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[ATLANTA BELTLINE]

A major urban redevelopment project that will transform a historic 22-mile rail corridor into a network of parks, trails and transit connecting 45 neighborhoods in Atlanta, Georgia

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Executive Summary

The Atlanta BeltLine is a unique project that has the potential to transform the urban landscape of Atlanta, Georgia and serve as a model for urban redevelopment around the country. The City of Atlanta has experienced rapid, sprawling growth over the past several decades, which has resulted in congestion, uneven economic growth, limited public space and automobile dependency. The Atlanta BeltLine aims to organize new growth along with parks, transit, and trails within the inner core of Atlanta in order to change the trend of suburban sprawl and improve the quality of life for all residents. The combination of land use, transportation planning, and social services create a complex mix of monetary and non-monetary costs and benefits that affect the City of Atlanta. The purpose of this analysis is to compare the \$3 billion price tag of the project with the benefits accrued solely from the new parks and transit.

I. Project Background and Motivation

The Atlanta BeltLine is a large-scale redevelopment project designed to link 45 neighborhoods and numerous parks in the center of Atlanta, Georgia in an effort to improve the public transport network and the public green spaces, as well as increase the overall walk-ability and livability of the city. The BeltLine, a 22-mile loop of historic railroad corridor encompassing the urban center of Atlanta, will be transformed into public transit and integrated with the current transit infrastructure. Figure 1 shows the location of the BeltLine corridor. The goals of this project are to improve not only the transportation network, but also the overall health of Atlanta residents; increase job opportunities, affordable housing, and community engagement; and to decrease the city's environmental impact. In addition to the transit route, the BeltLine will bring 33 miles of trails and 1,300 acres of new park space. The Atlanta BeltLine will instigate change not only in the neighborhoods bordering the project, but also in the greater Atlanta region.

The redevelopment of the BeltLine corridor was inspired in 1999 by the master's thesis of Georgia Tech graduate student, Ryan Gravel. "Ryan's original concept [to link neighborhoods and develop new transit] has grown to include transit, parks and trails, neighborhood preservation and revitalization, mixed-use development, affordable housing, cleaner air, and an improved tax base – all advancing economic development and quality of life."ⁱ The project then gained grassroots support through community organizations and was later picked up by Mayor Shirley Franklin. In only 12 years, the BeltLine was transformed from a mere idea into an in-progress, multi-billion dollar urban redevelopment project.

Figure 1: BeltLine Corridor and Zones. Source: AECOM/JJG Joint Venture

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II. Vision for the BeltLine

A. Conditions prior to 2006

Atlanta has a long history with transportation infrastructure. The city originated in the mid 1800s, at the terminus of the Western and Atlantic Railroad, and was fittingly named ‘Terminus’. Other rail lines soon extended to Atlanta, and it became a regional hub for transportation. Railroads have been a crucial factor in defining Atlanta’s economy and development throughout its history; the railroad led to Atlanta’s distinction as a regional commercial hub. Over the past 30 years, however, Atlanta has experienced “uncontrollable suburban growth and extensive inner city gentrification”ⁱⁱ. While the region has experienced population growth, the core of Atlanta experienced a decline in population from 1970 until the early 2000s. Figure 2 shows the population of Atlanta since 1960, as well as population projections until 2030. The population of the center of Atlanta declined from a high of 497,024 in 1970 to a low of 394,017 in 1990ⁱⁱⁱ. Even recent population growth leaves the city with a smaller population than in 1970. Despite this historic decline in growth, the population of Atlanta is projected to grow to over 600,000 by 2030. Similarly to population, employment also declined during this period, in contrast to the greater Fulton County area, and has only started to grow in the past several years^{iv}.

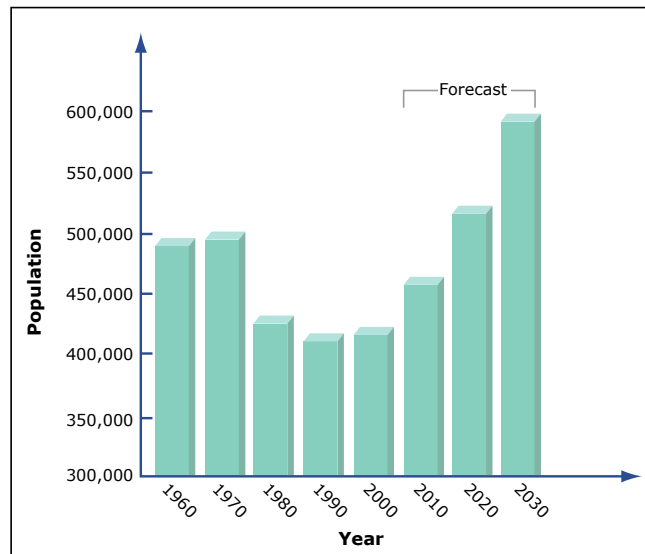


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Figure 2: City of Atlanta Population, 1960-2030. Source: Atlanta Regional Commission^v

i. Social Conditions

Of particular interest with regards to the BeltLine project is the low-income and minority populations within the BeltLine corridor. As an urban redevelopment project meant to crosscut racial and socio-economic lines, it is important that the demographics of the corridor mirror those of the city. Atlanta has historically been segregated, with lower-income black neighborhoods in the south and wealthier neighborhoods in the north of the city. According to US Census data, the 1999 median income for households in the City of Atlanta was \$35,500. While the median income for the BeltLine study area is significantly higher, at \$43,000, the four different zones of the BeltLine vary in median income from \$20,478 in the southwest zone to \$48,149 in the northeast zone. Within the project corridor, the percentage of the population living below the poverty level in 2000 was 20.7%, compared to 24.4% in the greater City of Atlanta. The minority population in the BeltLine corridor ranges from 34.3% of residents in the northeast zone to 98.6% of residents in the southwest zone. Minority population is defined by the US Department of Transportation Executive Order (5610.2) on Environmental Justice to include four groups: black, Hispanic, Asian American and American Indian and Alaskan Native. Overall, the BeltLine corridor has a minority population percentage of 57.9%, compared to 68.7% in the City of Atlanta^{iv}.

Mirroring the racial and economic breakdown, the percentage of zero-car households is highest in the southern zones of the BeltLine corridor. These populations are considered to be transit-dependent. In the southwest zone, 34% of households do not have a car, and 20.6% of workers 16 years and older rely on public transportation to get to work. In the northeast zone, 17.4% of households do not have a car, and 10% of workers rely on public transportation to get to work. Within the entire corridor, 19.9% of households do not have a car, and 13.5% of workers rely on public transportation to get to work. Within the city as a whole, 23.6% of households do not have a car and 15% of workers rely on public transportation^{iv}.

ii. Land Use

Each of the four zones includes a variety of land uses that are residential, industrial, commercial, open space, community facilities or institutional. All the zones also include

varying proportions of vacant land. The predominant existing land use is residential, ranging from 38% in northeast zone to 67% in the southwest zone^{iv}. Open space and parks currently account for less than 2% of total BeltLine land, while more than 23% of land is currently used for industrial purposes. In addition, 6% of land remains vacant while another 9% of land within the BeltLine corridor contains structures in substandard, deteriorated or dilapidated conditions.^v

Prior to the commencement of the BeltLine project, there were 51 existing public parks within the 22-mile BeltLine corridor, covering a total area of about 413 acres. **Error! Reference source not found.** shows the location of existing parks within the BeltLine corridor. There are six existing park classifications in Atlanta, all of which are present in the corridor. The classifications are regional parks, drawing visitors from outside the city limits; community parks, such as recreation centers and swimming pools; neighborhood parks, serving informal recreational needs of the community; block parks, small sites typically including a playground; garden parks, small sites maintained for visual interest and conservation parks, managed for environmental protection^{iv}.

The history of industry within the BeltLine corridor created many potentially contaminated sites. A study of sites within ¼-mile radius of the BeltLine alignment found 234 sites within the corridor. The vast majority of these sites, 172 of 234, are located in the northern region of the BeltLine.

