Technology Enterprise Park

FEASIBILITY STUDY

February 2017

About the Feasibility Study

The purpose of this study is to understand the feasibility and provide a roadmap for expanding Georgia Tech's existing Technology Enterprise Park (herein referred to as "TEP") into a broader mixed-use innovation district or neighborhood. Through this study, Georgia Tech hopes to help create a more livable and thriving community along the western edge of Georgia Tech, which would attract new residents, workers, and visitors to the area while enhancing the historic culture, character, and quality of life for existing residents on the Westside. A clear challenge of the study was the sensitive interjection of high tech industry into an economically depressed neighborhood. The opportunity is to utilize and leverage the assets of Georgia Tech, the existing TEP research park, and the surrounding area to be a catalyst to create a pedestrian friendly, desirable neighborhood with an innovation and commercialization focus in close proximity to Georgia Tech and downtown Atlanta.

This report would not have been made possible without the contribution of a talented and dedicated project team. Under Georgia Tech's direction and leadership was the consulting team led by Perkins+Will, along with TEConomy, HR&A Advisors, and Point A Consulting, who evaluated the TEP Study Team's vision through economic, cultural and physical development lenses. This work was supported by the Economic Development Administration (project ED15HDQ0300031), with contributions by partners Invest Atlanta and The University Financing Foundation. Also, special thanks to Stacey Mills, Program Officer, US EDA Atlanta Region, for her assistance with grant administration.

The TEP Study Team includes members of the Enterprise Innovation Institute at Georgia Tech, along with partners Invest Atlanta and The University Financing Foundation (TUFF). With oversight and collaboration with the TEP Study Team, a collaborative team consisting of Perkins+Will, TEConomy Partners, HR&A, and PointA Consulting evaluated the TEP Study Team's vision through economic, cultural and physical development lenses.

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PERKINS +WILL   TECONOMY PARTNERS   HR&A

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“TRULY GREAT INSTITUTIONS LIKE GEORGIA TECH DEFINE AND DIRECT THE WAY OUR WORLD CHANGES, RATHER THAN JUST WAITING FOR IT TO HAPPEN.”

G. P. “Bud” Peterson, President
Designing the Future: A Strategic Vision Plan

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EXECUTIVE SUMMARY

BACKGROUND

Technology Enterprise Park is an existing bio-science research park adjacent to and affiliated with Georgia Tech. This existing research park is at the center of an effort to expand the economic development of Georgia Tech by further developing the innovation neighborhood concept around the campus.

TECHNOLOGY ENTERPRISE PARK AT A GLANCE

ESTABLISHED

Technology Enterprise Park opened in 2007 and is owned and operated by Georgia Advanced Technology Ventures, a non-profit affiliated corporation of Georgia Tech

LOCATION

South of Georgia Tech's North Avenue Research Area (NARA) at the intersection of North Avenue and Northside Drive and on the edge of Atlanta's Westside

LAND AREA

13 acres of near term soft development site within 35 acres of institutionally-controlled land

PROGRAMMATIC TARGET

Current programmatically targeted to bio-sciences companies

CURRENT BUILDINGS

Contains two buildings:
(1) a five story multi-tenant facility (built in 2006 and called TEP1) with 120,000 square feet of high performance wet labs, clean rooms and commercial office space
(2) the reuse of an existing warehouse into high-tech, pre-clinical research space

FEASIBILITY STUDY

Conducted and supported by Georgia Tech, The University Finance Foundation and Invest Atlanta, this feasibility study builds on Georgia Tech's planning efforts with a grant from the U.S. Economic Development Agency (EDA). Whereas previous plans created many viable concepts for Technology Enterprise Park, it was the task of this study to synthesize earlier efforts and test their merits for programmatic and economic feasibility in relation to continued social, economic and general positive impact on the English Avenue and Westside neighborhood areas, with the underpinning of expanding the existing Technology Enterprise Park into a broader bio-science and technology innovation district or neighborhood. Further, the study sought to provide a roadmap that could unify the relatively few immediate landowners by creating a framework plan that will meet the programmatic needs of many.

METHODOLOGY

The study was conducted through three distinct tracks to ensure that feasibility was measured in every dimension, while ensuring the district vision was held at the forefront.

The tracks included:

- Economy: An analysis and direction for the research strengths and industrial drivers can propel economic growth in the future grounded in the area's real estate market. This track was completed by Teconomy and Partners and HR&A.
- Place: An analysis and direction for the physical development that responds to the site's challenges, opportunities and neighbors to enable economic development. This track was completed by Perkins+Will.
- Culture: An analysis and direction for programs and the communication needed to create a culture of innovation. This track was completed by Point A Consulting.

With these tracks in place, the study team conducted the following analysis:

- Industry/Technology Line-Of-Sight Analysis
- Real Estate Analysis
- Economic Impact Analysis
- Redevelopment Analysis
- Concept Master Plan
- Innovation Ecosystem Analysis

These analyses included over 100 interviews, data analysis sourced from national, state and local sources and technical studies.

KEY FINDINGS + VISION

This study confirms that a multi-disciplinary mixed-use innovation district can be created in and around the existing Technology Enterprise Park. Key to this success will be Georgia Tech efforts to extend the university's identity, connectivity and programming in the district area. Specific findings for the success of a district vision are as follows.

Economy

Technology Enterprise Park needs to expand its focus from the bio-science vector already in place. While bio-science can continue as a vector, Technology Enterprise Park needs to expand into a multi-disciplinary research park that leverages both the research strengths of Georgia Tech and the growing industry sectors in Atlanta including:

- Biosciences
- Advanced Manufacturing
- Energy
- Information and Communications Technology

To build on these findings, the vision is to create a diversified science and technology park designed to foster multi-disciplinary opportunities in these research strength areas.for each discipline and, most critically, for the disciplines to come together around multidisciplinary opportunities. Based on our analysis, the following near-term opportunities are envisioned for the park:

- Biofuels and bioproducts
- Cell manufacturing
- Digital health
- Autonomous robot systems
- Cyber-physical and sensing systems

Combining these areas with the commercialization know-how, entrepreneurial culture, workforce skills and manufacturing competencies in Georgia Tech, Technology Enterprise Park's opportunity is to harness all of these areas of excellence to establish a mixed-use "**industrial innovation district**."

The district should be a vibrant urban destination, not just a research park. It should be complete, with inter-parcel connectivity, balanced land uses and shared parking. The district should be active throughout the day and night, promoting a diversified mix of visitors and a casual interaction between those visitors.

Place

Technology Enterprise Park needs to become more integrated into its context. Currently, the site feels like an island situated at a critical point in the city near Georgia Tech. The site is:

- Physically disconnected from campus by a rail line
- Physically isolated by its vehicular focused boundaries of North Avenue and Northside Drive
- Physically divided by a high-tension power line that cuts through the site
- Culturally split between Georgia Tech and the Westside neighborhoods
- Culturally ungrounded in its industrial past

The vision for Technology Enterprise Park is to provide more and better connections for people, while creating a flexible and connected district that leverages its industrial heritage and makes places for people.

The following improvements and additions need to be explored in the short term:

- The North Avenue Underpass needs enhancement with a focus on pedestrians and cyclist.
- The Bankhead Bridge (an abandoned bridge) needs to be repurposed providing a connection from Georgia Tech to the Westside over the railroad.
- A new pedestrian-bike bridge directly connecting Technology Enterprise Park to Georgia Tech's campus through NARA needs to be added.
- New streets need to be aligned and coordinated with the Atlanta Housing Authority's Herndon Redevelopment to the south.
- Shared parking or a municipal parking structure needs to be considered, as per current zoning providing parking to match the development potential is challenging.

Longer term, building on the site's rich industrial history, coupled with the vision to create an innovative maker district, must be expressed through a character that celebrates the industrial and creative spirit of the place. This should be coupled with extending the sustainable development practices and policies of Georgia Tech employs on campus to Technology Enterprise Park. Combined, these efforts will build on the **industrial innovation district** and truly break ground in the global space of research parks.

Culture

Technology Enterprise Park needs to create a platform for fully engaging functions that are central to creating an innovation ecosystem. As the park grows from its compact size, the demand for a strong dedicated leader with a clear directive will become critical.

To fully realizing success, the vision for Technology Enterprise Park is to establish an expanded and centralized management structure to shepherd the district. This structure should build basic building blocks are in place, establishing a strategic business plan to guide the development of the park. This business plan should:

- Align to Georgia Tech's strategic priorities
- Incorporate the physical master plan's goals and assumptions
- Demonstrate how physical elements will be implemented
- Address programmatic elements

Further, Technology Enterprise Park should both more strategically join the active Westside community and invite the community to join the park, creating an innovation ecosystem that is open, dynamic and expansive.

SOCIAL AND ECONOMIC IMPACT

The catalytic impacts of significant investment in Technology Enterprise Park have the potential to greatly benefit the surrounding neighborhoods of English Avenue and Vine City. As Technology Enterprise Park attracts the tenants, resources, and programs that will catalyze the area into a truly mixed-use innovation district, these traditionally underserved communities will gain increased accessibility to job opportunities, workforce development and training resources, expanded retail options, and an improved public realm.

Technology Enterprise Park has the potential to add nearly 3,000 new jobs to the immediate area and $3 million in annual recurring local taxes. While many of these jobs are anticipated to be in professional research sectors, Technology Enterprise Park has the potential to offer jobs in a wide variety of sectors requiring a diverse array of skill levels, ranging from food service to medial instrument manufacturing to hotel administration.

The continued development of Technology Enterprise Park will significantly increase the usage of and demand for open space and broader connectivity to the main Georgia Tech Campus. This connectivity could include pedestrian bridges over the railroad tracks to traverse the hard physical barrier, traffic calming measures on North Avenue and Northside Drive to facilitate safe walkability, and linkages to the potential new spur trails that with connect the university to the Beltline and the Westside Quarry Park. In an area containing a relatively small amount of open space, Technology Enterprise Park could create much-needed public space for the surrounding neighborhood, serving local and regional residents, and providing a rich amenity to attract new businesses to the District.

NEXT STEPS

Realizing the great potential of Technology Enterprise Park to become an **Industrial Innovation District** requires many enabling actions on the part of Georgia Tech and its district partners. The following is a list of key next steps:

- District Alliance
  Georgia Advanced Technology Ventures and Georgia Tech need to create a partnership/alliance to drive the district vision.

- Continued Coordination (Physical and Brand)
  Further coordination is necessary between Georgia Tech, Northyards and the Atlanta Housing Authority to establish a unified development plan for the district. Such a plan would detail programmatic mix, zoning parameters and shared parking solutions. Beyond the district's core area, coordination needs to continue with the Georgia Department of Transportation, Bethursday Development Corporation and the Westside neighborhoods.

- Support for Connectivity
  With the physical disconnectivity issues, connectivity needs continued support, planning and implementation. Specific projects for support include: bridges over the railroad, the North Avenue Underpass and North Avenue site entry, GDOT's Northside Drive studies and the City's current studies in public transit.

- Brand and Communications Strategy
  A branding and communications strategy needs to be developed as a way to translate the findings of this study into a compelling message that can be taken to market.

- Dedicated Leadership Function
  A dedicated leadership function needs to be created within the district to address marketing, recruitment, tenant services and business planning.

- Continue to Lead
  The district's future will continue to depend on the university's leadership.

01.

01. DISTRICT VISION

"Collectively we have created viable master plan concepts. However, we wish to test the merits of these concepts for programmatic and economic viability and for the continued social, economic and general positive impact on the English Avenue and Westside neighborhood areas."

REVITALIZATION MOMENTUM, TRANSFORMATIVE POTENTIAL

Atlanta's Westside is changing. Over the past four years, the level of interest, investment and community outreach has accelerated at a pace unseen since the Olympics. And while Atlanta has always had a robust dialogue about the future of its neighborhoods and institutions, this Westside resurgence is different from other transformative efforts in the past.

Most notably, there is a fresh and vigorous public sector focus on revitalization emanating from several different sources. Invest Atlanta has recently updated the Westside Tax Allocation District plan, which identifies priority corridors for Complete Streets investments as well as catalyst sites for residential infill and mixed-use development in Vine City and English Avenue. During the same period, the Atlanta Housing Authority completed a Choice Neighborhoods plan and was awarded $30 million to be invested in neighborhood improvements and mixed-income housing. The City's Department of Parks and Recreation is leading the development of two new urban parks, MARTA is proposing several transit projects including a new station at Boone Boulevard, and the Georgia DOT is completing a study of long-term transport diversification on Northside Drive.

In addition to brick-and-mortar efforts, there is an upward trend in environmental awareness, advocacy, and action. High profile efforts include the linear arboretum and the rehabilitated landscape around the massive Bellwood Quarry, both along the Atlanta BeltLine. Proctor Creek, the Westside's neglected urban waterway, has benefited from grassroots cleanups and a host of environmental studies. The Emerald Corridor Foundation is actively acquiring land along the creek to be used for conservation and open space, starting with a pilot project along the BeltLine. And the Atlanta University Center area is one of eleven pilot projects in North America working toward EcoDistrict sustainability certification.

There is also heavy philanthropic investment through the efforts of the Arthur M. Blank Family Foundation, the Chick-fil-A Foundation, the Coca-Cola Foundation, and others. This has resulted in over $30 million supporting projects like Westside Works, the Westside Social Enterprise Civic Innovation Lab, new programs at City of Refuge, home improvements coordinated by Atlanta Habitat for Humanity, and many more. These efforts depend on the sustained engagement of local residents who have been vocal about the need for inclusivity.

The catalyst for much of this activity is Mercedes-Benz Stadium, the $1.4 billion project that will open in 2017. It will be a new landmark for the city and state, an anchor for commercial and mixed-use development along Northside Drive, and an icon for the Westside.


PIEDMONT PARK
ATLANTA BELTLINE
PONCE CITY MARKET
FOURTH WARD PARK
MIDTOWN ATLANTA
DOWNTOWN ATLANTA
TECH SQUARE
COCA COLA
TECHNOLOGY ENTERPRISE PARK
AHA HERNDON REDEVELOPMENT
GEORGIA INSTITUTE OF TECHNOLOGY
METLIFE NORTHYARDS
GEORGIA WORLD CONGRESS CENTER
NORTH AVENUE RESEARCH AREA
ENGLISH AVENUE NEIGHBORHOOD
RODNEY COOK, SR. PARK


GEORGIA TECH
MARIETTA STREET
TECH PARKWAY
NORTHSIDE DRIVE
COCA COLA
NORTH AVENUE
TEP STUDY AREA
+/- 70 ACRES
LUCKIE STREET
ENGLISH AVENUE
GWCC PARKING
GWCC STAGING
IVAN ALLEN JR. BLVD


NARA
TEP 1
T3 LABS
TEP SITE
AHA HERNDON REDEVELOPMENT
METLIFE NORTHYARDS

THE SITE

The key location of TEP will make it as important to the future of the Westside as the Mercedes Benz Stadium, less than a mile to the south. Its visibility and prominent position at the busy intersection with North Avenue enhances its real estate value; taken together with AHA's Herndon Homes redevelopment, development on this site has the capacity to change the blighted corridor into the Westside equivalent of Peachtree Street. It is a key redevelopment target for many major area stakeholders beyond Georgia Tech – most notably Antioch Baptist Church, whose property investments and development plans depend on activation of Northside Drive. It is also highly symbolic to local residents who see it as the test case for Georgia Tech's commitment to their community.

However, to realize the site's full transformative potential it needs improvements both within and beyond its boundaries. It is well located for regional vehicular access but is hampered by a lack of pedestrian connectivity, especially to the Georgia Tech campus and the adjacent neighborhoods. Pedestrian and bike facilities range from inadequate to barely present along Northside Drive, and the railroad viaduct presents obstructs the site visually and physically from Tech's historic core. The site is culturally rich with artifacts of an earlier rail era, but lacks amenities that would attract casual visitors. The high-voltage power distribution infrastructure along with the Georgia World Congress Center (GWCC) **marshalling** yards further constrain the site. The GWCC is not currently interested in redevelopment of the marshalling yards, and it was not considered as part of this study.

STAKEHOLDER PERSPECTIVES

Despite these drawbacks, there is an overwhelming sense of possibility and untapped potential, and the feeling that, like Tech Square in the early days, there is energy around something ready to launch. In over 80 interviews with a wide variety of stakeholders, including representatives from academia, government, real estate, business, and local faith-based institutions and nonprofits, there was consensus around the future of TEP as a premier Innovation District and one of the last big economic opportunities in Atlanta's core. A sampling of comments reflects this optimism. To many stakeholders, TEP is:

- A district that melds into the community and knocks down borders
- A place for jobs and training, education, outreach, and research
- A landing pad for graduate companies from Tech Square
- A place to expand Georgia Tech's role as an anchor institution
- A unique venture, and different kind of urban research park
- The Campus of the Future

BACK-OF-HOUSE TO FRONT AND CENTER

The trajectory of TEP has been intimately linked to changing attitudes toward the rail corridor and Northside Drive over the last twenty years. This shift is embodied in the way the two oldest developments, NARA and Northyards, have evolved - and the way TEP 1 and the Herndon Homes site are now being positioned as components in a larger research landscape.

NARA (the North Avenue Research Area Complex) began with the construction of the Zinn Combustion Lab in 1997, and was most recently updated with the Carbon Neutral Energy Lab in 2013. It was originally seen as a place for nuisance-prone testing, selected for its relative isolation and industrial context. The current buildings all conform to this pattern which is perceived as incompatible with the new direction of the campus core, with high-bay spaces and mechanical equipment. NARA is planning an expansion to the north in order to provide additional space for advanced research and testing which would be otherwise difficult to accommodate on campus.

As a flexible lab space and demonstration project of carbon-neutral building technology, the design of the Carbon Neutral Energy Lab is a departure from the back-of-house, out-of-sight orientation of older buildings in the complex. Compared to the industrial warehouse of the Materials Research Lab, this newest NARA building suggests a greater public face and an experimental edge for this side of campus.

In similar fashion, Northyards has transitioned from a budget-conscious adaptive reuse concept to a mainstream example of the new American workplace. When it was repositioned in 2001, Northyards was a pioneering example of a (quasi) heavy manufacturing complex repurposed into creative Class B office space. Its main selling point was bargain rents for an in-town location, and the typical tenant profile targeted by the developers was a call center – a very back-of-house commercial use.

Yet in early 2016 MetLife bought the property for $63 million, roughly $40 million more than its total development cost at launch. Current rents at Northyards average $25 a square foot, exceeding both Class B rents in Midtown and Class A and B rents in Downtown. With fiber-optic technology and high design, Northyards has become a prime destination for creative industries and emerging concepts in shared / mobile work environments. Tenants like The Gathering Spot are redefining the way people work, with concierge services, flexible office space, conference and events spaces, and 24/7 availability.

This shift from a back-of-house attitude to one of front and center prominence is nowhere more apparent than in the plan for the Herndon Homes redevelopment. For many years one of AHA's lower priority redevelopment sites, the Herndon Homes property is now being envisioned as a mixed-use, mixed-income development more in line with loft-style market rate apartments in the Upper Marietta / West Midtown district than with comparable public housing transformations elsewhere in the city. With a grocery store and structured parking in its first phases, it is a no-holds-barred urban project in a part of town that would have been very difficult to imagine only a few years ago.


< COFFEE
BOT

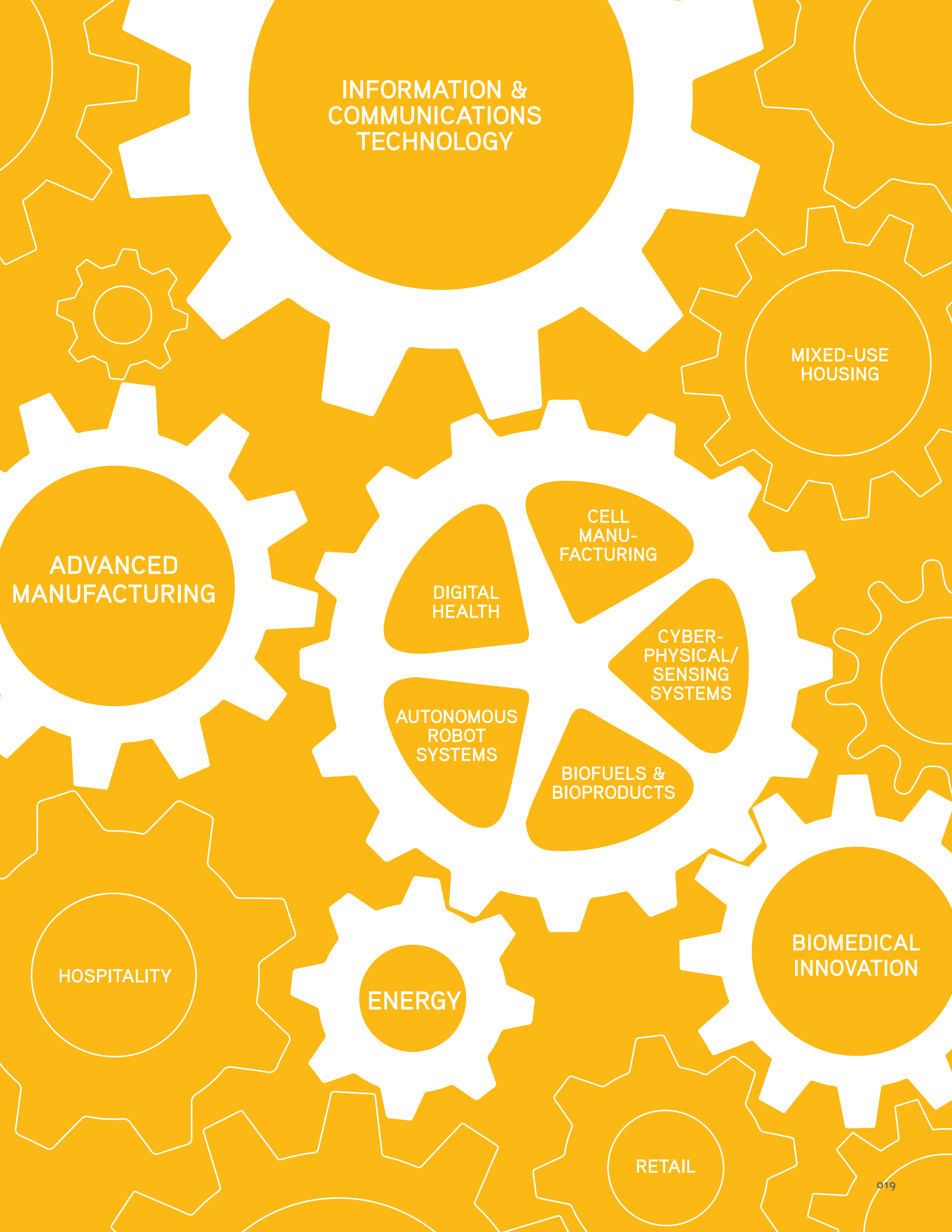
A DIFFERENT KIND OF SANDBOX

Georgia Tech and its partners have recognized the potential of TEP as a new research destination on par with Tech Square, as illustrated by the 2006 investment in biotech space under the Building 1 project. The vision for TEP's future has revolved around the concept of blending additional biotech research space with residential development and amenities, similar to the model of Tech Square, albeit with a different research program. At the same time, there has been a recognition of the success of NARA and the need for other types of testing labs that could support research programs more aligned with Georgia Tech's traditional engineering roots.

The emergence of the Maker Movement coincides with this impulse toward blending engineering research and urban manufacturing with economic and community development. This phenomenon reaches back to the heroic era of American invention, to figures like Thomas Edison and George Westinghouse. In fact, Edison's West Orange complex is one of the most comprehensive examples of sole-sourced makerspace dedicated to manufacturing and commercialization we have, even though it is over a century old. At West Orange, Edison constructed an assortment of sheds and lofts to conduct physical and chemical experiments leading to inventions like the phonograph and the electric storage battery. These buildings were largely masonry shells capable of supporting heavy machinery, set up to "build anything from a lady's watch to a locomotive". The simple adaptability of the complex and its components allowed Edison to rapidly innovate and prototype new ideas.

Another modest example of the power of flexible, adaptable (and unfortunately demolished) space is Building 20 at the Massachusetts Institute of Technology. It was built in 1943 as an emergency temporary structure for the war effort. Like most wartime buildings it was intended to be removed immediately after it fulfilled its purpose. However, lack of research space at MIT kept it in service for another fifty years. Affectionately referred to as the "Magic Incubator", Building 20 was loved by its occupants for the fact that there was little institutional concern for the ways in which it was being used. This throwaway attitude toward the building gave researchers the freedom to adapt the building in whatever way they wanted. This resulted in what is probably the first instance of hackerspace / makerspace in the nation, leading to commercial ventures like Bose and National Semiconductor.

Flexibility can exist at the scale of a district as well as a building. Our post-colonial military infrastructure can be considered as a kind of large-scale maker environment, embodying ideas and practices that were quite sophisticated at the time of their inception. Two miles from MIT's Building 20, workers at the Charlestown Navy Yard built the 18th Century's most advanced weapons using industrial materials and processes, with skilled labor sourced from the surrounding areas. The complex contained shops, storehouses, rope mills, a powerhouse,


INFORMATION & COMMUNICATIONS TECHNOLOGY
MIXED-USE HOUSING
ADVANCED MANUFACTURING
CELL MANU-FACTURING
DIGITAL HEALTH
CYBER-PHYSICAL/ SENSING SYSTEMS
AUTONOMOUS ROBOT SYSTEMS
BIOFUELS & BIOPRODUCTS
HOSPITALITY
ENERGY
BIOMEDICAL INNOVATION
RETAIL

a foundry, and a forge, as well as administrative offices, residential buildings and a dispensary. Most of these were housed in large shed-like buildings arranged within a street network that accommodated everything from pedestrians to railroad cars. While some buildings changed over time, most of the complex was flexible enough to adapt to advancing technology due to the simplicity of its design. Decommissioned through BRAC, it is today an extremely desirable environment for creative industries and innovative start-ups.

What would a 21st Century version of Edison's labs look like? There are few if any precedents to guide design; most exist in the form of artists' facilities that involve industrial-like processes such as metal casting, woodworking, glass and ceramic production, electronics prototyping, and others. Many of these occupy former manufacturing facilities, ranging from a blast furnace (Sloss Metal Arts) and a cotton gin (Goat Farm Arts Center) to an entire military factory (Beijing 798 Art Zone). At the other end of the spectrum are the new, purpose-built makerspaces, like Baltimore's Open Works or San Francisco's Double Union, that resemble small artisan workshops or flexible space for creative tinkerers.

Very few research universities have made investments in the kind of experimental environments epitomized by Edison's labs or arts incubators. One notable exception, Pennovation Works in Philadelphia, has only just opened its first building, although the university has plans to develop the entire 23-acre site as a working landscape that combines R&D makerspaces with artistic production and exhibition. This "sandbox" for Penn will facilitate interaction between a variety of academic researchers, students from the design school, and corporations like Hershey.

THE OPPORTUNITY + THE VISION

This is a unique opportunity for Georgia Tech, the City of Atlanta, and the neighborhoods of the Westside. It is a chance to change vacant land into productive development, to transform a state highway into a multimodal main street, to anchor the Westside in a mixed-use innovation district of the highest quality, and to bring the intellectual energy and technological capabilities of a world-class research institution to a new audience across the tracks. Together, an **Industrial Innovation District** can be developed to support and enhance Georgia Tech's mission while creating significant economic growth and opportunity in this area.

By combining technology and craft in a major planned development that encourages creativity and innovation around the making and commercializing of things, Georgia Tech will write the next chapter of its long story that began with its mission of educating leaders, and would drive the industrial economy of the New South. In an area of the city that has seen conflict over civil rights, dislocation due to urban renewal, and abandonment by the market, Georgia Tech has the skill, capability, and resources to turn the attention of the city from the east toward the west.

VISION STATEMENT

An Industrial Innovation District that leverages the research strengths and capabilities of Georgia Tech, that is designed for multidisciplinary opportunities for industry, and creates a mixed-use environment for significant economic development.

02.

02. FEASIBILITY FACTORS

FACTORS TO ESTABLISH FEASIBILITY FOR TEP

To ensure its success as a programmatically and economically viable place that has a continued social, economic, and generally positive impact on the English Avenue and Westside neighborhood areas, Technology Enterprise Park should take the following steps:

Measure #1
EXTEND THE UNIVERSITY

Measure #2
ECONOMY

- Play a catalytic role in advancing innovation opportunities
- Be open to flexibility in research sectors
- Make a district
- Cultivate activity

Measure #3
PLACE

- Provide more and better connections for people
- Be an environmental leader, following the campus's lead
- Be flexible and connectable
- Make places for people
- Create character
- Be creative with parking

Measure #4
CULTURE

- Create an organizational structure with capacity to lead
- Create a strategic business plan
- Join the community
- Have the community join TEP

Measure #1
EXTEND THE UNIVERSITY

The "secret sauce" at TEP should be Georgia Tech, just as it is at Tech Square. For too long NARA and TEP have been islands on the far side of the railroad and outside of the perceptual boundaries of the university. This study recommends extending Georgia Tech's brand, signage, police presence, and public safety infrastructure into NARA, TEP, and the edges of the district. Further, a re-branding exercise is necessary to collapse NARA and TEP into a single place, both physically and in name.

Measure #2
ECONOMY

PLAY A CATALYTIC ROLE IN ADVANCING INNOVATION OPPORTUNITIES

While all of the innovation opportunity areas reflect an alignment between the region's existing and emerging industry innovation drivers and Georgia Tech, only the Information and Communication Technology (ICT) innovation opportunity area is strong enough today in its growth to drive absorption in the near term. This study recommends that Georgia Tech play a strong role in catalyzing TEP to generate industry engagement and technology commercialization.

BE OPEN TO FLEXIBILITY IN RESEARCH SECTORS

The innovation opportunities for TEP lie in flexible spaces that can accommodate ICT, biosciences, energy and advanced manufacturing, allowing for academia and industry to come together in research, evaluation and testing. The market opportunities for TEP lie in urban industrial mixed-use environments. This study recommends that TEP leverage both opportunities to establish itself as an **industrial innovation district**, where Georgia Tech and industry can come together to make future technologies.

MAKE A DISTRICT

Momentum exists for the creation of an "innovation district" with TEP at its heart. Atlanta's Upper Westside, also an area characterized by industrial land, has undergone a renaissance in the last five years. TEP sits within a large zone of land that could be ripe for change with the right catalytic activities. Making the district complete, with inter-parcel connectivity, balanced land uses and shared parking, is possible through coordinated planning with adjoining property owners, notably NARA, the Atlanta Housing Authority, Northyards and community institutions west of Northside Drive.

CULTIVATE ACTIVITY

The vitality of an innovation district is as much about what goes on outside the lab as it is a quality of the science inside. Leading innovation districts have mixed office, R&D, residential and other commercial land uses. This mix creates activity throughout the day and night and promotes casual interaction between people, known as creative collisions. With careful orchestration of uses and phasing, Georgia Tech can build a vibrant urban destination, not just a research park.

Measure #3
PLACE

MORE + BETTER CONNECTIONS FOR PEOPLE

TEP is disconnected by railroads and major arterial streets. This study recommends TEP be strategically connected to Georgia Tech's campus, the surrounding community, and adjoining properties. For this, new connections are recommended for pedestrian, bicycle, and transit movement. As hallmarks of mobility on campuses and in vibrant mixed-use districts, these connections should be human scaled, by foot and transit, and should focus on the three measures of connectivity success: 1) convenience, 2) safety and 3) attractiveness.

BE AN ENVIRONMENTAL LEADER, FOLLOW THE CAMPUS'S LEAD

To find models of leading sustainable development, TEP does not need to look any further than the campus and policies of Georgia Tech. This study recommends adopting the university's sustainability strategies to build the greenest innovation district in the world.

FLEXIBLE AND CONNECTABLE

Establishing a clear, flexible framework of streets, blocks, and open spaces that can accommodate a wide variety of building types is central to this feasibility study. It ensures long-term adaptability as the site is developed over time. Flexibility leaves room for the unknown, such as new building programs and uses, incremental implementation, phasing and changing parking needs. Further, TEP's success will hinge on its connectivity: to the campus, to the community, to the city, and to technology itself. The master plan must facilitate connectivity.

MAKE PLACES FOR PEOPLE (AND CONNECT THEM)

As a nexus of creativity, innovation, learning, and living, TEP is uniquely positioned to elevate these activities in a way that inspires a new kind of makerspace for the campus and community. Reactivating major streets, such as North Avenue and Northside Drive, through street frontages with a mix of retail, makerspace, and innovation labs will bring a new identity to the area, while also encouraging more pedestrian and bike connectivity. Within the site itself, signature open spaces and alleys allow for the activity within the buildings to be brought outside as a way to activate the streets and showcase innovation and creativity.

CREATE CHARACTER

The site's rich industrial history, coupled with the vision to create an innovative maker district, must be expressed through a character that celebrates the industrial and creative spirit of the place. While the buildings should all exhibit a contemporary aesthetic, they can all share the use of honest materials, simple forms, and a transparency of structure and activity within. Open spaces, such as parks, plazas, and streetscapes should be centered around performative design and durability, while providing for a spectrum of activity and gathering spaces - all celebrating the industrial-inspired character and forward-thinking and sustainable planning of Tech's campus and the innovative spirit of the maker district.

BE CREATIVE WITH PARKING

The demand for and eventual supply of parking is central to the long-term development of TEP. On the one hand, parking is necessary as it is part of daily life in Atlanta. On the other hand, the City is growing into a more dense city with alternative modes of transportation becoming more viable. Further, technological change including automation and ride sharing will change mobility in coming years. These changes will decrease the demand for on-site parking. With this in mind, this plan recommends that shared parking scenarios with AHA and/or Northyards be explored as well as strategies for ride share and unbundle parking demand.

Measure #4
CULTURE

CREATE AN ORGANIZATIONAL STRUCTURE WITH CAPACITY TO LEAD

As with all great endeavors, TEP needs a strong management structure to shepherd the district through its future successes and challenges. The basic building blocks (corporate structure, legal entities and authorities, mechanisms, etc.) are largely in place and are operating with TEP as it exists today - a relatively small and self-contained research park. As TEP grows and new opportunities are realized, this study recommends an expanded and centralized management structure, including a CEO for TEP, to ensure effectiveness in addressing functions central to innovation district success.

CREATE A STRATEGIC BUSINESS PLAN

A road map and operational plan must be in place to ensure that the big vision doesn't get lost in the everyday. For TEP, this study recommends a strategic business plan that provides alignment to Georgia Tech's strategic priorities and is updated at regular intervals as they too evolve. The plan should incorporate the physical master plan's goals and assumptions, demonstrating how those physical elements will get implemented. Further, it should address how all manner of programmatic elements will overlay on the physical plan and provide the content and "stuff" of the place.

JOIN THE COMMUNITY

An incredible amount of community development activity is presently underway in Atlanta's Westside. Georgia Tech, with TEP and NARA, has the potential to contribute a major employment center to the local economy and create a gateway of opportunity. Engagement in planning activities and advocacy for the district's potential and needs among stakeholders and institutions is required to fully leverage this opportunity.

HAVE THE COMMUNITY JOIN TEP

A successful innovation ecosystem is open, dynamic, and expansive, not limiting or constrained. With this in mind, while it is important for TEP to join the community, TEP should also invite the community into the site. This study recommends that community inclusiveness be considered a desired goal, that the establishment of a community workforce development pipeline be a priority and that TEP provide workforce development beyond direct neighborhood interests.

03.

03. ADVANCING RESEARCH

ADVANCING RESEARCH WITH INNOVATION-LED GROWTH OPPORTUNITIES

Understanding the feasibility of enhancing Technology Enterprise Park into a larger innovation district requires an in-depth assessment of the likely innovation-led industry growth opportunities that can drive the demand for space. When TEP was launched by Georgia Tech in 2007 on its original 11-acre parcel, it was largely conceived of as a biosciences-focused research park. While TEP has had some success, its potential for catalyzing broad-based economic development has yet to be fully realized.

This raises the need for a refreshed examination of the likely innovation-led industry opportunities to grow TEP. These opportunities are likely to have close ties to the existing and emerging core research competencies at Georgia Tech, so it is important to consider the alignment of broader innovation and industry growth taking place in the Atlanta region with Georgia Tech's industry-facing research strengths.

The results of that in-depth examination are set out in this section and find significant potential in a diverse set of innovation-led opportunities across sectors including: Biosciences, Energy, Advanced Manufacturing, and Information & Communications Technology.

The feasibility for each of these opportunities has been further considered by setting out the potential development pathways for realizing each one, based on interviews with Georgia Tech research leaders, industry executives, and economic development stakeholders.

The exciting opportunity that emerges is the transformation of TEP into a diversified science and technology park emphasizing multi-disciplinary applications in targeted innovation opportunities. This will create the nexus between industry and Georgia Tech where local research and development know-how, entrepreneurial culture, workforce skills, and manufacturing competencies can come together to drive economic development.

This enhanced focus of TEP will require greater connectivity with the North Avenue Research Area, Northyards Business Park, and the main Georgia Tech campus. It would then offer a distinct place-based development, complementary to the success that Georgia Tech has had in advancing Tech Square in Midtown Atlanta, one of our nation's leading innovation districts.

THE CONTEXT

The Atlanta region is well-known as a leading hub for commerce tied to its significant transportation infrastructure, first for the New South and now globally. Less well-known is that the Atlanta region is increasingly a hotbed for innovation-led industries.

The Atlanta region is making healthy gains in innovation-driven, export-oriented industries, aptly named Advanced Industries by The Brookings Institution, that drive economic development across regions of the U.S. These Advanced Industries include a wide range of manufacturing industries as well as engineering, software/computer services, and commercial research and testing services. They typically have a high innovation content and large workforce in science, technology, engineering and math (STEM) intensive occupations, which are exported to other states and around the world.

The Brookings Institution reports that from 2013 to 2015 Atlanta ranked 17th among the 100 large metro areas in the U.S. in its job gains in Advanced Industries, with growth of 4.5% standing well above the 2.5% recorded nationally. By 2015, direct employment by Advanced Industries in the Atlanta region accounted for nearly 230,000 workers, or nearly 9% of the region's total employment base. The full economic impact of these Advanced Industries rises by another 180,000 jobs, reaching roughly 15% of the Atlanta economy, through its multiplier impacts from supply chain relationships with other industries and personal spending by its workforce.[1]

For the potential expansion of TEP, this rising Advanced Industry focus found in the Atlanta region is complemented by the industry-facing research focus of Georgia Tech. The economic literature is clear that there are significant spillovers from universities, research, talent generation and commercialization activities in specific industries related to a university's strengths.[2] Unlike many other leading research universities, Georgia Tech has also taken a pro-active focus on advancing university-based economic development, which is embodied by its institutional focus on industry-facing research to drive industry collaborations. As Dr. Stephen Cross, Senior Vice Provost for Research explains: "Georgia Tech defined an industry facing research strategy focused both on leading-edge, use–inspired [university] research and economic development…Georgia Tech pursues a concurrent strategy centered on the core research areas…selected because they are appropriate aggregations of core university competencies represented in over 300 research centers and laboratories at Georgia Tech, their inter-disciplinary and trans-disciplinary nature, the alignment with strategic markets within the region, and the existence of industry partners interested in working with Georgia Tech."[3]

1 See Brookings Advanced Industries web site for more details at https://www.brookings.edu/research/americas-advanced-industries-new-trends/

2 See Hausman, University Innovation, Local Economic Growth and Entrepreneurship, National Bureau of Economic Research, Paper CES 12-10, June 2012

3 Stephen E. Cross, "Strategic Considerations in Leading an Innovation Ecosystem," Global Science and Technology Forum Journal of Business Review, 2013, vol 2, no 3, 104–109.

Georgia Tech is not only one of our nation's largest research universities, it is also a leader in industry-supported research and is very robust in its technology transfer activities. Total research activity at Georgia Tech reached $765 million in 2015, ranking it 25th in the nation and second only to MIT for universities without medical schools.[4] The $41 million of that research activity being funded by industry is substantial, placing Georgia Tech 26th in the nation in 2015. Technology transfer activities are also robust at Georgia Tech, with 300-400 disclosures each year having generated 469 active licenses with industry as of 2014, and 36 new companies started from university research over the 2012-2014 period. [5] Georgia Tech is also nationally recognized for its focus in advancing both entrepreneurial development and corporate innovation centers. The Advanced Technology Development Center (ATDC) is one of the most successful university-based incubator initiatives in the nation, named a Top 12 Incubator Changing the World by Forbes, with a 90% success rate for its incubator graduates five years after graduation. More than $2 billion in private funding has been raised among the 150 graduates since 1987. Meanwhile, through its Office of Industry Collaboration, Georgia Tech has been nationally recognized as "one of the nation's leading destinations for corporate research centers."[6]

But place-making around anchor research universities alone is not sufficient to drive innovation-led development. There must also be a focus on creating connections with existing and emerging regional industry players that can have a physical presence within the innovation district. One leading economist, Enrico Moretti from the University of California, Berkeley, explains in The New Geography of Jobs: "universities are most effective at shaping a local economy when they are part of a larger ecosystem of innovative activity, one that includes a thick market for specialized labor and specialized intermediate services. Once a cluster is established, colleges and universities play an important role in fostering its growth, often becoming a key part of the ecosystem that supports it and makes it successful."[7]

This points to the dynamics in which innovation-led industry clusters form and grow. Research universities can help in catalyzing development and supporting its growth over time, but a more intensive ecosystem of entrepreneurs, venture capitalists and existing industry needs to come into place to be the primary job driver for the commercialization of university research, formation of new companies and employment of universities' graduates. To identify where innovation-led industry clusters have an existing or emerging footing in the Atlanta region and align with Georgia Tech's research competencies, a detailed analysis was undertaken to consider the full set of innovation opportunities that could drive TEP growth.

4 NSF University Research Expenditures, 2015

5 Association of University Technology Managers (AUTM) database, 2014

6 Scott Andes and Bruce Katz, "Why Today's Corporate Research Centers Need to be in Cities," Harvard Business Review, March 1, 2016

7 Moretti, E., The New Geography of Jobs, Houghton Mifflin Harcourt Publishing, New York, NY, 2012, page 197.

APPROACH TO IDENTIFYING GROWTH OPPORTUNITIES

A line-of-sight analysis was used in this assessment to identify likely growth opportunities for enhancing TEP. This approach considers where the market pull of industry innovation drivers found in the Atlanta region align with the core research competencies of Georgia Tech to offer realistic growth opportunities for TEP, as illustrated below.

Demand Side:
Market Pull

Identify the industry innovation drivers in Broader Atlanta region

TEP OPPORTUNITIES

Targeted opportunities for expansion of TEP into a larger Innovation District

Supply Side:
Technology Push

Identify leading areas of Georgia Tech research discovery/technology advancement
+
Alignment of Georgia Tech research competencies and capabilities with Atlanta regional tech industry drivers

The key metrics for assessing the line of sight are explained below:

1 Patent Analysis of New Inventions

- Specialization in patent focus areas
- High impact areas

2 Emerging New Companies

- Venture Capital-backed
- ATDC Graduates

3 Leading Advanced Industry Strengths

- Industry Specialization
- Job growth
- Relative growth to U.S.

4 Academic Research Strengths

- Peer-reviewed publications
- Industry-facing research centers

METRIC 1 | Patent Analysis of New Inventions.

Patents are a primary way in which inventors are able to protect their innovations from being replicated. Industry is the overwhelming holder of patent applications and awards, and thus patent analysis is a direct way to consider the broad base of innovation across the Atlanta region's industry base. Since it can take several years for a patent award to be issued, it is important to also consider patent applications for assessing current innovation activities, though some of these applications may not be sufficient to lead to patent awards. Although there are other forms of intellectual property protection through copyrights, trademarks, and trade secrets, patents are among the most widely used form of protection for novel technological inventions.

Over 27,000 patent awards and applications were filed by inventors residing in the Atlanta region from 2009 to 2015, offering a significant database to analyze for innovation activity. While Georgia Tech is the leading university generator of patent awards and applications in the region, it still comprises less than 3% of the total number and overall universities in the region comprise just over 4% of patent activity.

To identify where the Atlanta region stands out in innovation activity, TEConomy considered those specific patent classifications where the region is a national leader as defined as: 1) A higher level of concentration than the nation at large, so the patent classification can be viewed as an area of patent specialization in the Atlanta region; and 2) A higher level of citations for patents in that classification than the national average (or what can be viewed as a higher patent impact). Patents routinely cite prior patents as references in documenting their new intellectual property, demonstrating the influence and importance of these earlier patents on future innovation.

Over 90 patent classifications with at least 20 patent awards stood out in the Atlanta region as both specialized and having a higher patent impact compared to national averages. This suggests the breadth and depth of innovation activity taking place in the region.

METRIC 2 | Presence of Emerging Technology Company Activities.

This assessment was considered by cross-walking venture capital-backed companies and recent graduates from Georgia Tech's Advanced Technology Development Center. Venture capital represents formal equity investment by established venture firms in emerging technology companies that offer high growth potential to generate sizable returns on that equity investment, as reported by Thomson Venture One database.

Over the 2009 to 2015 period, 220 companies in the Atlanta region received venture capital investments totaling $4.3 billion. Over the same period of time, ATDC reported generating 48 graduates, of whom 9 also received formal venture capital.

METRIC 3 | Leading Advanced Industry Strengths.

An analysis of industry performance at the most detailed six-digit industry classifications available under the North American Industrial Classification System (NAICS) was undertaken. These detailed six-digit industries offer insights into very specific products being developed by Atlanta regional companies and so enable a more refined cross-walk to Innovation Themes. Standard regional economic measures of performance were used to assess leading areas of detailed industry strengths found in the Atlanta region. These included the level of industry specialization found in the Atlanta region, where the industry is generating job growth, and the relative employment growth of the industry compared to the nation. TEConomy analyzed industry performance over the 2009 to 2014 period to offer a view since the economic recovery started.

Altogether, 86 detailed industries were identified in the Atlanta area as likely industry drivers of future economic growth because they are highly specialized, growing in jobs and/or growing faster than the nation, or some combination of these criteria.

METRIC 4 | Academic Research Strengths.

Each university has its own set of core research competencies—based on those focus areas where there is a critical mass of activity—in scholarly activities as measured by publications as well as the presence of research centers, grants and specialized laboratory infrastructure. While investments in universities can have significant impact in better aligning their research competencies with industry needs, pursuing new fields of research capacity can only be done selectively given the high cost and time it takes to accomplish.

