure improvement projects is a step in the right direction.

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Appendix

City of Atlanta Infrastructure Projects 1999 – 2005 by NPU

NPU	SEC Rank	Number of Projects	Investment
A	High	1	$192,045
B	High	3	$521,166
C	High	2	$348,760
D	High	4	$466,249
E	High	7	$530,464
F	High	3	$279,111
G	Low	2	$293,613
H	Low	3	$471,894
I	Medium	8	$463,168
J	Low	1.33	$85,331
K	Low	2.33	$275,631
L	Low	1.33	$90,333
M	Medium	10	$1,029,390
N	High	12	$875,308
O	Medium	3	$304,159
P	Medium	0	$0
Q	High	0	$0
R	Medium	5	$323,684
S	Low	4	$260,129
T	Low	5	$259,965
V	Low	6.5	$527,586
W	Low	2	$52,737
X	Low	4	$433,032
Y	Low	4.5	$802,076
Z	Low	1	$500,000
Total		95	$9,385,830

City of Atlanta Infrastructure Projects 2005 - 2012 by NPU

NPU	SEC Ranking	Number of Projects	Investment	Investment Per Capita
A	High	5.6	$2,613,722	$179.97
B	High	12.1	$17,414,232	$404.78
C	High	4.3	$1,162,987	$63.19
D	High	7.3	$2,932,180	$229.70
E	High	11.2	$17,277,882	$419.24
F	High	11.8	$3,577,135	$160.55
G	Low	5.5	$1,586,591	$163.72
H	Low	4.3	$2,055,767	$155.65
I	Medium	5.2	$1,171,287	$56.18
J	Low	5.1	$2,743,869	$201.19
K	Low	2.1	$1,388,628	$121.27
L	Low	1.3	$141,089	$23.11
M	Medium	18.5	$25,030,707	$1,089.29
N	High	3.6	$1,705,350	$92.88
O	Medium	10.0	$4,477,973	$317.07
P	Medium	1.1	$1,192,000	$89.50
Q	High	0.0	$0	$0.00
R	Medium	2.1	$1,532,000	$117.99
S	Low	2.6	$883,833	$72.57
T	Low	8.3	$880,866	$53.57
V	Low	12.8	$4,006,879	$387.40
W	Low	6.1	$5,665,415	$288.54
X	Low	5.0	$2,563,882	$213.75
Y	Low	4.3	$3,096,850	$322.82
Z	Low	4.8	$2,037,125	$117.04
Total		154.8	$107,138,245	