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Figure 3: Existing Parks, BeltLine Corridor. Source: City of Atlanta Department of Parks, Recreation & Cultural Affairs

iii. Transportation

Public transportation in Atlanta is currently provided by MARTA, the Metropolitan Atlanta Rapid Transit Authority, and the GRTA, the Georgia Regional Transportation Authority. The BeltLine will connect to three of the existing MARTA rail systems in five separate locations across the four zones of the project. In addition, fifty-six bus routes will connect to the BeltLine. MARTA currently carries an average of 500,000 passengers per day on its four heavy rail lines and 125 bus routes.^v

MARTA currently runs four heavy rail lines in Atlanta, the Red, Gold, Green and Blue Lines. The tracks for the system are a combination of elevated, ground-level, and underground tracks. These four lines follow roughly a north-south and east-west alignment, dividing the core of Atlanta into four quadrants. Two lines run in each direction, following similar paths, often sharing a track. Figure 4 shows the location and alignment of the existing heavy rail lines run by MARTA. MARTA also operates Atlanta's bus system, which has ninety-one routes and covers over one thousand miles^{vi}.

iv. Freight Rail Corridors

Due to the nature of the project, the BeltLine corridor currently includes, or is adjacent to, both active and inactive freight rail corridors. This corridor includes segments of freight rail owned by The Georgia Department of Transportation (GDOT), Atlanta Development Authority (ADA), CSX Transportation (CSXT) and Norfolk Southern Corporation (NS)^{iv}. Figure 5 shows the alignment and usage of current freight rail corridors. The only continually active right-of-way is in the northwest segment, owned by CSX. A large portion of the northeast corridor and a segment in the southwest are owned by GDOT and are available for the BeltLine redevelopment. The other segments remain inactive, or only marginally active, and processes are underway to purchase these rights-of-way.

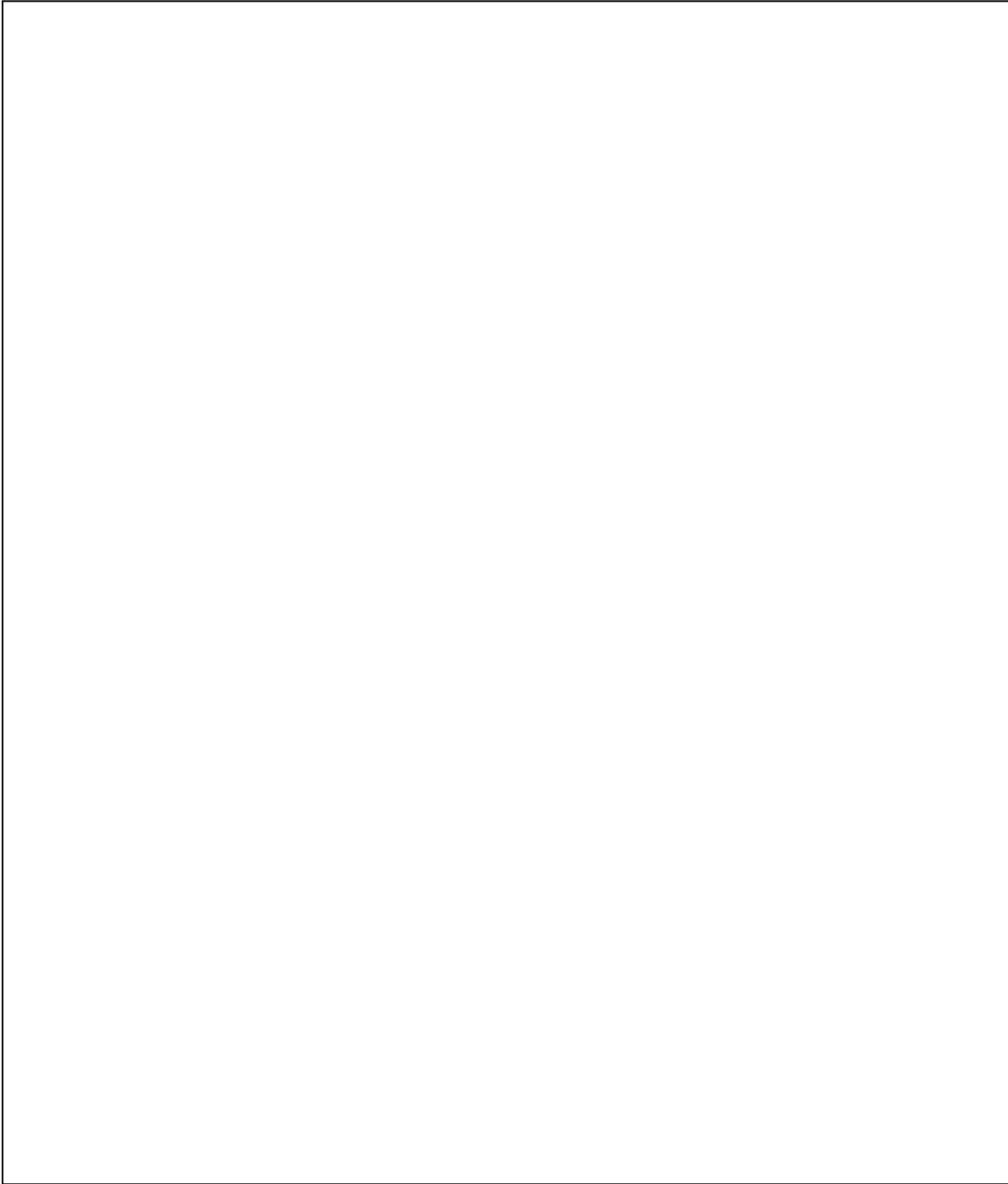


Figure 4: The existing heavy rail system operated by MARTA.
Source: <http://www.itsmarta.com/rail-schedules-or-route.aspx>