To help assess the alignment of Georgia Tech's assets with broader measures of industry innovation activity a number of specific measures of Georgia Tech's core competencies were developed from analysis of publicly available databases along with insights from interviews with faculty leaders and administrative staff. Metrics include:

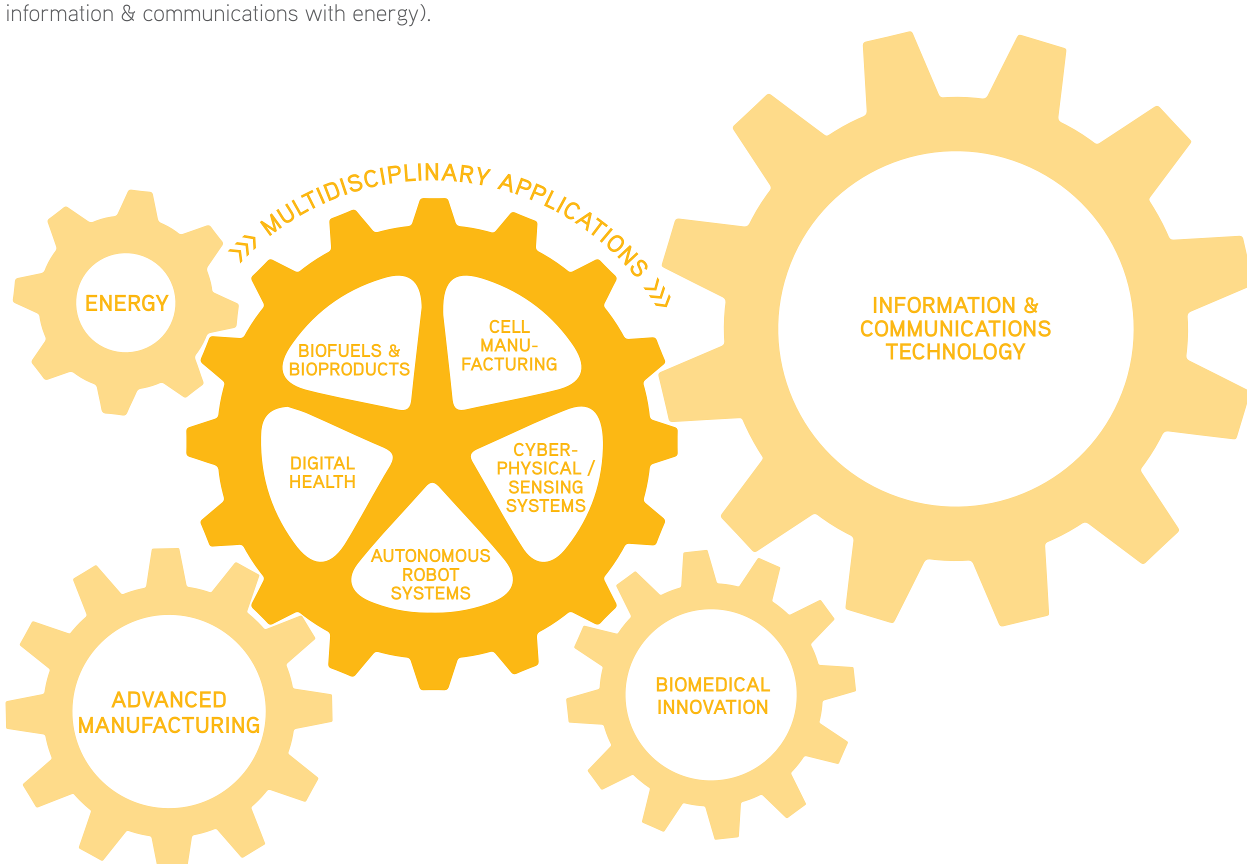
- Publications' share of the nation in peer-reviewed journals using data from Thomson Reuters for U.S. for 2009 to June 2013. The publication fields are predetermined by Thomson Reuters and were then mapped to the Innovation Themes.
- Presence of Major Industry Facing Research Centers, which bring together research excellence along with specialized education and training programs in signature facilities involving shared use laboratories that offer the ability for multiple users, including from industry, to collaborate with Georgia Tech.
- Presence of Active Industry Engagements as identified by industry sponsorships, consortium, and collaborative research activities identified from interviews.

FOUR BROAD AREAS OF OPPORTUNITIES

The results from the line-of-sight analysis identified four broad innovation-led opportunities that represent a strong alignment across both Atlanta's industry innovation drivers and Georgia Tech's research and development assets, including:

- Biosciences
- Energy
- Advanced Manufacturing
- Information & Communications Technology (ICT)

What stands out within each of these four innovation opportunities is that they are highly multi-disciplinary in their applications, and draw on the specific innovation strengths found among industry and Georgia Tech within each opportunity area. These involve technologies such as robotics, bioengineering, data analytics, cyber-physical/sensor systems and additive manufacturing. Among the multi-disciplinary applications that stand out are digital health (linking biosciences and information & communications technology), cell manufacturing (linking advanced manufacturing with biosciences), and smart energy systems (linking information & communications with energy).



APPROACH TO IDENTIFYING GROWTH OPPORTUNITIES

This innovation opportunity stands as an emerging industry innovation driver in the Atlanta region. While recent industry job growth has far outpaced the nation – led by commercial research and testing, surgical devices, and in vitro diagnostics – the overall sector has a 40% lower industry concentration in the Atlanta region than nationally. Still, at nearly 10,000 jobs in 2014, of which 30% are in the urban core of the Atlanta region, this emerging industry is reaching a critical size to drive future growth.

In terms of innovation activity, there are several leading areas across medical technology and biopharmaceuticals that stand out, including biomaterials, respiratory devices, ultrasound diagnosis, radiation therapy, monoclonal antibodies and genetic engineering. Both Georgia Tech and Emory University are leaders in patent innovation activity in both medical technology and biopharmaceuticals – which is not unusual for the biosciences since industry innovation is closely related to academic research discoveries. A very encouraging sign is that the Atlanta region appears to have an emerging innovation ecosystem with 36 bioscience companies receiving venture capital funding between 2009-2015 of nearly $800 million.

Georgia Tech stands out as a national leader in bioengineering, ranked 2nd in the nation in 2016, led by the Parker H. Petit Institute for Bioengineering and Bioscience. These efforts represent a broad span including: cardiovascular devices, new drug design and development, tissue and biomaterial engineering for novel devices, the emerging field of cell manufacturing that brings advances in robotics and sensing, and scaled-up manufacturing of stem cells and cell-based therapies, among other capabilities. Through its significant biosciences innovations, Georgia Tech collaborates with many large, emerging biomedical companies, including those involved in biopharmaceuticals, device development, and healthcare delivery.

There are many unique facilities and centers associated with Georgia Tech that contribute to the commercialization of medical innovation. One is the Global Center for Medical Innovation, which operates as an independent non-profit to offer entrepreneurs a shared-use space for prototyping of medical devices with significant technical and regulatory assistance. The Coulter Translational Research Program is another key resource for advancing new medical innovation at Georgia Tech, bringing together engineers and clinicians to identify and advance new medical innovations. Closely aligned with Georgia Tech is T3 Labs, a pre-clinical testing facility currently owned by Emory but located at TEP, which has significant regulatory compliance capabilities and offers training facilities for health professionals on new devices. Georgia Tech also supports a growing biomedical innovation professional master's program that trains students in the rigors of device innovation and regulatory affairs. Plus, the Atlanta Pediatric Device Consortium, which is a collaboration of Georgia Tech, Emory, and Children's Healthcare of Atlanta has an innovation competition and offers seed grants for development.

A closely related multidisciplinary industry development to biosciences innovation in the Atlanta region is found in digital health. The Metro Atlanta Chamber in its most recent survey found that statewide digital health stands at 16,000 jobs, primarily found in the Atlanta region. The Georgia Department of Economic Development reports that eight of the top 100 health information technology firms are located in Georgia, including McKesson Technology Solutions, MedAssets, HealthPort, and Navicure in the Atlanta region. Georgia Tech has a signature Interoperability and Integration Innovation Laboratory, now operated by Georgia Tech Research Institute, for addressing how health information systems are linked and offers a unique testbed for new health information technology applications development.

LEADING PATENT AREAS (2009-2015):

Medtech

- 2,151 patents, 4.5% of U.S. total, 14% more specialized, lower relative impact
- Examples of leading invention areas: materials for prostheses; bandages/dressings; respiratory devices, ultrasound diagnosis, radiation therapy

Biopharmaceuticals

- 1,069 patents, 3.8% of U.S. total, less specialized and lower relative impact
- Examples of leading invention areas: medicinal preparations, monoclonal antibodies, genetic engineering

PRESENCE IN EMERGING COMPANIES (2009-2015):

36 companies receiving $795 million with leading biomedical investment areas, including:

- Medical/Health Products – 8 companies, $254 million, 2.9% of companies and 6.9% of investment nationally
- Medical/Health Services – 6 companies, $100 million, 3.1% of companies and 2.7% of investment nationally
- Medical Therapeutics – 10 companies, $260 million, 1.8% of companies and investment nationally
- Human Biotech – 8 companies, $178 million, 0.9% of companies and 0.6% of investment nationally

Examples of Leading VC-backed Companies:

- CardioMems – wireless sensing and communication device, acquired by St. Jude
- EndoChoice – endoscopic imaging systems, devices and infection control products
- Clearside Biomedical – developing drug therapies for diseases affecting the retina and choroid
- Celtaxsys – developing drugs for inflammatory diseases through regulation of immune cell migration/activation

15 ATDC recent incubator graduates in biosciences innovation.

OVERALL INDUSTRY STATISTICS (Not including Digital Health):

Total Jobs, 2014 = 10,433

Job Growth, 2009-2014, Atlanta Region = 10.5%

Job Growth, 2009-2014, US = 2.8%

Relative Industry Concentration in Atlanta Region Compared to National Average, 2014 = 42% Lower

LEADING DETAILED INDUSTRIES (2014 AND GROWTH FROM 2009-2015):

- Medical laboratories – 3,050 jobs, 9% higher specialization, 4.4% job growth
- Surgical appliances and supplies – 1,132 jobs, 27% lower specialization, 56% job growth
- In-vitro diagnostic substance manufacturing – 535 jobs, 55% higher specialization, 17% job growth
- Commercial research and development – 2,376 jobs, 47% lower specialization, 57% job growth
- Digital health – Metro Atlanta Chamber cites a study that puts employment statewide, led by the Atlanta region, at over 16,000 with strong growth expected by the primary businesses surveyed

GEORGIA TECH'S ACADEMIC RESEARCH STRENGTHS:

Publications in leading fields include:

- Biomedical engineering: 245 publications from 2013-2015, 2.4% national share
- Biomaterials: 117 publications from 2013-2015, 2.4% national share
- Chemical Engineering: 278 publications from 2013-2015, 2.4% of national share

National Ranking (U.S. News & World Report):

- 2nd in Biomedical Engineering and 8th in Chemical Engineering

Examples of Major Industry-Facing Research Centers:

- Parker H. Petit Institute for Bioengineering and Bioscience
  - Center for Pharmaceutical Development/Center for Drug Design Development and Delivery
  - Atlantic Pediatric Device Consortium
  - Center for Innovative Cardiovascular Technologies
  - Marcus Center for Therapeutic Cell Characterization & Manufacturing

    Global Center for Medical Innovation

    T3 Labs – pre-clinical testing – 80-100 projects involving major cos, early-stage cos and academics

    Interoperability and Integration Innovation Laboratory – for digital health applications development

    Georgia Tech BioID (professional master's program)

    Coulter Translational Research Program

ENERGY

Another emerging innovation driver in the Atlanta region is found across energy-related industries, which employ just over 14,000 workers. While growing by 8.8% from 2009 to 2014, the region did not keep pace with overall U.S. growth of 19.4% and has a 23% lower industry concentration than found nationally. Several detailed energy industries do stand out as industry specializations in the Atlanta region, including storage battery manufacturing, lighting, electric power distribution, electric power and specialty transformer manufacturing, and electric bulk power transmission and control, though job gains have been mixed across these detailed industries.

The leading areas of patent innovations in energy track closely with Atlanta's industry specializations, led by smart grid, lighting, and batteries. Two other patent innovation areas that stand out in the Atlanta region are combustion and chemical separations and filtration processes. Energy-related new firm creation is modest in the Atlanta region with only four companies receiving venture capital funding. Of these, Summit Midstream Partners, focused on shale oil development, and Suniva, founded by a Georgia Tech faculty member, focused on solar power, received significant investments of $207 million and $179 million, respectively, from 2009-2015. It is interesting to note that several recent ATDC graduates in alternative energy bring a strong data analytics component to energy-related solutions, including Verdeeco, Urjanet, and Innovolt, suggesting the importance of multi-disciplinary research and development for advanced energy solutions.

Georgia Tech's research reach in energy is broad and substantial. Led by Georgia Tech's Strategic Energy Institute, it offers a very multi-disciplinary footprint of energy research and development activities spanning new fuels, energy generation and conversion, sustainable building technologies, energy storage, and smart grid technologies. The Strategic Energy Institute has been very successful in generating highly sought-after grants from the U.S. Department of Energy's Advanced Research Projects Agency (ARPA-E) in diverse research areas of carbon capture, smart grid, high-efficiency heat extraction, and power conversion and distribution. In recent years it also won a new energy frontier research center award of $11.2 million in 2014 to advance new classes of materials for large-scale energy applications, as well as nuclear power grants totaling $6.6 million awarded in 2014 to find better ways to recycle and dispose of spent nuclear fuel and develop design reactors that produce more energy and less waste. Georgia Tech is also the first university awarded a center of excellence in photovoltaics research and education by the Department of Energy.

Across the Strategic Energy Institute, the range of industry partners are extensive, from electrical transmission and smart grid companies, to major oil companies, to many utilities to large-scale construction companies, to innovative Small Business Innovation Research grant recipients working on alternative fuels among other technologies.

LEADING PATENT AREAS (2009-2015):

Smart Grid – 202 patents, 6.6% of U.S. total, 67% more specialized and 46% higher relative impact

Lighting – 193 patents, 11.5% of U.S. total, 189% more specialized and 233% higher relative impact;

Batteries – 98 patents, 4.7% of U.S. total, 19% more specialized and 4% lower relative impact

Combustion – 85 patents, 7.9% of U.S. total, 99% more specialized and 18% higher relative impact

Chemical Separations and Filtration Processes – 84 patents, 4.3% of U.S. 8% more specialized and lower relative impact

Leading Companies: Siemens; Acuity Brands; Sila Nanotechnologies; Exide Technologies

PRESENCE IN EMERGING COMPANIES (2009-2015):

6 companies receiving $426 million, including: Summit Midstream Partners – Shale oil development, $207 m raised; Suniva – Solar cells and modules, $179 m raised, ATDC graduate

5 recent ATDC incubator graduates in alternative energy: Verdeeco (2015) – smart grid analytics, acquired by Sensus; Urjanet (2013) – automates utility data; Innovolt (2009) -- power protection technologies and analytics to improve energy efficiency

OVERALL INDUSTRY STATISTICS:

Total Jobs, 2014 = 14,173

Job Growth, 2009-2014, Atlanta Region = 8.8%

Job Growth, 2009-2014, U.S. = 19.4%

Relative Industry Concentration Atlanta Region Compared to National Average, 2014 = 23% Lower

LEADING DETAILED INDUSTRIES (2014 AND GROWTH FROM 2009-2014):

Electric power distribution – 4,662 jobs, 49% higher specialization, -27% job growth

Storage battery manufacturing -- 665 jobs, 197% higher specialization, -22% job growth

Lighting – 527 jobs, 63% higher specialization, 480% job growth

Electric power transformer manufacturing – 551 jobs, 44% higher specialization, 24% job growth

Electric bulk power transmission & control – 443 jobs, 16% higher specialization, 49% job growth

GEORGIA TECH'S ACADEMIC RESEARCH STRENGTHS:

Publications in leading fields include:

- o Energy Fuels: 332 publications from 2013-2015, 2.4% national share
- o Thermodynamics: 126 publications from 2013-2015, 2.6% national share
- o Electrochemistry: 109 publications from 2013-2015, 2.1% of national share

National Ranking (U.S. News & World Report): 5th in Environmental Engineering; 6th in Mechanical Engineering; 8th in Chemical Engineering; 8th in Nuclear Engineering

Examples of Major Industry-Facing Research Centers:

- Georgia Tech Strategic Energy Institute's broad multi-disciplinary footprint of energy activities includes: Fuels & Chemical Processing – biofuels, carbon capture, combustion, gasification, separation; Hydrogen Energy Generation and Conversion – fuel cells, gas turbine, nuclear, solar and other renewables; Sustainable Building Technologies and Systems – building energy systems, data centers; Providing Power When and Where Needed – batteries, electric grid and pipelines.

- Significant shared use facilities located at North Avenue Research Area: Ben T. Zinn Combustion Laboratory – largest university combustion lab working on energy-related turbines and aerospace engines, 70% industry funded, Part of FAA CoE for Alternative Jet Fuels; Carbon Neutral Energy Solutions Laboratory – 42,000 sq ft "net zero energy use" facilities housing wide range of energy research programs requiring large scale (high bay) and intermediate scale (mid-bay) capabilities – 75 faculty and student researchers (90% graduate students).

ADVANCED MANUFACTURING

This innovation driver represents a very diversified base of industries outside of energy, biosciences and computing, and communications manufacturing found in the Atlanta region. Among industries that stand out in their high level of industry specialization are aerospace, flavoring syrup and concentrate, industrial controls, and engineering services. It is a major employer in Atlanta with more than 38,000 jobs, but it has been in decline in recent years, falling in employment by 4.1% from 2009-2015 in the Atlanta region compared to growing 8.1% nationally. This broad-based sector is close to the U.S. average in its concentration in the Atlanta economy. Surprisingly, even more technical services industries have declined or remained flat in the Atlanta region since the economic recovery took hold, including engineering and testing labs.

Advanced manufacturing is a very active area of innovation in the Atlanta region. Leading areas include packaging technologies, material sciences, optics, robotics and autonomous systems, and food processing. Interestingly, while advanced manufacturing is not a hotbed of venture capital investing nationally, the Atlanta region had 17 companies in the broad areas encompassing advanced manufacturing receive nearly $450 million in venture funding from 2009-2015.

In contrast to the mixed industry performance, Georgia Tech is a star in advanced manufacturing research and development. Georgia Tech is the top-rated university in industrial and systems engineering in the U.S. What stands out is that this strength in industrial and systems engineering is able to tap the specific domain strengths found at Georgia Tech across nearly all of the engineering disciplines, from mechanical to electrical to chemical to computer engineering, among others. This breadth of capabilities enables Georgia Tech to bring multi-disciplinary solutions forward in advanced manufacturing that few other universities can match.

Georgia Tech has two significant industry-facing research centers that propel its leadership in advanced manufacturing. One is the Georgia Tech Manufacturing Institute that focuses on additive manufacturing, factory information systems, and supply chain and logistics, facilitating broader cross-cutting capabilities in modeling, precision machining, and sustainable design and manufacturing. The other significant industry-facing research center is the Institute for Robotics and Intelligent Machines, which is actively involved in the application of autonomous machines in a wide variety of applications, including autonomous vehicles, food processing, precision agriculture, and medical robotics.

Advanced manufacturing has a strong footing overall with industry. There are more than 50 active industry partnership program members found across specific research centers affiliated with the Georgia Tech Manufacturing Institute, including many leading Fortune 500 companies. There are also active consortia in place involving composites, poultry, and the paper industry.

LEADING PATENT AREAS (2009-2015):

- **Packaging** – 563 patents, 19% of U.S. total, 378% more specialized and 500% higher relative impact
- **Material Science** – 391 patents, 7.7% of U.S. total, 94% more specialized and 146% higher relative impact
- **Optics** – 340 patents, 6.6% of U.S. total, 68% more specialized and 60% higher relative impact
- **Robotics/Autonomous Systems** – 237 patents, 5.8% of U.S. total, 47% more specialized and 62% higher relative impact
- **Food Processing** – 191 patents, 8.6% of U.S. total,118% more specialized and 114% higher relative impact
- **Leading Companies:** Graphic Packaging, Georgia Pacific, Coca-Cola, AT&T, UPS, Omega R&D Technologies

PRESENCE IN EMERGING COMPANIES (2009-2015):

17 companies receiving $448 million with broad areas receiving investment, including:

- Manufacturing – 2 companies with $296 million invested, 2.4% of companies and 39% of funding nationally
- Industrial Automation – 2 companies with $6 million invested, 1.5% of companies and 0.2% of funding nationally
- Food and Beverage – 3 companies with $17 million invested, 2% of companies and 1% of funding nationally
- Transportation – 2 companies with $43 million invested, 1.3% of companies and 0.6% of funding nationally
- Chemicals and Materials – 2 companies with $38 million invested, 1.3% of companies and funding nationally
- Electronics Equipment – 2 companies with $23 million invested, 5% of companies and 6.8% of funding nationally
- Semiconductors – 3 companies with $23 million invested, 0.9% of companies and 0.3% of funding nationally

Examples of Leading VC-backed Companies: Bway – $294 m invested, metal and plastic containers; Lehigh Technologies –$24 m, micronized rubber powders; Qcept Technologies – $23 m, wafer inspection solutions for non-visual defect detection in semiconductor manufacturing

• Two recent ATDC incubator graduates

OVERALL INDUSTRY STATISTICS:

- Total Jobs, 2014 = 38,253
- Job Growth, 2009-2014, Atlanta Region = -4.1%
- Job Growth, 2009-2014, U.S. = 8.1%
- Relative Industry Concentration in Atlanta Region Compared to National Average, 2014 = 8% Lower

LEADING DETAILED INDUSTRIES (2014 AND GROWTH 2009-2014):

- Engineering Services – 16,300 jobs, 16% higher specialization, -4.9% job growth
- Aircraft Manufacturing – 6,633 jobs, 87% higher specialization, -18% job growth
- Process and Logistics Consulting Services – 1,364 jobs, 15% less specialization, 37% job growth
- Industrial Process Variable Instruments – 1,051 jobs, 9% higher specialization, 8% job growth

GEORGIA TECH'S ACADEMIC RESEARCH STRENGTHS:

- Publications in leading fields include: Aerospace Engineering: 179 publications from 2013-2015, 6.1% national share; Manufacturing Engineering: 182 publications from 2013-2015, 6.0% national share; Robotics/Automation Control Systems: 220 publications from 2013-2015, 4.1% of national share; Nanoscience: 821 publications from 2013-2015, 3.7% of national share
- National Ranking (U.S. News & World Report): 1st in Industrial and Systems Engineering
- Examples of Major Industry-Facing Research Centers:

Georgia Tech Manufacturing Institute with key focus areas in:

- Additive manufacturing – existing strengths in polymers, ceramics, and printed electronics and adding metals
- Factory information systems – strong industry interest, especially in automotive and aerospace
- Supply chain and logistics – largest research institute in the world, significant industry partners program
- Other strengths: model-based systems engineering, precision machining, sustainable design and manufacturing

Institute for Robotics and Intelligent Machines – one of the leading programs in the nation; 70+ faculty members; 180+ graduate students; 30+ robotics labs; $30M+ sponsored research annually.

Leading research center at GTRI Food Processing Technology **Division** – active program in use of robotics for food processing + precision agriculture involving biological sensors – 26+ researchers, 40 students, roughly $7 million with $1 m from industry.

Renewable Bioproducts Institute – legacy from paper institute, now involved in conversion of biomass into value-added products, $44 m endowment supporting efforts.

INFORMATION AND COMMUNICATIONS TECHNOLOGY

Far and away, the largest and most dynamic industry innovation driver for the Atlanta region is the information and communications technology sector. It employs over 136,000 workers, is 79% more specialized than the nation, and had job gains of 15.6% from 2009-2015, a full percentage point greater than the nation. Leading the growth of this dynamic sector are the traditional ICT industries of computer systems design services, custom computer programming services, and wireless and other telecommunications services. Its strengths are also found in technical services for banking and corporate services, with both financial transaction processing and clearing and administrative management consulting services standing as sizable, highly specialized and growing industries.

While patent activity is strong in the sub-fields of computing, network communications, and TV systems and video, what sets the Atlanta region apart is the significant depth of its entrepreneurial development in ICT. From 2009-2015, 164 companies received venture capital totaling nearly $2.7 billion, with leading fields in computer software, e-commerce, and turnkey systems. ICT is also the largest technology area of focus for the ATDC incubator.

Georgia Tech is a national leader in ICT research and development. It has traditionally had a top program in electronics, with research programs in optical networks, wireless communications, radar sensor systems, and electronic design and packaging. Its computer sciences and data sciences strengths put it among the top universities in the nation, and the recent formation of the Institute for Data Engineering and Science is expected to further advance its position, bringing together strengths in machine learning, high performance computing, and data analytics. These ICT research and development strengths are also reflected in the size and quality of Georgia Tech's talent generation in ICT. Georgia Tech's College of Computing alone has nearly 1,600 undergraduate students, over 2,700 master's students, and nearly 300 doctoral students.

The ICT sector is one in which the combination of Atlanta's industry development and Georgia Tech's research strengths have complemented each other well. Along with a strong commercialization and entrepreneurial development focus at Georgia Tech, as demonstrated by the strength of ATDC in ICT, many of the recent developments of corporate innovation centers around Georgia Tech have been driven by its computing and data sciences strengths. These include Home Depot, Delta, AT&T Mobility, and NCR. Georgia Tech has also had a high level of industry partnerships in electronics and communications, including national leaders such as Analog Devices, IBM, and many major defense contractors. In industry-sponsored research at Georgia Tech, which reached $41.1 million in 2015, computer science was the highest funded field at $9.2 million and electrical engineering was second at $7.6 million. Together they comprise just over 40% of all industry-sponsored research at Georgia Tech.

LEADING PATENT AREAS: (2009-2015)

- **Computing** – 5,422 patents, 4.5% of U.S. total, 12% more specialized and 7% higher relative impact
- **Network Communications** – 4,188 patents, 6.1% of U.S. total, 55% more specialized and 81% higher relative impact;
- **TV Systems and Video** – 1,375 patents, 8.4% of U.S. total, 113% more specialized and 177% higher relative impact
- **Leading Companies:** AT&T, Cox, Arris, NCR, UPS, American Megatrends

PRESENCE IN EMERGING COMPANIES: (2009-2015)

- 164 companies, receiving $2.695 billion, with key areas of funding, including:
- Computer Software – 82 companies with $1.3 billion invested, 1.9% of companies and 1.6% of funding nationally
- Internet E-commerce – 12 companies with $292 million invested, 1.4% of companies and 1.2% of funding nationally
- Turnkey Systems/Solutions – 9 companies with $193 million invested, 2.8% of companies and 3.9% of funding nationally
- Examples of Leading VC-backed Companies:
    - o Kabbage – $238 m invested, on-line small business loans
    - o Air Watch – $179 m invested, mobile security and enterprise mobility management
    - o Cardytics – $167 m invested, card-linked marketing solutions that leverage consumer purchase data for online and mobile banking
    - o Pindrop Security – $122 m invested, phone caller identity software
    - o FleetCor Technologies – $102 m invested, fuel cards for fleet marketplace
- 26 recent ATDC incubator graduates

OVERALL INDUSTRY STATISTICS:

Total Jobs, 2014 = 117,694
Job Growth, 2009-2014, Atlanta Region = 15.6%
Job Growth, 2009-2014, U.S. = 14.6%
Relative Industry Concentration in Atlanta Region Compared to National Average, 2014 = 79% higher

LEADING DETAILED INDUSTRIES: (2014 AND GROWTH FROM 2009-2014)

- Custom Computer Programming – 18,800 jobs, 59% higher specialization, 12.2% job growth
- Computer Systems Design – 18,691, 42% higher specialization, 39.8% job growth
- Wireless Telecommunications – 10,113 jobs, 324% higher specialization, 24% job growth
- Other Telecommunications Services – 3,193 jobs, 659% higher specialization, 138% job growth
- Financial Transaction Processing and Clearing – 4,680, 146% higher specialization, 97%

job growth

- Administrative Management Consulting Services – 13,138 jobs, 81% higher specialization, 26% job growth

GEORGIA TECH'S ACADEMIC RESEARCH STRENGTHS:

- Publications in leading fields include: Electrical Engineering: 1,037 publications from 2013-2015, 3.4% national share; Telecommunications: 266 publications from 2013-2015, 3.1% national share; Computer Science, Hardware Engineering: 134 publications from 2013-2015, 3.0% of national share; Computer Science, Software Engineering: 169 publications from 2013-2015, 2.7% of national share; Computer Science, Artificial Intelligence: 170 publications from 2013-2015, 2.6% of national share
- National Ranking (U.S. News & World Report): 6th in Computer Engineering; 6th in Electrical Engineering; 9th in Computer Science
- Examples of Major Industry-Facing Research Centers:
    - Georgia Electronic Design Center – Key driver for advanced communications technology integrating analog, digital and mixed signal devices; active research programs in optical networks, wireless communications, and radar and sensor systems, among other areas
    - Newly formed Institute for Data Engineering and Science – brings together Georgia Tech's Big Data strengths across machine learning, high performance computing, and data analytics

Examination of these innovation opportunities suggests that they are positioned very differently across the key line-of-sight metrics analyzed:

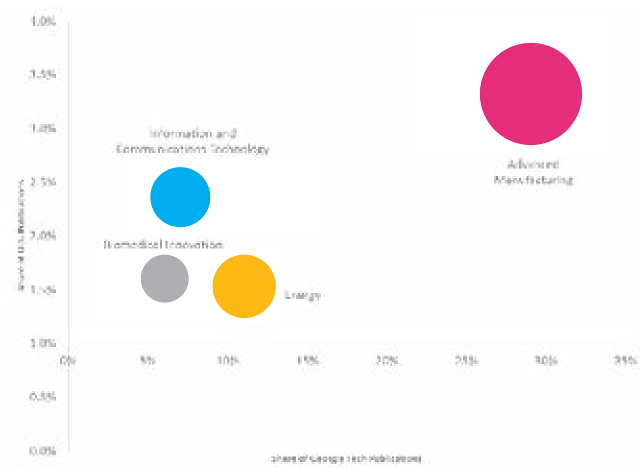
- From a scholarly activity perspective, considering peer-reviewed publications, advanced manufacturing stands out in both its size at Georgia Tech and its share of national influence.
- In patent innovation activities, the strength of advanced manufacturing continues to stand out, along with energy, in their specialization and quality compared to the nation, but both are relatively small compared to ICT and biomedical sciences.
- In new start-up activities, reflected by both venture capital funding and ATDC recent graduates, ICT is dominant. All of the other industry innovation drivers do not equal the level of companies or funding seen in ICT. Biomedical, the next largest area of venture-backed companies, stood at 1/4 the level of companies and 1/3 the level of funding of ICT.
- In industry performance, ICT is not only the largest industry innovation driver in the Atlanta region in total employment, it is also the highest performing in terms of job growth and level of specialization. While both energy and biomedical innovation are growing, they are relatively small at 14,173 and 10,433 jobs, respectively.

While each of the four innovation opportunity areas reflect an alignment between the region's existing and emerging industry innovation drivers and Georgia Tech, only the ICT innovation opportunity area is strong enough today in its industry growth to drive industry absorption in the near term, without some connection to Georgia Tech serving in a catalytic role to generate industry engagement and technology commercialization. The next section takes a more in-depth examination of the likely development pathways for each of these innovation opportunities, to provide a more hands-on perspective of how the enhancement of TEP can play out for each innovation opportunity area.

Currently TEP is focused on biosciences development across its two existing buildings, offering 173,000 total square feet (sf) of space in a 142,000 sf modern, multi-tenant lab

Georgia Tech's Leading Publication Strengths and Industry Supported Research by Innovation Opportunity Areas, 2013-2015:

*Source: Web of Science; Grouping of publication fields by TEConomy



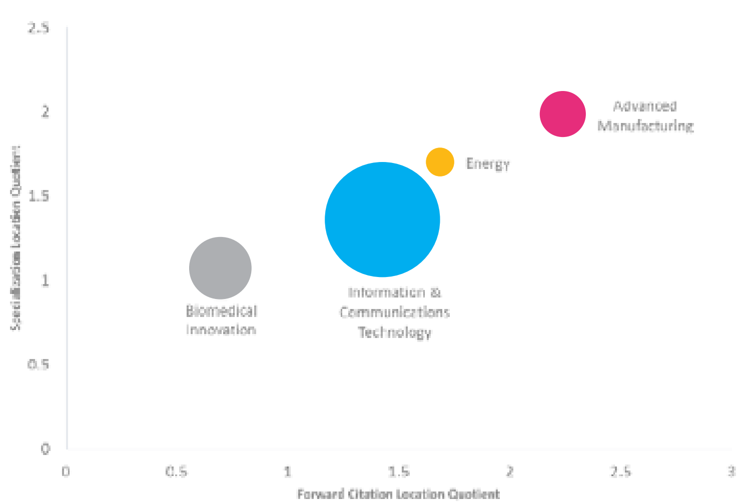
INTERPRETING A BUBBLE CHART

The bubble chart captures three key characteristics:

- Size of bubble = Number of publications
- Horizontal axis = Share of Georgia Tech publications
- Vertical axis = Share of U.S. publications

Atlanta Region's Leading Patent Strengths by Innovation Opportunity Areas, 2009-2015

Source: Thomson Innovation

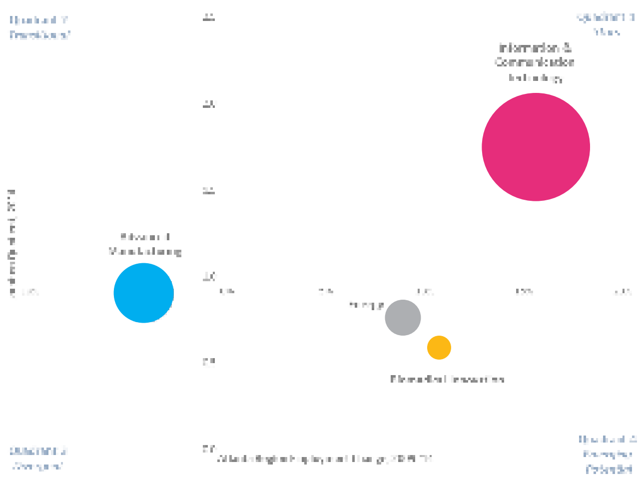


Grouping by TEConomy of ~90 leading patent classifications in Atlanta region demonstrating significant size (50+) and/or high specialization or forward citation:

- Innovation Specialization – measures the level of relative concentration in Atlanta region compared to the U.S. across specific patent areas.
- Forward Citation – measures the relative impact of patent areas in Atlanta region by examining forward citations per patent compared to U.S.

Industry Performance by Innovation Opportunity Areas, 2009-2014

Source: IMPLAN, industry grouping by TEConomy



INTERPRETING A BUBBLE CHART

The bubble chart captures three key characteristics:

- Size of bubble = Number of publications
- Horizontal axis = Share of Georgia Tech publications
- Vertical axis = Share of U.S. publications

Presence of VC-backed Companies and ATDC Graduates by Innovation Opportunity Areas, 2009-2015:

Industry Innovation Drivers	VC Activity in Atlanta Region				ATDC Graduates
	# of VC-backed Companies	Equity Invested ($ in millions)	Share of Companies Nationally	Share of Equity Invested Nationally	
Advanced Manufacturing	17	$448	1.5%	1.9%	2
Biomedical Innovation, including Heath IT	36	$795	1.6%	1.4%	15
Energy	6	$426	1.0%	3.3%	5
Information & Communications Technology	152	$2,392	1.6%	1.3%	26
All VC Investment	220	$4,332	1.5%	1.4%	48

Source: Thomson Venture One; ATDC website

Only ICT stands out as a "star" advanced industry sector in the region:

- 136,023 jobs in 2014, 79% higher concentration in Atlanta than nation and growing at 15.6% since 2009

Emerging industry sectors include energy and biomedical, but small and not highly concentrated in the region:

- 14,173 Energy jobs in 2014, growing by 8.8% since 2009
- 10,433 Biomedical jobs in 2014, growing by 10.5%

Advanced Manufacturing is sizable, but less concentrated than nation and losing jobs through the economic recovery

- 38,253 jobs in 2014, declining by 4.1% since 2009 (while growing 8.1% nationally)

DEVELOPMENT PATHWAYS FOR INNOVATION

The expansion of TEP is a significant opportunity for Georgia Tech to advance a broad science and technology place-making initiative involving biosciences, energy, advanced manufacturing, and information and communications technology which can further raise the impact of the university's industry-facing research activities as well as its contributions to the economic and community development of Atlanta. However, only the ICT innovation opportunity area appears strong enough in its existing industry growth to drive substantial absorption in the near-term without Georgia Tech playing a key role in catalyzing the future growth of TEP.

Having new and enhanced Georgia Tech activities on the TEP site is desirable for multiple reasons:

- It shows University commitment to the project
- It can be leveraged by developers as credit in tenant pre-leased commitments to allow additional financing to be secured and bring new buildings with some spec space on line, helping to attract external market demand to the site
- A range of university entities can mutually benefit from synergy among the capabilities and functions of different units on site at TEP and nearby NARA. This is because of how they may function within an intentionally planned and managed innovation district and ecosystem – one that differs from the traditional campus.
- It can catalyze larger industry engagement by targeting industry-facing research activities
- It fundamentally addresses the issue of "feasibility" that is the focus of the EDA grant-funded inquiry

Given the current market forces for industry innovation activities and broader development, the specific development pathways for the innovation opportunity areas, with the exception of the ICT innovation opportunity area, need to reflect the position and potential of Georgia Tech's industry-facing research and development to generate more industry engagement and technology commercialization.

The discussion below explores what combination of Georgia Tech and industry development is feasible for each innovation opportunity area over the near-term to spur the future development of TEP.

BIOSCIENCES INNOVATION

building and a stand-alone lab building of 31,000 sf. Currently, nearly 70% of available space at TEP is occupied by several biosciences focused tenants, including:

- **St. Jude's Medical**, which acquired CardioMems, a Georgia Tech start-up, in 2014, shortly after it received FDA approval for its heart failure monitor that significantly reduces hospital admissions and improves quality of life for heart failure patients. Currently, CardioMems occupies approximately 40,000 sf of space at TEP.
- **CryoLife,** a biomedical company that preserves human tissues for cardiac and vascular transplant applications. It currently occupies 10,000 sf of space at TEP.
- **Kemira,** a research center of a Finnish bio/chemical company that at TEP is focused on ecologically sustainable water treatment for the oil and mining industries and related water chemicals. It occupies 37,000 sf of space at TEP.
- **T3 Labs,** a contract research organization involved with medical device new product development and training, owned and operated by Emory University. It occupies its own facility at TEP of 31,000 sf.

TEP was also previously home to Altea Therapeutics Corp., a venture-backed biopharmaceutical company developing a noninvasive method to deliver therapeutic proteins, conventional drugs, and vaccines through the skin by creating "micropores" on the surface, which sold off its IP after some business set-backs in 2011. At its peak, Althea employed 75 workers and occupied 40,000 sf.

Given this strong orientation towards the biosciences, the Perkins+Will project team took an intensive examination of the potential industry developments at TEP. Beyond the analysis of industry innovation and development, two focus group discussions were held with more than 20 bioscience corporate-level executives from the Atlanta area, conducted in collaboration with Georgia Bio. The Global Center for Medical Innovation also assisted in surveying an additional six companies. Key discussion questions included the value proposition for bioscience companies to locate at the TEP.

What was learned was that many bioscience companies prefer to locate in the suburbs of Atlanta as they move beyond the early stages of development and need to expand and recruit more management and scientific talent. The primary reasons are twofold:

- Attractiveness of the suburban areas, with their quality K-12 schools and family-oriented neighborhoods, for mid-and-senior level management and scientific talent;
- Lower cost to lease space or buy land for their growing companies.

From the discussions, it is clear that communities such as Alpharetta are actively competing for bioscience companies. In 2012, the Alpharetta Technology Commission was formed by the City, comprised of local technology companies. It has advanced an Innovation Center which provides a meeting space for networking activities as well as co-location office space with access to business resources for the technology community in the northern suburbs. Many of Atlanta's top bioscience companies have located in the suburbs, such as EndoChoice, CSI Laboratories, and Alcon Laboratories (now part of Novartis).

Over the years, this has created not only a sense of place for biosciences companies, but availability of private commercial bioscience lab space. Additionally, the northern suburbs offer close proximity to UPS's hub facility for accessing logistics and distribution of medical products. These northern suburban communities also have good access to the Centers for Disease Control and Emory University, which is advancing a 60 acre site known as Executive Park close to its main campus that will capture many of their industry-facing institutional anchors involved in cardiology, brain health, sports medicine, and pediatric research. Emory is already occupying 330,000 sf of space at this site.

Despite the fact that TEP currently has larger bioscience tenants, nearly all of the bioscience industry executives participating in the focus group meetings agreed that TEP can stand out as a location for early-stage, product development bioscience companies that needed to access university research and development resources, such as shared use labs, pre-clinical testing, pilot-scale bioprocessing manufacturing, and faculty expertise.

This focus on early stage, developmental companies builds upon existing technology development organizations that have close associations and relationships with Georgia Tech, but are not yet completely consolidated at TEP. At the earliest stage of new medical product development, the Global Center for Medical Innovation (GCMI) has a growing track record in assisting start-ups, clinical innovators, and academic researchers to design, engineer, prototype, and commercialize new medical products. While the GCMI lab facilities are located at 15th street, it has a presence at TEP and a close working relationship with T3 Labs, another valuable early stage development asset. T3 Labs, as noted, is a significant tenant at TEP and offers a pre-clinical testing facility, with regulatory expertise to help companies meet FDA requirements on new medical devices. It has a growing national reputation for its work with major medical products companies, such as Boston Scientific, Edwards and Medtronic, as well as strong ties to a broad range of clinicians at Emory, including in cardiology, orthopedics, and neurosurgery, among other clinical areas. There is also entrepreneurial development support for new biosciences companies at ATDC, which includes a 15,000 sf of wet lab incubator space on campus at the fully occupied Ford Environmental Science & Technology building. There is a growing talent connection for trained bioscience professionals to support new product development through regulatory approvals and product launch through Georgia Tech's one-year professional master's program in biomedical innovation and product development. This unique program, undertaken as part of the Biomedical Engineering Program at Georgia Tech, offers hands-on technical, regulatory, and business skills development, including an internship. The program is now reaching a significant size with its most recent class at over 30 students, and has close working relationship with T3 Labs and GCMI.

With all this in mind, an important development opportunity for TEP is to become a signature location for new biomedical product start-ups by consolidating the ATDC bioscience wet lab space and program efforts, along with a more lab-based physical presence of GCMI at TEP. A complementary opportunity may be to position TEP as a showcase medical product launch site by expanding the T3 Labs training program, which enables companies with new medical products to train health professionals in their use. Currently 2,000 physicians and allied health professionals are trained at T3 Labs annually. This expansion of the T3 Labs training program could expand their clinical setting-styled classroom capacities and develop more auditorium class facilities that could also facilitate TEP becoming a meeting site for biomedical professionals in Atlanta.

Georgia Tech's industry-facing research programs in the biosciences will also occasionally generate opportunities for expansion of TEP to create new shared-use facilities with industry and further offer industry opportunities to co-locate their own R&D teams around these facilities at TEP. One emerging area with multiple opportunities for major center funding to Georgia Tech to establish signature shared use facilities is in cell manufacturing. With the rise of cell-based therapies as an effective approach for life-saving medical treatments, including immunotherapies, stem cell therapies, and regenerative medicine, there is a critical need for technology advancements to enable cost-effective, reproducible, high quality cell manufacturing at a large scale that does not exist today.

The advancement of cell manufacturing will require application of advanced robotics, sensing, and real-time data analytics to complement cutting-edge technologies in bioprocessing. Georgia Tech is a national leader having developed a technology road map, released in 2016, for the National Cell Manufacturing Consortium. This Consortium brings together major industry players such as Celgene, General Electric, Johnson & Johnson, Lonza, and Pfizer, along with major federal agencies and leading academic medical centers. Currently, Georgia Tech is being considered for several major federal center grants with NIST, NSF and DoD, which would create the need for new large-scale, shared-use facilities in cell manufacturing and require industry participation for matching funds and research partnerships.

Once TEP can establish itself as the signature place for Georgia Tech industry-facing shared-use bioscience labs, it is expected that there will be many other opportunities in emerging scientific areas of biosciences for locating these facilities at TEP and creating co-location space for industry. For instance, Georgia Tech's Renewable Bioproducts Institute, which is focused on converting biomass into value-added products through advanced refining technologies and manufacturing processes, may need pilot-scale facilities as it develops new process improvement technologies for its industry partners.

ENERGY

The Strategic Energy Institute is an untapped yet important partner for the expansion of TEP. Two substantial signature shared-use facilities associated with the Strategic Energy Institute are located just across the street from TEP in the North Avenue Research Area of Georgia Tech:

- The Ben T. Zinn Combustion Laboratory, the largest university combustion lab working on energy-related turbines and aerospace engines, primarily supported by industry funding and serving as part of an FAA Center of Excellence for Alternative Fuels.
- The Carbon Neutral Energy Solutions Laboratory, a highly flexible 42,000 sq. ft. facility that is able to host various research projects that often involve industry partners. Core research conducted within the lab includes solar technologies, combustion, gasification, catalysis and bio-catalysis, as well as carbon capture and sequestration.

These major shared-use lab facilities are critical resources for the energy-related graduate programs. More than 60 graduate students are located at these facilities, providing an important access to talent for companies.

Each of these facilities were established to focus on industry collaboration and translational research activities, along with more basic research efforts. They have been highly successful in generating extensive relationships with companies such as Boeing, Pratt & Whitney, Dow Chemical, Siemens, BP, and Phillips 66, among others. Despite the mission and success in engaging industry partnerships at each of these facilities, neither facility can support the co-location of R&D teams of their industry partners. The availability of co-location space was intended for the Carbon Neutral Energy Solutions Laboratory, but research project levels skyrocketed and grew into space intended for industry co-location.

Beyond the opportunities in offering co-location space to energy company partners of the Strategic Energy Institute, the enhancement of TEP into a broader innovation district may help catalyze even larger corporate innovation centers for energy companies, as is taking place around Tech Square in Big Data collaborations. The conditions are ripe for this type of larger scale corporate presence as Georgia Tech's relationships with energy-sector companies goes well beyond research collaborations, and involves licensing technologies, training employees, and developing the next generation of scientists and engineers.

ADVANCED MANUFACTURING

From discussions with Georgia Tech leadership, there is a significant opportunity to align future industry-facing efforts of the Institute for Robotics and Intelligent Machine with the expansion of TEP. Currently, the North Avenue Research Area (NARA) houses two facilities associated with the Institute for Robotics and Intelligent Machine.

One is the Food Processing Technology Division of Georgia Tech Research Institute, which as noted earlier is a leader in applying robotics to food processing and precision agriculture. Its 36,000 sf facility is home to an integrated set of labs to provide solutions for new technologies, including an automation lab, electronics lab, environmental analysis lab, optics analysis lab, and systems development lab, plus a high bay testing and fabrication area and an auditorium. The facility is home to 26 research scientists, engineers and staff for the Food Processing Technology Division and approximately 40 students, largely in graduate programs at Georgia Tech.

Looking forward, the Food Processing Technology Division has potential needs for additional space that may be accommodated by TEP, including:

- Office and demonstration space for growing collaborations with equipment companies that supply the food processing industry
- A small-scale farming site (could be a greenhouse) to do pilot testing of sensors for precision agriculture

The other facility at NARA is a small industrial robotics lab that can help in development and testing of industrial processes such as assembly, drilling, and machining, often as part of a shared robot-human work tasks. Current projects involve industry partners who have expressed interest in the general focus area of human-robot collaborative work environments based on outreach conducted by the Institute.

Still, in robotics there is room for continued advancement of industry engagement on a sustained Institute level. Under the new leadership of Magnus Egerstedt, there is a renewed focus on growing industry partnerships at an Institute level that tap the broad strengths of Georgia Tech and advance a better value proposition for industry engagement. This broader engagement with industry would feature a more applied development capacity and focused effort on demonstrating and testing robotic applications.

Key steps are being taken to develop this more applied development, demonstration and testing approach to partnering with industry. A new master's program in robotics is being launched, which would enable the Institute to have a talent base to work on these more applied efforts with industry. Currently, the Institute has a sizable but basic research-focused PhD program with approximately 170 students.

A critical need going forward is for the establishment of a technology readiness lab in robotics that can focus on ways to apply basic research to real world needs, and prototyping new applications in partnership with industry. An example of this type of facility is the National Robotics Engineering Center (NREC), an operating unit with Carnegie Mellon Universities Robotics Institute, which is a peer to Georgia Tech's Institute for Robotics and Intelligent Machines. NREC is housed in a 100,000 sf facility with significant capabilities for developing, prototyping and testing robots, including two high bay assembly areas (28,000 and 14,000 sf), overhead cranes with lifting capacity up to 10 tons, a thermal chamber, electronics shops, and machine shop with computer-numerical controlled milling machines, welding equipment and a water jet cutter. It is fully instrumented with sensing, image processing, modeling and other technologies to design, plan and monitor activities of robots. In many ways, such a facility takes the elements contained in the Food Processing Division facility at NARA and provides a much larger footprint that can address a broader range of autonomous robotic applications.

NREC also allows for broader educational and outreach activities in robotics through a Robotics Academy housed at the facility. This Robotics Academy effort develops curricula, offers professional training to teachers, and supports robot competitions. Another potential use of a large-scale shared-use space at TEP would be to allow for larger-scale basic robotics research efforts which integrate faculty from the many departments at Georgia Tech that are involved with the Institute. Currently, there is no "main" facility that can bring the diverse robotics faculty together.

Robotics was identified as the leading area for Georgia Tech to spur co-location by advanced manufacturing companies to locate at TEP. Given the breadth of Georgia Tech's overall efforts in advanced manufacturing and strength of its industry partnerships with advanced manufacturing companies, there may be other opportunities for shared-use facilities with advanced manufacturing companies in the future. A major new shared-use facility in additive manufacturing being developed with significant industry support; however, is likely to be located along 15th street based on discussions with Georgia Tech leadership. This is quite a distance from TEP, so it is uncertain whether these advanced manufacturing companies collaborating with Georgia Tech in additive manufacturing would be interested in co-location space at TEP. Still, since there are many advanced manufacturing companies partnering with Georgia Tech, TEP might be able to stand out as a location, especially if it is built out as more flex space with high ceilings and floor loading capacities.

INFORMATION & COMMUNICATIONS TECHNOLOGY

The center of gravity, so to speak, for ICT around Georgia Tech is clearly Tech Square. This is expected to be further reinforced with the completion of the CODA building, a recently announced 750,000 sf building located in Tech Square. CODA is a joint effort of Georgia Tech and Portman Company. It will house a new 80,000 sf high performance computing center for Georgia Tech, and Georgia Tech will occupy an additional 310,000 sf of space in the building, including its new Institute for Data Engineering and Science.

This means that 310,000 sf of high-end Class A office space will be available to companies for leasing, making CODA a signature and sizable location for industry collaboration in Big Data with Georgia Tech. 40,000 sf of retail space will also be available at CODA to offer amenities, further making it a highly desirable location for companies.

Still, not all companies will be able to afford the leasing rates at CODA. There is considerable evidence that even with the development of the CODA building, there is opportunity for spill-over of ICT companies to TEP as an alternative site to Tech Square near Georgia Tech, especially if it is able to provide quality site amenities and easy access to the main campus and Tech Square.

First, consider both recent and forecasted employment growth in ICT-related industries. Over the last five years, the job gains in ICT overall for the urban core county of Atlanta, comprised largely of the City of Atlanta, reached 12,990 jobs from 2009-2014, which translates into 2.6 million sf or an annual average of more than 500,000 sf, using a rule of thumb of 200 sf per job. Looking to the future, the Atlanta Regional Commission forecast for the City of Atlanta over the 2015-2030 period estimates more than 20,000 job gains in information, finance, and professional, scientific and technical consulting services, translating to more than 4 million sf of space required or an average of 267,000 sf per year.

There are already signs of spillover to the broader TEP Innovation District with the high occupancy of the "tech-oriented" Northyards Business Park, adjacent to TEP. The Northyards Business Park offers "hip" and highly flexible loft office space with excellent fiber-optic capacity across six buildings comprising 275,000 square feet. It is now over 90% occupied. The tenants of Northyards reflect a strong "ICT" connection, including:

- **ZenithOptimedia,** a digital and on-line marketing company
- **Gametap, LLC** an online video game service
- **Sarvint Technologies, Inc.,** a venture-backed Georgia Tech startup company making a smart shirt that was born out of groundbreaking wearable technology research conducted at Georgia Tech by Dr. Sundaresan Jayaraman and Ms. Sungmee Park

- **Kellogg Partners, L.L.C.,** a Fin Tech company offering for both equity and fixed income trading
- **Moxie Marketing, LLC,** a digital media marketing company
- **Neurofocus,** a part of Nielsen providing consumer neuroscience analysis to understand consumers' non-conscious and conscious emotional responses, memory activations and attentional patterns, empowering companies to better navigate the increasing complexity of modern consumer behavior
- **Performics,** a digital consumer behavior marketing company

The success of Northyards suggests that high quality, alternative office space with competitive leasing rates (under $30 per sq. ft. all in which is below the rates of Midtown) will attract a broader technology sector.

What is particularly informative about the Northyards development is that its more loft-oriented space would be compatible with the more lab and flex space needs of bioscience, energy, and advanced manufacturing companies.

SUMMARY

It is well-known that place-based developments, such as research parks and larger innovation districts, are key tools for advancing innovation-led industry development. According the National Research Council in its study of research park best practices:

> "Research parks are seen increasingly around the world as a means to create dynamic clusters that accelerate economic growth and international competitiveness. They are widely considered to be a proven tool to encourage the formation of innovative high technology companies. They are also seen as an effective means to generate employment and to make existing companies more competitive."

The economic development value of place-making is that it creates the nexus where local industry innovation and academic research competencies can come together to drive economic development. In their book, "The Smartest Places on Earth", leading economic observers Antoine van Agtmael and Fred Bakker document that the success of local innovation-led development efforts requires "collegial collaborations, open exchange of information, partnerships between the worlds of business and academia, multidisciplinary initiatives and ecosystems composed of an array of important players, all working closely together." This is the high quality business environment that place-based developments achieve.

But industry development within place-based developments is very specific to the strengths and areas of expertise found among anchor research institutions and regional industry strengths. Van Agtmael and Bakker explain that "the sharing of brainpower among a diverse set of players in a brainbelt ecosystem is most effective when the entities have the right mix of focus and openness."

For TEP, the line-of-sight assessment found a diverse mix of activities that are a good fit for existing and emerging industry innovation in the Atlanta region and Georgia Tech's research competencies. These include biosciences innovation, energy, advanced manufacturing, and information and communications technology (ICT). Still, only the ICT innovation opportunity area appears strong enough in its existing industry growth to drive substantial absorption in the near-term without Georgia Tech playing a key role in catalyzing the future growth of TEP.

Extensive discussions with Georgia Tech administrative and faculty leaders suggest many specific existing and future industry-facing research efforts at Georgia Tech that can be leveraged, either by consolidating ongoing technology development efforts at TEP (in the case of the biosciences) or by creating better integration with TEP, such as with the energy and robotics activities found at the North Avenue Research Area. Plus, TEP can benefit from stronger integration with Northyards Business Park as a means for attracting ICT-related

8. National Research Council, Understanding Research, Science and Technology Parks: Global Best Practices, 2009.

9. Antoine van Agtmael and Fred Bakker, The Smartest Places on Earth: Why Rustbelts are the Emerging Hotspots of Global Innovation, Public Affairs, 2016, page 8.

10. IBID, page 35.

11. http://www.brookings.edu/events/2014/06/09-innovation-districts.

firms. Another important mechanism for Georgia Tech to shape the development of TEP is to locate many of its large shared-use lab opportunities at TEP. Two that were identified as particularly good fits were cell manufacturing and applied robotics development, testing,` and demonstration.

Still, innovation place-making requires more than just having a site near anchor institutions like Georgia Tech, but also combining at these sites housing, retail, dining, and other amenities. Brookings Institute notes the rise of these innovation districts as "geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible, and technically-wired and offer mixed-use housing, office, and retail." From discussions with industry and Georgia Tech administrators and faculty leaders, the attractiveness of TEP will not just depend upon whether the site can add mixed-uses, but whether TEP can be better integrated with the main campus and Tech Square.

04.

04. GROWING THE ECONOMY

GROWING THE ECONOMY AT TEP

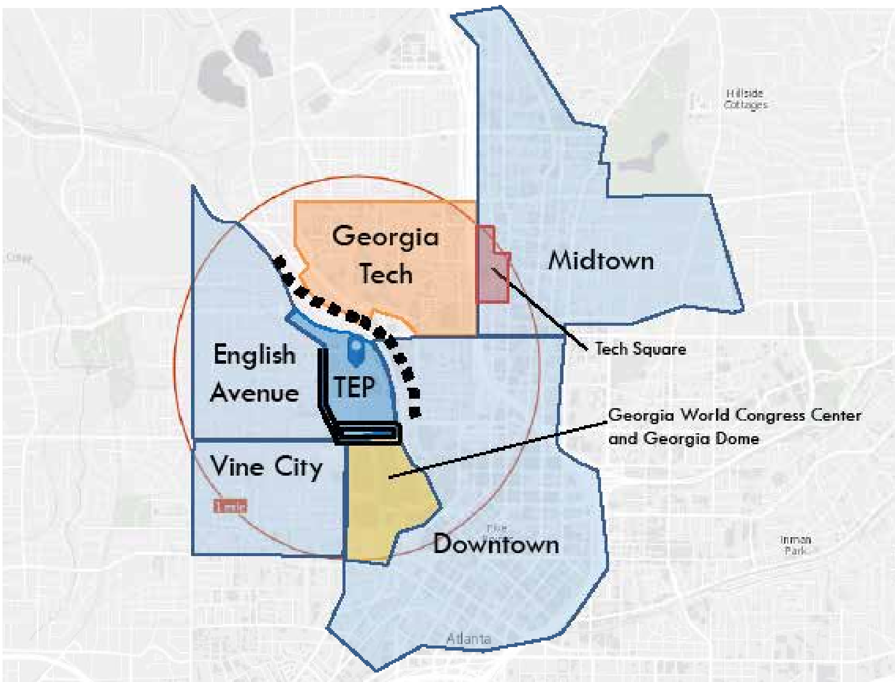
The feasibility of enhancing the Technology Enterprise Park into a larger innovation district requires an understanding of the market and the economic potential nested within the site. At a glance, it's clear that the landholding has a tremendous amount of potential by virtue of it's location. This geography combined with the forward momentum in the neighboring community as well as the market demand for creative spaces in the city hints at the future success potential embedded in TEP.

To fully understand these dynamics, a real estate market analysis was conducted. This analysis recommended a conceptual development program and an estimate of the anticipated economic impacts of future development. The analysis combined local market trends, regional economic development conditions, and future projections with an examination of the mixed-use built environments surrounding comparable and aspirational innovation districts throughout the United States. Analysis of these innovation districts, which included South Lake Union in Seattle, WA, Kendall Square in Cambridge, MA, Berkeley-Emeryville Bio in Emeryville, CA, and Cortex Innovation in St. Louis, MO, provided an opportunity to benchmark the characteristics of similar mixed-use districts set in urban environments containing large research, medical, or academic anchor institutions with strong public sector and institutional support.

The exciting opportunity that emerges is to capitalize on the institutional strength of Georgia Tech and the movement underway in the area with existing facilities like Northyards and new facilities like AHA's Herndon Green Redevelopment. Together, these entities set the table for a distinct place that creates a strong district to anchor Atlanta's Westside.

MARKET ANALYSIS FINDINGS

TEP is at the center of a half dozen widely disparate market force areas, each of which has its own impact on market dynamics.



Our study area boundaries contain the TEP District and the English Avenue and Vine City Neighborhoods, primarily located within NPU L.

DEMOGRAPHICS

Compared to the region and the city, the study area is home to younger, less educated residents with a higher unemployment rate and lower median household income.

	STUDY AREA	CITY	MSA
BACHELOR'S DEGREES OR HIGHER	29.5%	48.1%	35.5%
UNEMPLOYMENT RATE	13.1%	9.5%	8.7%
MEDIAN AGE	29	34	36
MEDIAN HH INCOME	$25,690	$41,530	$56,890

Source: ESRI Business Analyst, 2016

RESIDENTIAL CHARACTERISTICS

Compared to the region and the city, the study area is predominantly multifamily housing, and has an exceptionally high vacancy rate.

	STUDY AREA	CITY	MSA
HOUSING UNITS	4,700	225k	2.2M
MULTIFAMILY	69%	51%	23%
OWNER OCCUPIED	12%	33%	56%
VACANT	41%	17%	10%

Source: ESRI Business Analyst, 2016

KEY DEMOGRAPHIC CONSIDERATIONS

These challenges in existing conditions require that new development must respond to local needs, physical connections, and economic opportunities.

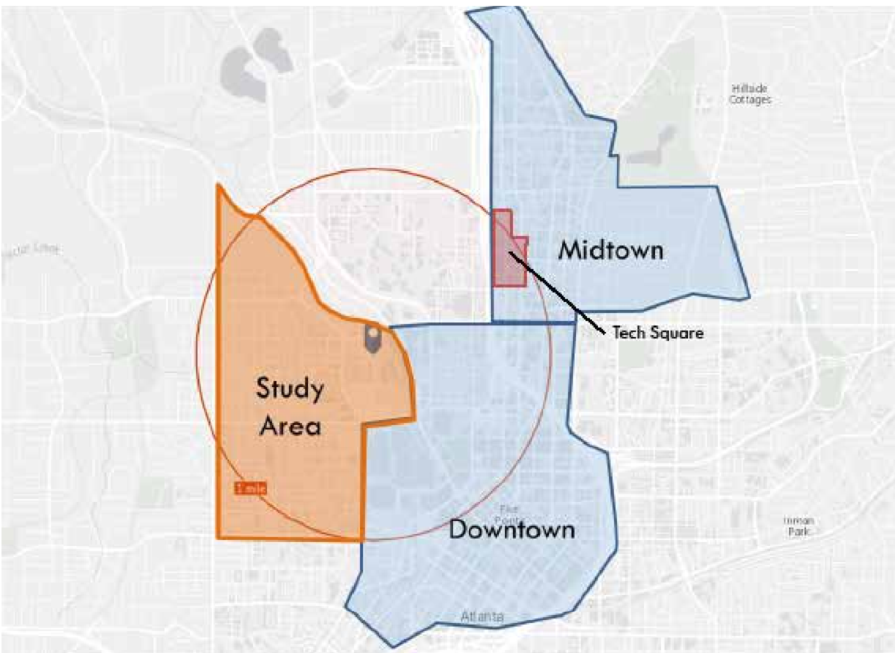
1. **Residential Stability**
   Low homeownership and high vacancy rates are significant impediments to neighborhood revitalization.

2. **Access to quality jobs**
   Lower rates of college degrees and high unemployment contribute to fewer opportunities for neighborhood residents.

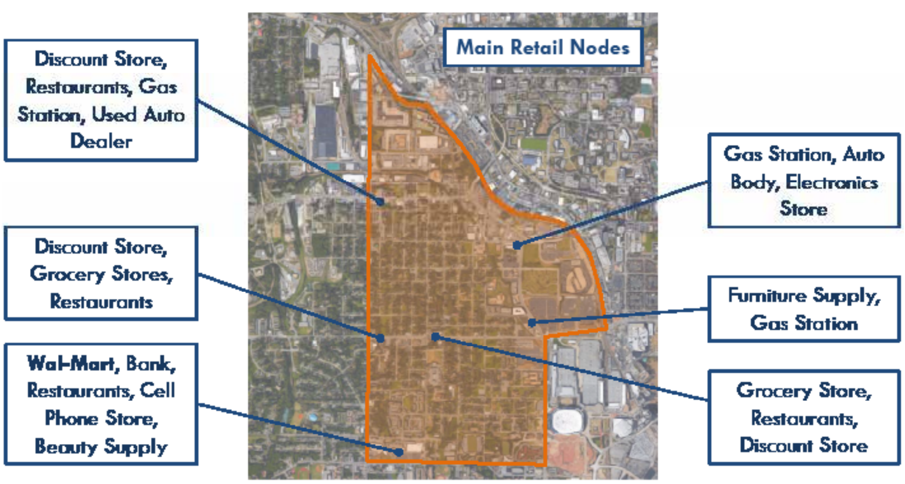
3. **Herndon Homes**
   AHA's plans for Herndon Homes will begin to provide residential stability, workforce development opportunities, and neighborhood retail for this underserved community.

MARKET TRENDS

Our analysis benchmarks the surrounding neighborhood to the two primary markets in Central Atlanta and, when possible, Tech Square.



Existing retail sales within the study area significantly outweigh the spending potential of local residents and workers.



Note: The Study Area experienced general merchandise sales of more than $50M per year, the vast majority of which is likely occurring at the Walmart on MLK Jr. Drive

Source: GoogleMaps, 2016; HR&A Advisors

OFFICE TRENDS

The low vacancy rate of the study area compared to surrounding markets is driven by the strength of the creative loft offices at Northyards Business Park.

STUDY AREA	TECH SQUARE	MIDTOWN	DOWNTOWN
547k SQ. FT.	915K SQ. FT.	18M SQ. FT.	34M SQ. FT.
6.4% 2016 VACANCY	0.0% 2016 VACANCY	11.9% 2016 VACANCY	13.2% 2016 VACANCY
9k NET ABSORPTION *Avg. Annual 2010-2015*	7k NET ABSORPTION Avg. Annual 2010-2015	61k NET ABSORPTION Avg. Annual 2010-2015	-131k NET ABSORPTION Avg. Annual 2010-2015
$25.89 TOTAL OFFICE GROSS RENT	$30.25 CLASS A GROSS RENT	$30.67 CLASS A GROSS RENT; $23.97 CLASS B GROSS RENT	$23.61 CLASS A GROSS RENT; $17.28 CLASS B GROSS RENT

Source: CoStar, 2016

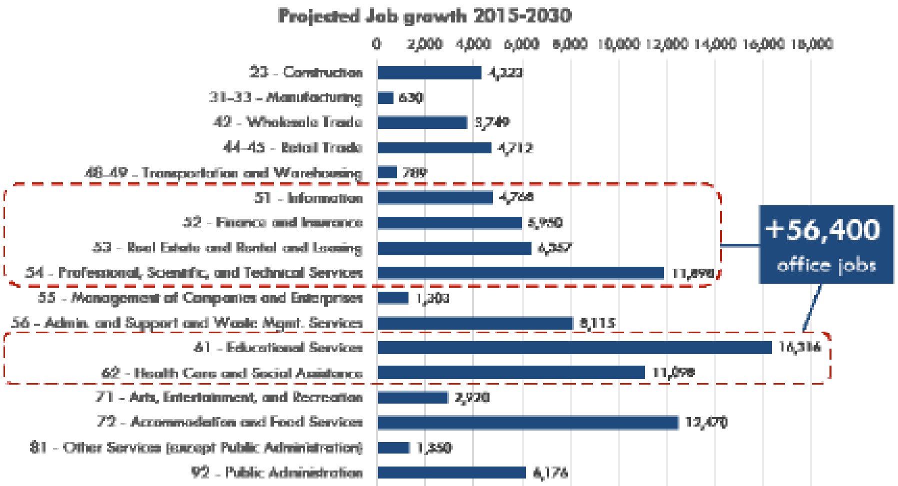
Downtown and Midtown have both seen net positive Class A absorption and negative Class B and C absorption since 2010.

	TECH SQUARE		MIDTOWN		DOWNTOWN	
	GROSS RENT	NET ABSORPTION *Avg. Annual 2010-2015*	GROSS RENT	NET ABSORPTION *Avg. Annual 2010-2015*	GROSS RENT	NET ABSORPTION *Avg. Annual 2010-2015*
CLASS A	$30	9k	$28	123k	$24	50k
CLASS B	n/a	n/a	$24	-34k	$17	-70k
CLASS C	n/a	n/a	$25	-28k	$18	-113k

Source: CoStar, 2016

EMPLOYMENT PROJECTIONS

The City of Atlanta is projected to gain 103,000 jobs by 2030, nearly 55% of which will be in office sectors.



Source: Atlanta Regional Commission, 2016, HR&A Advisors

MULTIFAMILY RESIDENTIAL TRENDS

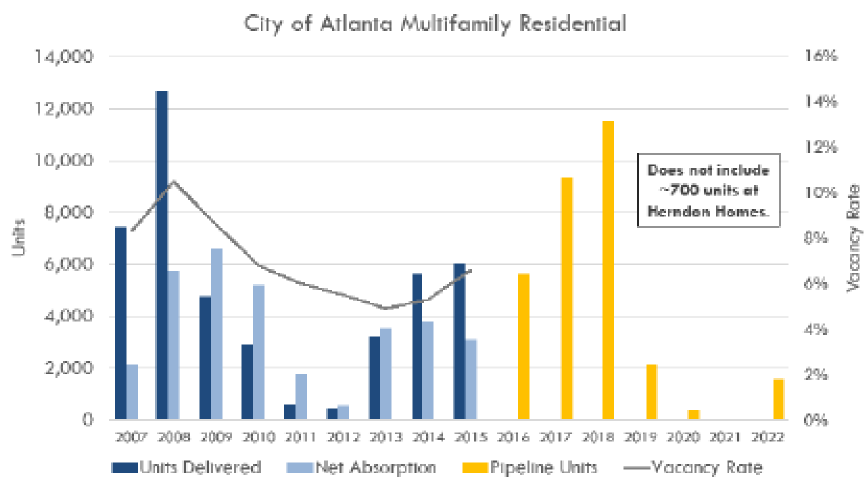
Residential rents in the study area are far lower than nearby markets.

STUDY AREA	DOWNTOWN	MIDTOWN
2,300 UNITS	7,700 UNITS	12,000 UNITS
700 PROPOSED UNITS	1,400 UNITS UNDER CONSTRUCTION	3,500 UNITS UNDER CONSTRUCTION
$930 ASKING RENT PER MULTIFAMILY UNIT	$1,500 ASKING RENT PER MULTIFAMILY UNIT	$1,530 ASKING RENT PER MULTIFAMILY UNIT
$1.15 ASKING RENT SF	$1.47 ASKING RENT SF	$1.92 ASKING RENT SF

Source: CoStar, 2016

MULTIFAMILY RESIDENTIAL TRENDS

In the past two years, a surplus of units have been delivered throughout the city. 2016 is anticipated to bring more than 26,000 new units to market.



Source: CoStar, 2016, HREA Advisors

The $150 M Herndon Homes master plan will be a critical component of a vibrant mixed-use district.

~700
MIXED INCOME UNITS

20k SF
GROCERY

7k-10k SF
STREET-FACING RETAIL

COMMUNITY CENTER

Source: What Now Atlanta, Hunt Companies

RETAIL TRENDS

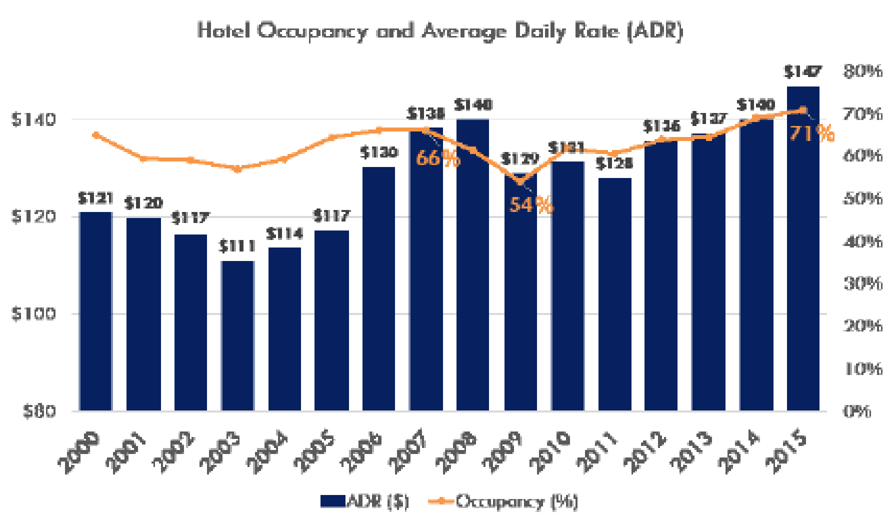
Low retail rents in the study area may require additional support to bring in new retail options.

STUDY AREA	DOWTOWN	MIDTOWN
421k SQ. FT.	3M SQ. FT.	2M SQ. FT.
1.6% VACANCY	8.7% VACANCY	3.2% VACANCY
-2k ABSORPTION 2010-2015	-29k ABSORPTION 2010-2015	4k ABSORPTION 2010-2015
$12.00 NNN RENT	$18.87 NNN RENT	$38.00 NNN RENT

Source: CoStar, 2016

HOTEL ANALYSIS

The Downtown and Midtown Atlanta hotel market has rebounded since the recession, but requires more demand to incentivize supply.



Source: Smith Travel Research, 2016

KEY ANCILLARY DEVELOPMENT CONSIDERATIONS

There is potential for a mixed program to support office development.

1. **Office / Lab / Flex**
   Strong demand for unique spaces has resulted in a tight but small local office market. The anticipated ~56,000 office employees in Atlanta will require up to 17M new square feet of product over the next 15 years.

2. **Multifamily**
   700 units of AHA housing may compete against an overheated Atlanta market. Competitive pricing will be crucial to attract new residents to the area.

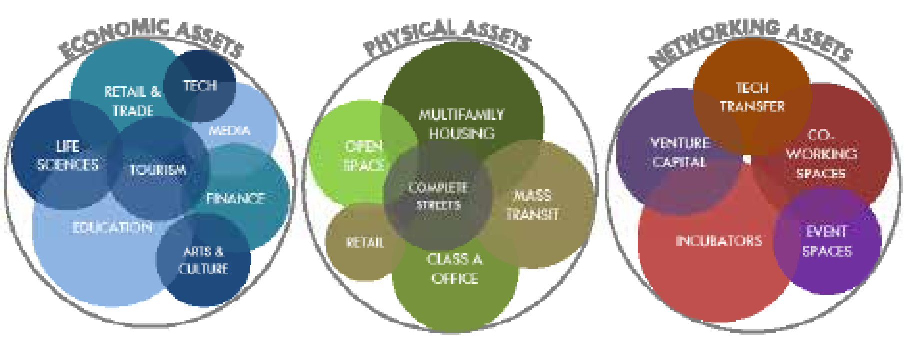
3. **Retail**
   Neighborhood retail rents are low, but future demand exists for grocery and convenience retail.

4. **Hotel**
   While a proposed 1,000 key hotel near Mercedes Stadium may impact broader demand, stakeholders indicate need for a business-focused property in the district.

CREATING A MODEL INNOVATION DISTRICT

Once the domain of suburban office parks, research and development is now increasingly occurring in mixed-use, walkable, and transit-rich innovation districts.

Innovation districts derive competitive advantages from an interrelated set of economic, physical, and networking assets.



Innovation districts across the country reflect the strengths of their underlying regional economies.

CHARACTERISTICS OF URBAN DISTRICTS

Analysis of successful innovation districts provides an opportunity to benchmark characteristics of the built environment.

Primary attributes include:

- Urban setting
- Large research, medical, and/or academic anchor institutions
- Mixed-use development that provides multifamily housing
- Strong public-sector and institutional investment

These districts contain a diverse mix of uses designed to support a vibrant urban neighborhood anchored by research and development.

	SEATTLE	CAMBRIDGE	EMERYVILLE	ST. LOUIS
ACADEMIC ANCHOR	✓	✓	✓	✓
MEDICAL ANCHOR	✓			✓
PRIVATE LAB/OFFICE	✓	✓	✓	✓
INCUBATOR	✓	✓	✓	✓
MULTIFAMILY HOUSING	✓	✓	✓	✓
RETAIL/ENTERTAINMENT	✓	✓	✓	✓

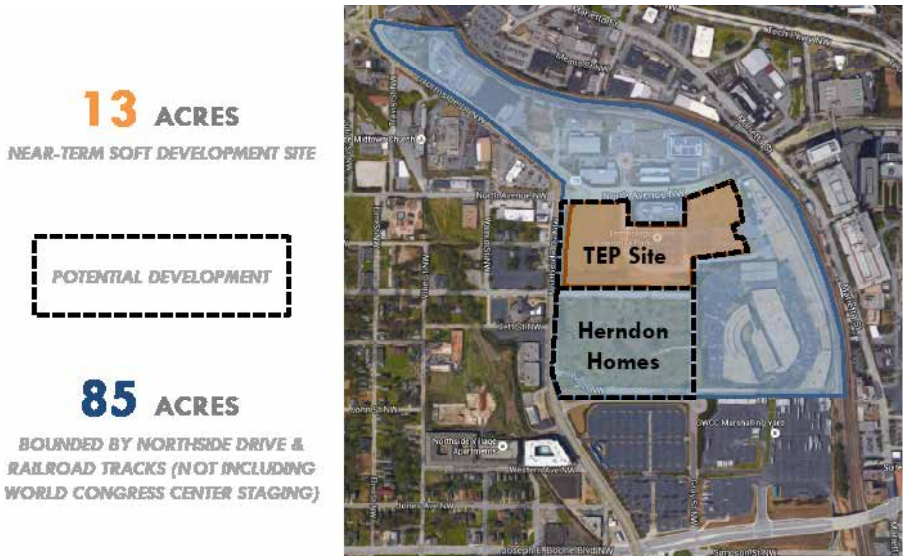
	SOUTH LAKE UNION	KENDALL SQUARE	EMERYVILLE	CORTEX	TEP
Total Land Area (Acres)	230	281	741	205	X
Existing or Proposed Development (SF)					
Retail	800K	130K	1.5M	720K	X
Hospitality	1.4M	740K	820K	150K	X
Multifamily	14.8M	3.5M	7.5M	1.7M	X
Institutional & Office/R&D/Flex	15.1M	14.9M	7.3M	4.5M	X
Total	32.3M	19.3M	17.0M	7.0M	X
Floor Area Ratio (FAR)	3.2	1.6	0.5	0.8	X

Source: HR&A Advisors

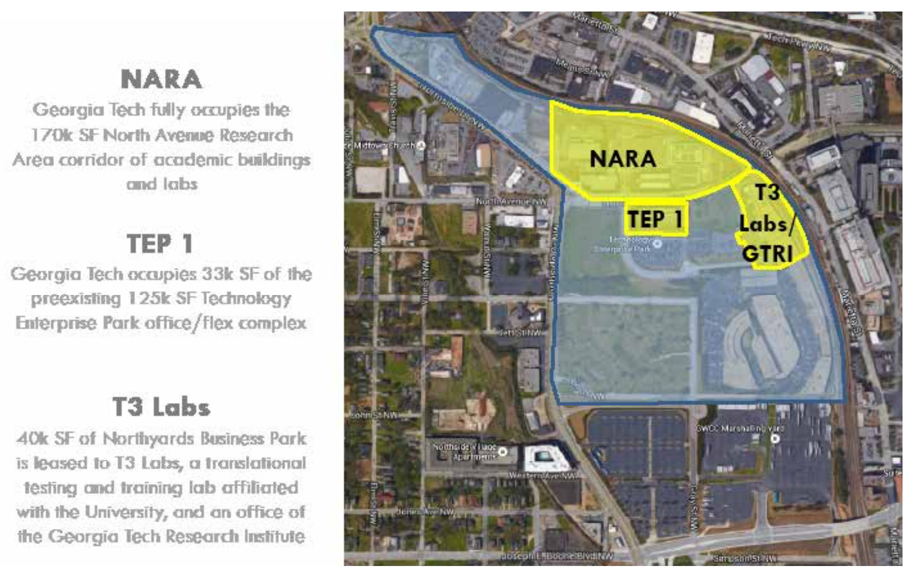
Our development scenarios will identify a mix of uses that are attractive to residents and provide economic opportunities to the surrounding neighborhood.

	INSTITUTIONAL / OFFICE / R&D / FLEX	MULTIFAMILY	RETAIL	HOSPITALITY
ASPIRATIONAL INNOVATION DISTRICTS	55%	33%	7%	5%
TECHNOLOGY ENTERPRISE PARK	X%	X%	X%	X%

The program must consider a broader district, including the planned Herndon Homes development and existing NARA and Northyards facilities.

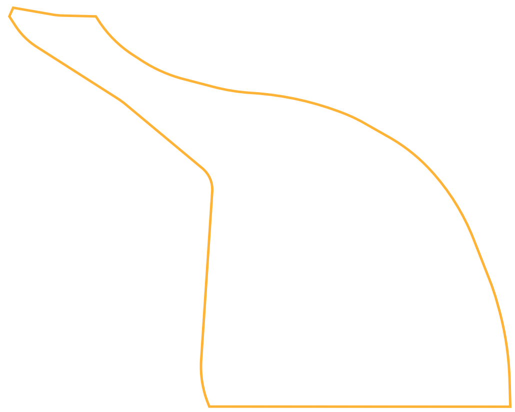


Georgia Tech and affiliates have a sizable presence in the emerging District.



RECOMMENDED PROGRAM MIX

Including the planned Herndon Homes and existing NARA and Northyards facilities, the district will contain **1.34 m sf** of additional development.



1.34 M SF

EXISTING & PLANNED

RESIDENTIAL	**700k SF**
AHA Herndon Redevelopment (Planned)	700k
RETAIL	**30k SF**
AHA Herndon Redevelopment (Planned)	30k
HOTEL	**0k SF**
INSTITUTIONAL	**0k SF**
OFFICE / R&D / FLEX	**605k SF**
MetLife Northyards Business Park (Existing)	270k
North Avenue Research Area (Existing)	170k
Technology Enterprise Park 1 (Existing)	125k
T3 Labs / GTRI (Existing)	40k

Georgia Tech and affiliates have indicated a near-term need for 80K-100K sf of new institutional uses, which could potentially expand in the future.

20,000 SF
NEAR-TERM

+ 20,000 SF
LONG-TERM

60,000 SF
NEAR-TERM

+ 60,000 SF
LONG-TERM

New residents and workers will provide additional retail demand beyond the planned retail component of the AHA site.

Retail Category	Total Demand (Residents and Workers)	Total Existing Sales	Unmet Spending Potential	Supportable Square Feet
Retail	$47.2 M	$69.9 M	- $22.7 M	62,000 SF
Restaurant	$13.4 M	$6.8 M	$6.6M	27,000 SF
Grocery	$17.6 M	$8.8 M	$8.7 M	37,000 SF
Total	**$78.2 M**	**$85.5 M**	**- $7.4 M**	**126,000 SF**

126,000 SF (less 30,000 planned Herndon Homes retail) X

25% Capture Rate = 25,000 SF TEP Retail

Source: ESRI Business Analyst, 2016; HR&A Advisors

City-wide employment growth is estimated to require up to 17 m sf of new office space.

55,640 New Workers

x 300 SF per Worker

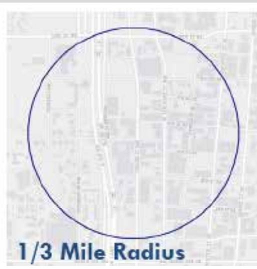
17M SF new

Office/R&D/Flex Space City-wide

Historic employment growth at Tech Square provides a benchmark for an anticipated share of City-wide growth.

Total Employment Growth

Year	Tech Square (70 acres)	1/3 Mile Radius of Centergy One (218 acres)	City of Atlanta
2002	1,540	3,810	376,700
2014	2,680	7,850	425,800
Growth	1,140	4,040	49,100
% of City Growth	2.3%	8.2%	N/A



The ability to capture a share of projected city-wide growth at TEP will be driven by Georgia Tech's presence and programming in the district.

2 to 5% Capture Rate

Total Workers	**1,100 to 2,800**
SF Total Development	**335,000 to 850,000**

***Tech Square contains ~915K SF of Office/Flex**

The consultant team has identified potential growth sectors that align with core Georgia Tech research strengths.

Source: TEConomy Partners and Point A Consulting

Sectors targeted for industry growth will demand a variety of spaces that can be accommodated in the district.

Examples:

Armour Yards

Northyards Business Park

Xia Group at Georgia Tech

Digital Design Lab at Georgia Tech

Comparable innovation districts provide meeting space and hospitality uses to support business growth.

TEP Business Hotel

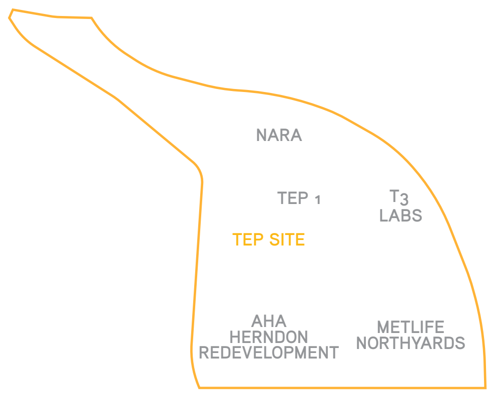
Le Méridien Cambridge-MIT

Courtyard Oakland Emeryville

Springhill Suites South Lake Union

Aloft Hotel at Cortex (Proposed)

The combined TEP District can accommodate a robust mix of uses.



1.34 M SF + **1.07 M SF**

EXISTING & PLANNED — TEP PROPOSED

(Not including 450K SF parking)

2.41 M SF

EXISTING & PLANNED & PROPOSED

RESIDENTIAL	**700k SF**
AHA Herndon Redevelopment (Planned)	700k
RETAIL	**55k SF**
AHA Herndon Redevelopment (Planned)	30k
TEP Retail	**25k**
HOTEL	**180k SF**
TEP Hotel (up to 200 keys)	**180k**
INSTITUTIONAL	**160k SF**
Step-up Space (near-term & long-term)	**120k**
Incubator (near-term & long-term)	**40k**
OFFICE / R&D / FLEX	**1.31M SF**
MetLife Northyards Business Park (Existing)	270k
North Avenue Research Area (Existing)	170k
Technology Enterprise Park 1	125k
T3 Labs / GTRI (Existing)	40k
Private Industry	**705k**
Parking	**1,500 spaces**

*Uses in bold are proposed for TEP.

This proposed mix of development provides a similar intensity and distribution to other urban innovation districts.

	SOUTH LAKE UNION	KENDALL SQUARE	EMERYVILLE	CORTEX	TEP
Total Land Area (Acres)	230	281	741	205	85
Existing or Proposed Development (SF)					
Retail	800K	130K	1.5M	720K	55K
Hospitality	1.4M	740K	820K	150K	180K
Multifamily	14.8M	3.5M	7.5M	1.7M	700K
Institutional & Office/R&D/Flex	15.1M	14.9M	7.3M	4.5M	1470K
Total	32.3M	19.3M	17.0M	7.0M	2.4M
Floor Area Ratio (FAR)	3.2	1.6	0.5	0.8	0.6

Source: HR&A Advisors

	INSTITUTIONAL / OFFICE / R&D / FLEX	MULTIFAMILY	RETAIL	HOSPITALITY
ASPIRATIONAL INNOVATION DISTRICTS	55%	33%	7%	5%
TECHNOLOGY ENTERPRISE PARK	61%	29%	2%	7%

How can TEP be positioned as an emerging Innovation District?

Key Considerations:

- Georgia Tech's existing presence and future investments in physical spaces and programs need to be leveraged to catalyze the district.
- The District must connect with existing and planned assets, including NARA, Northyards, and Herndon Homes, to create a vibrant, mixed-use corridor.
- The District must better connect to Georgia Tech's main campus.
- Programming and tenanting must consider how to maximize opportunities for surrounding neighborhood residents.
- The success of TEP can and should spill over to the Westside, starting with expansion across Northside Drive, but this market needs time to mature and thus a phased, responsive plan is critical.

ECONOMIC IMPACT

METHODOLOGY

HR&A utilized the IMpact analysis for PLANning (IMPLAN) input-output model for Fulton County, Georgia, created by MIG, Inc. (formerly Minnesota IMPLAN Group, Inc.), to analyze the project's economic impacts from both construction and annual ongoing operations at full development buildout. For each dollar of spending in the economy, IMPLAN traces the pattern of commodity purchases and sales between 536 industries within the specified geography. The IMPLAN model is used to conduct economic impact analyses by leading public and private sector organizations across the United States.

The economic impact analysis estimates economic output, job creation, and wages/income paid to employees at the following levels:

- **Direct impacts:** resulting from project construction and operations spending;
- **Indirect impacts:** resulting from industry-to-industry transactions from project construction and operations;
- **Induced impacts:** resulting from employee spending in the economy, including employees of directly and indirectly affected businesses.

Based on the current development program, shown in Table 1, HR&A conducted an economic impact analysis, measuring the above impacts of future development at Technology Enterprise Park on Fulton County. HR&A also examined the net fiscal impact of the development. This analysis examined potential income taxes and sales taxes for one-time construction inputs as well as income taxes, sales taxes, property taxes, and hotel taxes for the ongoing operations of the development. HR&A assessed the fiscal impact of TEP investment on City of Atlanta municipal tax revenues and Fulton County tax revenues. In addition to the economic and fiscal impacts of TEP, future investment in the area will benefit the surrounding community through increased access to job opportunities, workforce development and training resources, expanded retail options, and an improved public realm.

Table 1: Development Program Mix

Development Program Uses	
Office	564,000 sf
Retail	25,000 sf
Institutional	160,000 sf
Lab	141,000 sf
Hotel	200 rooms
Parking	1,500 spaces
Total	**1,520,000 SF**

Source: Perkins+Will, HR&A, Georgia Institute of Technology

SUMMARY OF KEY FINDINGS

HR&A's economic impact analysis found that proposed development on the site of TEP would generate:

- $452 million in economic activity and 2,540 total jobs during the construction phase
- $1.4 billion in annual economic activity and 5,790 total jobs when fully built out and operating

Based on the proposed conceptual development program, HR&A's fiscal impact analysis found that proposed development on the site of TEP would generate:

- $6.4 million in one-time net fiscal benefit of from construction
- $3.0 million in recurring net fiscal impact per year from direct impacts at full build out

ECONOMIC IMPACT ANALYSIS

One-Time Impacts From Construction

HR&A developed a series of assumptions to model the one-time economic impacts of construction of the conceptual development program for TEP. The distribution of office, institutional, retail, lab, hotel, and parking uses contained within the conceptual program are presented in Table 2 and are accompanied by their total development costs including hard costs, soft costs, and, where appropriate, tenant improvement costs.

Soft costs for each development use are assumed to be the equivalent of 20% of hard costs. Tenant improvements and furniture, fixtures, and equipment are assumed to be 20% of the combined hard and soft cost total for office, institutional, retail, and hotel uses, and 40% for lab uses.
Table 3 below is a summary of the horizontal infrastructure associated with the proposed

Table 2: Vertical Development Program and Construction Cost

Expense	Hard Costs	Soft Costs	TI/FF&E	Total Costs
Office	$70,500,000	$14,100,000	$16,920,000	$101,520,000
Retail	$3,125,000	$625,000	$750,000	$4,500,000
Institutional	$20,000,000	$4,000,000	$4,800,000	$28,800,000
Lab	$59,925,000	$11,985,000	$21,573,000	$93,483,000
Hotel	$34,425,000	$6,885,000	$4,131,000	$45,441,000
Parking	$27,000,000	$5,400,000	$0	$32,400,000
Total	**$214,975,000**	**$42,995,000**	**$48,174,000**	**$306,144,000**

Source: Perkins+Will, HR&A Analysis

development, including street infrastructure, hardscaping, and open space hard costs. Soft costs for each element of horizontal infrastructure are assumed to be the equivalent of 20% of hard costs.

Deriving IMPLAN inputs (shown in Appendix A) from the information presented above, HR&A

Table 3: Horizontal Infrastructure Costs

Expense	Hard Costs	Soft Costs	Total Costs
Street Parking	$151,100	$30,200	$181,300
Cycle Track	$23,500	$4,700	$28,200
Vehicular-Rated Pavers	$117,500	$23,500	$141,000
Hardscape Pavers	$1,789,700	$357,900	$2,147,600
New/Improved Road	$504,500	$100,900	$605,400
Open Space	$5,992,400	$1,198,500	$7,190,900
Total	**$8,578,700**	**$1,715,700**	**$10,294,400**

Source: Perkins+Will, HR&A Analysis

estimated the direct, indirect, and induced impacts on employment, economic spending, and personal income attributable to the construction of TEP, shown below in Table 4.

Annual Recurring Impacts from Operations

To study the ongoing economic impacts of the office, institutional, retail, lab, hotel, and parking

Table 4: Summary of One-Time Impacts from Construction

Economic Output, 2016 ($)	
Direct	$316,440,000
Indirect	$65,310,000
Induced	$70,110,000
Total	**$451,860,000**
Employment	
Direct (FTE)	1,880
Indirect (FTE)	280
Induced (FTE)	380
Total	**2,540**
Total Annual Wages/Income of TEP Construction Workers	$90,266,000
Average Annual Wages/Income of TEP Construction Workers	$48,000

Source: IMPLAN, HR&A Analysis

uses that will be developed for TEP, HR&A estimated the number of potential employees associated with each use. As shown in Table 5, HR&A estimated potential office, institutional (office and lab), lab, retail, lab, hotel, and parking employment on-site using the proposed vertical development program mix and estimates of the density of employees specific to each use.

Deriving IMPLAN inputs (shown in Appendix B) from the information presented above, HR&A estimated the direct, indirect, and induced impacts on employment, economic spending, and

Table 5: Employee Estimates by Use

Use	Quantity	Workplace Efficiency	Employees
Office	564,000 sf	300 sf per job	1,880
Institutional (Office)	128,000 sf	300 sf per job	427
Institutional (Lab)	32,000 sf	350 sf per job	91
Retail	25,000 sf	450 sf per job	56
Lab	141,000 sf	350 sf per job	400
Hotel	200 rooms	2 rooms per job	100
Parking	1,500 stalls	106 stalls per job	14
Total	**1,520,000 sf**	**N/A**	**2,968**

Source: HR&A Analysis

personal income attributable to the ongoing operations of TEP, shown below in Table 6.

FISCAL IMPACT ANALYSIS

One-Time Impacts From Construction

Table 6: Summary of Ongoing Impacts from Operations

Economic Output, 2016 ($)	
Direct	$788,590,000
Indirect	$424,380,000
Induced	$191,550,000
Total	**$1,404,520,000**
Employment	
Direct Jobs (FTE)	2,810
Indirect Jobs (FTE)	1,930
Induced Jobs (FTE)	1,050
Total	**5,790**
Total Annual Wages/Income of On-Site Workers	$1,98,139,000
Average Annual Wages/Income of On-Site Workers	$70,000

Source: IMPLAN, HR&A Analysis

*Direct employment is lower than estimated on-site employment due to the conversion of full and part-time jobs to full-time equivalents (FTEs).

HR&A assessed the one-time fiscal impact of TEP investment in terms of sales tax revenue at the City and County levels. Shown in Table 7 below, HR&A assumed spending on construction materials equals 50% of construction hard costs – from both vertical development and horizontal infrastructure development – in order to quantify the impact of construction spending on City and County sales tax revenue.

The amount of income taxes and sales taxes that will be attributable to the one-time construction of TEP are show in Table 8.

Table 7: Assumptions for One-Time Impacts on Sales Tax

Sales Tax Inputs	Total Sales	Municipal Sales Tax	County Sales Tax
General Retail Sales	$158,220,000*	1%	3%

Source: IMPLAN, HR&A Analysis

*Sales equal 50% of construction hard costs

Table 8: Summary of One-Time Impacts from Construction

Fiscal Impact, 2016 ($)	
Revenue Source	**Tax Revenue**
Municipal Tax Revenue	$1,582,000
County Tax Revenue	$4,747,000
Total Fiscal Impact	**$6,329,000**

Source: IMPLAN, HR&A Analysis

Annual Recurring Impacts from Operations

HR&A assessed the annual recurring fiscal impact of TEP investment in terms of sales tax revenue, hotel tax revenue, and property tax revenue at the City and County levels. Shown in Table 9 below, HR&A estimated total on-site retail spending to be $6.25M per year, assuming retail sales average $250 per SF across the 25,000 SF of retail space at TEP.

Table 9: Assumptions for Annual Recurring Impacts on Sales Tax

Sales Tax Inputs	Total Sales	Municipal Sales Tax	County Sales Tax
General Retail Sales	$6,250,000	1%	3%

Source: HR&A Analysis, City of Atlanta, Fulton County

HR&A assessed the ongoing impacts of room rental revenue on hotel tax revenue attributable to the 200-key hotel on the TEP site. Assuming the hotel would perform similarly to other hotels in the Atlanta area, HR&A calculated the expected annual revenue from hotel room rentals based on the average daily rates and occupancy rates of similar hotels, as shown in Table 10.

Table 10: Assumptions for TEP Hotel Revenue

TEP Hotel Rooms	Occupancy Rate	Occupied Hotel Rooms	Room Rental Average Daily Rate	Daily Room Rental Revenue	Annual Room Rental Revenue
200 rooms	71%*	142 Rooms	$147*	$20,870	$7,619,000

Source: STR, HR&A Analysis
*Based on performance of similar hotels in Atlanta area

Expected hotel room rental revenue was then used to calculate annual hotel tax revenue attributable to the proposed TEP hotel at the City and County levels, as shown in Table 11.

Table 11: Assumptions for Annual Recurring Impacts on Hotel Tax

Hotel Tax Inputs	Annual Room Rental Sales	Municipal Hotel Tax (+ Sales Tax)	County Hotel Tax (+ Sales Tax)
Hotel Room Rental Sales	$7,619,000*	8%	3%

Source: HR&A Analysis

In order to provide the inputs for property tax projections, average combined City and County property tax revenue per SF was obtained through CoStar for relevant samples of the different uses, as follows: "office" consists of data from Class A office and flex space in Atlanta; "retail" consists of data from retail space constructed in 2010 or later in Atlanta; "lab" consists of data from research and development space in Georgia (as there is limited availability of data for this type of use on a municipal level); "hotel" consists of data from hotels in Atlanta; and "structured parking" consists of parking garages in Atlanta. These figures, used to calculate annual impacts on property taxes, are shown in Table 12.