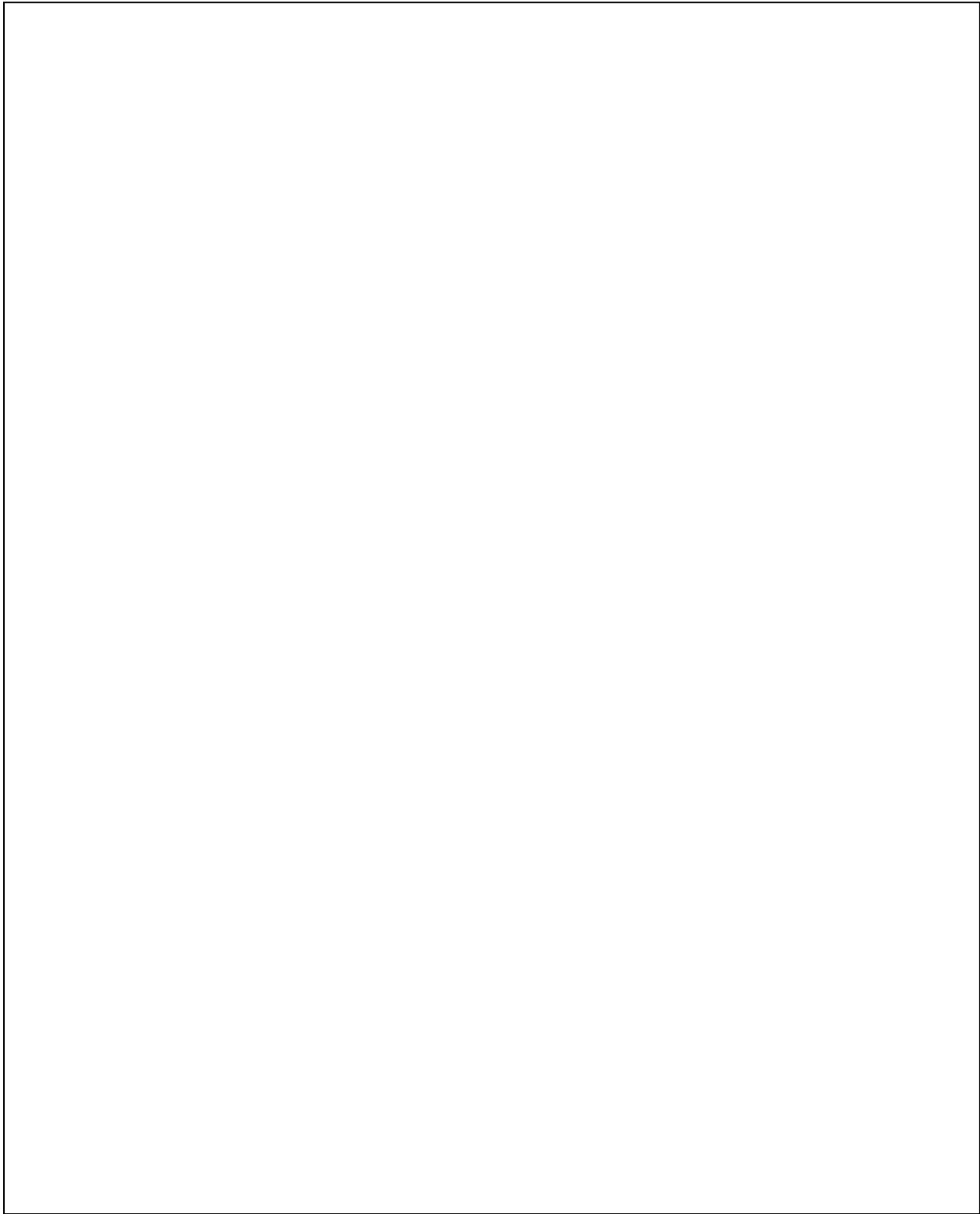


Figure 5: Freight Rail Corridors. Source: Georgia Department of Transportation ^{iv}

B. Green space

The purpose of the BeltLine is to increase the amount of green space in Atlanta, which represents only 3.8% of the city's area. Over the 25 years of development, the BeltLine will increase Atlanta's green space by nearly 40%^{vii}. The BeltLine's five-year work plan focuses on the development of parks and trails in order to provide as many benefits to the public as possible.

a. The BeltLine Arboretum

Similar to Boston's Emerald Necklace, thirteen expanded, new, and mixed use parks, or "jewels" will make up the BeltLine Emerald Necklace. In 2004, a mile-by-mile study, commissioned by the Trust for Public Land, concluded that a cohesive and fully-connected park system could be developed with strong community input. Over 1,300 acres of new parkland will be developed, and the BeltLine Arboretum will not only provide green space and extra carbon dioxide sequestration, but also education programming to residents and visitors. The goal is to plant several thousand trees, increase the perceived value of trees in an urban environment, and improve neighborhood identity.

b. Storm Water Management

In older parts of Atlanta, storm water and sewage systems are combined, and when there are heavy rains, sewage overflows into the waterways.^{viii} The Greenway Acquisition Project (GAP) intends to add natural vegetation to mitigate storm water runoff. Initiatives like the Clear Creek Combined Sewer Basin Relief Project in the North Avenue area will store water to provide relief to Atlanta's sewer system.

c. Brownfield Remediation

Brownfields are abandoned and potentially contaminated sites previously used for industrial or commercial purposes. There are an estimated 1,100 acres of brownfields within the Atlanta BeltLine Redevelopment area, and as population continues to grow, there is pressure to redevelop this land for a better use. More research must be conducted on these pieces of land to determine the best use for them.

C. Trails and Transit

One of the most important and defining aspects of the Atlanta BeltLine is the continuous loop of trails and transit. The construction of 22 miles of transit and more than 33 miles of

transit is meant to connect 45 neighborhoods and numerous parks. Pedestrian- and bicycle-friendly trails will improve the health of the residents. By closing the few gaps around the BeltLine corridor, residents will be able to circle downtown Atlanta and follow other trails that connect to the rest of the city. Similarly, new transit, either light rail or street cars, and three new MARTA stations will quickly connect residents to other parts along the BeltLine corridor and the existing rails that extend out from the city. The trails are being designed with the help of the PATH Foundation to link racially, socio-economically, and culturally diverse neighborhoods, and “to develop a system of interlinking greenway trails through metro Atlanta for commuting and recreating.”^{ix}

D. Other

a. Sidewalks and Streets

In addition to continuous transit and trails, the development of pedestrian-friendly sidewalks and intersections are imperative to the walkability of the city and the safety of the residents. The goal is to create a more cohesive urban street network and reduce the city’s dependency on automobiles by providing easy, walkable, and aesthetically-pleasing access to the BeltLine.

b. Historic Preservation

The historic preservations of Atlanta’s intown shopping districts and iconic homes contribute not only to the tourism industry, but the character of the city. Many historic districts have guidelines to accommodate the BeltLine and to limit the space for parking garages in an effort to preserve the pre-automobile era that represents most of the residential and commercial districts.

c. Public Art

The purpose of public art is to promote creativity and community along the BeltLine. “Art of the BeltLine” is an initiative to invite local artists to contribute to the BeltLine, and it is the largest temporary art project in the history of Atlanta.

d. Affordable Housing

In order to protect low-income households from increasing property taxes as development continues, a portion of the BeltLine’s financing is devoted to developing

affordable housing. As development starts and jobs are created, there will be a demand for affordable housing that will be satisfied by developing Community Land Trusts (CLTs).

III. Project Financing

As a large-scale project, the BeltLine requires funding from many sources, in both the public and private sectors. The three main sources of funding are the BeltLine Tax Allocation District (TAD), a Capital Campaign and Federal Funding. In addition, the City of Atlanta has allocated funds outside of the TAD for the project. These sources of funding vary in size and cover different aspects of the project. Table 1 shows a summary of the total anticipated costs and general funding sources.

Activity	Total Cost	TAD Funds	Private Funds	Other Public Funds	Comments
	In Millions				
Land acquisition: Right-of-way	\$70	\$50	\$6	\$14	2006, 2007 and 2008 TIP funds
Land acquisition: Parks	200-300 ⁴	225	75		
Greenway design & construction	75-85	17	64	4	2008 and 2010 TIP funds
Park design & construction	175-200	100	100		
Transit construction	600 - 1 billion	300		300	50/50 new starts
Transportation improvements	100-150	50		100	80/20 federal programs
Workforce housing	250	250			\$60,000/unit average subsidy
Atlanta public schools projects	30-40	40			School improvement, land acquisition
Developments infrastructure	308	380			
Estimated total costs	\$1.8 - \$2.4 Billion	\$1.34 Billion	\$245 Million	\$418 Million	

Image by MIT OpenCourseWare.

Table 1: Total Anticipated Costs and General Funding Sources. Source: Atlanta BeltLine TAD Feasibility Study

A. BeltLine Tax Allocation District

As seen in Table 1, it is expected that nearly 70% of the financing for the Atlanta BeltLine project will come from the creation of the BeltLine Tax Allocation District. Called Tax Increment Financing (TIF) in other states, a TAD diverts a portion of property tax revenue from collecting agencies in order to finance a new project that will add to the overall tax base. The associated government entities (such as city, county and school district) continue to collect property tax revenue at a base level determined by the tax base at the time of the TAD creation.

The BeltLine TAD was established December 31, 2005 and runs until December 31, 2030, or until the bond issuances have been paid off. Funding for the project is dependent on future development in the designated TAD area.

Figure 6 shows the BeltLine TAD boundaries. The boundaries include non-single family residential lots within the BeltLine corridor. The TAD crosscuts the nearly 50 neighborhoods that will be affected by the BeltLine project. While waiting for development to occur, the project funding will be generated through the sales of bonds. When bonds are sold through the local government, the local government can designate future tax revenue from the TAD to service the debt. The issuance of bonds for the BeltLine will be phased over the life of the project. It is important to know that the bonds are not backed by tax payers, but rather by the tax increment from the TAD^v.