Table 12: Assumptions for Annual Recurring Impacts on Property Tax

Property Tax Inputs

Use	SF	Property Tax per SF
Office	564,000	$2.07
Retail	25,000	$2.46
Institutional	150,000	$0.00
Lab	141,000	$0.75
Hotel	180,000 (200 rooms)	$1.65
Parking	450,000 (1,500 spaces)	$0.67

Source: CoStar

Table 13, shown below, presents the annual recurring fiscal impact of ongoing operations of TEP at full buildout. This impact is presented in terms of sales tax revenue, hotel tax revenue, and property tax revenue.

Table 13: Summary of Annual Recurring Impacts from Operations

Fiscal Impact, 2016 ($)

Revenue Source	Municipal Tax	County Tax Revenue	Total Tax Revenue
Annual Sales Tax Revenue	$63,000	$188,000	$250,000
Annual Hotel Tax Revenue	$610,000	$229,000	$838,000
Annual Hotel Tax Revenue	N/A	N/A	$1,935,000
Total Fiscal Impact			**$3,023,000**

Source: HR&A Analysis, CoStar

IMPACTS OF TEP IN THE SURROUNDING COMMUNITY

The catalytic impacts of significant investment in Technology Enterprise Park have the potential to greatly benefit the surrounding neighborhoods of English Avenue and Vine City. As TEP attracts the tenants, resources, and programs that will catalyze the area into a truly mixed-use innovation district, these traditionally underserved communities will gain increased accessibility to job opportunities, workforce development and training resources, expanded retail options, and an improved public realm.

Job Creation

Today, English Avenue and Vine City contain an unemployment rate of 13.1% , a figure that's nearly double the rate for the City of Atlanta. As described in the analysis above, TEP has the potential to add nearly 3,000 new jobs to the immediate area. While many of these jobs are anticipated to be in professional research sectors, TEP has the potential to offer jobs in a wide variety of sectors requiring a diverse array of skill levels, ranging from food service to medical instrument manufacturing to hotel administration.

Workforce Development and Training

To further augment the job creation potential of the district, TEP can attract a workforce development entity aligned with specific industries occurring on site that are aligned with adjacent incubator space and innovative activity. In the longer term, a more comprehensive educational institution such as a local community or technical college could expand its resources and programs to the site to provide local residents with the focused training and experience necessary to obtain more advanced positions in TEP and elsewhere in Atlanta.

Expanded Retail

Current employees and tenants at NARA and the Northyards Business Park have voiced interest in having more accessible food and beverage options. While existing office and innovation users have at times attracted food trucks to address the slowly emerging demand, there are no brick-and-mortar establishments currently on the site. As demand increases from new on-site residents and workers, TEP will have the opportunity to attract a mix of convenience retail and food and beverage offerings to supplement the pipeline grocery and retail development coming to the site through the Herndon Homes mixed-use project. Providing retail options at a price point that appeals to both local residents and new workers will increase the vibrancy of the district and encourage greater utilization and interaction among its users.

Improved Public Realm

Investments at TEP will significantly increase the usage of and demand for open space and broader connectivity to the main Georgia Tech Campus. This connectivity could include pedestrian bridges over the railroad tracks to traverse the physical barrier, traffic calming measures on North Avenue and Northside Drive to facilitate safe walkability, and linkages to the potential new spur of the Atlanta BeltLine to connect to the growing greenway. In an area containing a relatively small amount of open space, TEP could create much-needed public space for the surrounding neighborhood, serving local and regional residents, and providing a rich amenity to attract new businesses to the district.

FINANCIAL FEASIBILITY

Financial feasibility of the vertical development program was assessed with two different approaches for accomodating parking on the site. These included: (1) consolidated appraoch and (2) integrated approach. Table 14 depicts the program analyzed.

Table 14: Proposed TEP Vertical Development Program

Development Program Uses	
Commercial Office	564,000 GSF
Institutional	160,000 GSF
Lab	141,000 GSF
Retail	25,000 GSF
Hotel	180,000 GSF
Total built area	**1,070,000 GSF**

Under a consolidated approach, all parking spaces serving the Site would be centralized in a single parking structure separate from other uses. Under an integrated approach, parking would instead be distributed amongst smaller parking decks attached to buildings on each block. The integrated approach results in higher hard costs for both parking and the buildings to which parking decks are attached.

HR&A further tested the project's sensitivity to the amount of parking provided. Baseline scenarios assume 2,500 parking spaces for the Site, reflective of current zoning assumptions. Alternative scenarios assume 1,000 fewer spaces, in line with the 1,500 parking spaces assumed in the initial feasibility study. HR&A understands that parking strategies for the Site are expected to evolve as negotiations proceed over potential sharing opportunities with the adjacent Atlanta Housing Authority (AHA) development, NARA, and Northyards Business Park, and as other public transit improvements are explored.

In summary, HR&A evaluated the following four scenarios in terms of relative financial feasibility:

- **Scenario 1A:** A consolidated, pre-cast parking structure containing 2,500 spaces, constructed at a cost of $20,000 per space. Hard costs for private and institutional office, retail, and hotel uses assumed to be $150 per square foot, with the more capital-intensive wet lab space costing $500 per square foot.
- **Scenario 1B:** Assumes separate parking structures would be built, each featuring a direct connection to one of the new TEP buildings and collectively accommodating 2,500 total spaces. Podium decks come at a cost of $30,000 per space. Hard costs for all non-parking uses also increase by 20 percent.
- **Scenario 2A:** Same structural and cost assumptions as Scenario 1A, with total parking supply reduced to 1,500 spaces.
- **Scenario 2B:** Same structural and cost assumptions as Scenario 1B, with total parking supply reduced to 1,500 spaces.

KEY FINDINGS

HR&A evaluated the development feasibility for private office, institutional office, wet lab, retail, hotel, and parking uses individually as well as Site-wide under four parking Scenarios. Key findings include:

- **All Scenarios will require additional public or institutional subsidy under existing market conditions.** Efficiency savings under a consolidated parking approach are not sufficiently large enough to cover the financial gap incurred by other aspects of the development program – namely, the large drag incurred through the development of wet lab space. The residual land value – or total market value net of development costs and required returns – is estimated to be (-$60M) under Scenario 1A, a gap that more than doubles under an integrated parking approach (-$142M), as shown in Table 15 below.

- **Parking uses, anticipated to be accessory in the short-term and revenue-generating upon full build-out, are a significant drag on overall project value.** After lab space, parking has the lowest land value per square foot of all the uses. Reducing the parking program from 2,500 to 1,500 spaces is not itself sufficient in yielding a positive overall land value.

- **Hotel, commercial office, and retail are financially-feasible on a stand-alone basis, while institutional is assumed to break even.** Wet lab yields the largest negative land value, the result of high upfront construction costs. Wet lab space is critical to delivering a true innovation district, thus financially-accretive uses like hotel and commercial office should be used to offset some of the large upfront capital costs associated with lab construction.

- **To offset the large negative drag on total project value incurred through the parking program as well as costly site improvements, GATV should consider public funding to help cover a portion of horizontal and/or parking costs.** Other means of reducing the cost burden associated with parking include a possible sharing agreement with adjacent sites and/or developing phasing options that allow for maximum flexibility in the delivery of parking as other transit improvements are advanced.

Table 15: Financial Analysis Summary – All Scenarios

No. Parking Spaces	2,500 Spaces		1,500 Spaces	
Scenario	**1A**	**1B**	**2A**	**2B**
Description	*Consolidated parking, $150/SF hard costs*	*Integrated parking, $180/SF hard costs*	*Consolidated parking, $150/SF hard costs*	*Integrated parking, $180/SF hard costs*
Gross Vertical Development				
Market Value	$312,566,000	$319,478,000	$312,566,000	$319,478,000
(Total Development Costs)	($290,259,000)	($348,311,000)	($290,259,000)	($348,311,000)
Total Project Value (Gross)	*$22,307,000*	*($28,833,000)*	*$22,307,000*	*($28,833,000)*
Value per Built SF	*$21*	*($27)*	*$21*	*($27)*
Parking				
Market Value	$10,969,000	$10,969,000	$6,581,000	$6,581,000
(Total Development Costs)	($60,000,000)	($90,000,000)	($36,000,000)	($54,000,000)
Parking Value	*($49,031,000)*	*($79,031,000)*	*($29,419,000)*	*($47,419,000)*
Horizontal Site Costs	($10,294,000)	($10,294,000)	($10,294,000)	($10,294,000)
Total				
Market Value	$323,535,000	$330,447,000	$319,147,000	$326,059,000
(Total Development Costs)	($360,553,000)	($448,605,000)	($336,553,000)	($412,605,000)
[Developer Profit (7.5% of TDC)]	($27,042,000)	($33,645,000)	($25,242,000)	($30,945,000)
Residual Land Value (RLV)	***($64,060,000)***	***($151,804,000)***	***($42,648,000)***	***($117,491,000)***
RLV per Built SF	***($60)***	***($142)***	***($40)***	***($110)***

APPROACH

In collaboration with GATV and the Enterprise Innovation Institute at the Georgia Institute of Technology, the project team developed a conceptual development program, summarized in Table 14 above. HR&A analyzed the financial feasibility of the collective program under alternative parking scenarios. The two parking typologies assessed include a consolidated approach, whereby all parking spaces serving the Site would be centralized in a single parking structure separate from other uses, and an integrated approach, under which parking would instead be distributed amongst smaller parking decks attached to buildings on each block. Given that construction costs associated with an integrated approach are higher for both the parking component as well as other uses to which parking is attached, HR&A further analyzed the two alternative scenarios assuming that fewer total parking spaces would be built. Since neither the selected approach to parking nor the number of parking spaces built are anticipated to impact the developable square footage of other uses, the commercial development program is the same under all four Scenarios.

HR&A collected real estate data from third-party data providers, such as CoStar and CBRE, reviewed local and regional market reports, and spoke with local area real estate professionals and stakeholders to establish assumptions regarding the revenues, construction costs, vacancy rates, and capitalization rates associated with each proposed use. This research informed inputs into the stabilized year pro-formas used to derive net land values for each use. After conducting separate feasibility assessments of each program component, HR&A then assessed the financial feasibility of the project as a whole under each Scenario.

METHODOLOGY

The following three-step process offers an overview of the data sources and methods employed in HR&A's development feasibility analysis:

1. **Market Value:** As part of an in-depth real estate market review, HR&A analyzed historical rents and vacancies in the immediate Study Area as well as in Tech Square, Midtown, and Downtown. Rent assumptions were confirmed through conversations with local commercial real estate brokers and through a review of individual rents for comparable properties obtained through CoStar. Rents for institutional uses were set to break-even to reflect likely future use as ancillary academic space serving a not-for-profit purpose. The Average Daily Rate (ADR) and operating expenses used for the hotel analysis were informed by STR market data covering all hotels within the Atlanta Central Business District, adjusted to reflect new construction and the hotel's anticipated provision of conference, food and beverage, and banquet space. HR&A calculated net operating income for uses with gross leases (commercial office, institutional office, and parking) using industry-standard ratios of operating expenses to total revenue, taking into account use-specific property taxes and insurance costs. Regional capitalization rates were derived from CBRE market reports and property-specific CoStar comps, and were used to arrive at estimates of total market value for each use.

2. **Development Cost:** HR&A relied on hard cost estimates provided by Perkins + Will, applying a standard 20 percent premium for soft costs to arrive at the total cost of new construction. HR&A assumed that per-capita hard costs would be similar among all stick-built construction components, including office, institutional, retail, and hotel uses. Separate estimates were provided for lab and parking based on the respective construction techniques employed for each. All non-parking hard costs were increased by 20 percent under the Integrated Scenarios (Scenarios 1B and 2B) to reflect the added costs associated with constructing co-located uses. HR&A further considered tenant improvement and/or fixed furniture, fixture, and equipment (FF&E) costs, which differed depending on use and lease structure (gross versus triple-net). Horizontal improvement costs were added to that of vertical development to arrive at total development costs, to which a 7.5 percent developer return expectation was applied, reflective of the return on investment typically required among Real Estate Investment Trusts (REITs).

3. **Feasibility Summary:** Net land values were determined by subtracting total development costs from the market value of each program component, resulting in an approximation of the value that could be achieved under each Scenario relative to rents and construction costs. A positive net land value indicates project feasibility, while negative values suggest the project may require additional support.

DEVELOPMENT FEASIBILITY

Table 16 below summarizes the market value associated with each vertical development use, as determined by market rents, vacancy rates, operating expenses, and capitalization rates, as well as the development cost associated with new construction. Residual land value serves as a proxy for development feasibility, with negative values indicating that a particular use is financially infeasible. The residual land values presented in Table 16 indicate feasibility from a site-wide perspective after taking into account horizontal improvement costs, developer returns, and the disparate costs associated with the respective parking program under each Scenario.

Table 16: Vertical Development Financial Analysis Summary by Use – Scenarios A vs. B

Scenario	**A**	**B**
	Consolidated parking, $150/SF hard costs	*Integrated parking, $180/SF hard costs*
Commercial Office		
Market Value [Ann. Rent = $28/SF]	$170,435,000	$170,435,000
(Total Development Costs)	($121,824,000)	($146,189,000)
Commercial Office Value	*$48,611,000*	*$24,246,000*
Value per Commercial Office SF	*$86*	*$43*
Institutional		
Market Value [Ann. Rent=$18/SF (A); $22/SF (B)]	$34,560,000	$41,472,000
(Total Development Costs)	($34,560,000)	($41,472,000)
Institutional Value	*$0*	*$0*
Value per Institutional SF	*$0*	*$0*
Lab		
Market Value [Ann. Rent = $25/SF]	$45,496,000	$45,496,000
(Total Development Costs)	($93,060,000)	($111,672,000)
Lab Value	*($47,564,000)*	*($66,176,000)*
Value per Lab SF	*($337)*	*($469)*
Retail		
Market Value [Ann. Rent = $20/SF]	$6,305,000	$6,305,000
(Total Development Costs)	($5,175,000)	($6,210,000)
Retail Value	*$1,130,000*	*$95,000*
Value per Retail SF	*$45*	*$4*
Hotel		
Market Value [ADR = $175/Room]	$55,769,000	$55,769,000
(Total Development Costs)	($35,640,000)	($42,768,000)
Hotel Value	*$20,129,000*	*$13,001,000*
Value per Hotel SF	*$112*	*$72*
Sub-Total, Gross Vertical Development		
Market Value	$312,566,000	$319,478,000
(Total Development Costs)	($290,259,000)	($348,311,000)
Total Project Value (Gross)	***$22,307,000***	***($28,833,000)***
Value per Built SF	***$21***	***($27)***

The stabilized-year residual land values shown above indicate that commercial office, hotel, and retail uses are financially viable on a stand-alone basis. Annual rents for the institutional use have been set to break-even to reflect the space's anticipated occupancy by an academic and/or not-for-profit tenant. Lab space, a critical component of the innovation district model, is the only proposed commercial use that is not financially feasible on a stand-alone basis. Under a consolidated parking approach, other financially-accretive uses are able to fully offset the decrement associated with lab construction. This cross-subsidization mechanism is not sufficient in closing the financial gap under an integrated approach, however, owing to the heightened hard costs accruing to all vertical uses under this scenario.

Table 17: Financial Analysis Summary – All Scenarios

No. Parking Spaces	**2,500 Spaces**		**1,500 Spaces**	
Scenario	**1A**	**1B**	**2A**	**2B**
Description	*Consolidated parking, $150/SF hard costs*	*Integrated parking, $180/SF hard costs*	*Consolidated parking, $150/SF hard costs*	*Integrated parking, $180/SF hard costs*
Gross Vertical Development				
Market Value	$312,566,000	$319,478,000	$312,566,000	$319,478,000
(Total Development Costs)	($290,259,000)	($348,311,000)	($290,259,000)	($348,311,000)
Total Project Value (Gross)	$22,307,000	*($28,833,000)*	$22,307,000	*($28,833,000)*
Value per Built SF	*$21*	*($27)*	*$21*	*($27)*
Parking				
Market Value	$10,969,000	$10,969,000	$6,581,000	$6,581,000
(Total Development Costs)	($60,000,000)	($90,000,000)	($36,000,000)	($54,000,000)
Parking Value	*($49,031,000)*	*($79,031,000)*	*($29,419,000)*	*($47,419,000)*
Horizontal Site Costs	($10,294,000)	($10,294,000)	($10,294,000)	($10,294,000)
Total				
Market Value	$323,535,000	$330,447,000	$319,147,000	$326,059,000
(Total Development Costs)	($360,553,000)	($448,605,000)	($336,553,000)	($412,605,000)
[Developer Profit (7.5% of TDC)]	($27,042,000)	($33,645,000)	($25,242,000)	($30,945,000)
Residual Land Value (RLV)	***($64,060,000)***	***($151,804,000)***	***($42,648,000)***	***($117,491,000)***
RLV per Built SF	***($60)***	***($142)***	***($40)***	***($110)***

The above assessment indicates that the development program is not financially feasible without additional support under any of the four Scenarios. The high costs and low rents associated with wet lab space bring down overall land value significantly, as do the high costs associated with parking, particularly under an integrated approach.

Substantial positive values derive primarily from commercial office and hotel uses, though retail is also viable on a stand-alone basis. Though the total land value of commercial office is more than double (2.4 times) that of hotel under a consolidated parking approach (and 86% greater assuming an integrated approach), the hotel generates significantly more value on a per square foot basis relative to all other proposed uses across all Scenarios.

CONCLUSION

To enhance the viability of the project, HR&A recommends that GATV explore ways of reducing the financial burden that the parking program confers upon the overall value of the project. To reduce the number of parking spaces built on-site, GATV should continue to advance discussions with its immediate neighbors regarding a possible shared parking agreement, whereby some of the TEP District's parking needs would be met by parking structures housed at the adjacent Herndon Homes development or the existing NARA and Northyards Business Park sites. Project phasing, which falls outside the scope of the present analysis, should also be considered, as the build-out schedule of the vertical development program and the timing of nearby transmit improvements could significantly affect demand for parking at the Site.

Finally, HR&A recommends that GATV seek public sector support to help cover the costs associated with parking and other site and infrastructure improvements. Significant investments at the TEP Site have the potential to greatly benefit surrounding neighborhoods, including historically-disadvantaged English Avenue and Vine City. As TEP attracts new innovation economy tenants and additional private investments, these traditionally underserved communities will gain unparalleled access to new job and workforce development opportunities, expanded retail and community amenities, and an improved public realm. HR&A estimates that nearly 1,900 direct jobs will be generated through construction of the proposed program, with another 2,810 direct permanent jobs anticipated upon full stabilization of Technology Enterprise Park. This translates into more than $1.4 billion in annual economic activity and more than $3 million in annual sales, hotel, and property tax revenues for the City of Atlanta and Fulton County.

DEVELOPMENT FEASIBILITY ASSESSMENT

This section indicates the sources of the assumptions used as inputs into the stabilized year financial models for each vertical development use—office, institutional, lab, retail, and hotel—with parking assumptions further provided for both typologies. Assumptions are followed by the stabilized year financial model for each program.

Site-wide Assumptions.
Table 18 shows the assumptions that HR&A used for the Site as a whole. Site infrastructure needs and associated construction costs were obtained from Perkins + Will. HR&A assumed horizontal soft costs to be 20 percent of horizontal hard costs, reflective of industry standards.

Table 18

General Assumptions	
Site Assumptions	
Site size (acres)	13 acres
Horizontal Assumptions	
Site Infrastructure - Quantity	
Street Parking	15,105 GSF
Cycle Track	4,700 GSF
Unit Pavers (Vehicular Rated)	10,680 GSF
Hardscape (Unit Pavers)	170,450 GSF
New/Improved Road	100,890 GSF
Open Space	130,270 GSF
Total	**432,095 GSF**
Site Infrastructure - Cost per GSF	
Street Parking	$10/GSF
Cycle Track	$5/GSF
Unit Pavers (Vehicular Rated)	$11/GSF
Hardscape (Unit Pavers)	$11/GSF
New/Improved Road	$5/GSF
Open Space	$46/GSF
Total	**$20/GSF**
Soft Costs (as % of Hard)	20.0%
Required developer return (share of total development costs)	7.5%

Commercial Office.

Table 19 below describes the assumptions underlying the stand-alone feasibility analysis for commercial office use.

Table 19

Commercial Office Assumptions	*Scenario A* *Consolidated parking*	*Scenario B* *Integrated parking*
Income Assumptions		
Rent per NSF Year (Gross)	$28/SF	$28/SF
Loss Factor (gross to rentable square feet)	15.0%	15.0%
Vacancy Rate	6.4%	6.4%
Average Annual Property Taxes PSF	$2.1/SF	$2.1/SF
Operating Expenses (% of Revenue)	20.0%	20.0%
Capitalization Rate	5.75%	5.75%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost PSF	$150/SF	$180/SF
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	20.0%	20.0%
TI & FF&E (PSF)	$36/SF	$43/SF

Commercial office rents derive from HR&A's prior work examining the real estate market dynamics in the Study Area and surrounding markets, which included analysis of individual comparable properties in the area obtained through CoStar. Rents were also corroborated through discussions with local commercial brokers about the likely rent for office space at the TEP Site. The vacancy rate represents the 2016 average vacancy among total office properties in the immediate Study Area, as determined using CoStar. Property taxes per square foot reflect the average amount paid among Class A office properties in Atlanta, also obtained through CoStar. The office capitalization rate derives from CBRE's Cap Rate Survey from 2016.

Hard cost assumptions were provided by Perkins + Will and correspond to the differing parking typologies. All other assumptions (loss factor, vacancy rate, operating expenses as a percentage of revenue, sales cost, and soft cost and tenant improvement/FF&E shares) are based on industry standards and HR&A's assessment of what is appropriate given local market conditions.

Based on these assumptions, HR&A developed a stabilized-year commercial office income statement to derive a net land value for the office use.

Table 20

Stabilized-Year Commercial Office Income Statement		
Scenario	**A**	**B**
	Consolidated parking	*Integrated parking*
Gross Square Feet	564,000	564,000
Loss Factor	15%	15%
Rentable Building Area (85% of Gross)	479,400	479,400
Office Lease Revenue		
Rent Per Year PSF (Gross)	$28.00	$28.00
Potential Cash Flow	$13,423,200	$13,423,200
Less Vacancy Allowance at 6.4%	($859,085)	($859,085)
Less Operating Costs (20% of Lease Revenue)	($2,512,823)	($2,512,823)
Net Cash Flow	**$10,051,292**	**$10,051,292**
Stabilized Year NOI	$10,051,292	$10,051,292
Capitalized Value at 5.75%	$174,805,081	$174,805,081
Less Sales Costs at 2.50%	($4,370,127)	($4,370,127)
Market Value	**$170,434,954**	**$170,434,954**
Vertical Hard Costs	($84,600,000)	($101,520,000)
Soft Costs (20% of Hard Costs)	($16,920,000)	($20,304,000)
T/I + FF&E (20% Total Hard + Soft Costs)	($20,304,000)	($24,364,800)
Total Development Costs	**($121,824,000)**	**($146,188,800)**
Market Value	$170,434,954	$170,434,954
Less Total Development Costs	($121,824,000)	($146,188,800)
Net Project Value	**$48,610,954**	**$24,246,154**
Net Project Value per Built SF	**$86**	**$43**

Institutional Office.

Table 21 below describes the assumptions underlying the stand-alone feasibility analysis for institutional office use.

Table 21

Institutional Office Assumptions	*Scenario A* Consolidated parking	*Scenario B* Integrated parking
Income Assumptions		
Rent per NSF per Year (Gross)	$18/SF	$22/SF
Loss Factor (gross to rentable square feet)	15.0%	15.0%
Vacancy Rate	0.0%	0.0%
Average Annual Property Taxes PSF	$.0/SF	$.0/SF
Operating Expenses (% of Revenue) - Gross	20.0%	20.0%
OpEx PSF	$3.6/SF	$4.4/SF
OpEx PSF minus RPT	$1.5/SF	$2.3/SF
Operating Expenses (% of Revenue) - Net	8.3%	10.5%
Capitalization Rate	6.25%	6.25%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost PSF	$150/SF	$180/SF
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	20.0%	20.0%
TI & FF&E (PSF)	$36/SF	$43/SF

Institutional rents were set to break-even so that total net land value equals zero, an appropriate assumption given the space's intended academic/not-for-profit use. The vacancy rate was assumed to be zero under the presumption that the space would be fully occupied by Georgia Tech or an affiliate tenant. The industry-standard ratio of operating expenses to revenue was adjusted downward to reflect the property tax exemption conferred upon buildings erected and used for academic use, where the value of the exemption on an annual basis was set to the amount of property taxes paid by typical office uses. The institutional capitalization rate derives from CBRE's Cap Rate Survey from 2016.

Hard cost assumptions were provided by Perkins + Will and correspond to the differing parking typologies. All other assumptions (loss factor, sales cost, and soft cost and tenant improvement/FF&E shares) are based on industry standards and HR&A's assessment of what is appropriate given local market conditions.

Based on these assumptions, HR&A developed a stabilized-year institutional income statement to derive a net land value for the institutional use.

Table 22

Stabilized-Year Institutional Office Income Statement

Scenario	**A**	**B**
	Consolidated parking	*Integrated parking*
Gross Square Feet	160,000	160,000
Share of Total Development Program	15%	15%
Loss Factor	15%	15%
Rentable Building Area (85% of Gross)	136,000	136,000
Institutional Lease Revenue		
Rent Per Year PSF (Gross)	$17.77	$21.84
Potential Cash Flow	$2,416,993	$2,970,839
Less Vacancy Allowance at 0.0%	$0	$0
Less Operating Costs (8.3% of Lease Revenue)	($201,609)	($312,378)
Net Cash Flow	**$2,215,385**	**$2,658,462**
Stabilized Year NOI	$2,215,385	$2,658,462
Capitalized Value at 6.25%	$35,446,154	$42,535,385
Less Sales Costs at 2.50%	($886,154)	($1,063,385)
Market Value	**$34,560,000**	**$41,472,000**
Vertical Hard Costs	($24,000,000)	($28,800,000)
Soft Costs (20% of Hard Costs)	($4,800,000)	($5,760,000)
T/I + FF&E (20% Total Hard + Soft Costs)	($5,760,000)	($6,912,000)
Total Development Costs	**($34,560,000)**	**($41,472,000)**
Market Value	$34,560,000	$41,472,000
Less Total Development Costs	($34,560,000)	($41,472,000)
Net Project Value	**$0**	**$0**
Net Project Value per Built SF	**$0**	**$0**

Wet Lab.

Table 23 below describes the assumptions underlying the stand-alone feasibility analysis for wet lab use.

Table 23

Lab Assumptions	Scenario A *Consolidated parking*	Scenario B *Integrated parking*
Income Assumptions		
Rent per NSF Year (NNN)	$25/SF	$25/SF
Loss Factor (gross to rentable square feet)	15.0%	15.0%
Vacancy Rate	5.0%	5.0%
Operating Expenses (% of Revenue)	0%	0%
Capitalization Rate	6.1%	6.1%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost PSF	$500/SF	$600/SF
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	10.0%	10.0%
TI & FF&E (PSF)	$60/SF	$72/SF

Lab rents were assumed to be $25/SF based on average rates at neighboring Tech Square and wet lab space within comparable innovation districts in the U.S., as reported by CoStar. Vacancy assumptions similarly derive from CoStar, and are informed by average vacancy among R&D space in Atlanta. Given the triple-net lease structure, operating expenses borne by the landlord were assumed to be zero. A smaller T/I and FF&E share was assumed for lab space relative to the other uses to account for the disproportionate share of fit-out costs typically borne by tenants of wet lab and applied science space. The capitalization rate derived from CoStar comps for lab space in Midtown Atlanta.

Hard cost assumptions were provided by Perkins + Will, and incorporate the large capital cost premium associated with new lab space. Construction costs were increased by 20 percent under Scenario B, the result of the greater costs associated with integrated parking. All other assumptions (loss factor, sales cost, and soft cost share) are based on industry standards and HR&A's assessment of what is appropriate given local market conditions.

Based on these assumptions, HR&A developed a stabilized-year lab income statement to derive a net land value for lab use.

Table 24

Stabilized-Year Lab Income Statement		
Scenario	**A** *Consolidated parking*	**B** *Integrated parking*
Gross Square Feet	141,000	141,000
Share of Total Development Program	13%	13%
Loss Factor	15%	15%
Rentable Building Area (85% of Gross)	119,850	119,850
Lab Lease Revenue		
Rent Per Year per NSF (NNN)	$25.00	$25.00
Potential Cash Flow	$2,996,250	$2,996,250
Less Vacancy Allowance (5% of Lease Revenue)	($149,813)	($149,813)
Less Operating Costs (0% of Lease Revenue)	$0	$0
Net Cash Flow	**$2,846,438**	**$2,846,438**
Stabilized Year NOI	$2,846,438	$2,846,438
Capitalized Value at 6.10%	$46,662,910	$46,662,910
Less Sales Costs at 2.50%	($1,166,573)	($1,166,573)
Market Value	**$45,496,337**	**$45,496,337**
Vertical Hard Costs	($70,500,000)	($84,600,000)
Soft Costs (20% of Hard Costs)	($14,100,000)	($16,920,000)
T/I + FF&E (10% Total Hard + Soft Costs)	($8,460,000)	($10,152,000)
Total Development Costs	**($93,060,000)**	**($111,672,000)**
Market Value	$45,496,337	$45,496,337
Less Total Development Costs	($93,060,000)	($111,672,000)
Net Project Value	**($47,563,663)**	**($66,175,663)**
Net Project Value per Built SF	**($337.33)**	**($469.33)**

Retail.

Table 25 below describes the assumptions underlying the stand-alone feasibility analysis for retail use.

Table 25

Retail Assumptions	*Scenario A* Consolidated parking	*Scenario B* Integrated parking
Income Assumptions		
Rent per NSF per Year (NNN)	$20/SF	$20/SF
Loss Factor (gross to rentable square feet)	15.0%	15.0%
Vacancy Rate	8.7%	8.7%
Operating Expenses (% of Revenue)	0.0%	0.0%
Capitalization Rate	6.0%	6.0%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost PSF	$150/SF	$180/SF
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	15.0%	15.0%
TI & FF&E (PSF)	$27/SF	$32/SF

Retail rents were assumed to be $20/SF based on market area comps from CoStar and HR&A's own assumptions about what retail demand might look like upon full stabilization. Vacancy was set equal to the average for retail properties in Downtown Atlanta, as reported by CoStar. Given the triple-net lease structure, operating expenses borne by the landlord were assumed to be zero, and a smaller T/I and FF&E share was further assumed. The retail capitalization rate derives from CBRE's Cap Rate Survey from 2016.

Hard cost assumptions were provided by Perkins + Will. All other assumptions (loss factor, sales cost, and soft cost share) are based on industry standards and HR&A's assessment of what is appropriate given local market conditions.

Based on these assumptions, HR&A developed a stabilized-year retail income statement to derive a net land value for retail use.

Table 26

Stabilized-Year Retail Income Statement

Scenario	A *Consolidated parking*	B *Integrated parking*
Gross Square Feet	25,000	25,000
Share of Total Development Program	2%	2%
Loss Factor	15%	15%
Rentable Building Area (85% of Gross)	21,250	21,250
Retail Lease Revenue		
Rent Per Year PSF (NNN)	$20.00	$20.00
Potential Cash Flow	$425,000	$425,000
Less Vacancy Allowance (9% of Lease Revenue)	($36,975)	($36,975)
Less Operating Costs (0% of Lease Revenue)	$0	$0
Net Cash Flow	**$388,025**	**$388,025**
Stabilized Year NOI	$388,025	$388,025
Capitalized Value at 6.00%	$6,467,083	$6,467,083
Less Sales Costs at 2.50%	($161,677)	($161,677)
Market Value	**$6,305,406**	**$6,305,406**
Vertical Hard Costs	($3,750,000)	($4,500,000)
Soft Costs (20% of Hard Costs)	($750,000)	($900,000)
T/I + FF&E (15% Total Hard + Soft Costs)	($675,000)	($810,000)
Total Development Costs	**($5,175,000)**	**($6,210,000)**
Market Value	$6,305,406	$6,305,406
Less Total Development Costs	($5,175,000)	($6,210,000)
Net Project Value	**$1,130,406**	**$95,406**
Net Project Value per Built SF	**$45.22**	**$3.82**

Hotel.

Table 27 below describes the assumptions underlying the stand-alone feasibility analysis for hotel use.

Table 27

Hotel Assumptions	Scenario A *Consolidated parking*	Scenario B *Integrated parking*
Income Assumptions		
Average Daily Room Rate	$175/Room	$175/Room
GSF Per Room	900 SF	900 SF
Occupancy Rate	74.6%	74.6%
Capitalization Rate	6.25%	6.25%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost PSF	$150/SF	$180/SF
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	10.0%	10.0%
TI & FF&E (PSF)	$18/SF	$22/SF

HR&A analyzed existing trends within the hotel market to confirm supportable room rates at the Site. Average annual occupancy was derived from STR market data covering full-service hotels in the Atlanta Central Business District, current as of H1 2016. Based on a review of hotel uses in comparable innovation districts, HR&A assumed that the hotel use would contain additional amenities such as business conference room space and restaurants. HR&A did not analyze the market for these ancillary uses separately, but they have been incorporated into the hotel's projected revenues and operating budget. The latter was based on national hotel operating data from STR's "Host Almanac 2016," which provides ratios of revenues and expenses to sales by category for the average full-service hotel in the United States. To reflect the proposed restaurant and conference space programs, HR&A adjusted total Food and Beverage revenues to 20 percent of total hotel revenues. This reflects reasonable restaurant revenues per square foot and conference room rental rates given the location and context.

Based on these assumptions, HR&A developed a stabilized-year hotel income statement to derive a net project value for the hotel use.

Table 28

Stabilized-Year Hotel Income Statement

Scenario		A Consolidated parking	B Integrated parking
Gross Square Feet			
Hotel Rooms (GSF)		180,000	180,000
Hotel (Keys)		200	200
Share of Total Development Program		17%	17%
Stabilized Annual Occupancy Rate		75%	75%
Average Daily Room Rate		$175	$175
RevPAR		$130	$130
***Revenues by Department** (% of Total Rev.)*			
Rooms	65%	$9,525,901	$9,525,901
Food	20%	$2,945,702	$2,945,702
Beverage	4%	$615,520	$615,520
Other F&B	5%	$732,762	$732,762
Other Operated Depts.	3%	$498,278	$498,278
Misc. Income	2%	$337,070	$337,070
Total Operating Revenues	**100%**	**$14,655,232**	**$14,655,232**
***Expenses by Department** (% of Departmental Rev.)*			
Rooms	25%	$2,371,949	$2,371,949
Food & Beverage	71%	$3,061,610	$3,061,610
Other Operated Dept.s	67%	$561,354	$561,354
Total Departmental Expenses	**37%**	**$5,994,913**	**$5,994,913**
***Undistributed Operating Expenses** (% of Total Rev.)*			
Admin & General	8%	$1,143,108	$1,143,108
Info & IT	1%	$161,208	$161,208
Marketing	7%	$996,556	$996,556
Franchise Fees	2%	$263,794	$263,794
Utility Costs	3%	$498,278	$498,278
Property Operations & Maintenance	4%	$615,520	$615,520
Total Undistrib. Expenses	**25%**	**$3,678,463**	**$3,678,463**
Gross Operating Profit		**$4,981,856**	**$4,981,856**
***Other Fixed Expenses** (% of Total Rev.)*			
Management Fees	3%	$439,657	$439,657
Insurance	1%	$146,552	$146,552
Property Taxes	4%	$512,933	$512,933
Capital Replacement Reserve	2%	$307,760	$307,760
Total Other	**10%**	**$1,406,902**	**$1,406,902**
Stabilized Year NOI		**$3,574,953**	**$3,574,953**
Capitalized Value at 6.25%		$57,199,254	$57,199,254
Less Sales Costs at 2.50%		($1,429,981)	($1,429,981)
Market Value		**$55,769,273**	**$55,769,273**
Vertical Hard Costs		($27,000,000)	($32,400,000)
Soft Costs (20% of Hard Costs)		($5,400,000)	($6,480,000)
FF&E (10% of Hard + Soft Costs)		($3,240,000)	($3,888,000)
Total Development Costs		**($35,640,000)**	**($42,768,000)**
Market Value		$55,769,273	$55,769,273
Less Total Development Costs		($35,640,000)	($42,768,000)
Net Project Value		$20,129,273	$13,001,273
Net Project Value per Built SF		**$112**	**$72**

Parking.

Table 29 below describes the assumptions underlying the stand-alone feasibility analysis for parking.

Table 29

Parking Assumptions	Scenario A *Consolidated parking*	Scenario B *Integrated parking*
Income Assumptions		
Rent per Unit per Month	$50/Space	$50/Space
Vacancy Rate	5.0%	5.0%
Average Annual Property Taxes PSF	$2/SF	$2/SF
Operating Expenses (% of Revenue)	53%	53%
Capitalization Rate	6.0%	6.0%
Sales Cost	2.5%	2.5%
Development Assumptions		
Hard Cost per Space	$20,000/Space	$30,000/Space
Soft Costs (as % of Hard)	20.0%	20.0%
TI & FF&E (as portion of total Hard + Soft costs)	0.0%	0.0%
TI & FF&E (PSF)	$/SF	$/SF

HR&A analyzed the two parking scenarios on a stand-alone basis to account for revenue generation. Though the adjacent Northyards Business Park does not charge for parking, nor are tenants charged at the TEP site currently, the parking use is assumed to turn revenue-generating upon full program build-out and under the assumption that transit options in the area will be improved by stabilization. GATV provided estimates of potential monthly rental rates for parking based off what is currently charged at Tech Square and what the TEP Site is expected to be able to eventually command. Taxes were derived from CoStar property-level data for Atlanta. Operating expenses were assumed to be $300 per space per year, which includes the high insurance costs associated with operating a parking structure. Hard costs were provided by Perkins + Will, and take into account the differing structural requirements associated with consolidated versus integrated parking. All other assumptions (vacancy, capitalization rate, sales cost, and soft cost share) are based on industry standards and HR&A's assessment of what is appropriate given local market conditions.

Based on these assumptions, HR&A developed a stabilized-year parking income statement to derive a net land value for parking.

Table 30

Stabilized-Year Parking Income Statement		
Scenario	**A** *Consolidated parking*	**B** *Integrated parking*
Parking Spaces	2,500	2,500
Parking Revenue		
Rent per Space per Year	$600	$600
Potential Cash Flow	$1,500,000	$1,500,000
Less Vacancy Allowance (5% of Lease Revenue)	($75,000)	($75,000)
Less Operating Costs (53% of Lease Revenue)	($750,000)	($750,000)
Net Cash Flow	**$675,000**	**$675,000**
Stabilized Year NOI	$675,000	$675,000
Capitalized Value at 6.00%	$11,250,000	$11,250,000
Less Sales Costs at 2.50%	($281,250)	($281,250)
Market Value	**$10,968,750**	**$10,968,750**
Vertical Hard Costs	($50,000,000)	($75,000,000)
Soft Costs (20% of Hard Costs)	($10,000,000)	($15,000,000)
T/I + FF&E (0% Total Hard + Soft Costs)	$0	$0
Total Development Costs	**($60,000,000)**	**($90,000,000)**
Market Value	$10,968,750	$10,968,750
Less Total Development Costs	($60,000,000)	($90,000,000)
Net Project Value	**($49,031,250)**	**($79,031,250)**
Net Project Value per Built Space	**($19,613)**	**($31,613)**

05.

05. BUILDING AN ECOSYSTEM

05.

INNOVATION ECOSYSTEM PRECEPTS

"Magic happens if there is a coffee shop where you bump into people...especially f you weren't forced to drive somewhere."

This engagement is focused on establishing the feasibility of expansion of the existing Technology Enterprise Park (TEP). The study's stated intent has been to examine how TEP may evolve in the direction of becoming a mixed-use development, physically aligned with goals and opportunities of adjacent properties, notably that of the Atlanta Housing Authority (AHA), as well as the privately owned Northyards and Georgia Tech's North Avenue Research Area and nearby communities.

The vision is for TEP to be strategically and programmatically organized along the lines of an Innovation District, in keeping with emerging best practices for what were traditionally viewed as research parks.

What makes both research parks and Innovation Districts uniquely relevant in the economic development context is their ability to serve as an intentional, organized gathering point for innovation activity - activity that both comes from inside the university and that connects with outside innovation economy players regionally or globally. The park or district as a formal, institutionally sponsored effort can help support and coordinate delivery of value-added services to its resident companies and affiliates, while also serving as the hub for a larger region's innovation ecosystem. Parks and districts thus represent the classic sum that is greater than the whole of its ecosystem parts.

Successful research parks and Innovation Districts invariably are seen as special places that take on multiple functions and become identified as the "faces" of their communities' technology commercialization prowess. Otherwise said, they become the place-making element of their region's innovation ecosystem.

Defining TEP's Innovation Ecosystem

For purposes of this study we have defined the innovation ecosystem elements relevant to TEP as including, at a minimum, the following:

- The research base at Georgia Tech
- The research base and technology strengths of regional companies, federal and private institutions
- Commercialization support and entrepreneurial development organizations
    - Incubators, Accelerators, Co-working Spaces, Networking Initiatives
    - Venture Investors (Seed, Angel, formal VC)

- Traditional economic development entities
- Talent Pipeline: Georgia Tech academic programs plus:
    - Community and Technical Colleges
    - K-12 education
    - Adult and continuing education programs
    - Traditional workforce and job-readiness programs

Additionally, because of TEP's location adjacent to Atlanta's Westside Neighborhood, we also have included Community Organizations and Initiatives as a special case that is relevant to this particular research park's feasibility.

Section 03 of this report presented an assessment of Georgia Tech's core competencies and its industry-facing research and technology development efforts, as well as observations on the regional economy. Here, we focus on other elements of TEP's innovation ecosystem, drawing from extensive stakeholder interviews conducted over the course of this study. This innovation ecosystem overview is drawn from a blend of direct stakeholder perspectives, as well as our consulting team's synthesis of major themes and observations.

"Expanding TEP is a brilliant idea ... stop surveying and just go ahead and do it!"

Together these inform our assessment of the feasibility for TEP expansion, as well as specific recommendations for future directions that Georgia Tech and its key TEP stakeholders may wish to pursue.

ECOSYSTEM SUPPORT FOR EXPANDING TEP

Representatives from across Atlanta's innovation ecosystem consistently support the proposed expansion of TEP. These observations come from both Georgia Tech operated or affiliated entities, as well as organizations that are wholly independent of Georgia Tech. An expanded TEP was seen as increasing the community's store of innovation assets and not as competition.

While fully cognizant of major new properties coming on line in Midtown or planned at Georgia Tech, notably the CODA building, and factoring in the vibrancy of Tech Square, innovation system stakeholders made a case that expansion of TEP is viable for meeting future space needs of key industries. Perception from the street is that demand is strong and that Midtown is getting "maxed out;" there is need for an expansion area to accommodate an overflow of rapidly growing companies, some of which need space that is less is expensive or differs from the typical office space profile of Midtown properties.

Place-making Opportunities at TEP

"This is NOT Research Triangle Park!"
Stakeholders perceive that TEP is in a convenient and accessible location, regardless of

its site and transportation constraints, or its adjacency to low-income neighborhoods. One economic development official even cited the opportunity to promote the "renaissance aspects" of Westside redevelopment from a wider geographic context.

From an economic development perspective, the TEP site is seen as having a "blank slate" advantage—a place where contemporary urban design and land use principles can be intentionally applied to establish the location's brand and marketing presence as a competitive advantage. With strategically planned infrastructure improvements, marketing then can stress TEP's uniqueness: its connectivity to Georgia Tech, walkability and pedestrian-friendly atmosphere, adjacent mixed-use attractions (Northyards), and neighborhood connectivity that in one stakeholder's words "creates an urban chic environment."

"Atlanta is buzzing with technology and innovation, but it is scattered."

Positive Effects of Clustering

Given its size and Metro Atlanta's history of rapid suburban expansion, the region's technology assets in general and its distribution of companies are geographically scattered. Economic development professionals see value in further clustering of innovation activity around Georgia Tech and Midtown, believing this will support regional marketing and outsiders' perceptions of critical mass.

Additionally, there is a need for industry-specific ecosystems: IT companies and so-called Fin Tech in particular are reportedly drawn to existing clusters around Midtown, in part because it provides a supportive ecosystem for attraction of employees.

"They start and grow here for a reason, especially the support they have gotten from the universities and the state . . . they are being recruited every day by other states but they are staying here because of the support they get."

Similarly, Georgia Bio sees a need for some type of "center" or home base where the industry may gather, despite the strong orientation of larger bioscience companies to suburban centers such as Alpharetta that has been previously noted. If more companies and some additional key assets were centrally located—perhaps focused on facilities that support the needs of pre-clinical companies—such a center would help promote industry networking opportunities and help to convey to outsiders a better sense of Atlanta's total competitive advantage for the life science industry.

While lacking immediate adjacency to the Georgia Tech main campus, TEP nonetheless is seen as proximate and having advantages for talent recruitment. Stakeholders confirm a trend seen in research parks across the country, namely that companies would be motivated to locate at TEP because they want to hire Georgia Tech grads in fields such as industrial engineering and manufacturing operations as much as for accessing research activities.

"An explosion of entrepreneurship began across Atlanta 9-10 years ago. . ."

ATLANTA INCUBATION RESOURCES AS A "DEMAND DRIVER"

It is self-evident that incubators and incubation of young, even start-up companies are key factors in populating research parks and Innovation Districts. The strategy for growing TEP is hugely advantaged by the fact that this innovation ecosystem capability already exists, albeit not on site, and does not have to be created from scratch.

Georgia Tech's experience with incubation has a long history and a notable track record of success: programs that are operated under the umbrella of the Enterprise Innovation Institute (EI2) – notably the Advanced Technology Development Center (ATDC) – are among the most widely emulated in the United States. At issue for TEP is how incubator-type services can be delivered at its site, as it is currently removed from ATDC's home base at Tech Square.

"We're FOR entrepreneurs, BY entrepreneurs."

ATDC Experience and Observations

Founded in 1981 and 95% state funded, ATDC operates beyond Atlanta, serving as "Georgia's incubator." Its tiered program offerings reach a large statewide audience, as ATDC operates at satellite locations across Georgia and serves some 800 companies in a given year. This provides it with flexibility to match companies at remote locations with industry-specific mentors in Atlanta.

ATDC's trajectory has not been linear: between 2005 and 2011 state support waned, funding and staff were reduced, and its tenant list shrank. But through repositioning and launch of significant new program offerings, including a new accelerator program, ATDC has regained traction and then some: its 48,000 sf of space at its Centergy Building headquarters in Tech Square is today completely full. Additionally, ATDC operates 15,000 sf of wet lab space in the Ford Environmental Science and Technology Building.

Given this momentum, it is not surprising that ATDC is being asked to graduate more companies. Yet its lack of additional space represents an absolute constraint and ceiling on this goal. Furthermore, ATDC's experience with graduates in recent years suggests they are seeking to locate near to their Tech Square birthplace. Informal surveys suggest that a many are finding their new home within one mile of Tech Square. ATDC graduates are having to "fend for themselves" without any formal institutional pathway toward space that is specifically designed for its graduates.

Based on these dynamics, ATDC itself could be a driver of demand to an expanded TEP site, particularly if a model for delivery of its services can be established. As a cautionary note, ATDC also may establish a "pod" of activity in the CODA building, intended to house companies needing access to that facility's specialized computing capabilities. This is likely to absorb some of its Tech Square overflow or pipeline of graduates.
Relocation of ATDC wet lab operations from the Ford Building to TEP is a logical starting

point that is well-aligned with the historic focus of TEP as a life science focused research park, as well as with this study's finding of TEP's locational "fit" being strongest for pre-clinical companies. Assuming an ability to transition the underlying economic model to a TEP facility, this function becomes in and of itself a significant real estate demand driver that could help bolster feasibility of the existing building and establish a more directly linked pipeline of incubator graduates to a future TEP facility.