The estimated schedule of bond issuances is listed in Table 2, and shown as a cash flow in Figure 7. This schedule is based on estimated private development activity within the BeltLine corridor. In the early years of the project, it is very likely that BeltLine expenses will exceed BeltLine revenues, particularly due to land and right-of-way acquisitions. However, over the life of the project the revenue will increase as development is brought into the area.

Year of Issue	Amount of Issue	Cumulative Bonds
2006	\$111,906,093	\$111,906,093
2010	243,757,462	355,663,555
2014	357,475,614	713,139,169
2018	398,967,417	1,112,106,586
2022	373,024,995	1,485,131,581
2026	207,504,631	1,692,636,212
2030	16,496,344	1,709,132,556
Total	\$1,709,132,556	

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Table 2: Projected Timing and Range of Amounts of Bonds^v

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Figure 6: BeltLine Tax Allocation Districts. Source: Atlanta Development Authority^{iv}

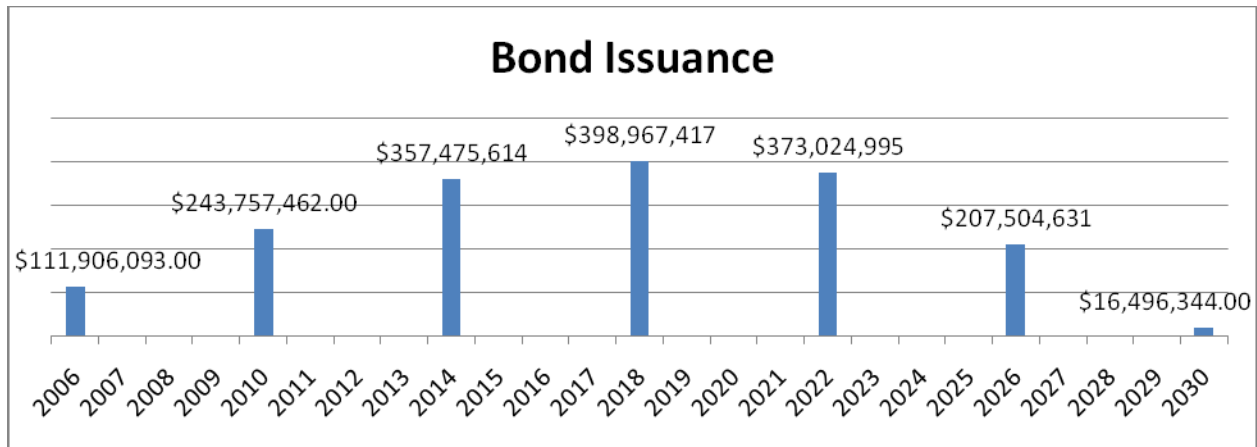


Figure 7: Schedule and amount of bond issuances

B. Capital Campaign

The Atlanta BeltLine Partnership, a non-profit organization that works with the Atlanta BeltLine Inc., works to raise awareness and funds for the BeltLine and to catalyze community resources to address the social concerns of the project. In 2007, they created a \$60 Million Capital Campaign to help achieve the goals of the Five-Year Work Plan, which ran from 2006 to 2010. To date, the capital campaign has raised \$35.7 million from more than 100 donors. These private funds were used to fund land acquisition and trail construction and are essential to the public-private partnership model for which the BeltLine strives^x.

C. Federal Funding

Federal funding for the BeltLine will be directed through several specific programs. Funding is already underway for right-of-way acquisition and trail construction. The Atlanta Regional Commission has marked \$18 million for these purposes through the Transportation Improvement Plan (TIP). In addition, the ARC long term plan, the Regional Transportation Plan, has committed \$240 million in funding for transit.

The federal government has earmarked \$1 million in funding to support the preliminary engineering portion of transit development. Down the line, the ABI will apply for federal transit funds via the federal New Starts or Small Starts programs. The New Starts program “is the federal government’s primary financial resource for supporting locally-planned, implemented, and operated transit ‘guideway’ capital investments”^{xi}. The

Small Starts program funds smaller projects that cost less than \$250 million and require less than \$75 million in federal funding. While the entire BeltLine project would not qualify for Small Starts, portions of the project may.

Additional federal funding is expected to come through Federal matching programs for pedestrian and roadway improvements, as well as for trail construction. Atlanta has received federal funding in the past for trail constructions and expects to continue doing so. In addition, the status of the BeltLine as a transformative urban project may lead to opportunities for additional federal funding from a government interested in the project's scope and scale^{xii}.

IV. Current Status of Project

A. Green space and Trails

ABI has purchased over 200 acres of land, as well as 50% of the 22-mile loop that will comprise the transit right-of-way.^{xiii} They have also purchased the Bellwood Quarry, which will be developed into the largest drinking water reservoir in Atlanta, in addition to a recreation area. The development of three parks has been completed, including the Historic Fourth Ward Park. Phase I of the park, the development of the Clear Creek Combined Sewer Basic Relief Project and other park amenities on five acres in the North Avenue area, was completed in February 2011. Several parks are also currently under construction, including the expansion of Stanton Park in Peoplestown, Boulevard Crossing Park, and the Westside Reservoir Park. These parks, along with others, will comprise the 13 “jewels” of the “BeltLine Emerald Necklace”.

In addition to the new green space, the first section of trail has been completed. The West End Trail, a 12 foot wide, 2.3 mile multi-use concrete trail connecting three parks along the corridor, was completed in 2010.^{xiv} With community and commercial support, this accomplishment is an important step toward bicycle and pedestrian connectivity that will test the overall cohesiveness and quality of the BeltLine. Its development also includes an upgrade for the Gordon White Park. The trail was funded and planned by the PATH Foundation, along with the Department of Planning and Community Development (DPCD).

Land acquisition is expected to be completed over the next 5-10 years, and park development will ramp up over the same time period.

B. Rights of Way

Atlanta BeltLine, Inc. has currently secured about 50% of the rights-of-way for the project, but has yet to negotiate terms with CSX. CSX owns the rail in the northwest quadrant of the BeltLine corridor and still operates the Seaboard Air Line Railroad. Although there is heavy use of the corridor as freight rail, this does not necessarily preclude sharing the right-of-way with light rail transit. CSX shares its right of way with transit in other locations around the country, including other MARTA lines within Atlanta. According to Ryan Gravel, however, this will come at a cost.

C. Transit

At this point in the project, the Atlanta BeltLine Initiative has secured construction permission from the Georgia Department of Transportation (GDOT), and the Tier 1 Environmental Impact Statement was completed in the summer of 2010. A Tier 1 EIS defines more precisely the right-of-way for transit and trails in the BeltLine Corridor^{xv}. The EIS analyzes the socio-economic impacts of “building transit and trail facilities in the 22-mile BeltLine corridor”^x. There are still 5 points along the rail corridor that do not connect; however, the first section of transit is expected to be built by 2014, based on a conversation with James Alexander, a senior project manager with Atlanta BeltLine, Inc. The next step for building transit is securing financing, some of which will come from the TAD, and some may come from federal funding programs described above.

D. Financing

Two rounds of BeltLine bonds have been issued, totaling \$355,663,555. These bonds have been used to finance the initial Five-year Work Plan and will also be used to begin construction of transit. In addition to TAD funding, the BeltLine capital campaign has raised \$35.7 million dollars to date. Finally, because the Tier I EIS is near completion, ABI can begin the application process for federal funds for transit from the New Starts and Small Starts programs.

E. Affordable Housing

Thirty-five development projects have already been announced or are under construction, including 6,600 housing units and over 1.3 million acres of retail and office space. The BeltLine Partnership is focusing on determining the viability of CLTs to create permanent affordable housing. They are beginning to develop partnerships with local leaders and national organizations to determine how CLTs will most benefit Atlanta. In addition, they are reaching out to homeowners who are at risk of being displaced and creating a resource guide to direct them to the non-profit and governmental agencies that can assist them.

V. Cost-Benefit Analysis

A. Costs

The total estimated cost of the project according to the Atlanta Development Authority was between \$1.8-\$2.4 billion over the 25 year life of the TAD. However, our detailed estimations place the cost at \$4.1 billion over the 25 years of the project, including operation and maintenance costs, which are excluded from the ADA estimation. Assuming a discount rate of 8%, however, the NPV of these costs in 2006 dollars is \$1.48 billion. A discount rate of 8% is used because it is 0.5% higher than the interest rate for the bonds financing the project. Figure 8 shows the total cost of the project in 2006 dollars, and Figure 9 shows the cost broken down by component. Table 3 shows the cost breakdown for the project.

This analysis includes only the monetary costs of the project, such as construction and operations and maintenance; the non-monetary costs of the project, including gentrification and economic displacement, are very abstract and there have previously been no studies done to quantify the economic cost of gentrification. In addition, many of the costs are variable and unknown. Construction costs over the 25 year life of the project are dependent on the economic climate. In addition, costs such as brownfield remediation are unknown until analyses are done on formerly industrial lots of land.

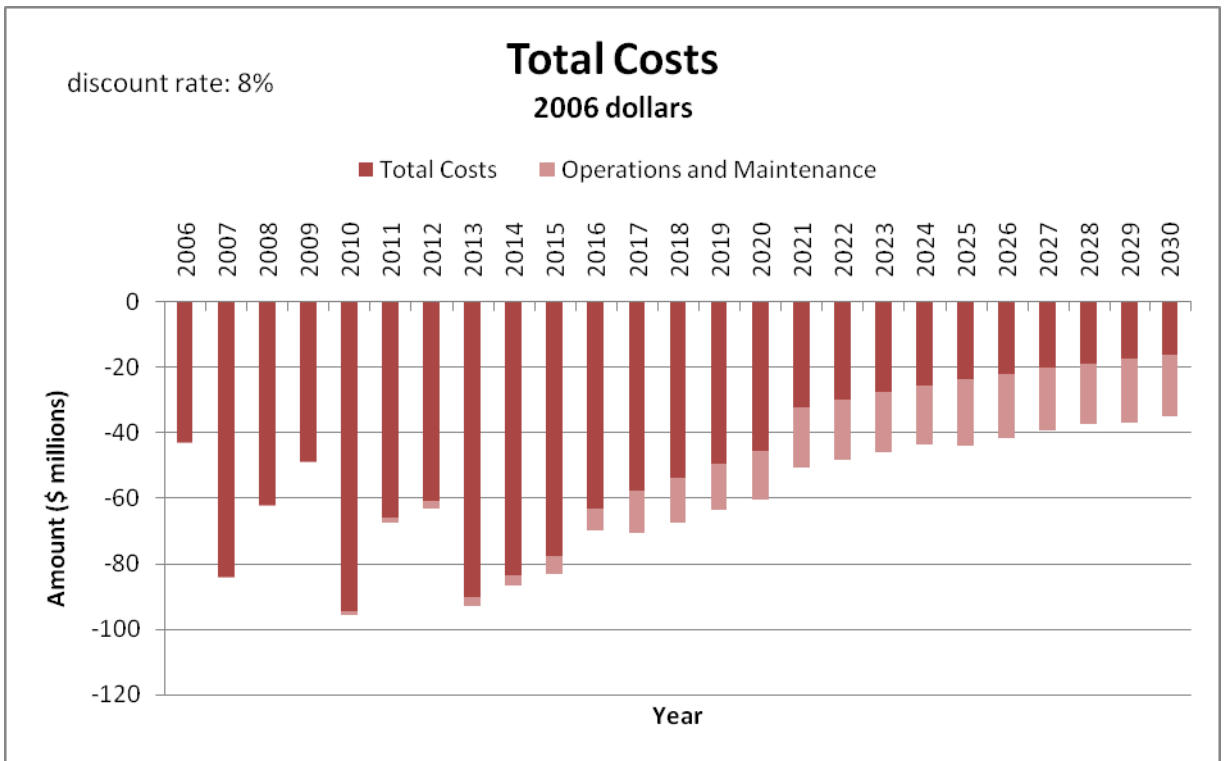


Figure 8: Total Cost of the Atlanta BeltLine in 2006 dollars

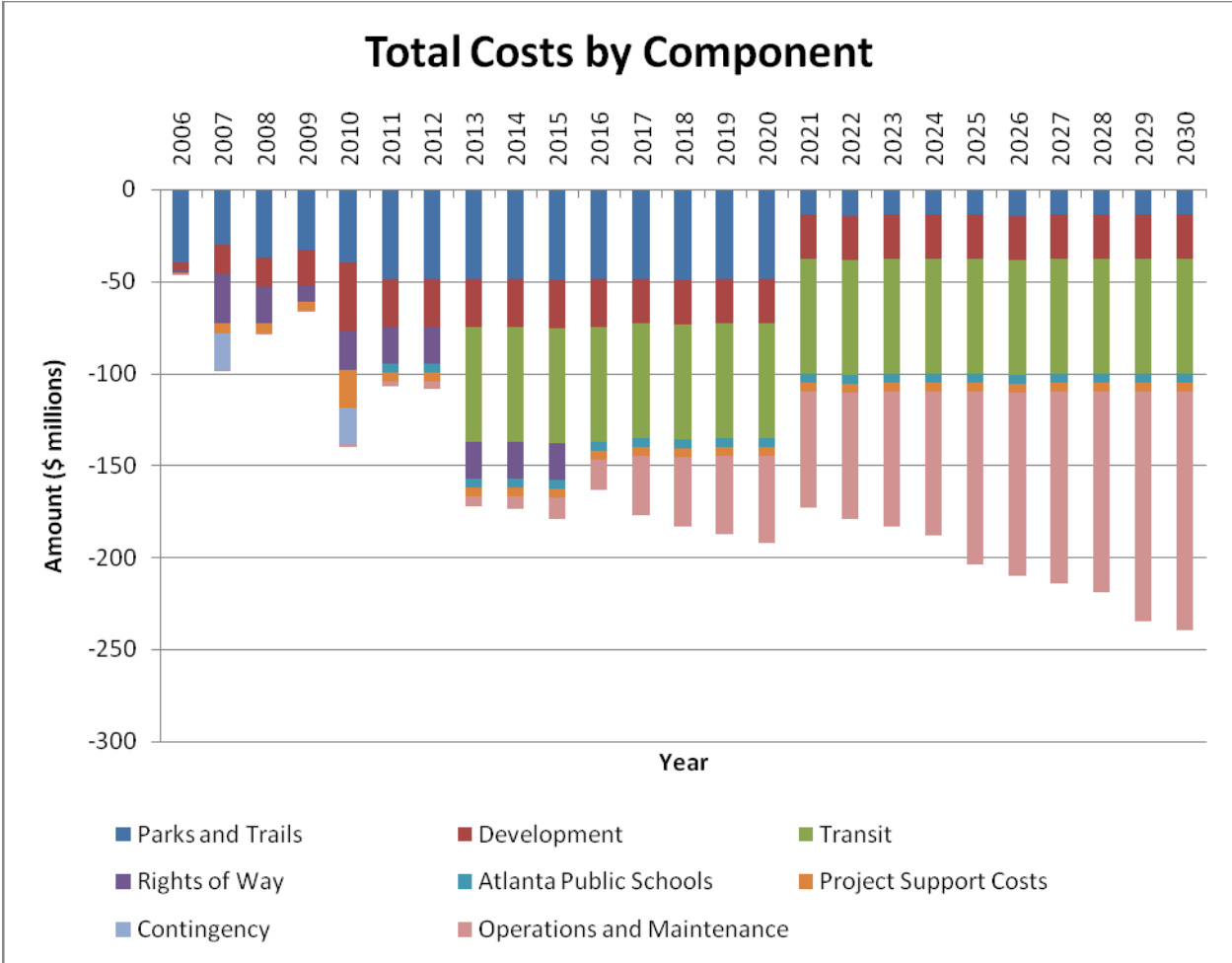


Figure 9: Total project costs by component.