ATDC goals include stronger program support to companies receiving federal SBIR / STTR awards. Its director also cites a need to focus emphasis on "inflection points where entrepreneurial companies fail;" that is, how to support companies through their transition growth phases, especially where changes of leadership are involved. These are compatible with a vision and role around which a defined ATDC presence could be established at TEP.

Observations on Other Incubation-type Models

From the standpoint of "building TEP's innovation ecosystem," ATDC represents the obvious dominant pathway. However, as the chart below indicates, Atlanta is experiencing a tremendous spurt of activity surrounding entrepreneurship, with a diverse set of programs and facilities devoted to meeting this demand. Many of these may also provide a pipeline of demand for space at TEP, provided that TEP establishes effective marketing outreach or programmatic linkages with these entities. The potential for tapping into this demand stream also depends on the type of new facilities that will be brought on line at TEP, both in terms of the type of real estate product as well as its pricing. TEP cannot and should not be all things to all people.

That said, for purposes of this study, a brief look at three models provides some insight into how other incubation-type activities, beyond ATDC, fit into the emerging TEP innovation ecosystem.

"The need is to connect the dots and people, plus contacts, in a special way."

Global Center for Medical Innovation (GCMI)

Atlanta Collaborative Workspaces and Incubators (partial list)

ATDC	NEX Atlanta
Atlanta Tech Village	O-Hub
Berthold Building	ROAM
Center for Civic Innovation	StartupChicks
Collider	Stockyards Atlanta
Flatiron City	StrongBox West
Forge ATL	Switchyards
GCMI (Global Center for Medical Innovation)	T3 @ Atlantic Station
Industrious	TechSquare Labs
Kollective South	The Garage @ Sandbox ATL
	The Gathering Spot (Northyards)

While GCMI is currently located in Georgia Tech Facilities on 14th Street, it has been described as having its own "ecosystem within an ecosystem" for medical devices.

In mid-2016 GCMI completed its merger with T3 Labs; within a year or so its operations will be integrated with T3 Labs and moved to TEP, occupying some additional 14,000 sf of space. It will take over space from an existing TEP tenant, a unit of Georgia Tech Research Institute, making net occupancy a wash. GCMI will bring its commercialization-oriented events and programming to TEP and make it available to the TEP community widely.

A spin-out from Georgia Tech, GCMI was built on the premise of helping pre-clinical companies navigate the start-up process: "…our approach has been to identify where the gaps in capabilities are." Its network of experts in medical device engineering, IP, regulatory, QS, along with its network of investors, help medical device companies move more rapidly "… from concept to market … like a CRO [Contract Research Organization], plus with access to academics."

GCMI currently runs an incubator at its 14th Street location, which includes four cubes and two office suites, plus three clean rooms. As they prepare to move to TEP, GCMI is establishing an accelerator program with selective admission. To be admitted, companies must be in an active product development stage and be prepared to interact with GCMI engineers and its ecosystem. In return they may receive support from a $250,000 seed fund. The accelerator will include prescriptive business development modules and coaching, and will assist companies in partnering with industry,

The Gathering Spot

The Gathering Spot is a selective membership hybrid dining club, co-working, and event space that opened during the past year in 25,000 sf of space within the Northyards complex (adjacent to TEP). The flexible work spaces in its co-working area include private offices (6) and hot desks in open areas along with 3 conference rooms and a "board room."

The Gathering Spot caters to individual entrepreneurs and small business owners who need a central Atlanta location for networking or periodic business activity. Over 450 members had subscribed at the time of our stakeholder interview, with a goal of 1200 to 1500 members as a ceiling, identified on a "curated" basis. Notably, nearly a third of its members are non-Atlanta residents who are seeking a place to conduct meetings or carry on their activities when they are in Atlanta on business.

From the perspective of traditional incubation, The Gathering Spot represents more of an amenity than a service. As an organization it is not building businesses, merely providing a venue that is attractive to young professionals and solo entrepreneurs. Nonetheless, it is a novel element within the innovation ecosystem surrounding TEP, demonstrating that there is demand by individuals who are choosing to spend time and dollars this site over other more established Midtown locations.

Center for Civic Innovation

Another non-traditional entrepreneurship and incubation entity, the Center for Civic Innovation, styles itself as being [per its website] "… a community-driven research and development lab for local governments, nonprofits, and social entrepreneurs. Our mission is to push Atlanta to be a smart, equitable, and engaged city by investing in community-driven ideas, supporting social enterprises, and engaging people in dialogue and action."

While housing its main activities and some 25 social venture enterprises in Downtown Atlanta, the Center's founder and CEO distinguishes it from traditional technology incubators by virtue of having "…more boots on the ground in the neighborhoods." Indeed, it is actively working with the Westside Communities Alliance (the residential neighborhood closest to TEP) to identify entrepreneurs and entrepreneurial opportunities. Some will be seeded from its $100,000 early stage investment fund.

The Center is also is cross-networked with Georgia Tech, citing collaboration with both ATDC and the Scheller School of Business.

These three examples illustrate the diversity of entrepreneurial organizations and initiatives that make up TEP's innovation ecosystem. Of these, only GCMI is focused on specific technologies (and building businesses based on those technologies) that align with the founding intent for TEP to serve as Georgia Tech's life science commercialization hub. The Gathering Spot may help attract entrepreneurs and possibly investors to the Innovation District within which TEP acts as an anchor; its impact on TEP's feasibility is only indirect and inferential.

"Ten years ago the strategy for Tech Square did not include all the elements that are there today. We shouldn't imagine that a TEP-centered Innovation District can have all these things figured out today, either."

The Center for Civic Innovation represents a new variant—organized on a social entrepreneurship model—that may eventually serve as a resource for building connections to low-income neighborhoods adjacent to TEP. As such, it may be catalytic in unlocking latent potential for entrepreneurship that exists nearby.

TECH SQUARE AS PRECEDENT FOR A SUCCESSFUL INNOVATION ECOSYSTEM

From the standpoint of the Innovation District model, Tech Square today is an unambiguous success. It exerts a significant real estate presence within the general Midtown area east of the Georgia Tech campus, both attracting and surrounded by a critical mass of innovation-type activity, some of it Georgia Tech based and some government related.

The clustering effect it has achieved increasingly reflects private sector locational choices: the concentration of Fin Tech companies nearby and construction of a new world headquarters for NCR almost adjacent to the Centergy Building stand as emphatic market validation for the vision of Tech Square's founders, investors and promoters.

Can an innovation ecosystem be built?

Emphatically, yes! A key lesson learned from Tech Square's relatively brief history (its grand opening was in 2003) has been the impact of multiple, coordinated locational decisions by Georgia Tech, State government, and local economic development interests, which rapidly allowed Tech Square to "create a destination." From a Georgia Tech 10th anniversary commemorative article:

> "The Technology Square Research Building houses five of Georgia Tech's cutting edge research centers – Digital Media, the Georgia Electronic Design Center, the Georgia Tech Research Network Operations Center, the Graphics, Visualization and Usability Center (GVU), and the Interactive Media Technology Center – as well as the School of Interactive Computing. Just across a tree-lined plaza, Centergy One is home to Georgia Tech's Institute for People and Technology, Tennenbaum Institute, GTRI Information and Communications Lab, and Enterprise Innovation Institute (EI2), which oversees the Advanced Technology Development Center (ATDC)...."

The Scheller College of Business and the Georgia Tech Hotel round out a range of Georgia Tech academic, research, and administrative units that anchor Tech Square, creating further bridges to the business sector and Atlanta's knowledge-based industries.

Beyond this, the Georgia state government co-located many of its critical economic development and workforce development agency functions, ensuring that private sector companies would have a reason to visit the Centergy One building and thus heavily promoting Tech Square's locational awareness. And indeed, over the course of this study remarkable synergies were observed to exist between the various state, private utilities, and Georgia Tech economic development and innovation-oriented activities in that building.

Georgia Tech "Corporate Innovation Centers" at Tech Square

As hoped, Tech Square has also been successful in recent years in attracting a wide range of national and international companies to establish Corporate Innovation Centers there. The core industries represented by these companies are strikingly diverse; what they have most in common is an affinity for being located in Atlanta or elsewhere in Georgia. However, their technology interests form a unifying theme around specific product development and validation capabilities related to Information Technology.

ANALYTICS.
SECURITY.
MOBILITY.
USER INTERFACE.

Above all, talent attraction is uniformly cited as the initial locational draw to Tech Square. It is not access to Georgia Tech research assets per se, but to its students as co-ops, interns, and, eventually, permanent hires. In some cases, bridges to Georgia Tech faculty and research have developed later, as a company has become better established within this ecosystem. Furthermore, Innovation Center companies report that, with time, some of the most advantageous relationships they establish are with other companies, and they explore technical issues of mutual and non-competitive interest. This is further evidence, cited through stakeholder interviews, that the theory behind Innovation Districts is being born out in practice.

Finally, because these are experimental initiatives with a strong workforce recruitment agenda, they do not thus far represent large leasehold footprints. Many range between 2,000 to 4,000 sf, with one of the largest being only 10,000 sf. The first Innovation Center was established only three years ago, so time will be needed to reveal whether these may grow to become more significant operations, along the lines of a traditional corporate research and development center.

Given real estate costs at Tech Square and its high occupancy levels, it is plausible that some Innovation Center companies, once recruited to Tech Square, could become candidates for migrating part or all of their activities to TEP. For purposes of documenting feasibility for TEP expansion, this remains a speculative proposition. However, it underscores an important premise: Tech Square has firmly established Georgia Tech's brand as an institution committed to innovation. This is an asset to be leveraged, and the strategy for TEP's development should strive to be complementary to the stage-setting opportunities provided by Tech Square.

In short, Tech Square forms part of TEP's wider innovation ecosystem. With time, TEP may further development, and critical mass might evolve to provide reciprocal reinforcement for Tech Square's market position. TEP should not be viewed as either competing with or being a "clone" of Tech Square. It must develop and emphasize its differentiators, its "secret sauce," as an innovation district in its own right. A key aspect of TEP's competitive advantage can result from defining a TEP real estate product mix, relative to the needs of various industry market segments. Some recommended approaches that articulate this differentiation will be explored in the following chapter of this report.

Innovation Center Company at Tech Square (partial list)

- Anthem
- AT & T Foundry
- Coca Cola
- Delta
- Emerson
- NCR
- Panasonic
- Southern Company
- Stanley Black & Decker
- The Home Depot
- ThyssenKrupp

OBSERVATIONS ON TEP'S COMMUNITY DEVELOPMENT CONTEXT

The status of the Westside residential neighborhoods as a feature of TEP's geographic ecosystem or landscape would be in all respects self-evident. However, we noted at the outset of this section a more ambitious intent to include these neighborhoods within our definition of TEP's innovation ecosystem. This stance is intentional, from the standpoint that ecosystems are by their nature open, dynamic, and expansive—not limiting or constrained.

As part of this study, stakeholders representing a range of community interests and community-facing institutions expressed clearly defined aspirations for TEP's immediately adjacent neighborhoods to benefit from its planned expansion. However, in traditional terms for a research park, related to technology commercialization or technology-oriented employment, the community's capacity to do so is constrained. At issue therefore is the question: "how to make TEP relevant to the community?"

From a perspective of establishing feasibility for TEP's expansion, these objectives require inclusion in this study, with defined solutions that can be integrated into the emerging strategic plan to guide future TEP development.

Community Inclusiveness as a Desired Goal

The intent by local civic as well as neighborhood leaders for the Westside area to be included s part of the vision and development planning for TEP as a wider innovation district reflects a number of factors:

This is the moment to do something like this . . . tie these [community development and economic development] pieces together programmatically.

- history of and commitments related to the Herndon Homes site;
- planning initiatives underway in the Westside and other neighborhoods related to the Stadium development; and
- projects being proposed for funding through the Westside Neighborhood Prosperity Fund, Invest ATL's Westside Tax Allocation District, etc.

Blank Foundation representatives in particular articulated a vision for an "innovation campus" that could come into existence surrounding TEP, which would promote inclusiveness and help establish a place-based focus for the Westside area through entrepreneurial leaning activities such as a makerspace or commercial kitchen.

A number of special initiatives already underway were identified that can create a bridge to the economic opportunities potentially generated by TEP expansion. These take various forms including efforts designed to promote neighborhood capacity-building, workforce development, and social entrepreneurship initiatives. Some thought that further opportunities for community engagement with TEP expansion could be linked to federally funded environmental and water quality initiatives.

Establishing a Community Workforce Development Pipeline

Workforce readiness programs can be built into the TEP expansion strategy as a mechanism to promote long-term inclusiveness in a range of new job opportunities which will develop at or near to TEP. While these programs may not be seen on a menu of traditional "research park" activities, they easily fit a broader concept of an innovation district, where the district by definition is integrated with its surrounding areas, rather than being inward-looking and isolated.

Furthermore, case studies exist among peer institutions for creative and effective ways in which research parks and universities have achieved their expansion goals in inner city neighborhood such as Philadelphia (University of Pennsylvania), Baltimore (the Science + Technology Park at Johns Hopkins and the University of Maryland-Baltimore BioPark), and Chicago (Illinois Institute of Technology Research Park).

In short, the potential exists to create a "talent pipeline" on-site, in particular reaching out to engage young people at early ages via the K-12 system and programs operated by the Community and Technical College that promote job access. Examples include efforts by the Westside Communities Alliance, which collaborates with Georgia Tech HR personnel to promote community-based recruiting, and a program being launched at the nearby Hollis Innovation STEM Academy for middle school students. Georgia Tech's Center for Education Integrating Science Math & Computing, known as CEISMC, is providing leadership in this area and has experience with community-facing initiatives that build career awareness in younger students along with skills that can help them overcome traditional barriers to advanced education and training.

Master planning for "Greater TEP", considering the full geography of the envisioned innovation district, may identify an ideal location for a neighborhood-oriented employment center, where job search and skills development support services can be a stepping stone to participating in the employment opportunities being generated by TEP and its related development.

Workforce Development at TEP—Beyond Neighborhood Interests

While workforce programming can provide a critical mechanism for community engagement and inclusion, it also has a role to play as part of TEP's economic development strategy. The potential for locating various type of training resources on-site can support existing tenants and help draw in new ones.

The State of Georgia's "QuickStart" customized job training program for new and expanding businesses has been nationally recognized by site locators as one of the best in the U.S. Typically this resource is called into play for a specific company considering Georgia for future expansion, as part of a negotiated process. That has sometimes led to establishing industry-specific training facilities and curriculum in partnership with the state's Technical College System. Once established, these capabilities can be made available for other companies within that industry cluster. Examples of this were cited in both the life science and automotive industries. While these transactions usually involve a specific large employer and its associated industry cluster, the potential to identify an industry-specific training gap and to bring such capabilities to the TEP site is an additional tool worth exploring within a portfolio of strategies to promote TEP's competitive advantage and hence the feasibility of its expansion.

TEP is at an inflection point ... we must change how it is marketed and managed—it is not being run like a true "research park."

Business recruitment as an activity forms part of TEP's prospective innovation ecosystem. Tech Square set a precedent of clustering economic development and workforce agencies, to good effect. Finding a suitable analogue for TEP that leverages these program capabilities should be a priority for the TEP's strategic management plan-in-waiting. Institutionally, Georgia Tech senior management is well-integrated with Atlanta and state economic development efforts, employing a highly effective "account team" approach toward recruiting industry partners and companies that may simultaneously hold a philanthropic interest for the institution. These capabilities can be tapped to help position and market the expanded TEP within the framework of shared Georgia Tech and community objectives.

OBSERVATIONS SPECIFIC TO TEP'S ORGANIZATIONAL MANAGEMENT AND GOVERNANCE

In comparison with Tech Square or with the innovation-focused real estate operations of comparable major academic institutions, TEP today is a relatively small enterprise—whether considered in terms of acreage, square feet of developed space, number of employees, or number of individual tenants. TEP therefore lacks the critical mass of activity that might necessitate the type of dedicated management staff that typically is in place at more fully developed research parks operated by peer institutions.

The result—perhaps qualifying as an "unintended consequence"—is that the combined managerial effort under the TEP banner fails the test for robustness and comprehensiveness with respect to the full range of functions that typically fall within a research park's management purview. The organization's legal structure has worked sufficiently well in terms of providing the needed mechanisms and arrangements to plan, finance, construct and operate TEP's two principal buildings. Arguably, these legal structures and business arrangements suffice for the foreseeable future in terms of continuing to support TEP's facility and site development agenda. What is less clear is whether TEP can continue to operate successfully without dedicated, full-time staff—especially a CEO that is fully and exclusively dedicated to the TEP mission, including its evolution into a significant innovation district on the scale that is envisioned.

This feasibility study found that the lack of such dedicated staff limited the kind and intensity of substantive professional interactions between university and TEP tenants (the primary reason why companies locate in university research parks), between and among tenants within the park, and between the park entity and other organizations that make up TEP's ecosystem, particularly those engaged directly in economic development.

These gaps in management focus bear directly on the adequacy of efforts to market the park (or the future innovation district), including assisting existing tenants meet their expansion needs, as well as in recruiting new companies to TEP. This in turn may constrain feasibility of the park's expansion and evolution into an innovation district, regardless of otherwise positive market demand characteristics or the strength of Georgia Tech's industry-facing research and technology assets.

To this end, the feasibility study sponsors requested that the consultants undertake a more detailed examination of these aspects of TEP organization and activity, so that the pertinent issues might be more readily addressed in the next stage of TEP strategic planning.

Defining the Management and Governance Landscape

We treat these operational characteristics in terms simultaneously of management and governance. Confirming that situation-appropriate foundations for management and governance are in place represents a defined aspect of feasibility that should be considered alongside the analysis of market demand parameters, and the proposed physical development scenarios upon which the initiative will be based.

Otherwise said, the "ability to execute" ultimately may play as great a role in determining the outcome of the TEP expansion effort as its underlying market viability or any urban design solutions that are proposed to guide the future development program. Execution depends not only on the legal, corporate ,or administrative structure of the enterprise (e.g. governance), but also on organizational delivery capabilities represented by staff or programs (that is, "management"). Of course, budgets and other institutional forms of commitment must be in place to support them.

"Management" as TEP's Leading Edge Construct

In our review of the TEP environment, a general conclusion is that issues surrounding management are the primary consideration to be addressed as part of a next phase TEP implementation plan.

The basic building blocks of TEP governance, in terms of corporate structure, legal entities and authorities, mechanisms, etc., are largely in place to address key functions faced by all research parks, notably:

- ownership or acquisition of land or buildings;
- ability to lease, sell, or enter into contracts (e.g. with a real estate developer);
- financing of activities; and,
- ability to ensure accountability for performance of the overall enterprise.

On the other hand, interviews with stakeholders and our professional observations suggest that TEP's management and operational capacity, compared against similar environments, is significantly under-developed. Our concern is that approaches to management that worked reasonably well for TEP in the past, as a relatively small and self-contained research park, could limit the enterprise's effectiveness in addressing many functions that will be central to its future success as an innovation district. These gaps in covering certain management roles could impede TEP from reaching the desired outcomes to which this study and its stakeholders aspire.

An Innovation District for Atlanta's Westside: New Orders of Complexity

Effective management and governance are necessary and sufficient conditions for success of the endeavor, hence this review forms part of the overall feasibility study. Furthermore, evolution of TEP from functioning as a "research park" to embracing the contemporary definition of an innovation district adds complexity to the geography and to the array of basic functions that must be carried out by management.

Assuming that plans move forward, TEP will enter a new phase that involves at a minimum joint planning and coordinated implementation between Georgia Tech and the AHA, and very possibly with MetLife as owner of the Northyards complex. Adding NARA to the mix, as would be logical from the standpoint of treating the entire area as an innovation district for branding and programming purposes, adds yet another set of relationships that will require coordination and integration.

The list of real estate issues that previously could be handled “within the family” (e.g. Georgia Tech’s administration or special-purpose entities and the single private developer, The University Financing Foundation) will now presumably expand to include integrated efforts spanning the district. It may involve close collaboration between at least three discrete property owners to address a range of factors, including parking, security, maintenance of public spaces, event and tenant activity programming, and establishment of a singular brand for marketing the Innovation District as a whole.

In short, we anticipate a range of activities that will transform “Greater TEP” into a place where companies, employees, visitor and residents want to be.

A TYPOLOGY OF MANAGEMENT AND SERVICE DELIVERY FUNCTIONS

Treating the current governance structure for the moment as a given, the main question before us is how specific management capabilities can be put in place that today appear to be lacking at TEP. In our experience, these relate to being able to carry out the full typology of management functions outlined below, in a coordinated, coherent fashion.

This is a necessary and desirable step in order to fully support the strategic intent of further developing TEP’s real estate holdings, while evolving its foot print and modus operandi towards an innovation district model (e.g. “Greater TEP”).

Given the observations above, these steps should be possible within the existing governance and administrative structures established by Georgia Tech, which have worked successfully to date in positioning TEP as a recognized location for research and commercialization of new technologies within the Atlanta metro area.

Illustrative Management Functions (for any “Park” or “Innovation District”)
TEP is both a place and a set of functions which define it as clearly distinguishable from other real estate across the Atlanta region. Drawing on best practices from exemplary U.S. research parks, these functions can be organized around the following illustrative buckets of activity:

- Functions related to land and its development: Master planning; establishing / modifying the regulatory framework for development and building construction; land acquisition; land sales and leasing; infrastructure planning and implementation; public space planning and maintenance

- Development and management of facilities: Developer recruitment / relationship management; redevelopment of existing structures; self-development of facilities by the park entity (if not using a developer); ongoing property management

- Marketing (broadly defined): Strategy and brand development; advertising and related communications tools, e.g. websites, print material, way finding (signage), etc.; PR and media relations; being the "public face" of the park / innovation district

- Attraction of park tenants: Setting / implementing the business recruitment strategy, including trade shows, prospecting trips, etc.; broker policies; "sales" (closing functions including incentives packaging); establishing and maintaining key partnerships that are essential to the business recruitment process, e.g. with local and state government entities, chambers or economic development corporations

- Retention and support of park tenants: Liaison between tenants and the university (e.g. help in accessing the full spectrum of university resources, from faculty to students, equipment to facilities, or special privileges such as library or athletic facilities); park "Ombudsman" role; knowing tenants' ongoing real estate or business growth needs

- Innovation Ecosystem coordination and collaboration: Incubation, including direct support to start-ups, emerging / growing small enterprises; coordination with investor and entrepreneur networks; liaison with Technology Transfer office; building a pipeline of new tenant prospects or helping existing start-ups find new space in which to grow

- Fostering a sense of place: Activities programming, ranging from conferences and substantive networking events for targeted industry sectors to after-hours social activities (e.g. food trucks, sports and family events, etc.); other tenant-oriented services (e.g. daycare, access to sports facilities, concerts, arts events, farmers markets, etc.); communications vehicles (e.g. newsletters) to build awareness of the park, the ecosystem, and connectivity to outside activities and resources

- Activities related to talent attraction and workforce development: Organizing structured training and professional development opportunities for targeted growth industries or specific companies; maintaining / accessing human resource databases

- Stewardship of the Strategic Business Plan for the park / innovation district as a whole: Establishing, refining and regularly updating goals, objectives, and work plans (priority setting); alignment of park plans and processes with those of the university and other key partners / stakeholders; advocacy and coalition building; accountability (success metrics); identifying and accessing new resources to support the park mission (e.g. funding, institutional support, etc.); coordination with the full range of community and stakeholder interests

This list, while long, could certainly be added to. The buckets of activity may be configured in differing ways, and they typically are, as each park or innovation district seeks to define its optimal configuration and service delivery structure. In particular, functions that determine a park's fundamental competitiveness in attracting or retaining tenants will cut across the full gamut of capabilities, from the most substantive aspects of promoting research or accessing technology and talent, to place-making activities that contribute to a sense of community.

Entrepreneurial Support Programs: A Special Case

The role of ensuring the robustness of the local entrepreneurial ecosystem (in particular, running incubators) is a function that some parks actively lead, while others operate more as the benevolent landing place for the businesses that the ecosystem generates. Regardless of whether the incubator-type function is directly run by the park entity or by a separate special purpose organization, these activities are very closely intertwined with the mission and activities of the research park – something that clearly distinguishes it from being "merely another commercial office park." Park management therefore will typically have at least a strong partnership with the incubating entity / entities.

Implications: How This Gets Applied

It is useful to think of management's role for the research park (or the innovation district) in terms of service delivery capacity. Otherwise said, we are focused on the ability to execute, organized around a comprehensive plan that brings together all the needed resources to achieve Georgia Tech's and the community's shared goals and vision for the innovation district.

Looked at as a whole, the list above looks strikingly similar to the job description of a CEO who would run, oversee, or coordinate the entire enterprise. This is the role of management, and its functions can be accomplished under a variety of legal structures and governance mechanisms that are designed to fit the particular circumstances of the founding institutions and partners.

In short, the mere presence of strong research and technology assets at the parent university is not enough to ensure a park's attractiveness as a business location. Facilities, organizational structures, staff, and programming that help to promote interactions of park tenants with technology in universities, federal laboratories or with other companies typically represent a park's most valued capability—benefiting both its start-ups and its established business tenants.

NEEDS UNIQUE TO TECHNOLOGY ENTERPRISE PARK

In the case of TEP, what are the missions we need to advance and the functions or services we need to deliver? While many park functions are obvious, some are less so or embedded as sub-functions to other major roles of management and governance.

Consistent, Singular Vision for TEP

Irrespective of all other considerations there is a need for a single vision of how Greater TEP is to operate, especially as it executes its strategy to evolve from being a “research park” to becoming an innovation district.

The current EDA-funded Feasibility Study represents one tool and the first step in a process for shaping and articulating the emerging vision of TEP, one that hopefully incorporates consensus among the key stakeholders as to its defining elements. Once the consultant engagement ends, the real work of implementation begins. Translating the study findings, recommendations, and points of agreement reached into an actionable road map will launch a separate process, one that will benefit from locally-based leadership that is strongly invested in the outcome of future efforts.

A CEO for TEP

In short, the time has come for the TEP enterprise to be led by an executive level individual whose focus is solely on moving the TEP agenda forward: building capacity to address gaps in the current delivery system, then helping actualize the building blocks for Greater TEP as the innovation district that is destined to become. The actual title and reporting relationship, initially, is of minor importance; the key feature must be centralization of management roles and responsibilities in an individual charged with addressing the research park/ innovation district enterprise from a 360-degree vantage.

The CEO position should be structured around the ability to focus management time and attention on the game plan in its entirety, and then to follow through with execution—crossing over multiple functions, for example from planning to real estate, branding and PR to tenant recruitment, or from interfacing with the university to building community within. This in turn requires a variety of skills, and no one person can do it all.

But while some research parks do have large staffs, staffing, per se, is not the full answer. The specific expertise for each function can reside either inside the primary management entity or outside, carried out by contractors instead of employees. Or it may be provided through a partner agreement such as a memorandum of understanding (MOU). However it is provided, the move to designate a TEP CEO would allow the full range of activities related to the enterprise to be coordinated in a coherent and consistent way. This is the higher-order ambition to which we think TEP aspires.

TEP's Biggest Challenge: Coordination of Planning and Action

The intent behind having full-time dedicated staff for TEP, presumably in the form of a CEO, is to address the challenge of coordinating the many functions that must be central to the effective functioning of a research park or an innovation district.

Given that the many moving parts of the TEP enterprise are not all under a central command structure, it may seem self-evident and redundant to call further attention to this issue. Certainly, coordination of effort within any university is itself a challenge and a normal part of the territory.

But we cite this here as an overarching issue for a research park, especially one that is to be transformed into an innovation district, in order to underscore the importance of creating a leadership position for TEP that has a charge and level of authority suitable to the mission and to the order of magnitude of the complexity of the district.

A Tool for Coordinated Action: Strategic Business Planning

For the TEP enterprise as a whole, this is an ongoing function that requires sustained management leadership. Operational planning must be updated at regular intervals and provide for alignment with Georgia Tech strategic priorities, as they too evolve.

The strategic business plan incorporates the physical master plan's goals and assumptions, and demonstrates how those physical elements will be implemented. It should address how all manner of programmatic elements will overlay the physical plan to provide the content and "stuff" of the place.

Strategic plans may be formal, elaborate and written; or they can be informal, flexible, and implicit as captured through sequential decision-making, PowerPoints, memos and meeting minutes. But as the enterprise moves beyond being "two buildings, food trucks and 13 acres of land" (an over-simplification, yes, but to make the point!) the role of strategic business planning in driving activity forward becomes a priority management function, a central focus of management's time.

TEP's real estate development partner must have input to the park's overall plan, and it will be responsible for some aspects of its execution. But the developer cannot be expected to lead this function. TEP's strategic plan must encompass and reconcile other stakeholder viewpoints and agendas. In particular, the need for coordination with development activity by the Atlanta Housing Authority (and potentially also with the Northyards owner) in order to advance a vision and implementation road map of TEP as part of a larger innovation district underscores the importance of this function.

Single Point of Contact

A "Single Point of Contact" is needed for outside parties (prospective tenants, but also others) to be able to more effectively interact with TEP. Through TEP they should be able to reach its various resources, partners, tenants etc. TEP also can serve as an additional portal for companies wishing to access Georgia Tech's exceptional research and technology commercialization capabilities. The current website does this in part, through its "Customer Support" tab. But under "Contact Us" it presents a more confusing picture of how to access TEP that could be remedied by having a dedicated CEO on board.

More on Tenant Recruitment as a Research Park Management Function

Related to this engagement being a feasibility study, the ultimate test of feasibility for development of new buildings is market demand. Market demand is neither an abstraction nor a given; it is a reflection of behavior and choices made by decision makers in businesses, both large and very small, and by existing tenants as well as prospects located regionally, nationally, and internationally.

Probably the biggest gap in the current TEP management arrangement, specifically the lack of a dedicated CEO, is that there is not an individual or team whose primary mission is to focus on recruiting and retaining tenants. As roles and responsibilities for operations are divided among many players, no one wakes up daily knowing it is their charge to "work the networks" to identify a pipeline of interest and likely intent to locate at TEP.

Research park tenant recruitment is nearly always a matter of working networks closer to home, rather than landing the "big hit" from far away. This means direct engagement with Georgia Tech faculty and staff, and with the ATDC incubator. It requires outreach to the community's other accelerators and co-working spaces, as well as other nearby universities. It involves regular interaction with key ED groups and trade associations. And it involves building connections with relevant technology-oriented companies and their various service providers (lawyers, accountants, etc.) who may be the source of leads.

It is a daily, continuous job. It cannot be done by committee, or by leasing agents. It cannot be delegated to others (for whom it is a part-time vocation), and it won't happen based just on websites, brochures, advertising, or attending the occasional trade show. It requires personal interaction, coordinated efforts, and sustained leadership.

The work of this feasibility study has demonstrated, to varying degrees of robustness, likely sources and some orders of magnitude of potential demand by industry sector or technology clusters, as well as various industry-facing aspects of Georgia Tech's research and academic programs that most likely serve as demand drivers. Actualizing the potential revealed by this analysis will require hands-on engagement by TEP's collective leadership, centralized in the function of the TEP CEO.

PROGRAMMING

"Programming" as practiced in research parks and innovation districts is a key management function that involves managing a wide range of activities designed to reinforce a sense of place and provide a qualitatively different tenant experience than can be found at general office parks or even in downtowns.

From the standpoint of tenants, programmed activities are viewed as a value-added service and thus are part of the research park's locational attraction. To be sure, it is about more than just space and price. For robust innovation districts, the same holds true, although some of the interactions may take place in a more organic way over a larger geography. For a smaller research park that may be many years away from functioning as a true innovation district, the importance of intentional programming is therefore of considerably greater importance.

From the standpoint of management, creative and effective programming represents a competitive advantage that justifies the investment of time as well as funds for which the return on investment is indirect. It fulfills the mission of providing a unique environment where innovation can thrive.

Programming can be generally organized into two major categories:

- **Business-oriented**: high on content related to technology and research topics, commercialization issues, business practices, accessing talent, developing business partnerships and related activities
- **Community-building**: high on informal social activities that promote connecting people to people and foster employee quality of life as well as the sense of the research park being a "special place"

Programming at TEP

From our interviews with a variety of TEP stakeholders, including a majority of its tenants, we observed that significant efforts to develop community-building activities have come on line during the past two years, primarily organized by The University Financing Foundation (TUFF) in its developer role, and delivered through a private contractor.

The range of activities is diverse and imaginative, ranging from tenant-oriented communications (newsletters, elevator signs about events) to "snack attacks," employee-oriented sport events, and a harvest festival. Food trucks bring a much-needed amenity onto the TEP campus. The TUFF contractor has been enterprising in conducting its market research and building bridges to the adjacent T3 building, the Northyards development, and also the NARA complex, seeking to identify needs and the opportunity to build a critical mass of engaged tenants and employees.

Two aspects of this initiative bear on the discussion of research park management roles and responsibilities. First, our understanding is that these efforts have been instigated by the developer. Some of the costs are passed on to tenants via their common area charge, and there may be some cost-sharing with Georgia Tech, though the full details remain unclear. Second, the programming being provided at the TEP site is part of a much larger package of community-building activity that has been organized to meet the needs of the Tech Square complex, where TUFF and its contractor had previously perceived a need: "People didn't see Tech Square as having 'community'; it had lost its mojo and we wanted to liven things up."

In short, significant economies of scale are only possible because these programming activities are part of a larger effort, aimed at community-building for the more heavily populated Tech Square area.

While developers often do provide certain tenant amenities, this level of effort by TUFF is not the norm for research parks. These efforts are laudable, and, from anecdotal observation, successfully filling a need. But they underscore the fact that the developer is taking on a role more typically assumed by park management. The Association of University Research Parks conducted a panel discussion on the topic of programming at one of its conferences this year which included presentations by University of Illinois Research Park, NC State's Centennial Campus, and the Wake Forest Innovation District. Copies of these presentations can be made available and are instructive on this subject.

Lack of Business-Oriented Programming

In contrast, the lack of a TEP executive director, CEO, or equivalent full-time staffing has resulted in an almost complete lack of business-oriented programming. In particular, TEP appears to lack a dedicated resource to build bridges to Georgia Tech's educational and research resources, a relationship that is one of the principal reasons cite by companies locating in university research parks.

TUFF's contractor staged three "lunch and learn" events in the past year and has plans to repeat these events. TEP tenants and employees are also invited to attend events being held at Tech Square. In general, this is a key function that should shift become part of an agenda for TEP as part of its plan to expand and evolve into an innovation district. Above all, in the future TEP itself should be equipped from a management standpoint to facilitate linkages to the Georgia Tech academic and research mission, including helping tenants to access students for internships or coops, faculty, equipment, facilities, and commercialization expertise.

Other forms of business-oriented programming involve fostering relationships between tenant companies. Georgia Tech's Innovation Center program reports that its participating industry partners find such company-to-company interactions among the major advantages of being located at Tech Square.

Near term, TEP should benefit from new business-oriented programming coming on line through the Global Center for Medical Innovation, which is moving to TEP's "Bullet Building" as a result of its lash-up with T3 labs. GCMI is launching its new business accelerator program, which will include programming modules that will be open to other TEP tenants. In preparing for this move, GCMI management noted that TEP "... needs to connect the dots and people, plus [business] contacts in a special way." GCMI's accelerator will be one mechanism helping to fill the current gap. Longer term, this will be an important area for TEP management to amplify and develop.

Tweaking Governance: A "Light Touch", If At All

The good news: to accomplish a new level of performance while evolving towards this more complex environment may only require refinements to the governance structure. These would serve to promote effective planning, decision-making, funding (in some cases), and ongoing implementation across a range of mutually beneficial, collaborative activities and may range from alignment of overall strategy to joint marketing or planning and financing of shared infrastructure and shared programs. Direct land or building ownership and control are not presently being considered to accomplish these functions.

Therefore, our sense is that TEP's fundamental governance structures can remain unchanged, at least for the present time. The role of Georgia Advanced Technology Ventures Inc. (GATV) as a vehicle for ownership and financing of TEP real estate is complemented by administrative functions delivered through the Georgia Tech Office of Real Estate Development. The companion role of the Office of the Executive Vice President for Research, and specifically the Enterprise Innovation Institute, which also functions as staff to GATV's board, brings to the table a programmatic mission for technology commercialization and economic development.

These three entities, along with others related to economic development and industry relations across the spectrum of Georgia Tech units, work effectively in tandem with TUFF to cover most, though by no means all, of the essential functions needed to operate TEP as it is currently constituted. When we say "effectively" this is not to say there are not differences of opinion on approach or other business conflicts; but that this is a long-standing mutually beneficial relationship through which the partners collaborate and purposefully advance the TEP mission.

New functions and shared areas of responsibility can be addressed as they arise without changing corporate structure or creating new entities, through flexible arrangements such as advisory or coordinating committees, or by formal MOU's. In other words, even to the extent that certain "capability gaps" are identified, they do not appear to reflect deficiencies or limitations of a governance nature.

Note that we have not sought to study existing governance documents directly, as that was beyond the immediate reach of this exercise. Rather, our conclusion is inferred by, a) a general understanding of how TEP governance structures work at present; and b) the self-evident functionality of the TUFF business arrangement, which successfully brought TEP 1 on line and continues to incrementally address the park's evolving marketing, property management, and tenant relations needs.

Use of Additional Special-purpose Entities

Nothing that we have yet observed suggests the need for a new corporate entity, for example an additional 501(c) 3 corporation, to carry out the functions of the research park or prospective innovation district. The need for this type of new or additional entity usually arises in one of several conditions:

- It is a greenfield development where governance is being created from scratch.
- There is need for an entity that can operate separately from the university corporation, in order to achieve flexibility of action, e.g. for land acquisition and leasing / sale, procurement, construction management, hiring of personnel, provision of separate property management services, etc.
- There are needs related to separation from a university's main philanthropic foundation, e.g. for self-contained financials related to sources and uses of funding, segregation of revenues so they my recycle into the project, ability to receive outside governmental grants dedicated to the research park, etc.
- There is a need for the affairs of the park, particularly land or leasing transactions, to be determined efficiently and swiftly, whether through a smaller, dedicated decision-making board structure and/or through authorities delegated to staff or to a master developer. This may also apply where there is a desire for park real estate to be governed by its own Design and Operating Guidelines, e.g. classic Codes, Covenants, and Restrictions document, Tenant Selection Criteria, Use Regulations, Design Guidelines, etc.
- There is a desire to establish an independent body to serve as a platform for shared leadership between the university and local governmental entities, i.e. where a city or county joins with a university to in joint funding of land, buildings or operating costs, and each wants a "seat at the table," the ability to make board appointments, rotate chairmanship, and/or shared accountability of staff to the board.
- There is an opportunity to establish a special purpose financing authority. Some states, like Florida, have umbrella statutes allowing for "research park authorities" to be created as an arm of County government.

To emphasize again: we did not attempt to dig into these highly technical aspects of TEP governance as current governance arrangements appear to work satisfactorily for most basic purposes; above all, they did not emerge as front burner issues related to feasibility. If circumstances change, or there are problematic aspects of TEP's present governance that we missed, we should talk further about these particulars and determine whether additional scope is needed to investigate them more fully.

An additional issue that has not been examined by this study is the desirability or likelihood of carrying out the future development agenda through one of several possible models: a) "self-development;" b) multiple developer relationships for individual buildings; and c) entering into a Master Developer relationship. The question of whether a policy choice among these options would affect the optimal governance structure may need to be considered at a future date as TEP implementation moves forward.

IN CLOSING: THREE "SPECIAL CASES"

While many of the functions discussed thus far have addressed relatively generic aspects of management which apply to all research parks or innovation districts, three elements of the TEP environment deserve special mention. They will likely require a unique level of management focus and attention in the coming months and years.

Community Engagement

For TEP, Community Engagement constitutes a "special case" as not all parks have an equivalent adjacency and degree of intertwined interests with their surrounding neighborhoods. Community expectations surrounding future plans for TEP expansion and development on the Herndon Homes site are part of the fabric of planning efforts for this innovation district.

While a number of community-oriented initiatives underway are sponsored by the City of Atlanta, local philanthropies, and Georgia Tech (such as the Westside Communities Alliance), a future TEP CEO and management team would presumably join these conversations and be able to represent the "face" of TEP as various projects or initiatives emerge from this dialogue. Precedents exist for community engagement efforts that have successfully taken down barriers between neighborhood residents and "the white coats" in research parks. A notable example of this is Buffalo Niagara Medical Campus.

NARA

While NARA as a site, a cluster of facilities, and a set of research and industry partnership capabilities is fully a "Georgia Tech operation," the proposed innovation district framework provides an exceptional opportunity to leverage NARA's strengths and assets in support of TEP expansion. NARA holds potential as a market driver for TEP, while, conversely, TEP's future development may help address selected needs of NARA. These may range from a site for satellite facilities or a location where NARA partners may locate, to providing amenities and programming that enhance NARA as a place to work and conduct research. Improved physical linkages that are part of the Perkins+Will design work-in-progress should lay the groundwork for integration of NARA along these lines

Identifying and optimizing these layered features of a NARA relationship to the emerging innovation district will take time and cannot be addressed only from a Georgia Tech top-down planning standpoint. With dedicated management in place at TEP, the opportunity will exist to build an ongoing working relationship with the various business units that occupy NARA in order to explore and implement a wide range of mutually beneficial endeavors. In short, TEP management will be in the best position to provide leadership in determining how development and programming at the TEP site can help the agenda of NARA and its occupants.

Branding (Or Rebranding)

As plans move forward to implement an innovation district vision with the Atlanta Housing Authority, Northyards, and NARA as partners, the opportunity for rebranding TEP within this larger framework will need focused management attention in order to be fully realized. This will require well-integrated and consistently articulated messaging, both in an effort to attract new tenants and to communicate Georgia Tech's contributions to community and economic development.

Because of the number of stakeholders and the geographic diversity of this location, this will not be a garden variety branding exercise, and may take considerable time and resources to accomplish. However, it should figure prominently among the priorities for TEP's future management.

Further Ecosystem Questions Related to "Feasibility"

How to engage additional Georgia Tech units in support of TEP's expansion as an innovation district, beyond those just involved with research?

- May include: College of Business; Architecture and Planning Departments; Liberal and Fine Arts; student incubators; etc.

How to leverage proximity of Coca Cola World Headquarters?

- Its proximity to TEP, various satellite programs and activities it operates, etc.

How to leverage research, commercialization, and related innovation assets of the Centers for Disease Control?

Although they are not currently interested in redevelopment of the marshalling yards at this time, how to best leverage proximity of the Georgia World Congress Center?

How to develop further academic partnerships beyond Georgia Tech?

- Can there be opportunities for collaboration with other Atlanta-based institutions of higher education (Atlanta University Center, Savannah College of Art and Design, Emory, Georgia State University, etc.)
- Leverage different strengths, access to diversity in talent pipeline

06.

06. IMAGINING A MAKER DISTRICT

IMAGINING A MAKER DISTRICT FOR THE WESTSIDE

By combining technology and craft in a major planned development in order to encourage creativity and innovation around the making and commercializing of things, Georgia Tech can write the next chapter of its long story which started with its mission of educating leaders who would drive the industrial economy of the New South. And in an area of the city that has seen conflict over civil rights, dislocation from urban renewal, and abandonment by the market, Georgia Tech has the skill, capability, and resources to turn the attention of the city from east to west.

This is a unique opportunity for Georgia Tech, the City of Atlanta, and the neighborhoods of the Westside. It is a chance to change vacant land into productive development, to transform a state highway into a multimodal main street, to anchor the Westside in a mixed-use district of the highest quality, and to bring the intellectual energy and technological capabilities of a world-class research institution to a new audience across the tracks.

Georgia Tech and its partners have recognized the potential of TEP as a new research destination on par with Tech Square, as evidenced by the investment into biotech space in Building 1 in 2006. The vision for TEP's future has revolved around the concept of blending additional biotech research space with residential development and amenities, similar to the model of Tech Square but with a different research program. There has also been a recognition of the success of NARA and the need for other types of testing labs that could support research programs more aligned with Georgia Tech's traditional engineering roots in a purpose-built **industrial innovation district**.

An **industrial innovation district** pulls the critical and sometimes messy activities that drive economic change out of the back of the house and places them front and center for university-community partnership in an open and active place. By repositioning TEP, Georgia Tech can open a new door to the university and, ultimately, unlimited pathways progress.


ATLANTA BELTLINE
PONCE CITY MARKET
FOURTH WARD PARK
MIDTOWN ATLANTA
DOWNTOWN ATLANTA
TECH SQUARE
COCA COLA
TECHNOLOGY ENTERPRISE PARK
NORTHYARDS
GEORGIA INSTITUTE OF TECHNOLOGY
GEORGIA WORLD CONGRESS CENTER
NORTH AVENUE RESEARCH AREA
AHA'S HERNDON HOMES
ENGLISH AVENUE NEIGHBORHOOD
VINE CITY NEIGHBORHOOD

TECH IS TRAILBLAZING IN THE WAY IT EDUCATES STUDENTS, PARTNERS WITH GOVERNMENT AND INDUSTRY, SERVES ITS EMPLOYEES, AND CONNECTS WITH ITS LOCAL AND GLOBAL COMMUNITIES.

Designing the Future: A Strategic Vision Plan

CONNECTIVITY

STRATEGIC RECOMMENDATIONS

For the continued development of Technology Enterprise Park as an engine of economic and social progress, the following steps should be taken to ensure TEP is connected to the city:

1. **MORE CONNECTIONS** Despite its proximity to Georgia Tech's campus, TEP is disconnected by railroads and major arterial streets. In order for TEP to be an extension of Georgia Tech's campus, new connections are recommended from north to south across the railroad divide.
2. **HUMAN CONNECTIONS** Both existing and new connections between TEP and its community – Georgia Tech's campus, the surrounding community, and adjoining properties – are recommended to specifically provide for pedestrian, bicycle and transit movement. Human scaled movement, by foot and transit, are the hallmarks of mobility on campuses and in vibrant mixed-use districts.
3. **BETTER CONNECTIONS** In addition to greater connectivity that is designed for movement on foot and by transit, TEP's success will be intertwined with its attractiveness as a place. Will businesses and new residents want to locate in the area? To this end, the true measure of connectivity for vehicles, pedestrians, bicycles and public transit should be 1) convenience, 2) safety, and 3) attractiveness.

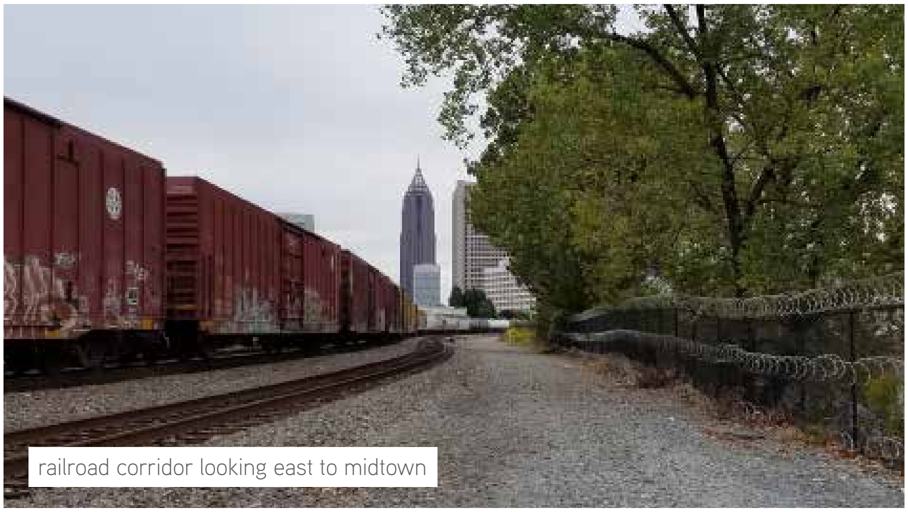
CONNECTIVITY ASSESSMENT

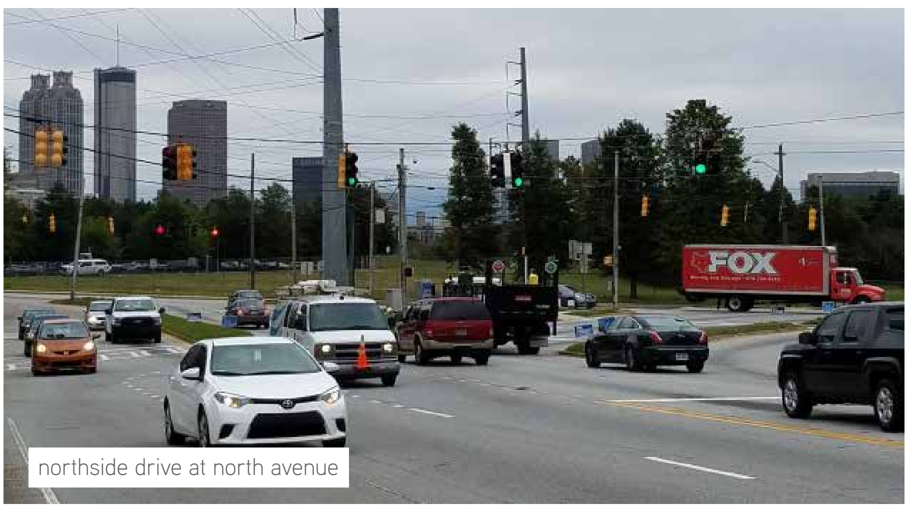
Connecting TEP to Georgia Tech's campus and the surrounding community is a challenge as old as the City of Atlanta itself. The railroad that separates TEP from the campus is one of the three original rail lines that followed converging ridge lines to meet nearby, forming the 'zero mile' of the railroads and the center of a new city that would eventually be called Atlanta. That the railroad predates land development in the city is important to recognize because, as the city grew, it grew in the pockets between the railroads and the tracks have since remained boundaries between neighborhoods and social and economic communities. These disconnections were exacerbated by the urban growth of the city in the automotive age; new streets, including highways like Northside Drive, were cut through the city, and old streets, like North Avenue, connect employment centers to our regional highway network. The character of these streets and corridors with their high vehicular speeds and relatively poor pedestrian environments are in every way barriers just like the railroads that were built before them.