Parks and Trails		
	<i>Acquisition</i>	\$470,000,000.00
	<i>Development</i>	\$330,000,000.00
	<i>Public Art</i>	\$6,000,000.00
Development		
	<i>Workforce Housing</i>	\$260,000,000.00
	<i>Incentives</i>	\$32,000,000.00
	<i>Brownfield Testing</i>	\$20,000,000.00
	<i>Transportation/Pedestrian Access</i>	\$270,000,000.00
Transit		
	<i>Construction</i>	\$1,250,000,000.00
Rights of Way		\$178,000,000.00
Atlanta Public Schools		\$95,000,000.00
Project Support Costs		\$137,000,000.00
Contingency		\$40,000,000.00
Operation and Maintenance		
	Parks	\$790,614,000.00
	Trails	\$825,000.00
	Transit	\$383,724,000.00
Total Cost=		\$4,263,163,000.00
NPV Cost= (8% discount rate)		\$1,566,182,271.22

Table 3: Cost breakdown for the Atlanta BeltLine project

i. Quantifying Costs

The costs of many components of the project were taken from the estimations given in the Atlanta BeltLine Redevelopment Report, and then dispersed over the final twenty years of the project. The costs for the first five years of the project, which was completed in 2010, are published and were used in this analysis. In addition, it was assumed that all park land to be developed would be acquired by 2020, all rights-of-way would be acquired by 2015, and brownfield testing would be completed by 2016.

The capital costs considered for the project can be seen in Table 4:

Parks and Trails	
	<i>Acquisition</i>
	<i>Development</i>
	<i>Public Art</i>
Development	
	<i>Workforce Housing</i>
	<i>Incentives</i>
	<i>Brownfield Testing</i>
	<i>Transportation/Pedestrian Access</i>
Transit	
	<i>Construction</i>
Rights of Way	
Atlanta Public Schools	
Project Support Costs	
Contingency	

Table 4: Capital Costs Included in Analysis

The Atlanta Development Authority failed to include operation and maintenance costs in its cost estimation. Although these costs will continue past the life of the TAD and will come from a separate funding source, it is very important to understand the scale of these costs for new development of parks, trails and transit.

The annual maintenance of urban green space was estimated to be \$1.50 per square foot^{xvi}. At a final estimation of 1,300 acres of new park space, the maintenance cost for the *new* green space at the end of the project will be \$90.16 million annually. The development of new park space over the 25 years of the project was estimated with a scaling increase as the project continues, but the total green space maintenance costs over the life of the project will total \$790.6 million in addition to the construction and acquisition costs. The maintenance of asphalt trails was estimated to be \$2,500 per mile per year^{xvii}. The BeltLine project aims to build 33 miles of new trails; in year 30, the annual maintenance costs of the trails will total \$70,000.

In order to calculate the maintenance costs of a new light rail line in Atlanta, it was necessary to compare the system with an existing light rail system. The chosen comparison was with the Portland Tri-Met system. Although currently larger than the Atlanta BeltLine

will be, it shares similar characteristics. A description of the comparison of the two systems and the calculations for the annual operating expenses can be found in Appendix B. The annual operating expense for the final 20 mile loop of light rail transit will be \$45.1 million dollars.

B. Benefits

No benefit analysis has yet been conducted for this project, as many of the benefits have been assumed and strongly supported by the public. This report focuses on quantifying three key benefits: the development of parks, additional local transit, and an increased tax base. The goal is to quantify enough of the benefits to justify the costs of the redevelopment of the Atlanta BeltLine. The total estimated benefits are about \$8.4 billion; however, these benefits are dominated by the increased tax base that is anticipated at the end of the project. Assuming a discount rate of 8%, the NPV of the benefits in 2006 dollars is \$1.3 billion. The values for each benefit are detailed in Table 5.

Parks		
	Property Value	\$ 155,339,043.33
	Direct Use	\$ 91,290,129.97
Transit		
	Revenue from Fares	\$ 75,706,513.59
Increased Tax Base		\$ 8,081,636,552.00
Total Cost =		\$ 8,403,972,238.89
NPV Cost = (8% discount rate)		\$ 1,307,861,993.63

Table 5: Benefits Included in Analysis

i. Quantifying Benefits

The quantified benefits in this report were modeled after other investigations. Still, many were difficult to quantify because there is a lot of uncertainty in values such as the rate of development and the amount and demographics park visitors. The benefits used in this analysis, excluding development benefits represented by the increased tax base are shown in Figure 10.

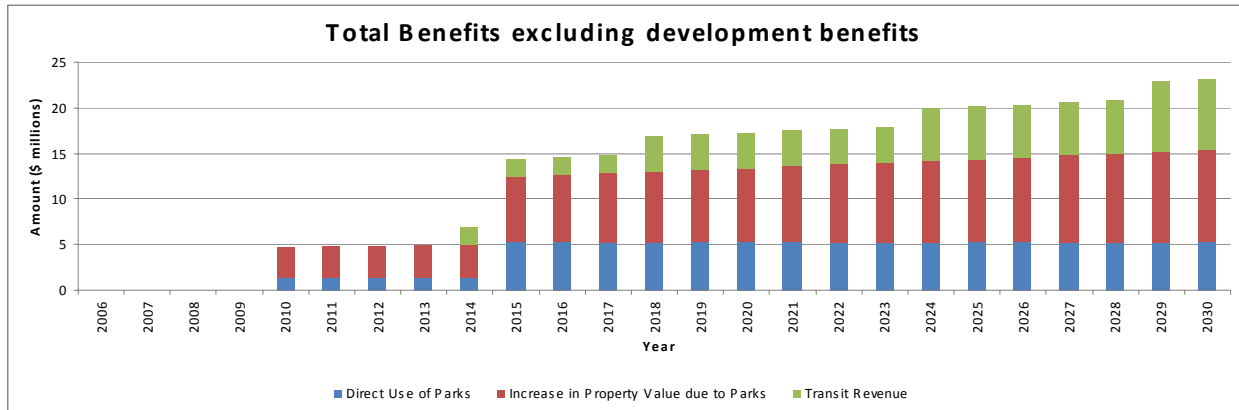


Figure 10: Total project benefits by component, excluding development benefits.

The property value and direct use benefits of additional parkland were calculated using case studies from “Measuring the Economic Value of a City Park System”, conducted by the Trust for Public Land. Based on this study and data from the 2000 census, the average property value of a housing unit within 500ft of a park is 15% higher. Ignoring future inflation, we predict an additional \$155 million in property value due to the development of parkland by 2030. The NPV in 2006 dollars is \$46.89 million.

We modeled the direct use value of Atlanta BeltLine’s proposed interconnected park system after the Boston Emerald Necklace. Based on the study conducted by the Trust for Public Land, three park activities; general use, sports facilities use, and special use, are assigned a monetary value per visit. Assuming the number of visitors per use scales linearly with park acreage, we calculated the total value per acre to be \$70,223.18, therefore, the direct use value of the additional 1300 acres is about \$91.3 million, and the NPV in 2006 dollars is \$62.13 million.

The benefits of increased transit were evaluated as the increased revenue due to additional miles of rail. The increase in passengers was estimated using data from the Portland Tri-met case, and we assumed that about a quarter of the total miles of transit will be developed every five years, for a total of 22 miles developed between 2014 and 2030. The predicted annual passenger-miles are 103,530,275, and the average rail fare is \$1.50, so the total revenue is about \$75.7 million; the NPV in 2006 dollars is \$18.78 million. For more detailed descriptions of the calculations using GIS and other estimates, see Appendix C.

Lastly, the value for the increase in the tax base in 2030 due to the TAD, is \$8.08 billion. This value is estimated..... BECCA

The NPV of this value in 2006 dollars is \$1.18 billion, which is much greater than the other calculated benefits, as shown in Figure 11.

C. Unknown Non-Monetary Costs and Benefits

As mentioned earlier, gentrification and brownfield remediation are difficult to quantify at this stage of the project. However, the costs evaluated in this report represent the majority of the costs associated with the redevelopment of the BeltLine. Likewise, many of these benefits are difficult to quantify. There are numerous additional benefits to this project, including improved walkability and health, improved intra-urban connectivity through transit-oriented development, decreased traffic congestion, the development of pedestrian- and bicycle-friendly trails, job creation during construction and for maintenance, more affordable housing, community development, decreased blight, storm water management, and public art. Although these benefits will have positive social and environmental, there is no reliable way to quantify them. Since there is such strong public support behind the BeltLine, there has not been a need for a detailed benefit analysis; however one is anticipated when the development of transit is started.

D. Comparison of Costs and Benefits

While the total NPV cost of the project in 2006 dollars is \$1.57 billion dollars, slightly higher than the calculated NPV benefits of \$1.3 billion, these numbers are close enough to warrant an appraisal that the benefits and costs of the project are roughly equivalent. If all the benefits listed above in Section C would be considered, we are confident that the benefits of the Atlanta BeltLine far outweigh the costs.

Figure 11 shows the cash flow for the project, including the costs and benefits listed above. The benefit of the increased tax base, which represents the benefit of future development, is the most significant benefit associated with the project and is the benefit in this analysis that equalizes the costs and benefits. This unique financing scheme not only allows the project to occur, but also it also makes it beneficial to society.

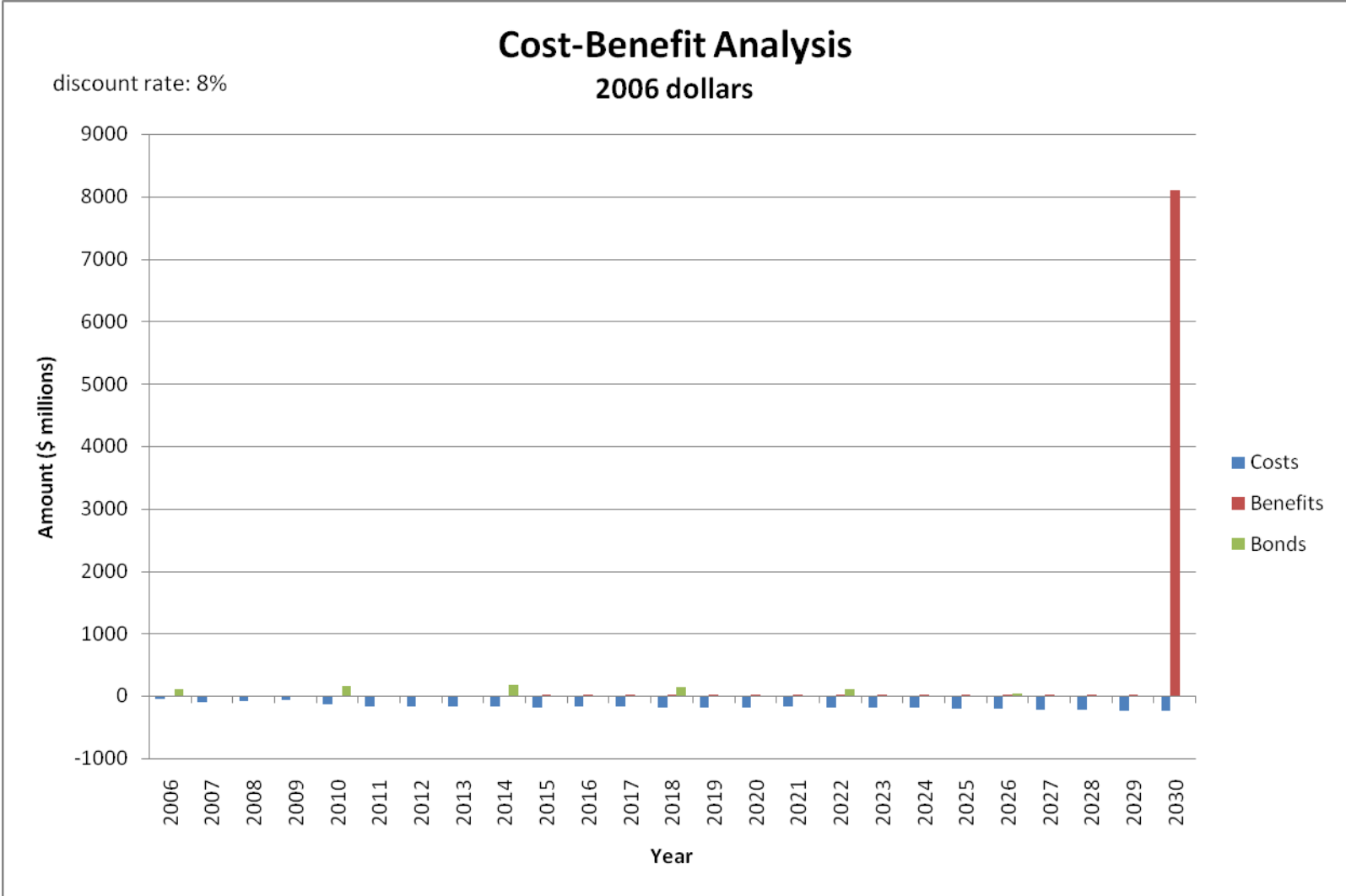


Figure 11: Cost-Benefit Analysis, discounted back to 2006

VI. Conclusions and Recommendations

Although this cost-benefit analysis shows that the costs slightly outweigh the benefits, the additional social benefits make this project worthwhile, and the increased tax base makes it economically feasible. Likewise, there are many uncertainties in the values we used, and small adjustments could alter the final numbers.

The BeltLine Redevelopment project shows how TADs, or TIFs, can finance major urban projects without overburdening taxpayers. Additionally, although social benefits are difficult to quantify, they drive public opinion, and public support and input are crucial to ensuring the completion of redevelopment projects. Likewise, this project represents the importance of transit-oriented and environmentally-conscious planning. Assuming the BeltLine is successful, this project will be an example for major urban redevelopment projects

Appendices

A. Project Financing—Becca

Include information about the calculations in the increase in the tax base from the

B. Costs

In order to calculate the maintenance cost of the BeltLine light rail transit, it was necessary to look for a similar transit system elsewhere in the country. The comparison that was chosen was the Portland Transit System. This system was chosen because of its comprehensive and progressive nature, as well as the similarities in the type and size of the service area and population to that of Atlanta. In order to estimate the annual operating costs of the light system, a comparison was drawn between the Portland system in 1996, in its infancy, and the current BeltLine transit system. Table 6 shows the comparison of the two systems.

The transit data for the Portland Tri-Met system was found from the National Transit Database. Although data was compiled for multiple years, it was deemed that the 1996 was the most relevant. The operating expense per vehicle revenue mile in 1996 was \$12, and has stayed relatively consistent over the past 15 years, decreasing slightly to \$10.97 in the mid 200s and then increasing again to \$13.22. Thus \$12 was used as the operating expense per vehicle revenue mile in the analysis of the Atlanta BeltLine.

The total annual vehicle revenue miles for the Atlanta BeltLine were estimated based on the fixed guideway directional route miles, the estimated number of vehicles traveling the route and the time of operation. The BeltLine transit will be a 20 mile loop, so there will be 40 fixed guideway directional route miles. The headway for the vehicles is assumed to be 4 min, a conservative estimate, so there will be 15 cars per hour. It is assumed that it will take 60 minutes for the 20 mile loop given the distance and number of stops, so there will be 15 cars operating in each direction, for a total fleet of 30 vehicles. Each vehicle will complete the loop once per hour. MARTA currently runs its trains from 6am to 1am, for a total operation time of 19 hours. It is assumed that the vehicles will operate 360 days per

year, providing a buffer for maintenance etc. Therefore the annual vehicle revenue miles are:

30 vehicles x 20 miles per hour x 19 hours per day x 360 days per year= 4,104,000 miles

Based on the operating expense per vehicle revenue mile of \$11, the total operating expense for a 20 mile BeltLine system is \$45,144,000 annually for the complete system.