CONNECTIVITY ASSESSMENT

TEP sits within one of Atlanta's many railroad corridors. This corridor is of national significance, as it is home to both Norfolk Southern and CSX Railways that connect to major destinations across the country. Trains moving between the United States' Midwest, Atlantic, and Gulf coasts travel through Atlanta and between TEP and Georgia Tech. The land around the railroads never needed to be connected into the fabric of the city because it was historically used for heavy industry and logistics. Now, however, this railroad corridor and its immediate surroundings are in the center of a city that is being reborn with new residents and economic activity. Improved connections will be required to bridge this divide.

The railroad corridor dividing Atlanta's Westside from Georgia Tech and Midtown. Technology Enterprise Park is as proximate to the center of Georgia Tech's campus as Tech Square.


railroad corridor looking east to midtown



northside drive at north avenue

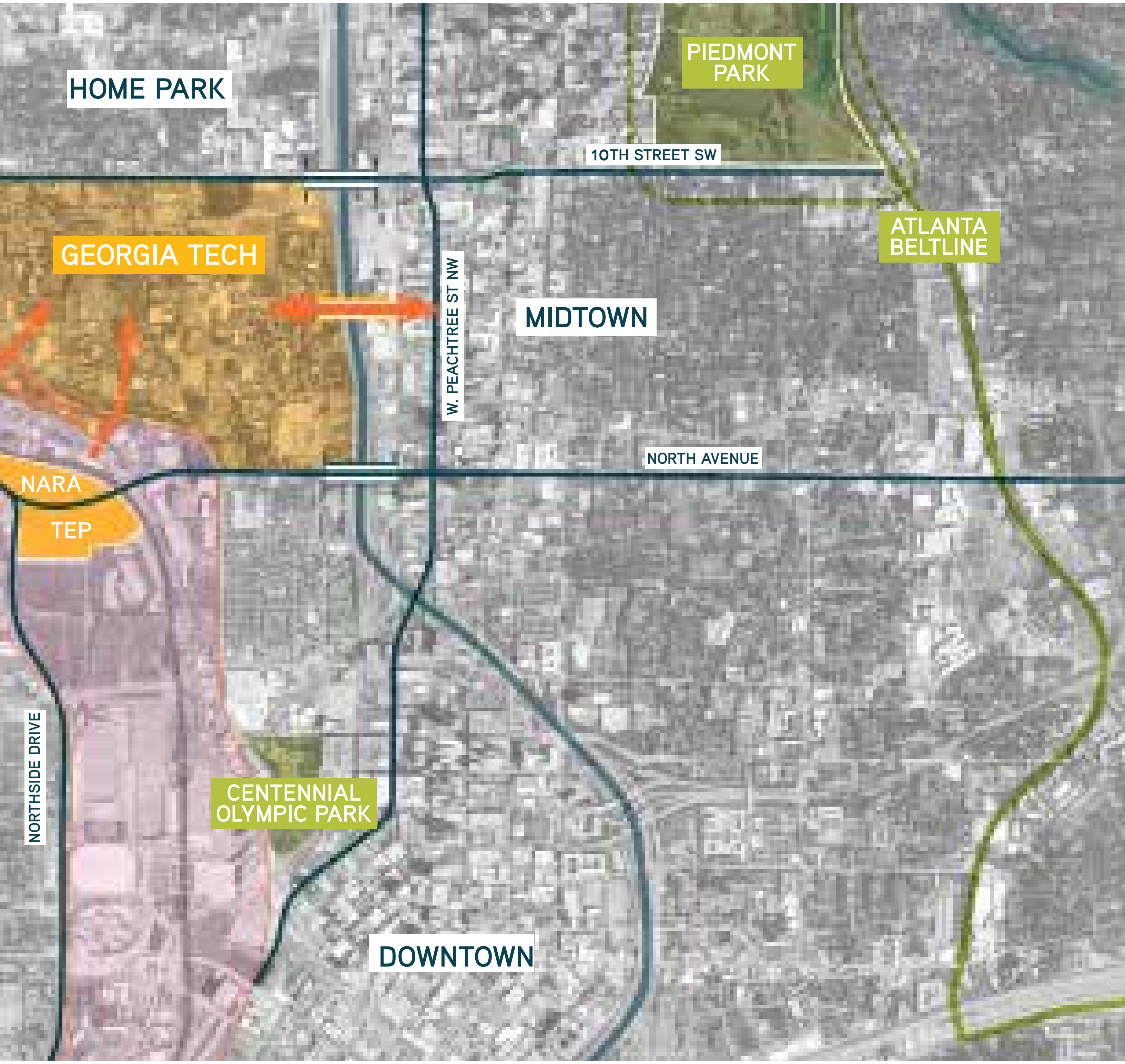

north avenue underpass

Photos of existing conditions on the edges of Technology Enterprise Park. TEP is disconnected from the university and the surrounding community by railroad lines, arterial roadways, bridges and the inhospitable tunnel that moves North Avenue under the railroad. These spaces need to be bridged physically and perceptually.

CONNECTIVITY CONTEXT AT THE CITY SCALE

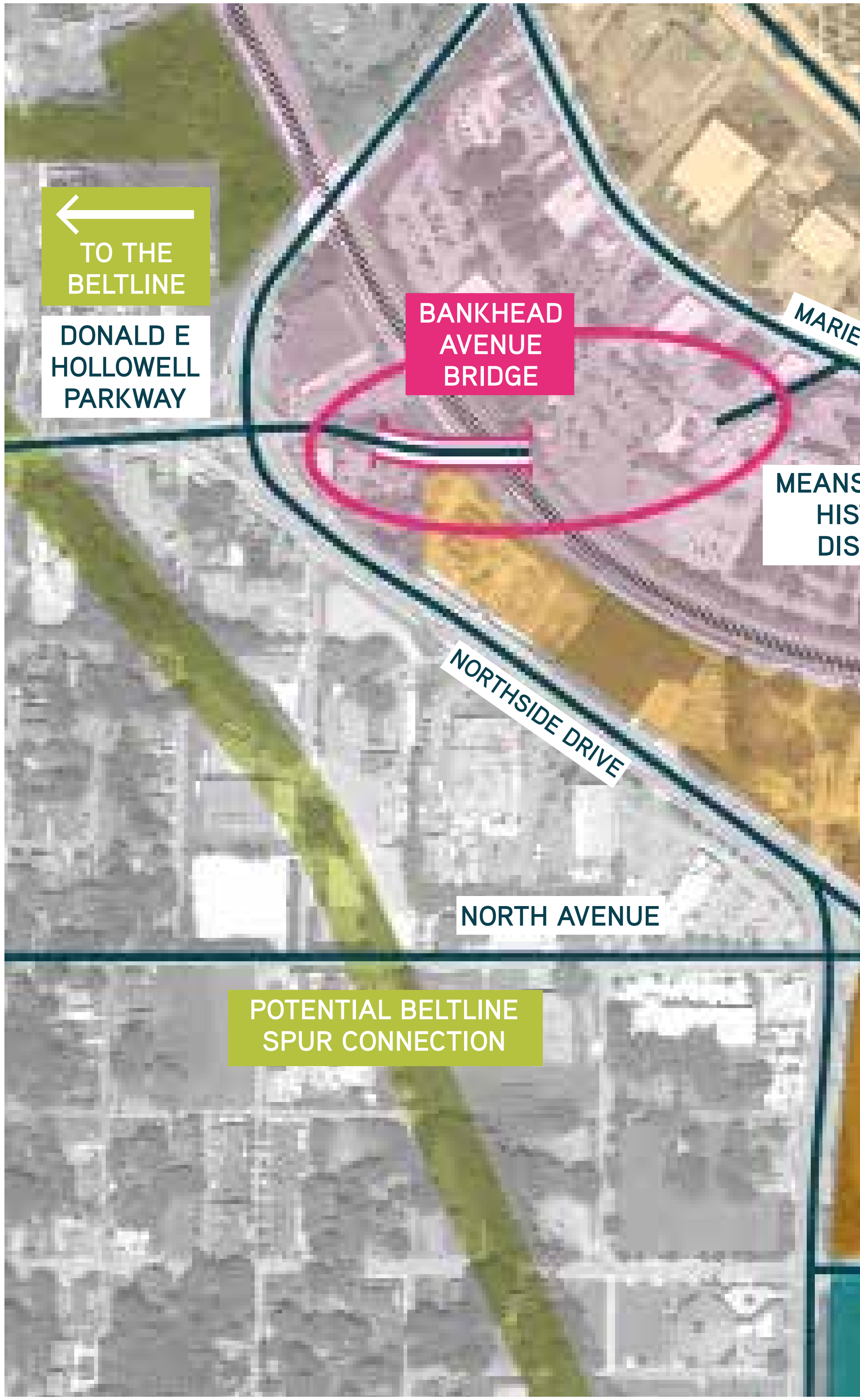

NORTHSIDE DRIVE
W. PEACHTREE ST NW
PIEDMONT PARK
HOME PARK
10TH STREET SW
GEORGIA TECH
MIDTOWN
ATLANTA BELTLINE
NORTH AVENUE
TEP
NORTHSIDE DRIVE
DOWNTOWN

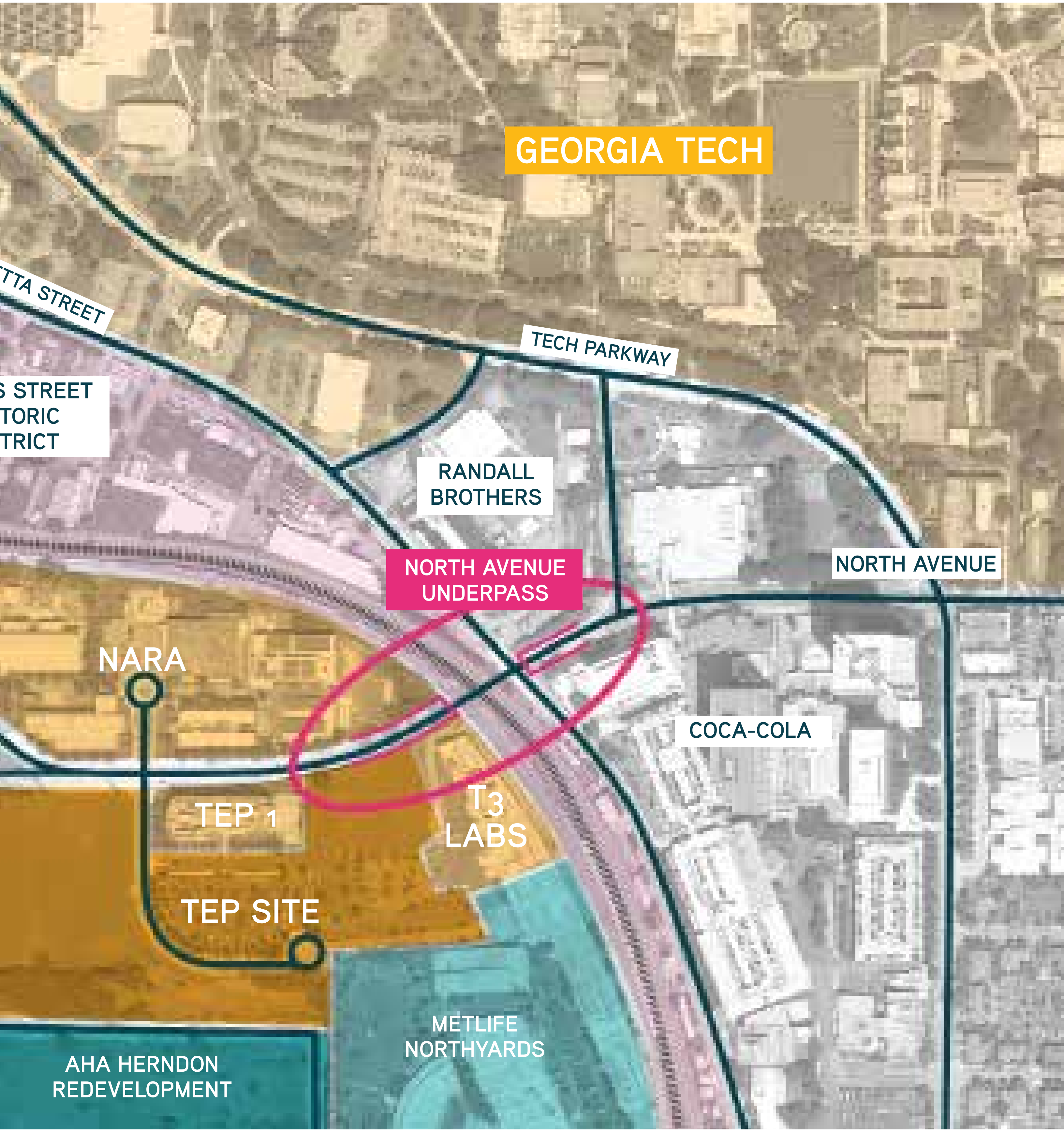
CONNECTIVITY CONTEXT AT THE LOCAL SCALE



HOME PARK
PIEDMONT PARK
10TH STREET SW
ATLANTA BELTLINE
GEORGIA TECH
W. PEACHTREE ST NW
MIDTOWN
NORTH AVENUE
NARA
TEP
NORTHSIDE DRIVE
CENTENNIAL OLYMPIC PARK
DOWNTOWN

DIS-CONNECTIVITY CONTEXT AT THE SITE SCALE




GEORGIA TECH
TTA STREET
TECH PARKWAY
S STREET
TORIC
TRICT
RANDALL
BROTHERS
NORTH AVENUE
UNDERPASS
NORTH AVENUE
NARA
COCA-COLA
TEP 1
T3
LABS
TEP SITE
METLIFE
NORTHYARDS
AHA HERNDON
REDEVELOPMENT

CONNECTIVITY IN CONTEXT

Georgia Tech has a history of undertaking purposeful connectivity measures to further the university's mission and to spur economic development. The university's partnership with the Georgia Department of Transportation to reconstruct the Fifth Street Bridge is a national example of pedestrian-oriented infrastructure leading economic development. The bridge was needed to improve pedestrian and vehicular circulation when Georgia Tech's growth and vision encountered an obstacle in the form of Interstates 75/85 on the east side of campus. Since it opened in 2007, the Fifth Street Bridge has become the essential connection, an economic hardwire, that has facilitated over $2 billion of investment in Tech Square. Further, by creating a physical and perceptual bridge between the university and the business community of Midtown Atlanta, the university embodied its ambition to transition from an internally facing campus to an outwardly oriented "knowledge based community."

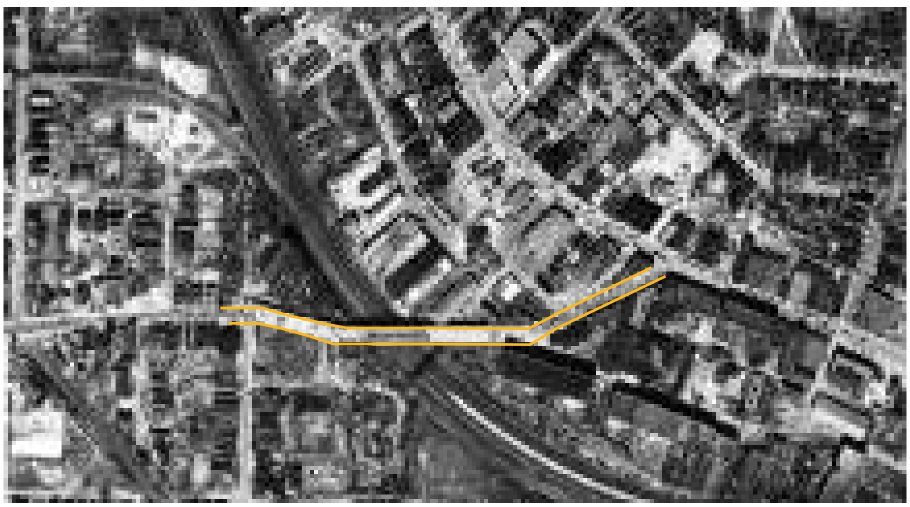
Fifth Street has become more than just a transportation link between campus and Tech Square, it has become a destination in its own right (shown here being used in a way essential to the campus and its culture).

CASE STUDY | PENN PARK, UNIVERSITY OF PENNSYLVANIA

Penn Park, on the east side of the University of Pennsylvania's campus, is an example of a university overcoming barriers presented by railroad infrastructure. To connect 24 acres of athletic fields to the main body of the campus and surrounding streets, Penn constructed a network of raised pedestrian ways. In addition to these connections, Penn has planned a pedestrian bridge across Schuylkill River to connect campus to the Pennovation Center and Central City.

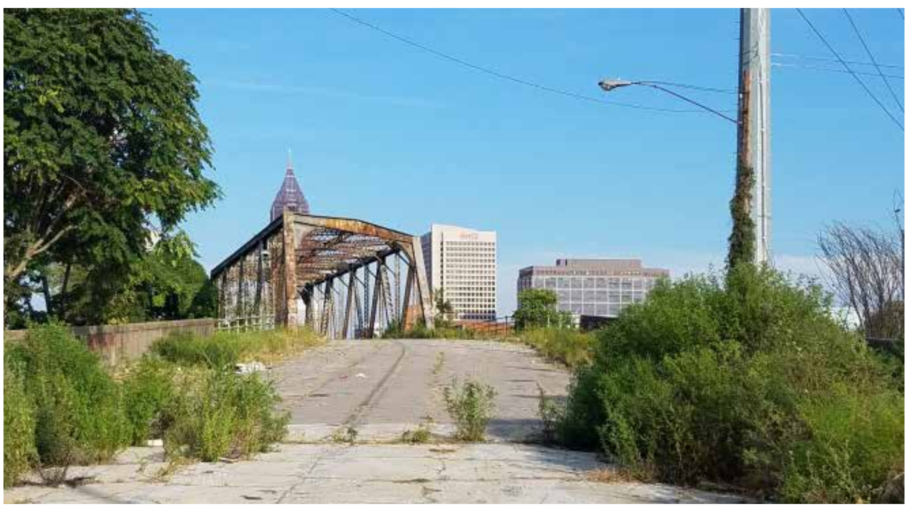
BANKHEAD AVENUE BRIDGE

North of the site is the old Bankhead Avenue Bridge, which is currently not in use. This connection is important for TEP and the greater Georgia Tech community as it connects the university to Atlanta's Westside and to the BeltLine. The bridge is programmed for demolition under the Renew Atlanta bond program and the city's Capital Improvements Plan. At the completion of this report, funding has not yet been allocated. Through the effort of this study, the Bridge has been placed on the bottom of the funding list; its demolition has been temporarily stalled. However, as a next step, this study recommends that Georgia Tech should play a central role in the preservation and reuse of the bridge. This will require engineering studies and coordination with the City of Atlanta, CSX Transportation, and adjoining property owners.



The Bankhead Bridge in 1949

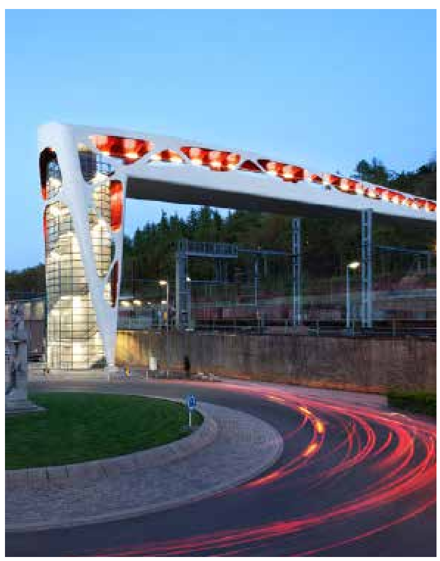
The Bankhead Bridge today showing the approach ramp removed across the Carriage Works property



Views of the Bankhead Bridge illustrating both its connection over the railroad and its proximity to Midtown and surrounding landmarks, such as the Coca Cola Headquarters.

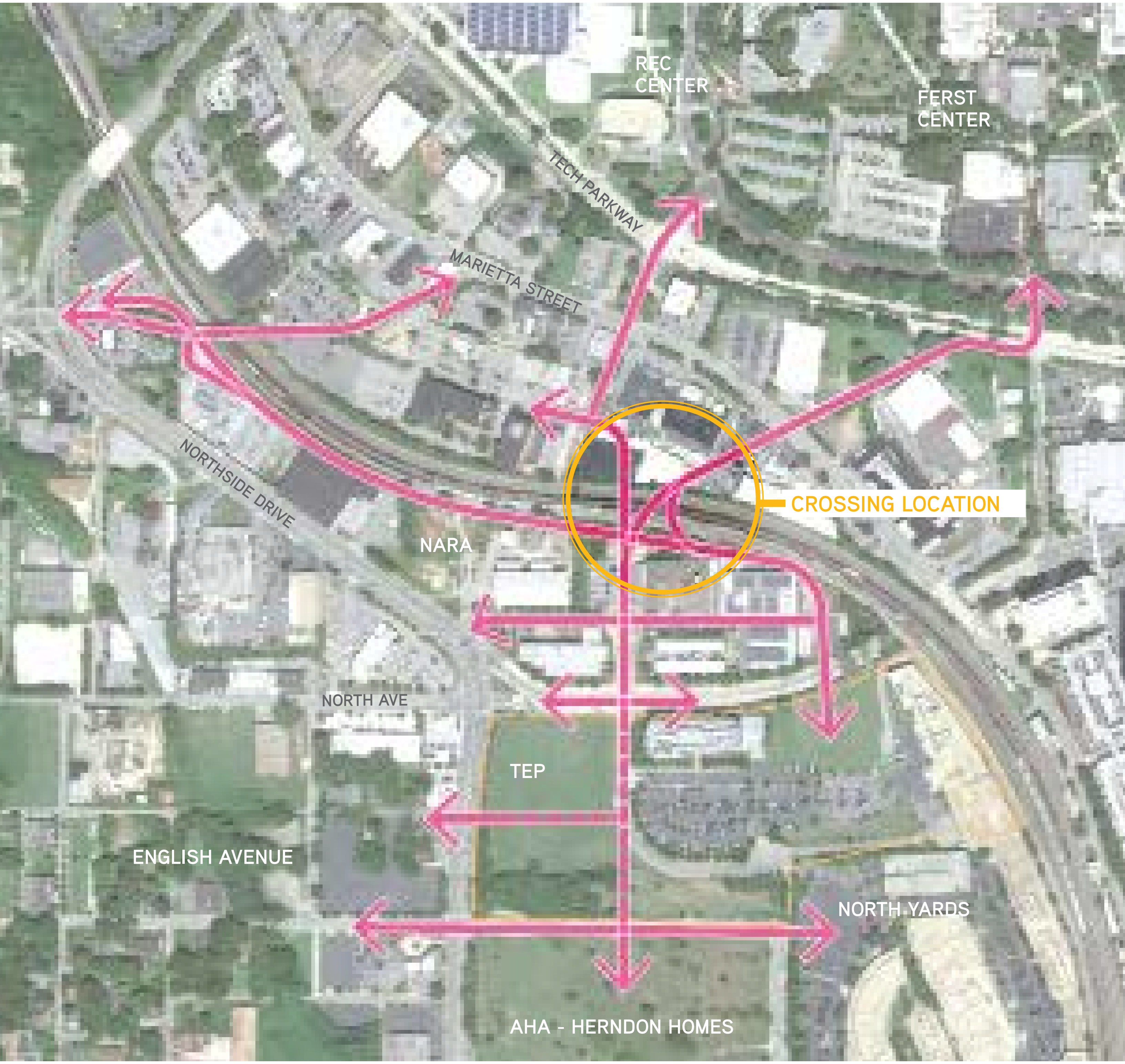
RAILROAD CROSSING

This plan proposes a new railroad crossing, prioritizing bicycles and pedestrians, between Marietta Street and the North Avenue Research Area. This link would provide the strongest "hardwired" connection between the heart of Georgia Tech's campus and the center of TEP. This study evaluated bridge types and crossings at a master plan level. Further design and engineering studies should be conducted to evaluate the ultimate feasibility of such a bridge. However, Georgia Tech is TEP's greatest strength and a strong connection will help propel TEP's ultimate success.

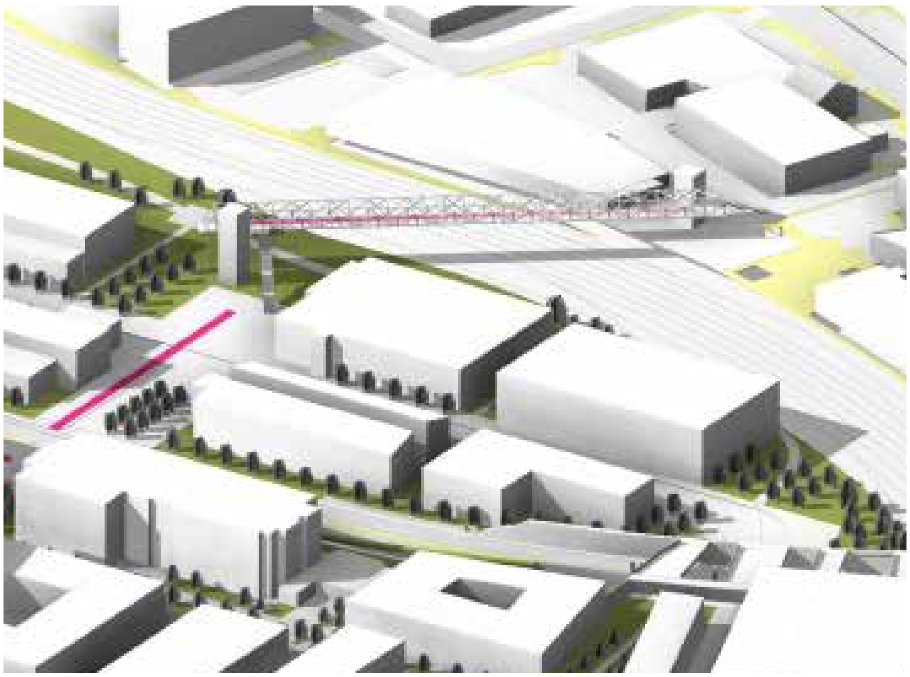


Bridge typologies

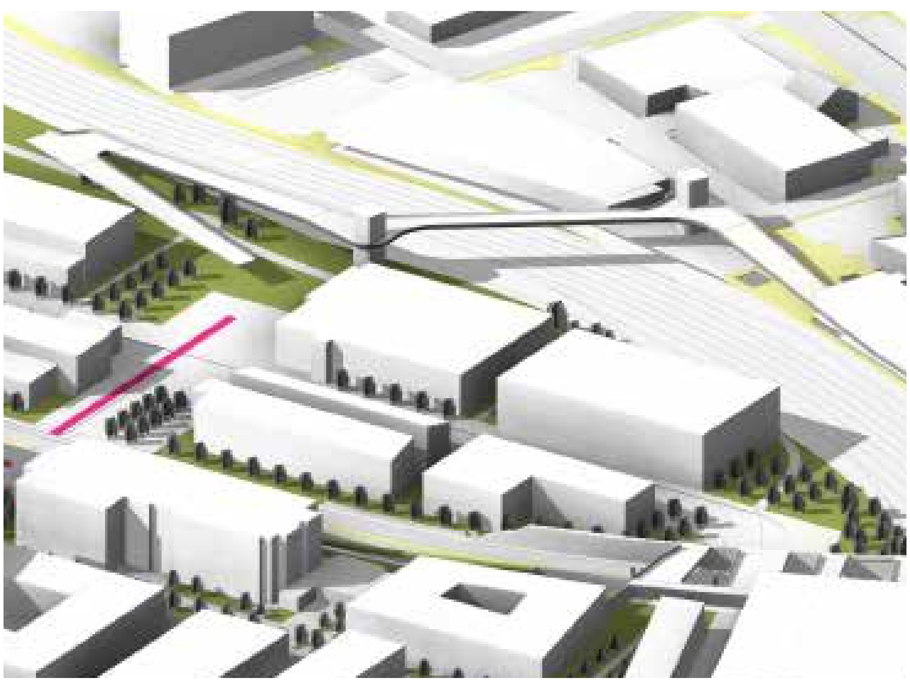
Map illustrating routes of potential pedestrian connectivity through the district and across the railroad tracks.


REC CENTER
FERST CENTER
TECH PARKWAY
MARIETTA STREET
NORTHSIDE DRIVE
CROSSING LOCATION
NARA
NORTH AVE
TEP
ENGLISH AVENUE
NORTH YARDS
AHA - HERNDON HOMES

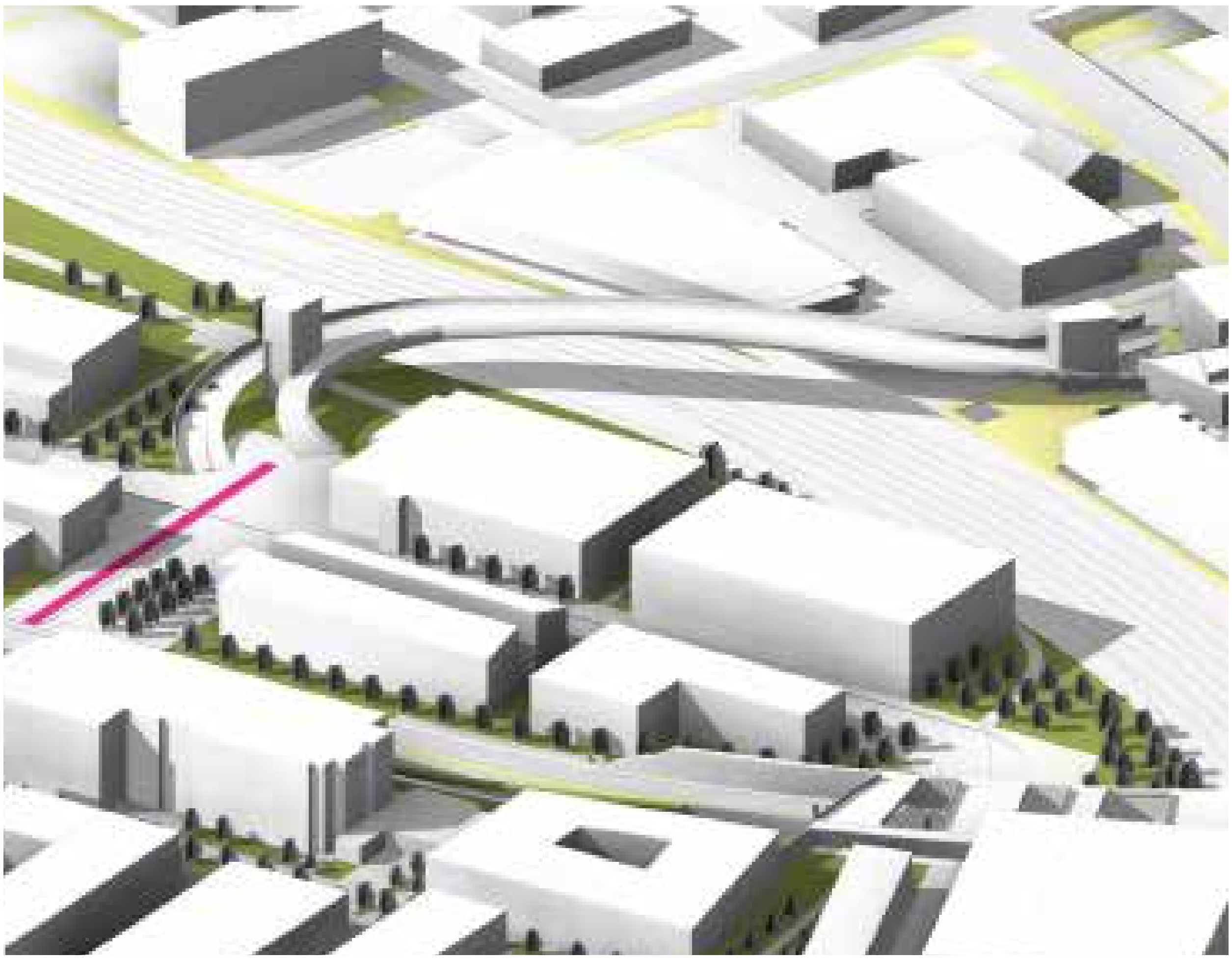
RAILROAD CROSSING



Bridge 1: Box truss pedestrian bridge with stairs and elevators for vertical movement



Bridge 2: Sculptural bridge with ramps to facilitate bicycle movement across the bridge



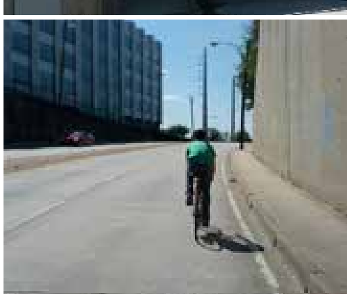
Bridge 3: A "landscape" bridge the combines elevator towers and ramping for vertical movement


Georgia Tech
CREATING THE NEXT

NORTH AVENUE UNDERPASS

North Avenue is a major corridor that provides a significant connection between TEP and the areas east of the rail lines, including the bulk of Georgia Tech's campus. Unfortunately, the underpass created to cross under the rails is effective only for vehicular movement and acts as a choke point for bikes and pedestrians. This condition exists largely because of the design and age of the underpass. The large blank retaining walls sit only feet away from the road's edge, leaving minimal room for sidewalks. There is inadequate lighting in the tunnel, such that the space feels dark and gloomy even during daytime hours. Lastly, the dated infrastructure has decayed over time. The underpass feels like a narrow, perilous passage, and while these conditions would be problematic on their own, they are compounded by the high levels of vehicular traffic and high driving speeds on North Avenue.

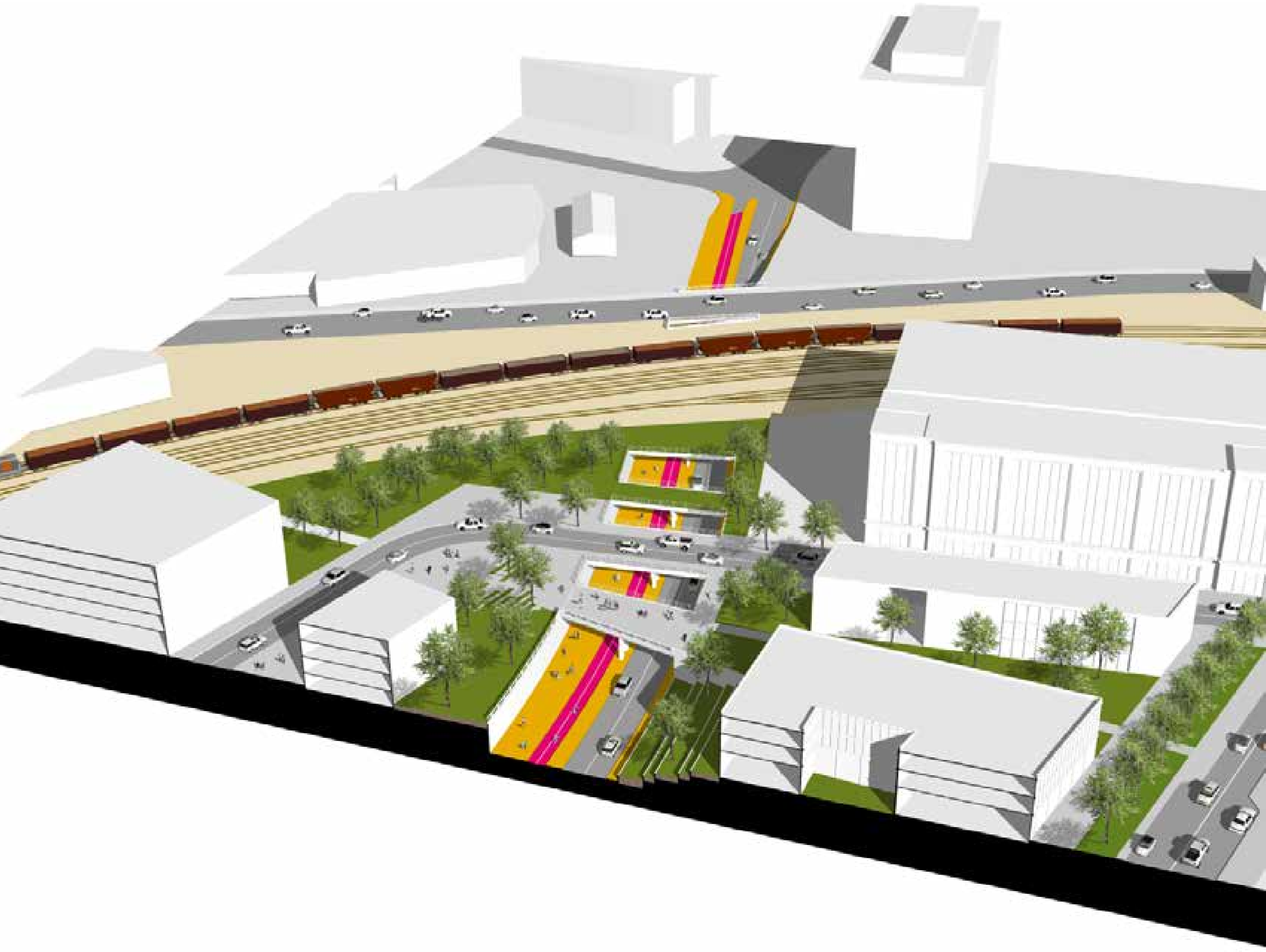
In order to make TEP accessible to all, major emphasis must be given to a rethinking of the underpass. A focus on user experience for pedestrians and cyclists should guide future plans.

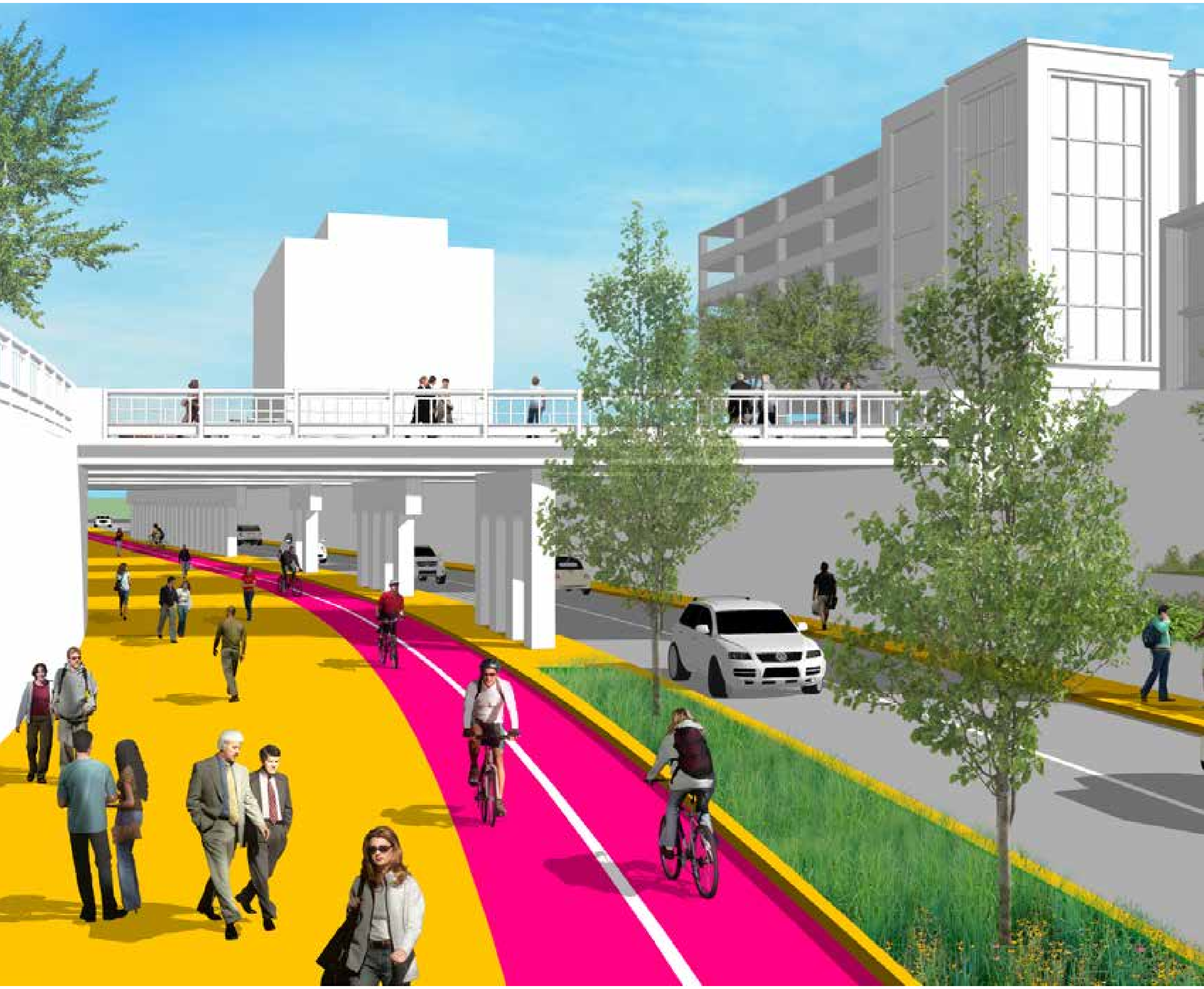


KROG STREET TUNNEL, Atlanta, Georgia
Graffiti Encouraged

18TH STREET, Birmingham, Alabama
Lighting Installations

NORTH AVENUE UNDERPASS





NORTH AVENUE UNDERPASS

existing street section

street section 1

street section 2

street section 3

NORTH AVENUE CROSSING

North Avenue presents many problems for the TEP site. In order to secure TEP's success, the extension of a north-south axis that connects NARA, TEP, and Herndon Homes across North Avenue will be crucial. A linear axis of this type would not only create a vehicular, pedestrian and bike connection across the busy street, but would also further connect pedestrians and cyclists to the main campus though the proposed pedestrian-bike bridge over the existing rail lines. To add additional internal vehicular and pedestrian connection from TEP to NARA, the unused railroad bridges over North Avenue should be repurposed. Lastly, the North Avenue street section should be modified by widening the north sidewalk to 20'-6" into the east-west lanes and introducing a two way 10'-0" wide bike lane. The remaining drive lanes south of the bridge columns would become two way vehicular lanes. These changes encourage the kinds of multi-modal uses that are not currently possible.

The intersection at North Ave at Nara

The intersection at Spring & 5th

NORTHSIDE DRIVE

Wide and busy Northside Drive could offer much more value to the TEP site, were it to undergo a number of alterations. The fork condition for right turn from North Avenue onto Northside Drive should be eliminated, simplifying the intersection and removing one traffic light. Improvements should be made to enhance the pedestrian experience along Northside Drive. Meldrum Street should be extended across Northside Drive to the east in order to improve connectivity to the adjacent residential neighborhood. Amidst these and other changes, efforts should be taken to maintain and improve the visual connections between the Northside Drive/North Avenue intersection and TEP. Equal importance should be given to the visual connection between the intersection and the downtown skyline. Lastly, improvements to the MARTA bus stop found at the intersection would encourage greater transit use to and from TEP.

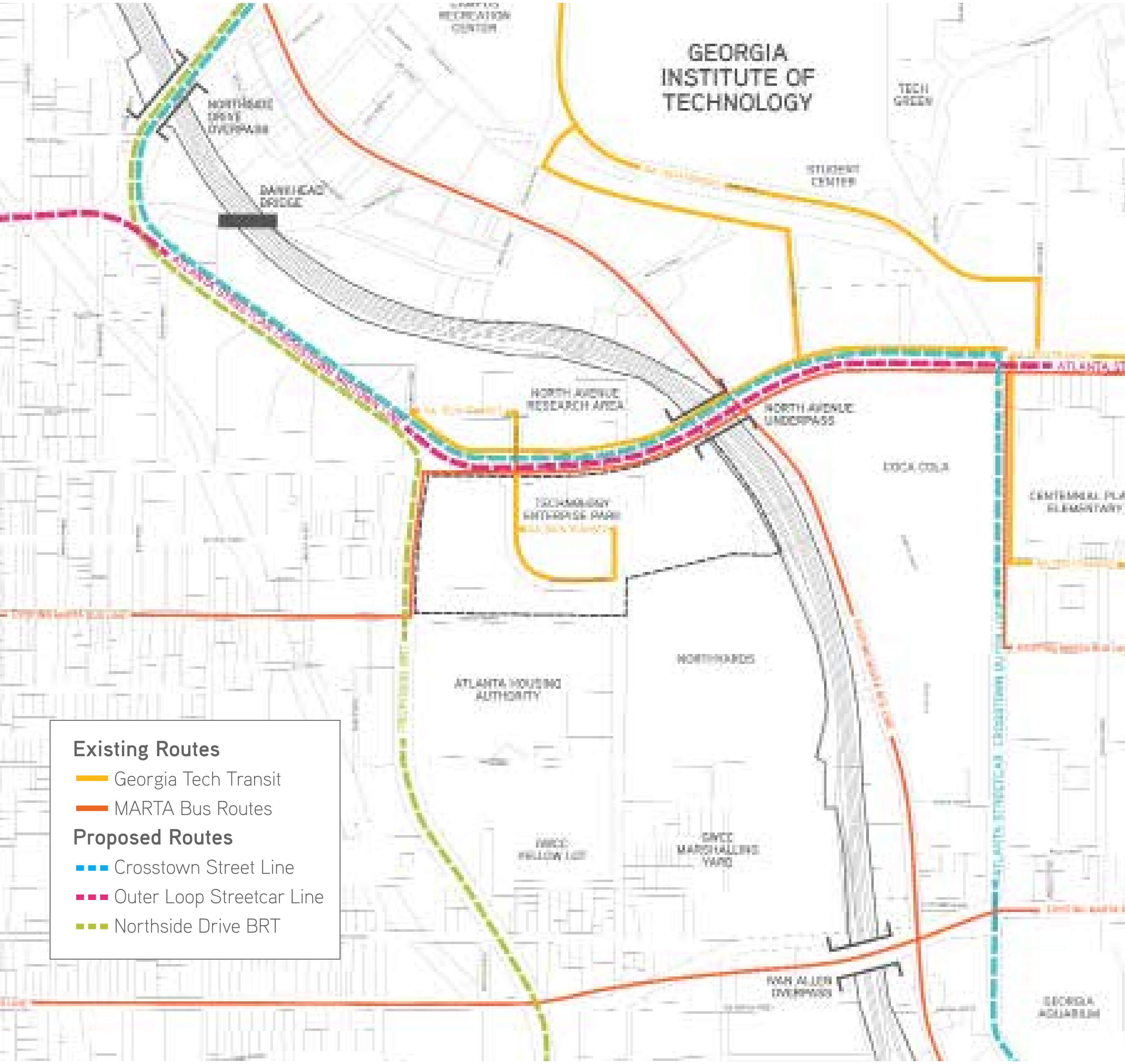
The view down wide and grueling Northside Drive

TRANSIT ASSESSMENT

Currently, TEP's location is poorly served by both Georgia Tech and Atlanta transit options, but proposed expansions could better serve the site. The sole transportation connection between TEP and Tech's main campus is a shuttle van that runs infrequently and only takes riders as far as the transit hub on the south end of the campus, meaning that many riders must board another bus route in order to reach those destinations that spread across the rest of campus. As various programs are expanded on the TEP site, Tech transit options should also increase. This could be either the addition of new routes or simply extending the existing route farther into campus, allowing it more reach. Considerations should be given to the location of those academic facilities related to the work being done at TEP.

While existing public transportation only accommodates TEP through a single MARTA bus route, the City of Atlanta has approved its streetcar expansion plans, which give first priority to a North Avenue route that would serve this site. This line would connect TEP not only to multiple MARTA rail stations, but also to a number of iconic Atlanta destinations and neighborhoods, including Ponce City Market and the east and west sides of the BeltLine. A later streetcar route oriented in a more north-south manner would provide even greater connection for TEP, as the route connects Turner Field, Georgia State, major downtown attractions, Georgia Tech's main campus, the Westside, Atlanta Station, and the north and south sides of the BeltLine. Fulton County residents voted in favor of the 2016 T-SPLOST proposal, which provided the needed funding for these network expansions. There are also continued discussions surrounding a possible Northside Drive Bus Rapid Transit route, although no specific plans have come to fruition.

Georgia Tech transit, MARTA bus transit, MARTA rail transit, and Atlanta's existing Downtown Streetcar

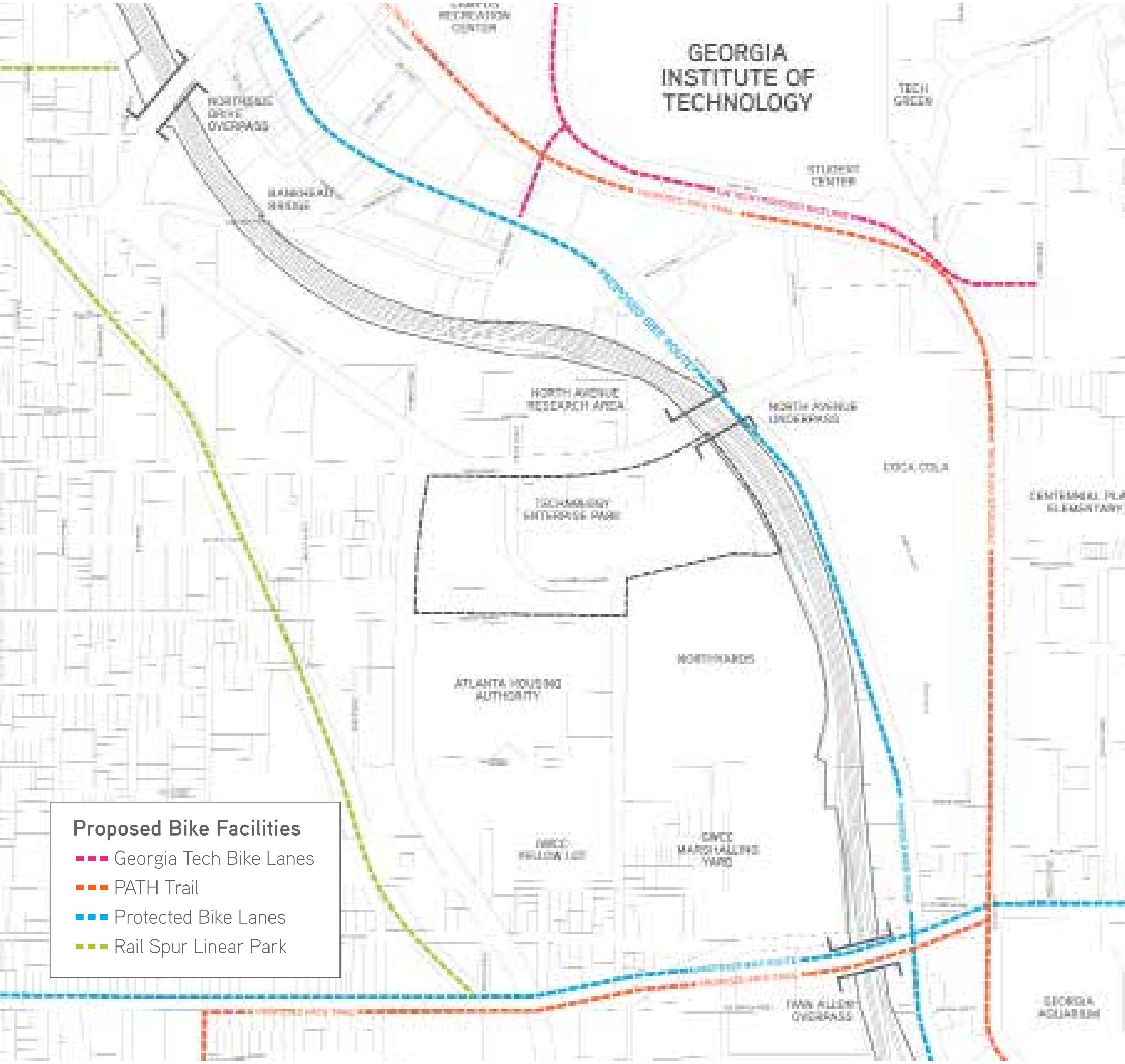

GEORGIA INSTITUTE OF TECHNOLOGY
TECH GREEN
STUDENT CENTER
NORTH AVENUE RESEARCH AREA
NORTH AVENUE UNDERPASS
COCA COLA
NORTHYARDS
ATLANTA HOUSING AUTHORITY
Existing Routes
Georgia Tech Transit
MARTA Bus Routes
Proposed Routes
Crosstown Street Line
Outer Loop Streetcar Line
Northside Drive BRT

BICYCLE ASSESSMENT

The TEP site is extremely disconnected from existing bicycle infrastructure, both of Georgia Tech and the City of Atlanta. There is currently no dedicated bike infrastructure that serves TEP, and neither the Georgia Tech Bicycle Master Plan nor the Connect Atlanta Plan call for future bicycle connections to this specific location. Nearby Marietta Street has been identified for future bike lanes, and work is already underway to transform part of Tech Parkway into a multi-use path that will strongly support biking. While in close proximity, these routes mean very little without a direct connection to TEP, given that the rail corridor and heavily trafficked streets present such a great physical divide. Campus surveys have consistently reported that the number one reason that Tech students avoid various routes is the feeling of being unsafe in traffic. Students on bike currently access campus through calmer streets on the east and north sides of campus, while avoiding the busy streets on the west and south near TEP.

The 2015 Georgia Tech Bicycle Master Plan acknowledges that cycling is projected to increase in the coming years, and it lays out the university's goal of reaching the highest designation of safe bicycling environments within the next five years, pursuing standards established by Bicycle Friendly University program. Proposed efforts toward these goals not only strengthen existing programs like Buzz Bikes, but they also lay out plans to encourage widespread biking through education and to add major cycling infrastructure across campus. In order to provide for the great number of students that will be using bikes as their primary means of accessing campus in the future, TEP plans should consider physical connections to Marietta Street, Tech Parkway, and the other portions of Tech's main campus, such as a bridge across the rail corridor. This option is the most feasible, given the resources within Tech's control. Other recommendations within this study examine the feasibility of adding dedicated bike lanes to the North Avenue street section. While this would be extremely beneficial, the complex change would involve a great number of outside stakeholders.

Signs of the growing bike presence on Georgia Tech's campus; Rendering of reconfigured Tech Parkway multi-use trail, including designated bike lanes


GEORGIA
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STUDENT
CENTER
NORTH AVENUE
RESEARCH AREA
NORTH AVENUE
UNDERPASS
COCA COLA
NORTHYARDS
ATLANTA HOUSING
AUTHORITY
GWCC
MARSHALLING
YARD
GEORGIA
AQUARIUM
Proposed Bike Facilities
Georgia Tech Bike Lanes
PATH Trail
Protected Bike Lanes
Rail Spur Linear Park

“INVOKING GEORGIA TECH’S MOTTO OF PROGRESS AND SERVICE, WE EMBRACE THE TASK OF GUIDING THE WAY THE WORLD CHANGES FOR ALL OF OUR CONSTITUENTS. AS LEADERS, DESIGNERS, AND INNOVATORS, OUR ROLE IS NOT ONLY TO SOLVE PROBLEMS, BUT ALSO TO SHAPE OUR WORLD.”

G. P. “Bud” Peterson, President
Designing the Future: A Strategic Vision Plan

ACTIVITY

STRATEGIC RECOMMENDATIONS

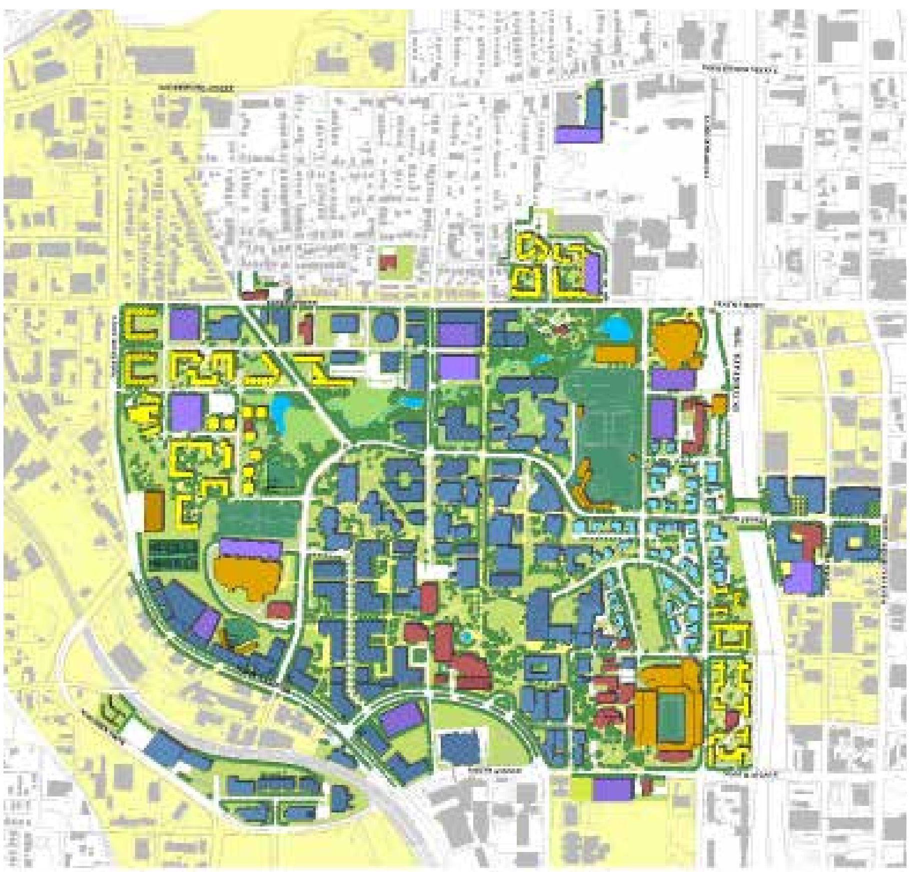
For the continued development of Technology Enterprise Park as an engine of economic and social progress, the following steps should be made to ensure TEP contributes to the vitality of the city:

1. **EXTEND THE UNIVERSITY** Georgia Tech is TEP's secret sauce, just as it is at Tech Square. For too long NARA and TEP have been islands on the far side of the railroad and outside the perceptual boundaries of the university. This study recommends extending Georgia Tech's brand, signage, police presence, and public safety infrastructure into NARA, TEP, and the edges of the district. Further, a re-branding exercise is necessary to collapse NARA and TEP into one place both physically and in name.
2. **MAKE A DISTRICT** Momentum exists for the creation of an "innovation district" with TEP at its heart. Atlanta's Upper Westside, also an area for industrial land, has undergone a renaissance in the last five years. TEP sits within a large zone of land that is ripe for change with the right catalytic activities. Making the district complete, with inter-parcel connectivity, balanced land uses, and shared parking can be made possible through coordinated planning with adjoining property owners, notably NARA, the Atlanta Housing Authority, Northyards, and community institutions west of Northside Drive.
3. **CULTIVATE ACTIVITY** The vitality of an innovation district is as much a quality of the activity outside a lab as it is the science inside. Leading innovation districts have mixed office, R&D, residential, and other commercial land uses. This mix creates activity throughout the day and night and promotes casual interaction between people, so-called creative collisions. With careful orchestration of uses and phasing, Georgia Tech can build a vibrant urban destination, not just a research park.
4. **JOIN THE COMMUNITY** An incredible amount of community development activity is presently underway in Atlanta's Westside. Georgia Tech, with TEP and NARA, has the potential to contribute a major employment center to the local economy and create a gateway of opportunity. Engagement in planning activities and advocacy for the district's potential and needs among stakeholders and institutions is required to fully leverage the opportunity.

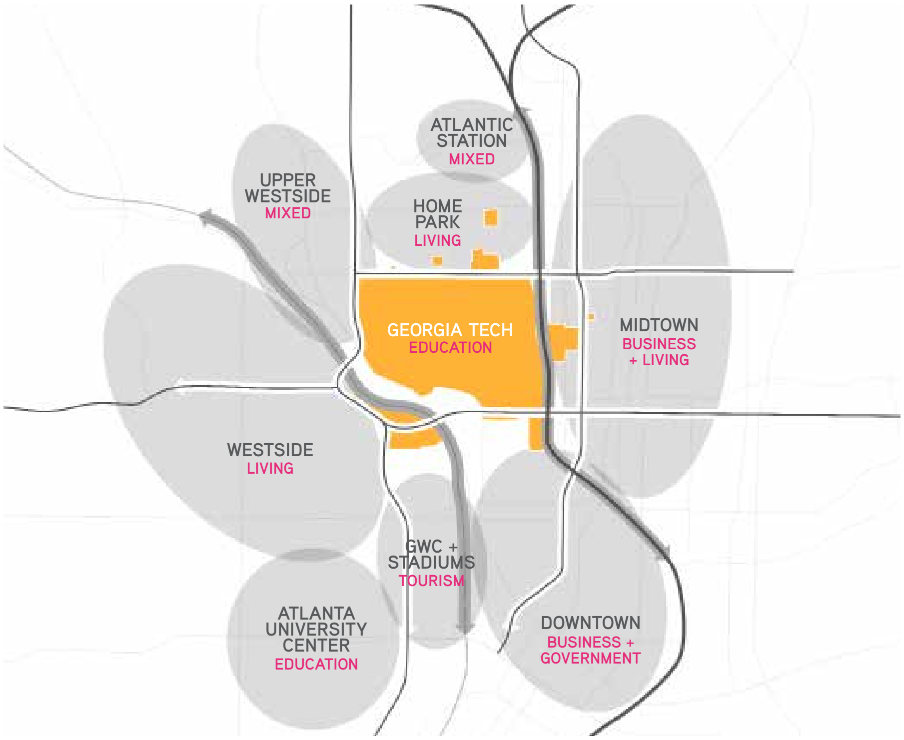
UNIVERSITY PRESENCE

Georgia Tech plays a significant role in the city and its presence can be felt in many social and economic ways. Georgia Tech is a leading educator, employer, activity center, economic driver, residential hub, and home to a rich history and vibrant subculture. The institution drives the vitality of the places and neighborhoods that surround it. At the same time, Georgia Tech is itself influenced by the dynamic activities that surround it. The university is enveloped by some of the city's most important institutions, neighborhoods, and activity centers.

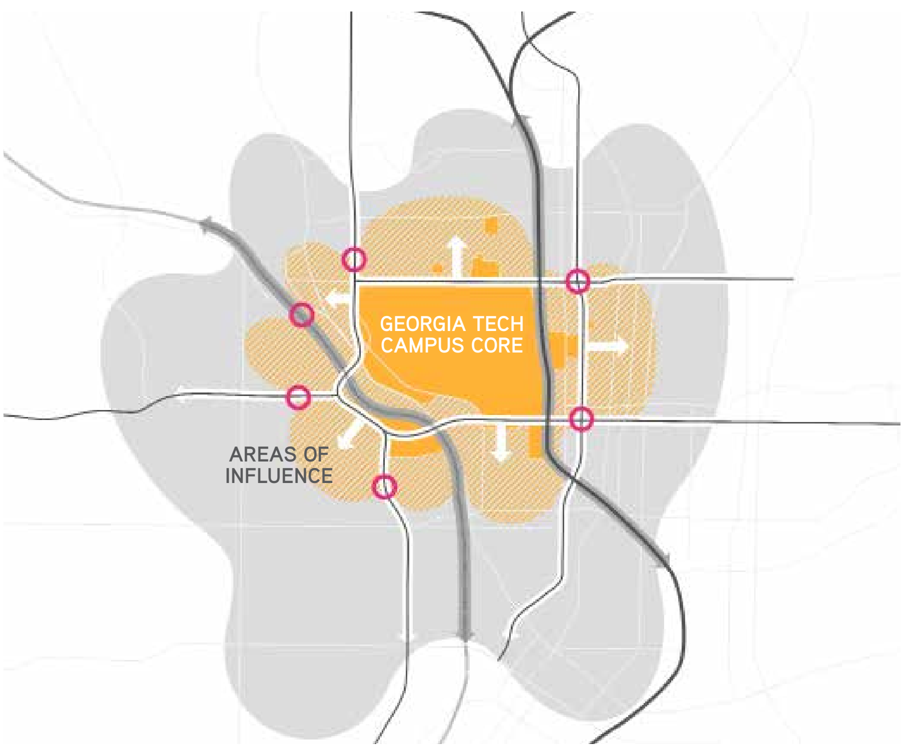
As Georgia Tech endeavors to foster an innovation ecosystem around the campus, it is critical when planning the growth of the campus to understand the surrounding community, its character, strengths, and role in the larger ecosystem of Atlanta. Further, as the university grows outside the traditional boundaries of the campus, new edges and gateways are established that change how the Atlanta community sees and perceives of Georgia Tech as a neighbor and institutional citizen.



The 2004 Campus Plan identifies Georgia Tech properties that are outside the main body of the campus, as well as "areas of interest," which are highlighted in yellow.



Georgia Tech's proximity to major neighborhoods and activity centers within central Atlanta



As a major institution, Georgia Tech impacts those places in immediate proximity to it.

UNIVERSITY PRESENCE

Establishing the vision of an innovation district with TEP, NARA, and adjoining land owners requires seamlessness of movement and continuity of design between individually owned parcels of land. The vision is to create one district with an interconnected fabric of open public spaces. To this end, public safety is crucial to the feasibility of TEP.

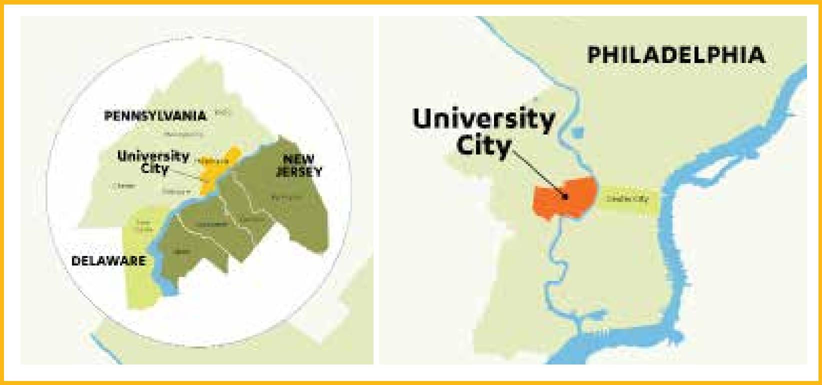
Although public safety is maintained today with fences and guard gates, in the long term, this plan recommends the extension of Georgia Tech's police force and campus security measures to establish a safe but open campus.

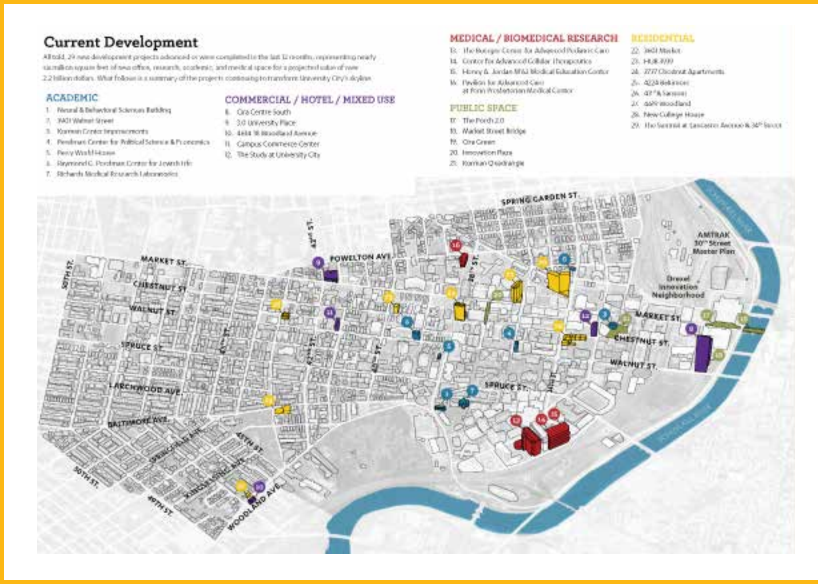
The entrance to TEP 1 Today


The entrance to NARA Today

CASE STUDY | UNIVERSITY CITY DISTRICT, PHILADELPHIA

University City in Philadelphia is a helpful case study for the relationship between institutions and the city that surrounds them. In Philadelphia, University City has become a brand unto itself.





PLANNING ENVIRONMENT

In recent years, Atlanta's Westside has been inundated with projects and plans that have sought to bring improvements to the area. Acknowledging the Westside's rich contribution to Atlanta's history, its close proximity to major Atlanta destinations, the needs of many existing residents, and its potential for rebirth, a number of individuals and organizations have taken major strides to jump start activity in the area over the last five to ten years. Georgia Tech has taken a stand in community outreach through the Westside Communities Alliance (WCA). During this study, WCA was involved and helped to facilitate several conversations with selected representatives of the communities on the Westside.

This study recommends that community outreach continue through WCA and that Georgia Tech select an area of focus within all of the initiatives taking place in this complex landscape. There are many organizations involved and many efforts in motion. TEP is a relatively small real estate asset at a critical junction between the university and the community. It can help in many ways but perhaps can not help in them all.

THE VARIOUS PLANS AND INITIATIVES IN PLACE ON THE WESTSIDE

PREVIOUS STUDIES
Northside Drive Corridor Study
MLK Jr. Drive Corridor Study
English Avenue Study

EXISTING PLANS FOR THE AREA
2004 Georgia Tech Campus Master Plan
Vine City Redevelopment Plan
English Avenue Redevelopment Plan
Simpson Road Corridor Redevelopment Plan
The Prince's Foundation Scoping Workshop
Atlanta BeltLine Subarea 1
Atlanta BeltLine Subarea 9
Atlanta BeltLine Subarea 10
Morehouse College Campus Master Plan
Electric Avenue Entertainment District

LIVABLE CENTERS INITIATIVES
West End Historic District LCI
West Lake LCI
Vine City / Washington Park LCI
Upper Westside LCI Update

HIGHER EDUCATION INSTITUTIONS
Georgia Tech
Atlanta University Center

MAJOR REDEVELOPMENT INITIATIVES
Invest Atlanta- Westside TAD
Westside TAD

SMALL-SCALE ECONOMIC DEVELOPMENT
Westside / Howell Mill CID

FAITH-BASED AREA REVITALIZATION
Friendship Baptist Master Plan
Northside Parc - Bethursday Development

AFFORDABLE HOUSING DEVELOPMENT
Quest Community Development Organization
Atlanta Housing Authority
University Choice Neighborhood
HUD

ELEMENTARY ED/YOUTH DEVELOPMENT
Families First - Westside Headquarters
Boone Street Center of Hope
Atlanta Youth Corps

FAMILY SUPPORTIVE SERVICES
Greater Vine City Opportunities Program
City of Refuge
United Way/Annie E. Casey Foundation

JOB TRAINING
Westside Works
Chick-fil-A

COMMUNITY CAPACITY BUILDING
Westside Future Fund
The Blank Foundation
Center for Civic Innovation
Friends of English Avenue

URBAN AGRICULTURE
Georgia Food Oasis
English Avenue Urban Farm
Collegetown Urban Farm

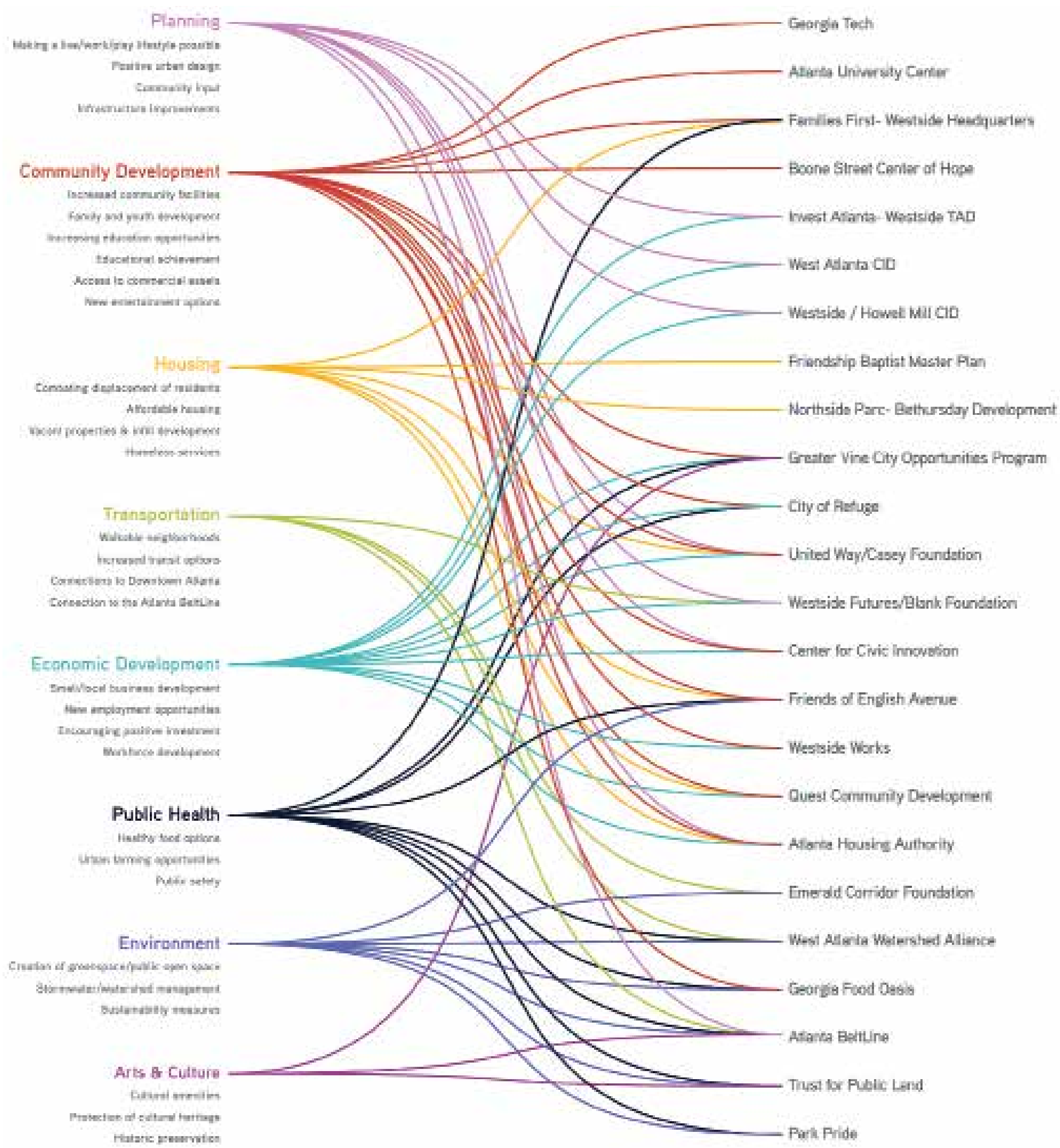
PARKS & GREEN SPACE
Atlanta BeltLine
Trust for Public Land
Park Pride
Historic Mims Park
Boone Park West
Lindsay Street Park

ENVIRONMENTAL REMEDIATION
Emerald Corridor Foundation
West Atlanta Watershed Alliance
Urban Ecology Resource Center

MAPPING THE PLANNING ENERGY ON THE WESTSIDE

WESTSIDE CONCERN

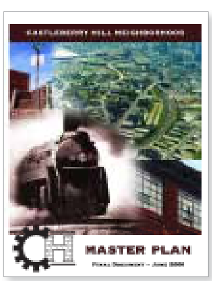
ORGANIZATION



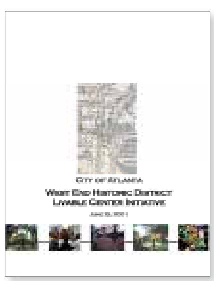
PLANNING ENVIRONMENT

The numerous Westside plans that have preceded this study have seen major progress in regards to assessing the needs of the area and proposing practical and realistic solutions in order to address them. A large number of these proposals have come to pass, however many have still not come to fruition. Of those that are outstanding, some are just as relevant today as the day they were written, while others are no longer pertinent, as a great deal of contextual variables have changed in the intermediate years.

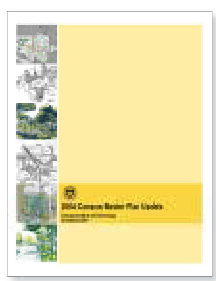
This study was informed by previous planning studies. The trajectory for TEP has been set with this wealth of information in mind, taking advantage of the expert opinions and community engagement that has preceded it. This understanding of the landscape has been vital in the creation of strategic goals. This study recommends that TEP and Georgia Tech continue to take Westside planning efforts into consideration amidst future visioning for the project.



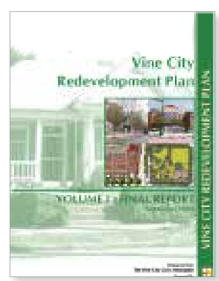
CASTLEBERRY HILL MASTER PLAN
2000



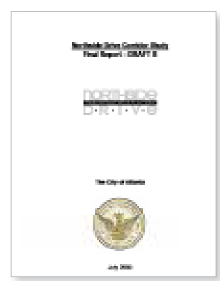
WEST END HISTORIC DISTRICT LCI STUDY
2001



GEORGIA TECH CAMPUS MASTER PLAN UPDATE
2004

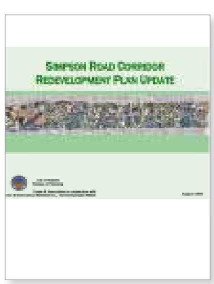


VINE CITY REDEVELOPMENT PLAN
2004



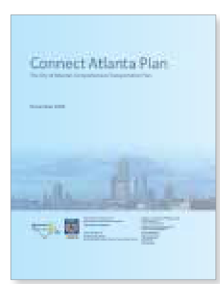
NORTHSIDE DRIVE CORRIDOR STUDY
2005

ENGLISH AVENUE COMMUNITY DEVELOPMENT PLAN UPDATE
2006

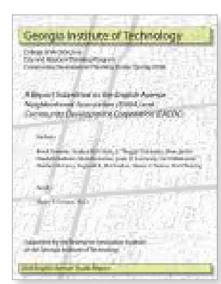


SIMPSON ROAD CORRIDOR REDEVELOPMENT PLAN UPDATE
2006

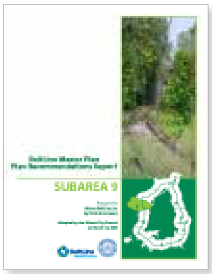
GEORGIA TECH WESTSIDE COMMUNITIES STUDIO
2007



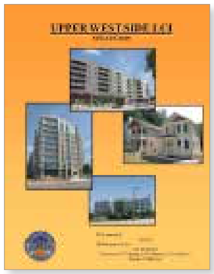
CONNECT ATLANTA PLAN
2008



GEORGIA TECH ENGLISH AVENUE STUDIO
2008

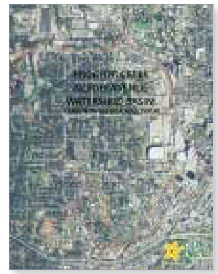


ATLANTA BELTLINE SUBAREA 9 MASTER PLAN
2009

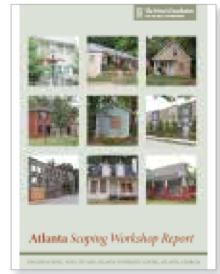


UPPER WESTSIDE LCI UPDATE
2009

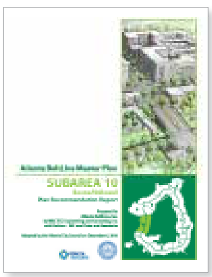
VINE CITY/WASHINGTON PARK LCI STUDY
2009



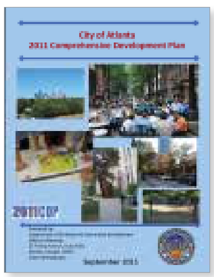
PROCTOR CREEK/NORTH AVENUE WATERSHED BASIN VISION
2010



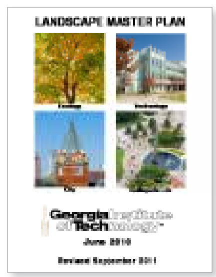
THE PRINCE'S FOUNDATION ATLANTA SCOPING WORKSHOP REPORT
2010



ATLANTA BELTLINE SUBAREA 10 MASTER PLAN
2010

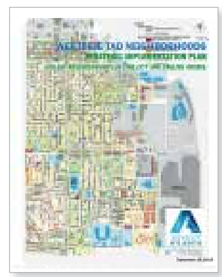


CITY OF ATLANTA COMPREHENSIVE DEVELOPMENT PLAN
2011

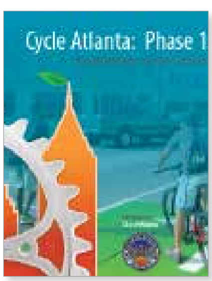


GEORGIA TECH LANDSCAPE MASTER PLAN
2011

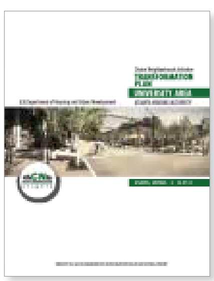
GEORGIA TECH NORTHSIDE DRIVE STUDIO
2012



WESTSIDE TADS STRATEGIC IMPLEMENTATION PLAN
2013

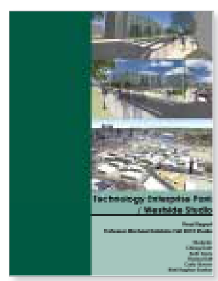


CYCLE ATLANTA PLAN PHASE 1 STUDY
2013



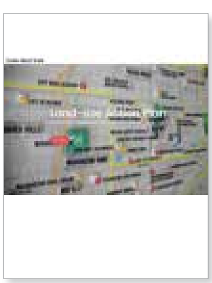
CHOICE NEIGHBORHOODS UNIVERSITY AREA TRANSFORMATION PLAN
2014

CITY OF ATLANTA CAPITAL IMPROVEMENT PROGRAM
2015



GEORGIA TECH TEP/ WESTSIDE STUDIO
2015

ENGLISH AVENUE NEIGHBORHOOD ASSOCIATION VISIONING SESSION
2016



PLAN WESTSIDE LAND-USE ACTION PLAN
2016

2016 AND BEYOND
PLAN WESTSIDE LAND-USE ACTION PLAN
AND FUTURE PLANNING EFFORTS

FUTURE PLANS

FUTURE PLANS

FUTURE PLANS

FUTURE PLANS

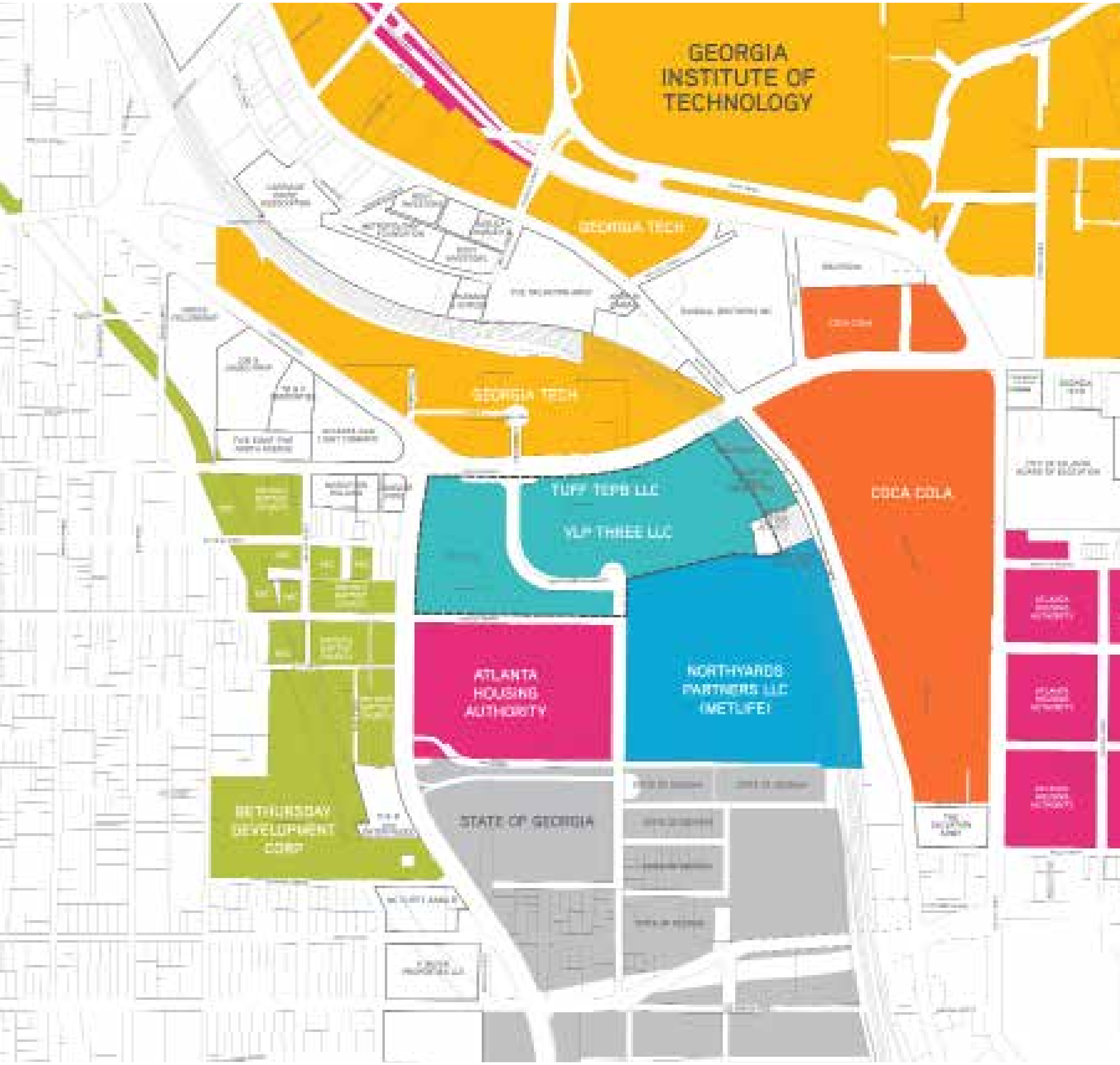
LAND OWNERSHIP

The TEP property is fully enveloped by a small number of large property owners. Having relatively few adjacent property holders with a large amount of land creates a favorable situation for long term growth of a mixed **industrial innovation district**.

To the north of TEP is Georgia Tech's NARA site and the university's main campus. The land east of the TEP site is delineated by the rail corridor, the property immediately across the rail lines is dominated by Coca-Cola's world headquarters. The south edge of TEP is defined by two different land owners. First is the Northyards business park, which claims land to the southeast, while the Atlanta Housing Authority plays host to the property on the southwest corner. The State of Georgia owns all of the land for the Georgia World Congress Center, along the northern side of Ivan Allen Jr. Boulevard between Northside Drive and the railroad. Northside Drive serves as the western edge of the TEP site, but across that street the Bethursday Development Corporation holds a vast swath of land and a former rail corridor.

LAND OWNERSHIP

- Georgia Tech
- Georgia Advanced Technology Ventures Inc. (GATV)
- Atlanta Housing Authority (AHA)
- Northyards Development LLC (Metlife)
- Bethursday Development Corp (also Antioch Baptist Church)
- State of Georgia
- Coca Cola
- Other Large Single Owner Parcels


GEORGIA INSTITUTE OF TECHNOLOGY
GEORGIA TECH
GEORGIA TECH
COCA COLA
COCA COLA
TUFF TEPB LLC
VLP THREE LLC
ATLANTA HOUSING AUTHORITY
NORTHYARDS PARTNERS LLC (METLIFE)
BETHURSDAY DEVELOPMENT CORP
STATE OF GEORGIA

Herndon Homes

The Atlanta Housing Authority (AHA) is in the early stages of redeveloping the old Herndon Homes site. AHA has selected a development team of Hunt Companies and Oakwood Development with Torti Gallas and Partners, Inc. and Lord Aeck Sargent leading the design of the project. Since the project is still in concept phases, there are several points of coordination between Herndon Homes and TEP: (1) shared streets and programming at ground floor, (2) phasing, and (3) shared parking. At the time of this report, coordination is underway and should be continued to support the success of the district and the neighborhoods.

North Avenue Research

The North Avenue Research Area (NARA) is a multi-purpose research campus that includes the Structural Engineering & Materials Research Lab, the Food Processing Technology Building, the Combustion Laboratory, Tech Way Building and the Carbon-Neutral Energy Solutions Laboratory. This is an important research center that must be leveraged and incorporated into the larger district.

Northyards Development

Northyards Development LLC and the Northyards development were acquired by MetLife's real estate division before this study began. Their goal for the property is to maintain it's success and, as such they would be open to discussions around coordination. At the time of this report, coordination has begun through AHA and should be continued to support the success of the district.

Bethursday Development Corporation

Bethursday Development Corporation, partnered with Antioch Baptist Church, has a mixed-use vision for the land west of TEP, called Northside PARC. At the time of this report, there is no known activity around implementation, though this organization is interested in coordinating with Georgia Tech. Coordination should be pursued to support the success of both the district and the neighborhoods over time.

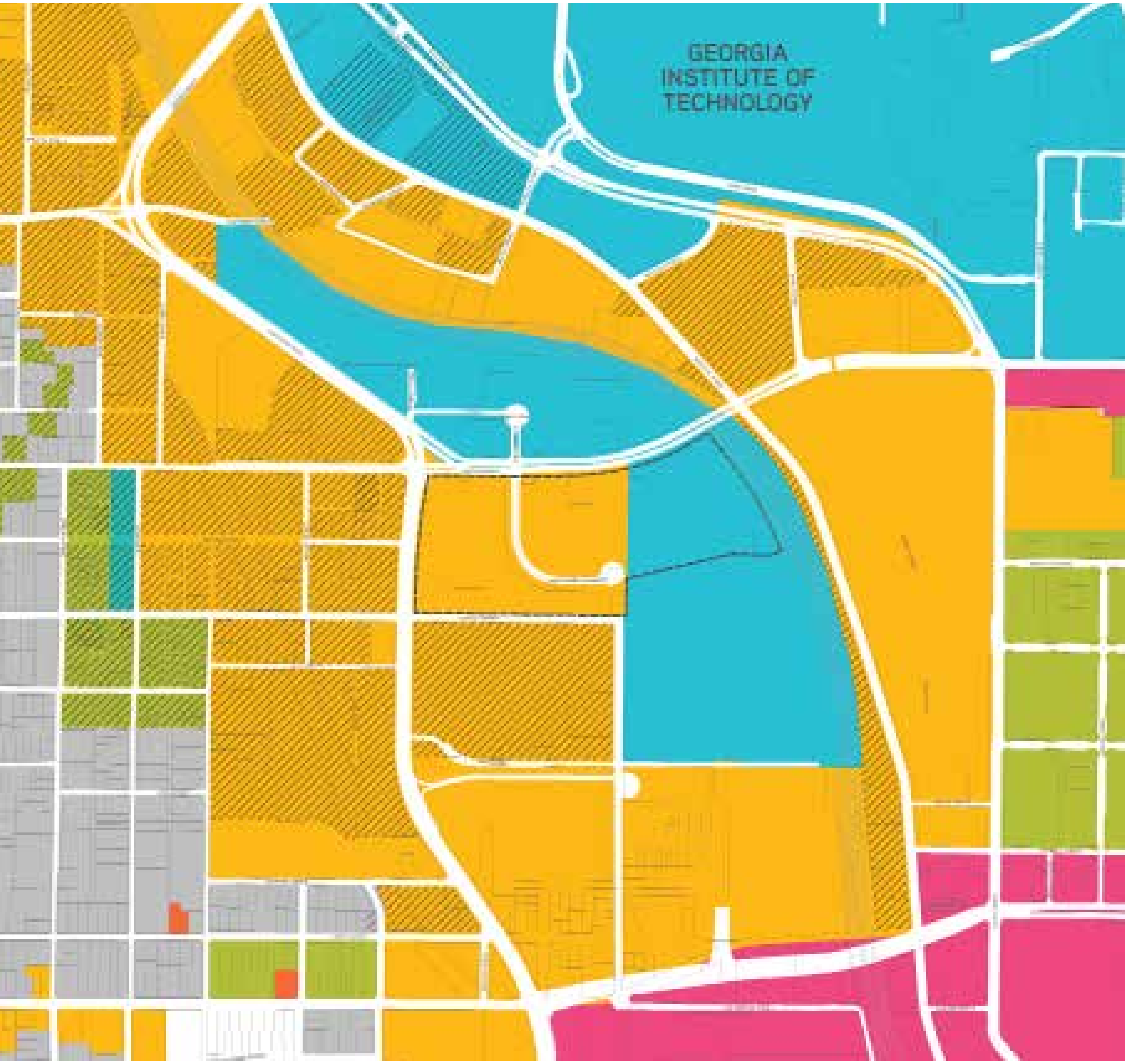
FUTURE LAND USE & SUSCEPTIBILITY TO CHANGE

Future land use categories on and around the TEP site are primarily mixed-use and office/institutional development. This enables the kind of dense and diverse urban corridor desired by Georgia Tech, the City of Atlanta, and the communities involved. Properties nested closer to the neighborhood cores are planned for purely residential uses, while those closer to downtown are targeted exclusively for commercial uses.

Susceptibility to change was determined by several criteria. The first factor considered was future land use. Properties identified for uses such as single family residential were deemed less likely to vary and therefore more stable, while properties with broad designations like mixed-use were seen as more susceptible to change. The second factor examined was current usage of the land. Vacant or otherwise underutilized properties, based on future land use criteria, were also identified as susceptible to change. The final factor considered was whether or not recent investments had been put into the property. Property owners making investments in their property were adding value and expressing a kind of commitment to the property and its future. This act was considered to reflect stability, while the large number of disinvested properties were considered unstable. When these factors were overlayed and viewed in tandem, a very clear separation appeared between highly stable properties and highly unstable ones. Those unstable properties were marked as highly susceptible to change.