City	Portland Tri-Met	Atlanta BeltLine
Year	1996	2009
Service Population	1,172,159	1,574,600
Service Area (sq. miles)	388	498
Operating Expense	\$18,406,745	\$45,144,000
Annual Vehicle Revenue Miles	1,533,463	4104000
Fixed Guideway Directional Route Miles	30	40
Total Fleet	26	30
Operating Expense per Vehicle Revenue Mile	\$10.97	\$11

Table 6: Comparison of Portland and Atlanta transit systems

Based on conversation with James Alexander, a senior project manager with Atlanta BeltLine, Inc, the first section of transit is expected to be opened by 2014. It is assumed that this section will be 5 miles and compose ¼ of the total length. The remaining three sections are assumed to be built consecutively, each composing 5 miles and each taking approximately 4 years to construct.

C. Benefits

Using ArcGIS and 2000 census data, it is possible to evaluate the increase of average property values within 500ft of a park. In 2000, the average property value in Atlanta was \$158,568.34, but the average property value around local parks was \$184,746.22, a 16.5% increase. The study conducted by the Trust for Public Land predicts a similar increase of 15%, so this value is used in the calculations. The amount of parkland added each year starting in 2010 is incrementally increased until 2030, assuming more development will ramp up over time, for a total addition of 1300 acres of parkland. During this time, the number of housing units per acre will increase as development increases. Based on

announced development, the average housing unit density will be estimated to increase from 2.835 to 3.06 housing units per acre. Assuming the parks are roughly circular, and after inflating housing values from 2000 to 2010 dollars, the value of parks due to the increase in property value they cause is about \$155 million, ignoring future inflation.

To calculate the direct use benefit of the additional 1300 acres of parkland, we modeled the Atlanta BeltLine's proposed interconnected park system after the Boston Emerald Necklace. The average value per visit for three park facilities/activities, or "Unit Day Value" method used in the Trust for Public Land's study was developed by the US Army Corps of Engineers; general park use, such as playgrounds, trails, and picnicking, is assigned \$1.91 per visit, sports facilities use is assigned \$3.05 per visit, and special uses, such as golfing, festivals, and gardening, are assigned \$9.33 per visit. The number of person-visits to the Boston Emerald Necklace was drawn from a telephone survey of 600 Boston residents; however, the proposed BeltLine "necklace" is much smaller in area. Assuming the number of visitors per use scales linearly with park acreage, we calculated the total value per acre to be \$70,223.18, and using the same rate of park development when calculating the increase in property value, we find that the direct use value of the additional 1300 acres is about \$91.3 million, and the NPV in 2006 dollars is \$62.13 million.

The benefits of increased transit were evaluated as the increased revenue due to additional miles of rail. The increase in passengers was estimated using data from the Portland Tri-met case, and we assumed that about a quarter of the total miles of transit will be developed every five years, for a total of 22 miles developed between 2014 and 2030. The predicted annual passenger-miles are 103,530,275, and the average rail fare is \$1.50, so the total revenue is about \$75.7 million; the NPV in 2006 dollars is \$18.78 million. The benefits are shown in Table 7.

Year		24	25	
		2029	2030	
Park Development		1225	1300	TOTAL
Parks (acres)		75	75	1300
Property Value Citywide average property value = \$158,568.34 Average property value within 500ft of park = \$184,746.22	Properties per acre	3.039	3.06	
	Value per property (inflated from 2000 values)	\$295,644.65	\$300,637.30	\$5,264,926.80
	Area 500ft around park (acres)	73.54640502	73.54640502	306.1981014
	Total value of properties	\$66,088,371.14	\$67,659,025.45	\$1,035,593,622.19
	Total value from parks (15%)	\$9,913,255.67	\$10,148,853.82	\$155,339,043.33
	Total value (in millions)	\$9.91	\$10.15	\$155.34
	NPV (in 2006 millions of dollars)	\$1.56	\$1.48	\$46.89
	Tax rate (1.05%)	\$104,089.18	\$106,562.97	\$1,631,059.95
Direct Use Value of park per acre = \$70,223.18	Total value of parks	\$5,266,738.27	\$5,266,738.27	\$91,290,129.97
	Total value (in millions)	\$5.27	\$5.27	\$91.29
	NPV (in 2006 millions of dollars)	\$3.58	\$3.58	\$62.13
Tax Base	Value due to increased tax base		\$8,081.64	\$8,081.64
	NPV (in 2006 millions of dollars)		\$1,180.06	\$1,180.06
Transit Annual passenger- miles = 103,530,275 Average fare = \$1.50	Trains/Rail Development (miles)	22	22	22 miles
	Annual Passengers	5176514	5176514	
	Total Revenue from Fares	\$7,764,770.63	\$7,764,770.63	\$75,706,513.59
	Total Revenue (in millions)	\$7.76	\$7.76	\$75.71
	NPV (in 2006 millions of dollars)	\$1.22	\$1.13	\$18.78
	Total Benefits (in millions)		TOTAL	\$8,403.97
Total (NPV)	NPV (in 2006 millions of dollars)	\$6.37	\$1,186.26	\$1,307.86
Total		\$22.94	\$8,104.82	\$8,403.97
			TOTAL (excluding development benefits)	\$322,335,686.89

Table 7: Benefits from parks and transit, showing only the final two years of development

Endnotes

- ⁱ <http://www.BeltLine.org/BeltLineBasics/BeltLineHistory/tabid/1703/Default.aspx>
- ⁱⁱ Thesis: Ryan Gravel. Pg. 1
- ⁱⁱⁱ HUD State of the Cities Data System. Atlanta, GA MSA. Demographic Characteristics, 1970, 1980, 1990, 2000: Total Population. <http://socds.huduser.org/census/totalpop.odb>
- ^{iv} AECOM/JJG . (July 2009). *BeltLine Corridor Environmental Study: Existing Conditions Report*. Atlanta, GA.
- ^v BeltLine Final Redevelopment Plan
- ^{vi} MARTA. Bus Schedule and Routes. 2 May 2011. <http://www.itsmarta.com/bus-schedules.aspx>
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<http://www.BeltLine.org/Implementation/ParksandGreenspace/tabid/1736/Default.aspx>
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- ^{ix} <http://pathfoundation.org/about/history/>
- ^x "Funding: Capital Campaign". Atlanta BeltLine, Inc.. 3 May 2011.
<http://www.BeltLine.org/Funding/CapitalCampaign/tabid/1732/Default.aspx>
- ^{xi} "Introduction to New Starts". USDOT: Federal Transit Administration. 3 May 2011.
http://www.fta.dot.gov/planning/newstarts/planning_environment_2608.html
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<http://www.BeltLine.org/Funding/FederalFunding/tabid/1733/Default.aspx>
- ^{xiii} <http://www.BeltLine.org/BeltLineBasics/FAQs/tabid/1743/Default.aspx>
- ^{xiv} <http://www.BeltLine.org/LinkClick.aspx?fileticket=4QcdnOiyEEg%3d&tabid=1826&mid=3460>
- ^{xv} "Environmental Impact Study (EIS)". 3 May 2011.
<http://www.BeltLine.org/BeltLineBasics/TransitTrailsandTransportation/EnvironmentalImpactStudyEIS/tabid/2936/Default.aspx>
- ^{xvi} http://rftgf.org/PP/pdf-presentations/CityStudies/WilmingtonR2G.pdf?ml=5&mlt=rhuk_milkyway&tmpl=component
- ^{xvii} <http://www.americantrails.org/resources/ManageMaintain/MilwMaintcost.html>

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