FUTURE LAND USE

- Single Family Residential
- Medium Density Residential
- High Density Residential
- Low Density Commercial
- High Density Commercial
- Mixed-Use
- Office - Institutional
- Susceptibility to Change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ZONING

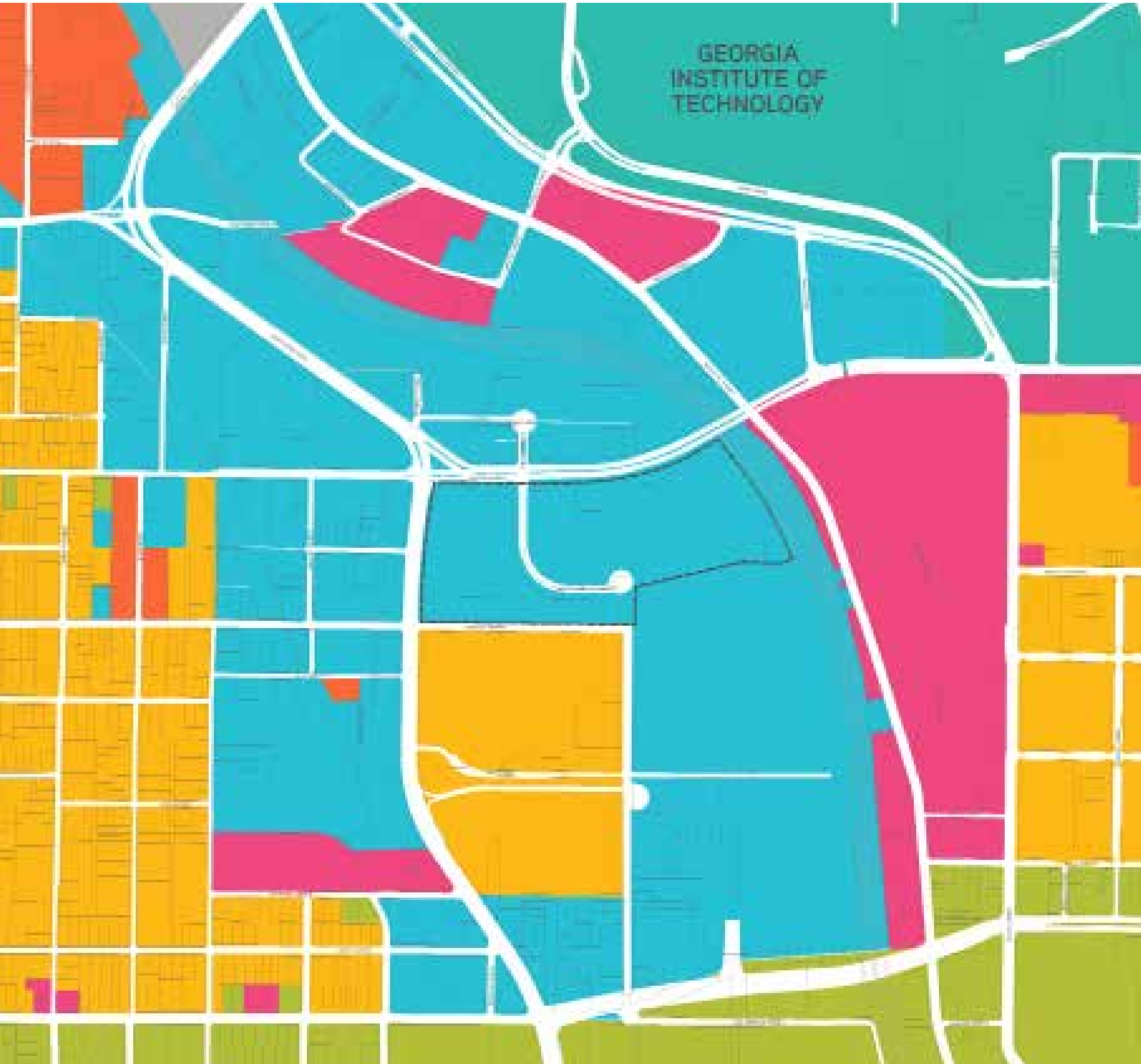
The land within TEP is split between I-1 and I-2 zoning classifications. These classifications are designed to regulate industrial uses, but the classifications also allow a wide range of other mixed uses. Housing is the only use expressly prohibited under these zoning classifications that might be a long term concern for Georgia Tech.

Although near term development prospects are unlikely to be hindered by the site's existing zoning, long term development prospects, including those on surrounding properties, may benefit from rezoning to allow a wider range of land uses, to reduce overall parking requirements, and to embody design characteristics that may be conducive to the development of a unified district.

After consulting with planning staff at the City of Atlanta, a possible bespoke classification, Planned Development Business Park (PDBP), could be used to tailor zoning criteria to the special needs of an innovation district.

ZONING

- Single Family Residential
- Multi Family Residential
- Commercial
- Industrial (I-1)
- Industrial (I-2)
- Industrial (I-3)
- Office - Institutional
- Other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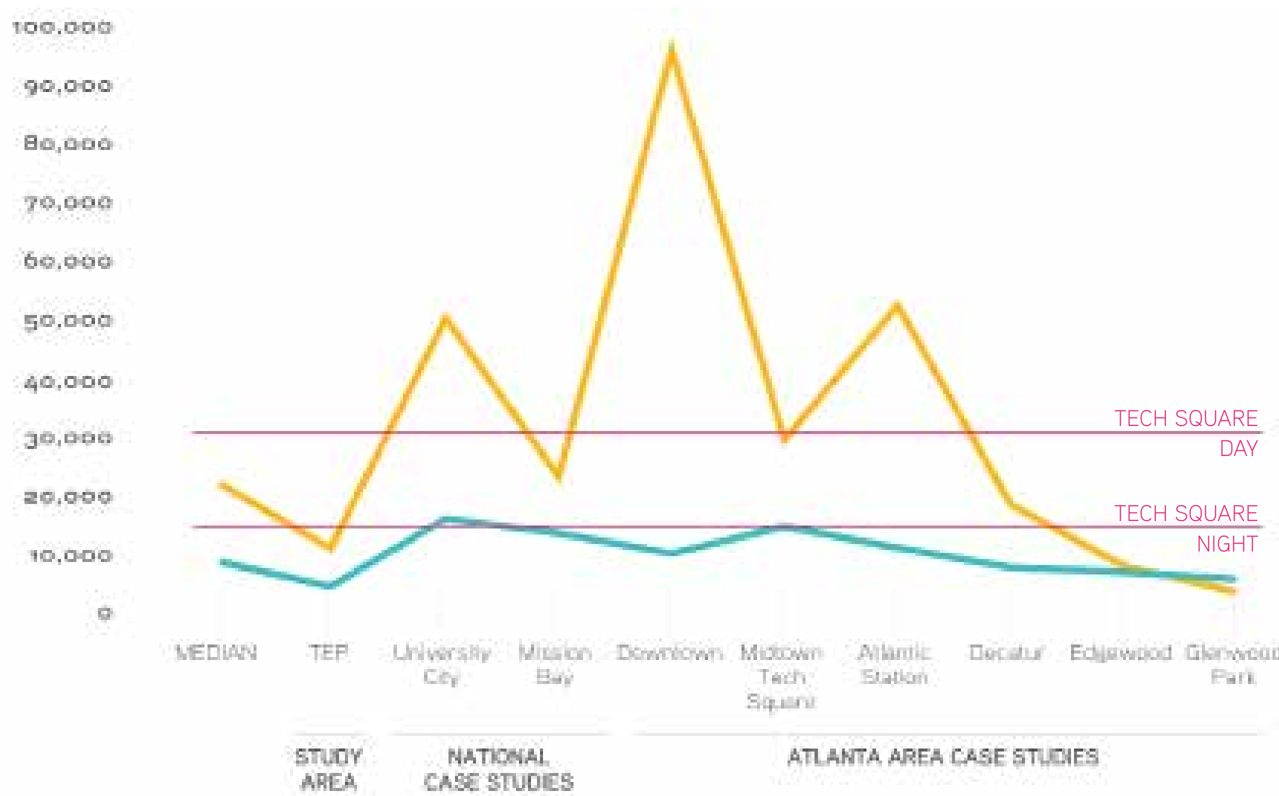
ACTIVITY LEVEL

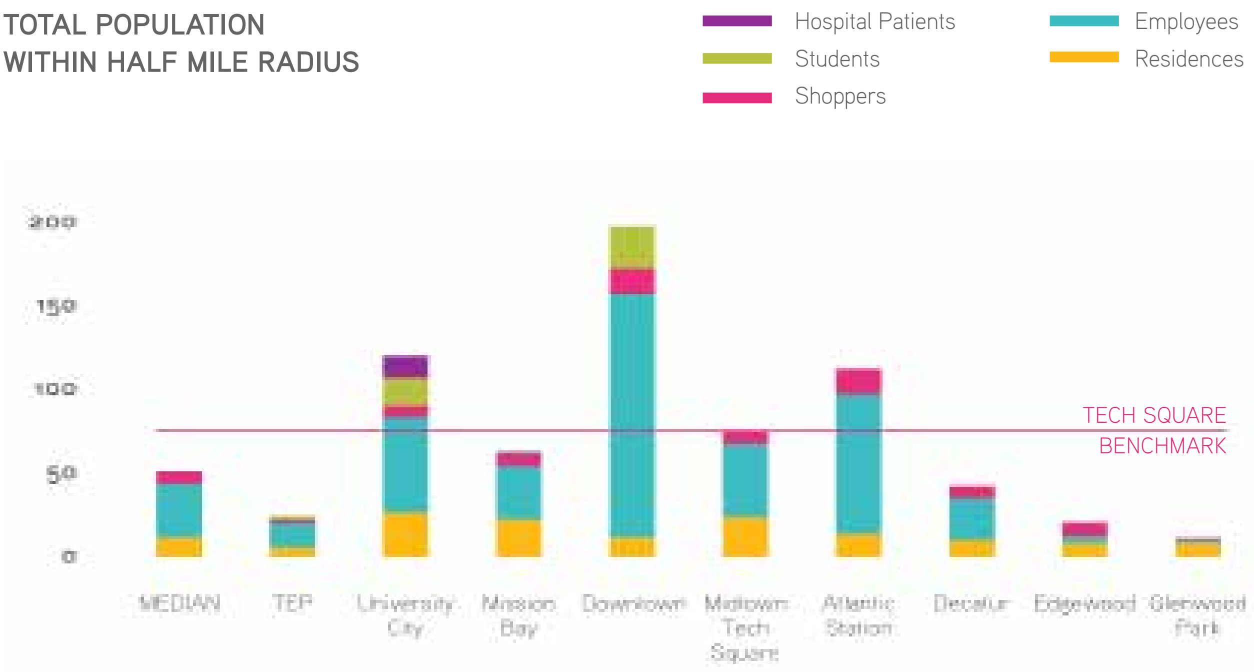
In order to understand the activity level at TEP, this study analyzed two national case studies and six Atlanta case studies to set benchmarks. In these comparisons, an "activity level" standard was created that accounted not only for the activity generated by residents, but also created by visitors, shoppers, students, employees, etc. This breakdown reveals exactly which groups are using these places and helps convey the difference between daytime and nighttime activity.

TEP measures extremely low in all activity levels and at all times of day. It is worth noting that activity is not necessarily correlated with population. The area within a half mile of TEP does contain similar numbers of people to places like Decatur, but TEP feels entirely different. Decatur has a rich and vibrant center that provides a core of activity for that small population. For the design of TEP, creating a core concentration of activity should be considered paramount. The characteristics of that activity should be focused on both daytime and nighttime populations to create a full experience for future users.

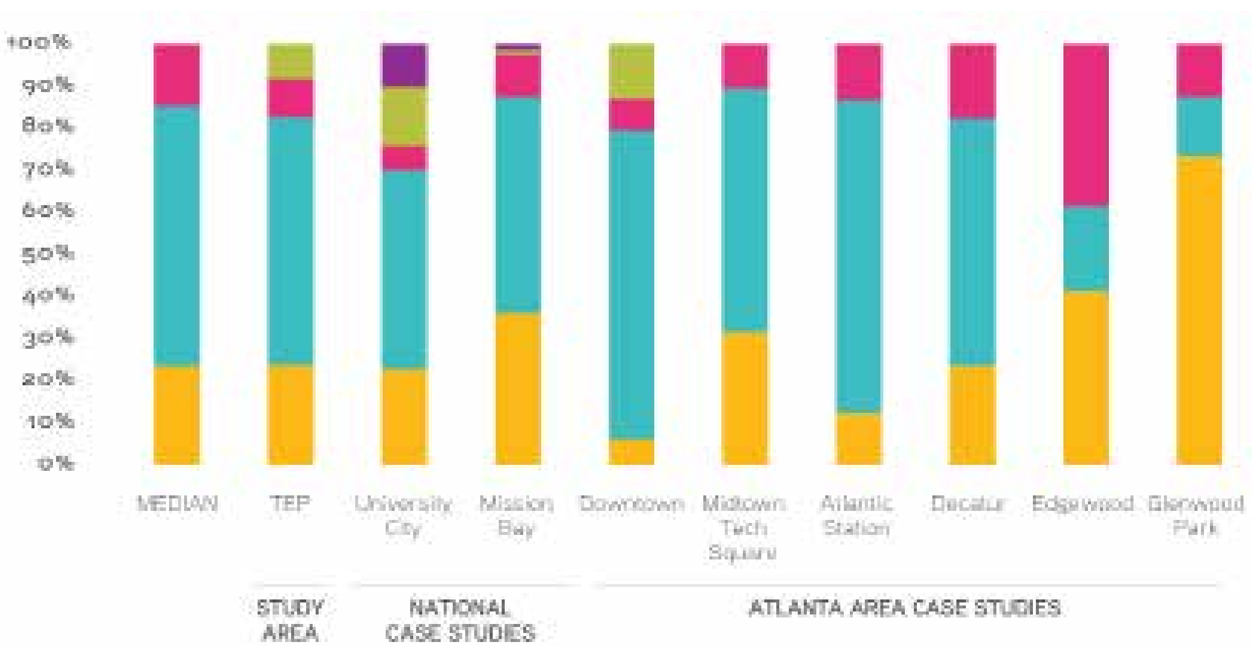
DAYTIME VS. NIGHTTIME POPULATION WITHIN HALF MILE RADIUS



TOTAL POPULATION WITHIN HALF MILE RADIUS

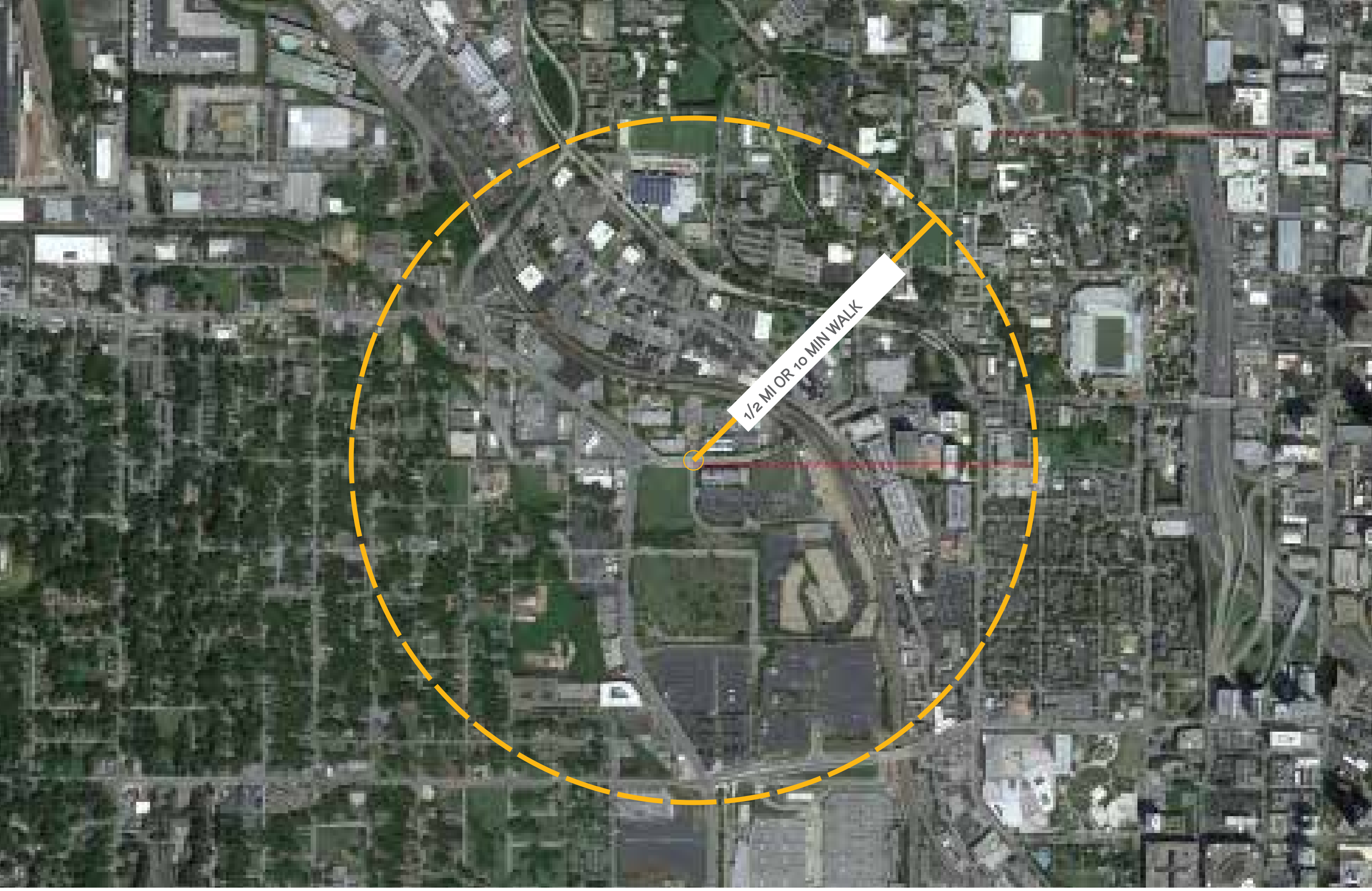


POPULATION PERCENTAGES WITHIN HALF MILE RADIUS



ACTIVITY WITHIN HALF MILE RADIUS OF TECH SQUARE

12,013	Residents
7,303	Dwelling Units
14.5	Dwelling Unit / Acre
21,989	Jobs
3.0	Jobs To Housing Ratio
806,932	Retail (GSF)
9,344,596	Office (GSF)
19	Open Space (Acres)
17,389	Parking Spaces



ACTIVITY WITHIN HALF MILE RADIUS OF TEP

2,900	Residents
1,400	Dwelling Units
2.79	Dwelling Unit / Acre
7,200	Jobs
5.14	Jobs To Housing Ratio
226,000	Retail (GSF)
2,800,000	Office (GSF)
1.9	Open Space (Acres)
--	Parking Spaces

1. DEVELOP A LANDSCAPE THAT HELPS GEORGIA TECH ACHIEVE ITS GOALS OF ENVIRONMENTAL SUSTAINABILITY, INCLUDING STORMWATER MANAGEMENT.

2. DEVELOP A LANDSCAPE THAT ENHANCES THE LIVING, WORKING, AND LEARNING ENVIRONMENT OF THE INSTITUTE.

3. DEVELOP A LANDSCAPE THAT UNIFIES THE CAMPUS, GIVES IT A DISTINCT SENSE OF PLACE, AND EXPRESSES THE IDENTITY OF GEORGIA TECH.

Georgia Tech, Landscape Master Plan (2011)

LAND & ENVIRONMENT

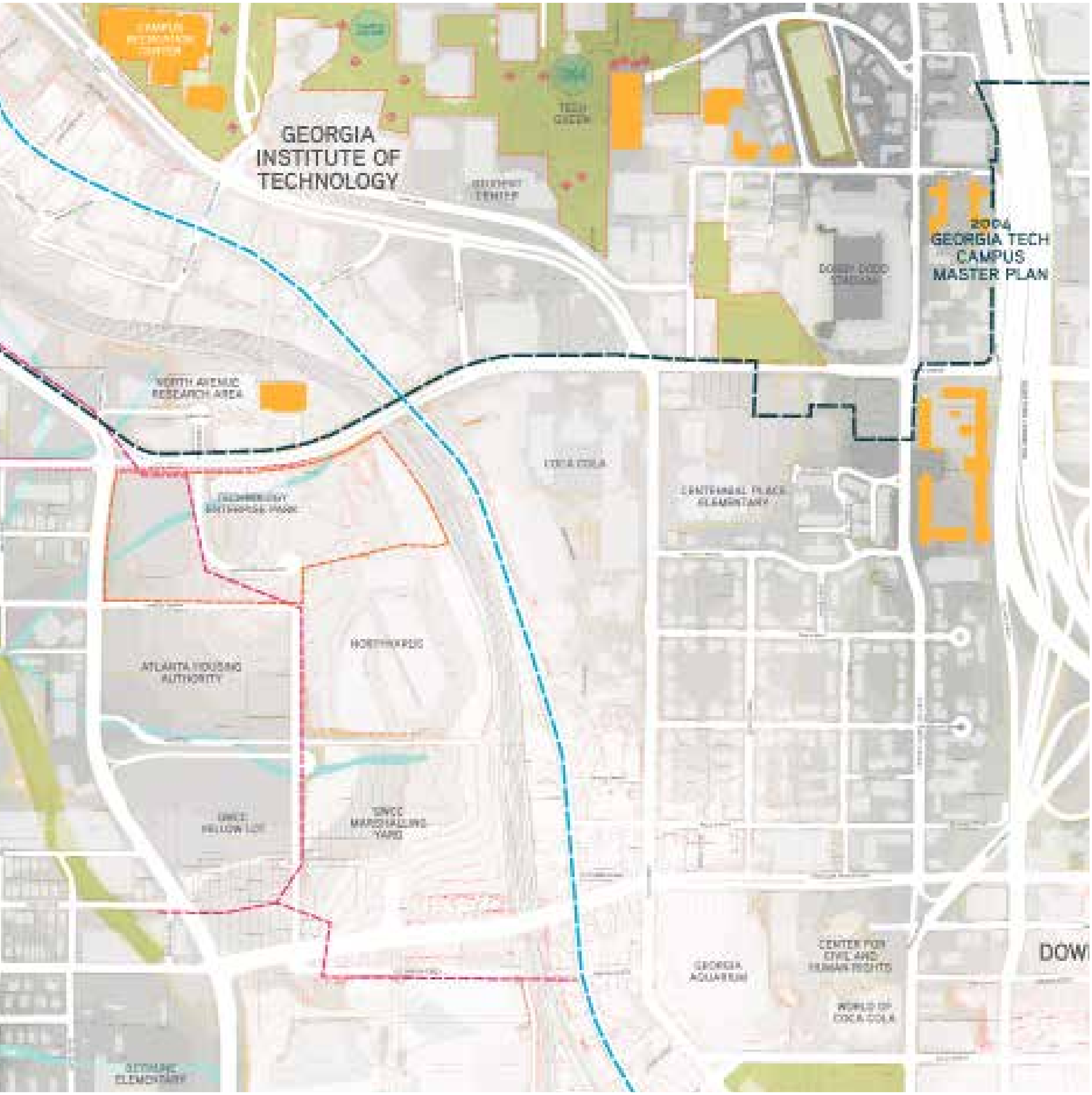
STRATEGIC RECOMMENDATIONS

For the continued development of Technology Enterprise Park as an engine of economic and social progress, the following measures should be made to ensure TEP contributes positively to the long term sustainability of the city:

BE AN ENVIRONMENTAL LEADER, FOLLOW THE CAMPUS' LEAD To find models of leading sustainable development, one does not need to look any further than the campus and policies of Georgia Tech. This study recommends adopting the university's sustainability strategies to build the greenest "innovation district" in the world. This requires:

1. **GREEN BUILDINGS AND LANDSCAPES** that follow the highest standard of LEED guidelines for buildings and Sustainable Sites for landscapes
2. **EMBRACE WATER** in the design of the district by treating the headwaters of Proctor Creek with utmost care, reducing overall flows from the site to less than predevelopment levels and creatively retaining, cleaning, and infiltrating water before it enters sewers and streams
3. **CERTIFICATION** of TEP to LEED for Neighborhood Development standards in future planning efforts. This certification would be a first of its kind in Atlanta for a large master planned development.

LAND & ENVIRONMENTAL CONTEXT AT THE LOCAL SCALE



CAMPUS RECREATION CENTER
GEORGIA INSTITUTE OF TECHNOLOGY
TECH GREEN
STUDENT CENTER
2004 GEORGIA TECH CAMPUS MASTER PLAN
BOBBY DODD STADIUM
NORTH AVENUE RESEARCH AREA
TECHNOLOGY ENTERPRISE PARK
COCA COLA
CENTENNIAL PLACE ELEMENTARY
NORTHYARDS
ATLANTA HOUSING AUTHORITY
GWCC YELLOW LOT
GWCC MARSHALLING YARD
GEORGIA AQUARIUM
CENTER FOR CIVIL AND HUMAN RIGHTS
WORLD OF COCA-COLA
BETHUNE ELEMENTARY

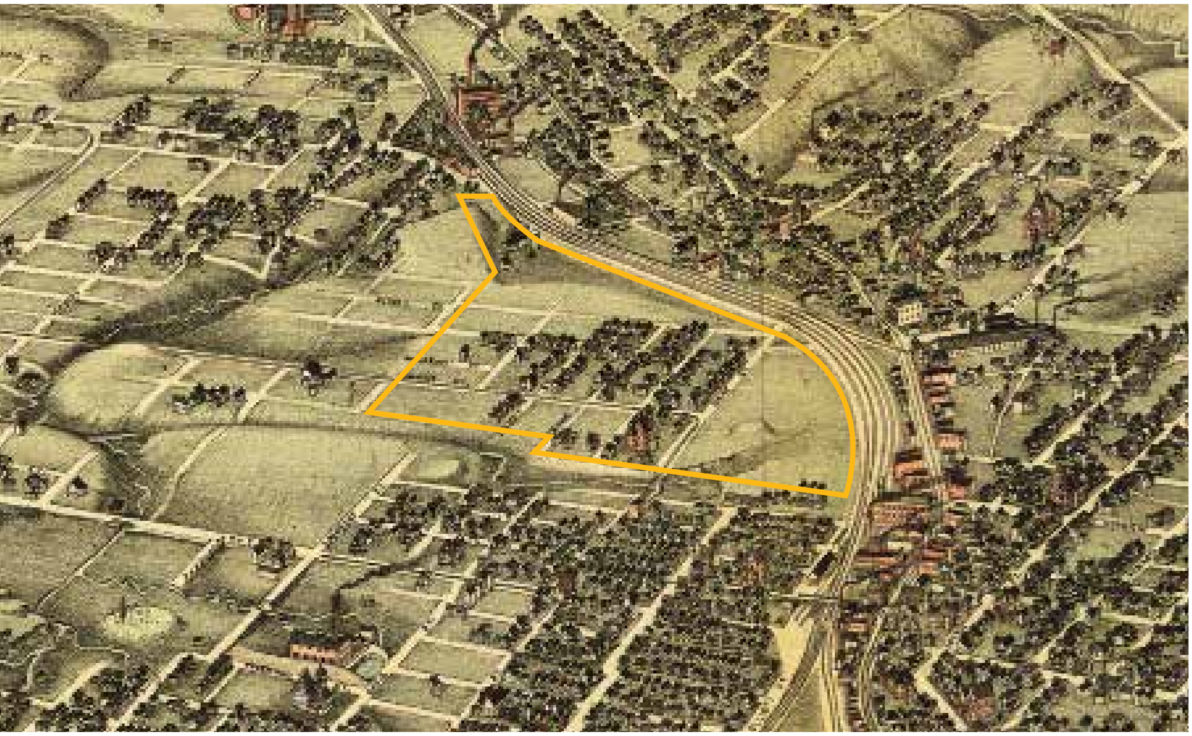
HISTORY OF THE LAND

Atlanta was never intended to be a city. It grew organically around the junction of three major southern railroad lines, which took shape between 1845 and 1854. The interchange became quite busy, and basic amenities like a hotel, general store, and homes starting taking root, forming the early signs of a city. The three rail lines radiated out in three diverging directions, following the land's natural topography. The lines to the east and southwest actually followed the ridge line of the Eastern Continental Divide. The line running north sat on lower land and would have to be built up upon an earthen embankment, an engineering feat known as the Monroe Embankment, in order to meet the other two lines. It is around these prominent natural and man made features that the city would be formed, despite being divided into segregated slices.

As the new city grew so did its industry. While civic, commercial, and residential development largely grew in directions away from the rail corridors, manufacturing and other rail-based industrialized functions enveloped the three rail lines in almost all areas outside of the city's original urban core. These bulky and unfriendly functions compounded on top of each other, creating weighty industrial corridors around the rails. These barriers were considerable and prevented natural urban growth across them. This was especially true on the northern rail line, whose low-lying land had required the Monroe Embankment for support. As a result, the lands to the northwest would largely be cut off from the rest of the city, which sat primarily on the east side of the rail line. The low ground on the northwest was also considered less favorable for habitation, further preventing the growth of non-industrial functions.

This area formed the basis for today's TEP site. While roads would later enter the picture, they were often laid in conjunction with train corridors, serving to compound the effect of the rails. This isolation has meant that the TEP site either served rail functions or was required to have self-sufficient, insular functions for all of its existence.

An 1864 map of early Atlanta showing the prominence of the three rail lines.



An 1892 map of Atlanta with the site of Technology Enterprise Park highlighted.

GEORGIA TECH SUSTAINABILITY GOALS

Georgia Tech has a comprehensive approach to sustainability through their initiative of "Georgia Tech as a Living Learning Laboratory." This initiative has three critical overlays: (1) Education: Learning in the Classroom, (2) Research: Discovery in the Laboratory, and (3) Campus: Practice in Managing our Campus.

Within the Georgia Tech campus proper, this goal has manifested itself in a few key plans and projects. These include:

Landscape Master Plan
The Landscape Master Plan outlines an 80-acre Eco-Commons that stitches the campus together and provides an ecological and human landscape for the campus. This integrates stormwater management with open space systems to unify the campus and establish a distinct sense of place. Best practices, like planting native vegetation systems and reducing impervious surfaces, are being paired with unique design solutions that reflect a strong public realm orientation for the campus. Currently in implementation, there will be a 50% reduction of stormwater retention at completion.

Stormwater Master Plan
The Stormwater Master Plan links the Landscape Master Plan with a Cistern Master Plan that knits retention, reclamation and infiltration together into a networked stormwater performance system across the campus. Georgia Tech is in implementation now in conjunction with the Landscape Master Plan.

Implementation of Green Buildings
Georgia Tech has a series of LEED (Leadership in Energy and Environmental Design) certified buildings and certifiable buildings (designed with sustainable practices that are not certified). In total, this equates to 125 square feet per student of LEED space to date, with more space planned for the future.

For the physical design of TEP, the Institute's goal of practicing a living learning laboratory through the campus is an important directive. This study recommends that TEP fully embodies this goal, with an aspiration to be one of Georgia Tech's beacons in realizing this achievement. Further, the goals of the Landscape Master Plan and Stormwater Master Plan as well as the implementation of green buildings should drive the physical development and design of TEP.

CASE STUDY | CARBON NEUTRAL ENERGY SOLUTIONS LABORATORY AT NARA

The Carbon Neutral Energy Solutions Laboratory was designed to foster industry collaboration and support translational and pre-commercial research in clean, low carbon energy technologies.

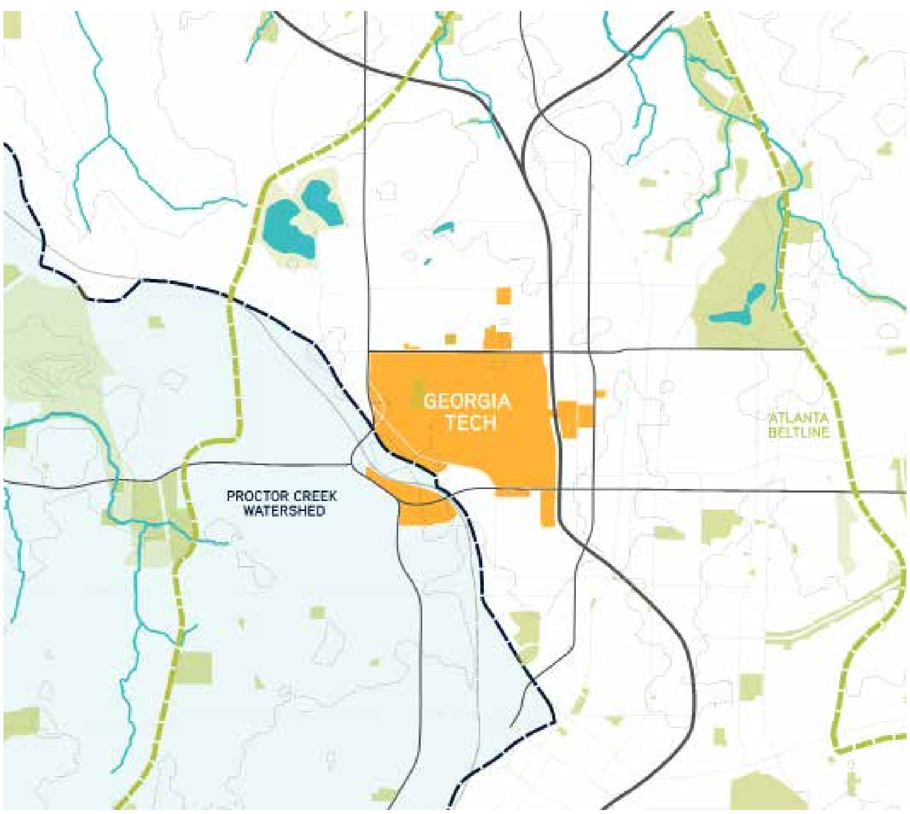
The building itself contains a series of flexible high bay, wet lab, and dry lab spaces that together create a LEED Platinum structure. A host of technologies in the building were designed with testing in mind, allowing performance to be measured and technologies to be changed. The building embodies Georgia Tech's living laboratory directive in a strong and authentic manner.

PROCTOR CREEK WATERSHED

TEP sits at the headwaters of the Proctor Creek Watershed, one of Atlanta's most valuable watersheds that drains into the Chattahoochee River west of the city. Per an initiative through the Environmental Protection Agency (EPA) to clean up our urban watersheds, Proctor Creek is receiving a tremendous amount of planning energy. Since 1980, no fewer than 35 plans and studies have been conducted within the 26-mile watershed. Currently the Atlanta Regional Commission, the City of Atlanta, and numerous partners such as the Emerald Corridor Foundation are working in tandem.

With NARA and TEP falling within the Proctor Creek Watershed, this study recommends that any water-related planning and projected performance measures be considered in this larger context.

PROCTOR CREEK WATERSHED WITHIN THE CITY OF ATLANTA

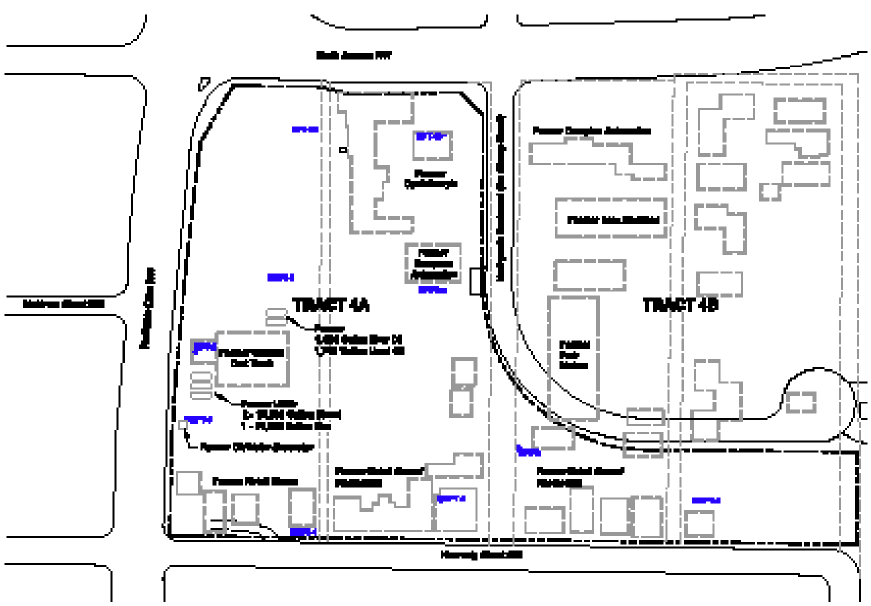


SOILS

A Phase I Environmental Site Assessment was conducted on the TEP site, and the study revealed no evidence of significant environmental concerns in connection with the property's soils. In investigating the historic uses of the property, it was found that underground storage tanks had been present on the former General Car and Truck Leasing property, but they had since been removed. The same was true of former auto repair facilities on adjacent properties to the east.

Although low levels of residual chemical impacts were reported, Environmental Product Declaration (EPD) issued a letter recommending No Further Action. In addition, low levels of chlorinated volatile organic compounds (VOCs) were detected in soil and groundwater samples collected on adjacent properties during site assessment activities in 2000. Although residual concentrations of regulated materials were reported, EPD determined that this condition did not constitute a reportable release under the Hazardous Site Response Act.

ENVIRONMENTAL STUDIES COMPLETED ON THE TEP SITE



UTILITIES

The TEP site is bisected by a high tension power line that connects a substation on the northern side of North Avenue to Georgia Tech's campus and to parts of the city south of the site. As these power lines are expensive to move, this study recommends that they be considered a fixed element of the project and, further, that they be considered an asset to be incorporated into the TEP landscape.

The power line has a 25' easement that needs to remain in perpetuity. All master and site planning should respect this easement.

VISUAL COMPARISON OF THE POWERLINES AT TEP TO ANOTHER CORRIDOR IN ATLANTA

The High Tension Powerlines on North Avenue at TEP

The High Tension Powerlines on 14th Street in Midtown Atlanta

CASE STUDIES | UTILITY INFRASTRUCTURE AS ART

The preponderance of utility infrastructure in the vicinity of TEP is both a challenge and an opportunity. Relocating or burying power utilities can be unnecessarily expensive. This study recommends thinking of utility poles as an opportunity for public art, signage and branding.

CONCEPT MASTER PLAN

CONCEPT MASTER PLAN

STRATEGIC RECOMMENDATIONS

For the continued development of Technology Enterprise Park as an engine of economic and social progress, the following steps should be taken to ensure that the TEP master plan creates a platform for opportunity:

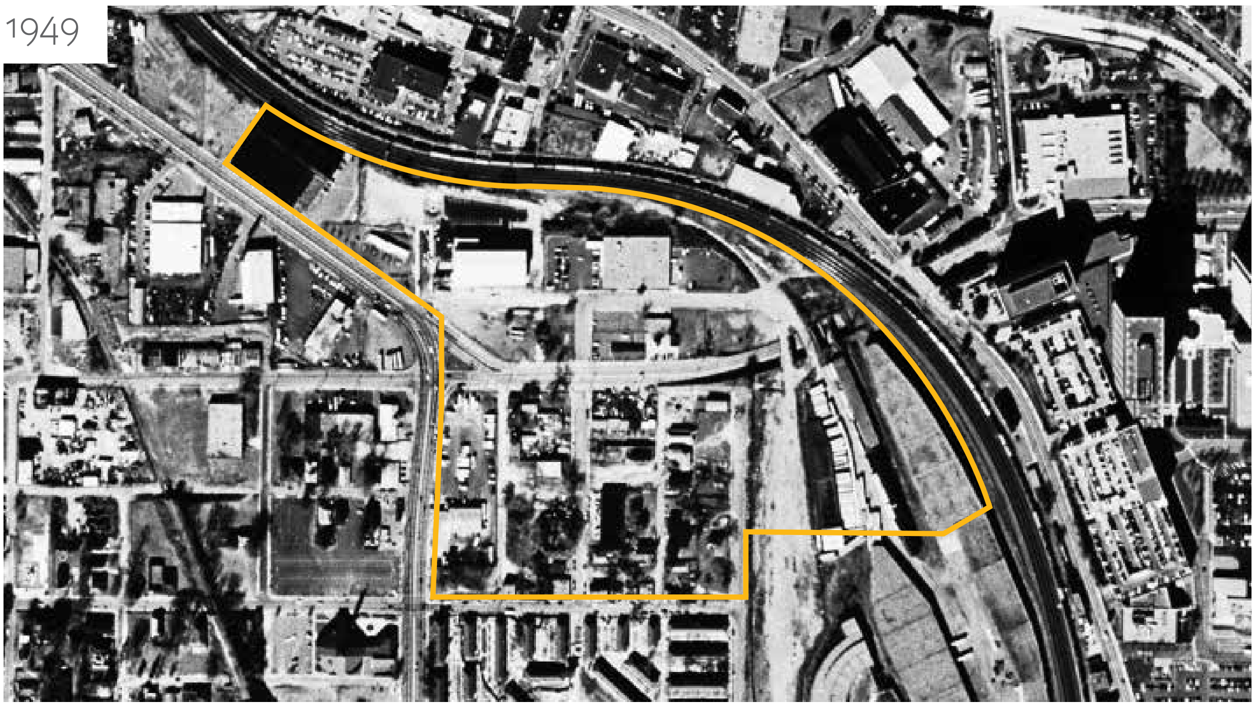
1. **FLEXIBLE AND CONNECTABLE** Establishing a clear, flexible framework of streets, blocks, and open spaces that can accommodate a wide variety of building types is central to this feasibility study. It ensures long-term adaptability as the site is developed over time. Flexibility leaves room for the unknown, such as new building programs and uses, incremental implementation, phasing, and changing parking needs. Further, TEP's success will hinge on its connectivity: to the campus, to the community, to the city, and to technology itself. The master plan must facilitate connectivity.
2. **MAKE PLACES FOR PEOPLE (AND CONNECT THEM)** As a nexus of creativity, innovation, learning, and living, TEP is uniquely positioned to elevate these activities in a way that inspires a new kind of maker-space for the campus and community. Reactivating major streets, such as North Avenue and Northside Drive, through street frontages with a mix of retail, makerspaces, and innovation labs will bring a new identity to the area, while also encouraging more pedestrian and bike connectivity. Within the site itself, signature open spaces and alleys allow for the activity within the buildings to be brought outside as a way to activate the streets and showcase innovation and creativity.
3. **CREATE CHARACTER** The site's rich industrial history, coupled with the vision to create an innovative maker district, must be expressed through a character that celebrates the industrial and creative spirit of the place. While the buildings should all exhibit a contemporary aesthetic, they can all share the use of honest materials, simple forms, and a transparency of structure and activity within. Open spaces, such as parks, plazas, and streetscapes should be centered around performative design and durability, while providing for a spectrum of activity and gathering spaces - celebrating the forward-thinking and sustainable planning of Tech's Campus and the innovative spirit of the maker district.

MASTER PLAN ASSESSMENT

A master plan was developed for Technology Enterprise Park in 2005/2006. This master plan guided the location and development of the TEP 1 building. The master plan also projects the growth of the campus to include three additional buildings and two parking structures along a central driveway. This master plan serves as a basis for design studies contained in this document.


BANKHEAD
BRIDGE
GEORGIA INSTITUTE
OF TECHNOLOGY
NORTH AVENUE
RESEARCH AREA
COCA-COLA
TEP 1
TECHNOLOGY
ENTERPRISE PARK
NORTHYARDS
AHA HERNDON
HOMES REDEVELOP-

SITE HISTORY



2007

2016

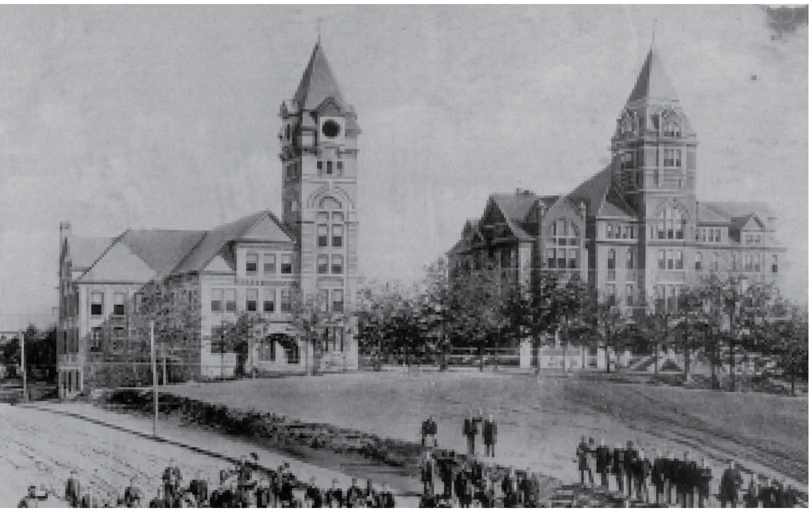
GEORGIA TECH'S HISTORY

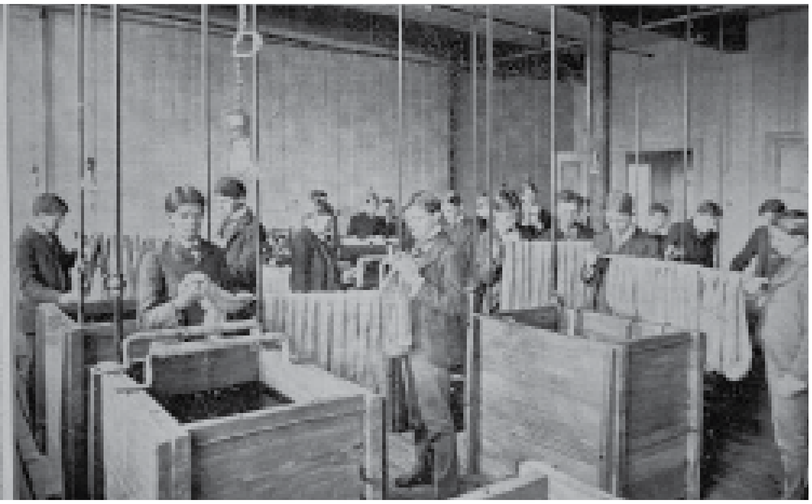
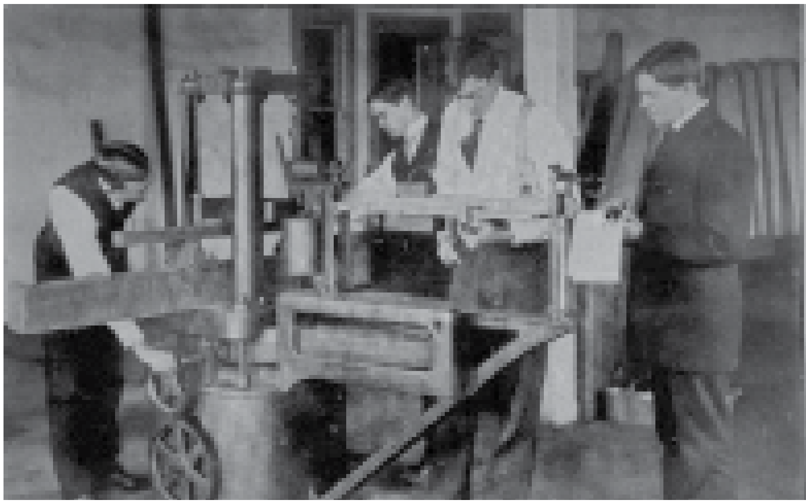
Georgia Tech's roots sprung forth during the New South movement after the Civil War as a means to bring engineers to the region. As the South needed to reinvent its waning agrarian economy, leaders knew the that they would need to embrace the industrialization movement that had elevated the economy of our northern states. While many ideas could be simply transplanted to the South, the area would need brilliant industrial thinkers in order to truly thrive. Understanding this necessity, State leaders founded the Georgia School of Technology in 1885.

When the school opened, it offered one degree, mechanical engineering. The chief need of progressive industrialization was the kind of minds found in the makers and doers of mechanical engineering. The school had only two buildings, an academic classroom building and a shop building. These two building were also a kind of metaphor for institution's primary approach, that scholarly and practical learning were required in tandem for the inventing and fabricating of industrialization. The shop building included a foundry, forge, boiler room, and engine room, and in it students worked in a hands-on setting to shape and manipulate products and processes. The shop was created specifically as a "contract shop," and the goods students produced were sold to raise revenue for the school while they were learning vocational skills firsthand.

After the school's first 15 years, it would also add electrical, textile, and chemical engineering to its degree offerings. In the decades that followed, it would continue to expand, quickly moving from a narrowly focused trade school into a regionally recognized technological university. In 1948, the school's name was changed to the Georgia Institute of Technology, reflecting a growing focus on advanced technological and scientific research.

In the ensuing years Georgia Tech has become a global leader in managing the intersection between the enduring industrial economy and a developing information-based economy. From its earliest history until today, Georgia Tech has continuously worked to ensure that students use their innovative skills and robust work ethic to solve real-world problems. Georgia Tech is and has always been the institution that teaches making.

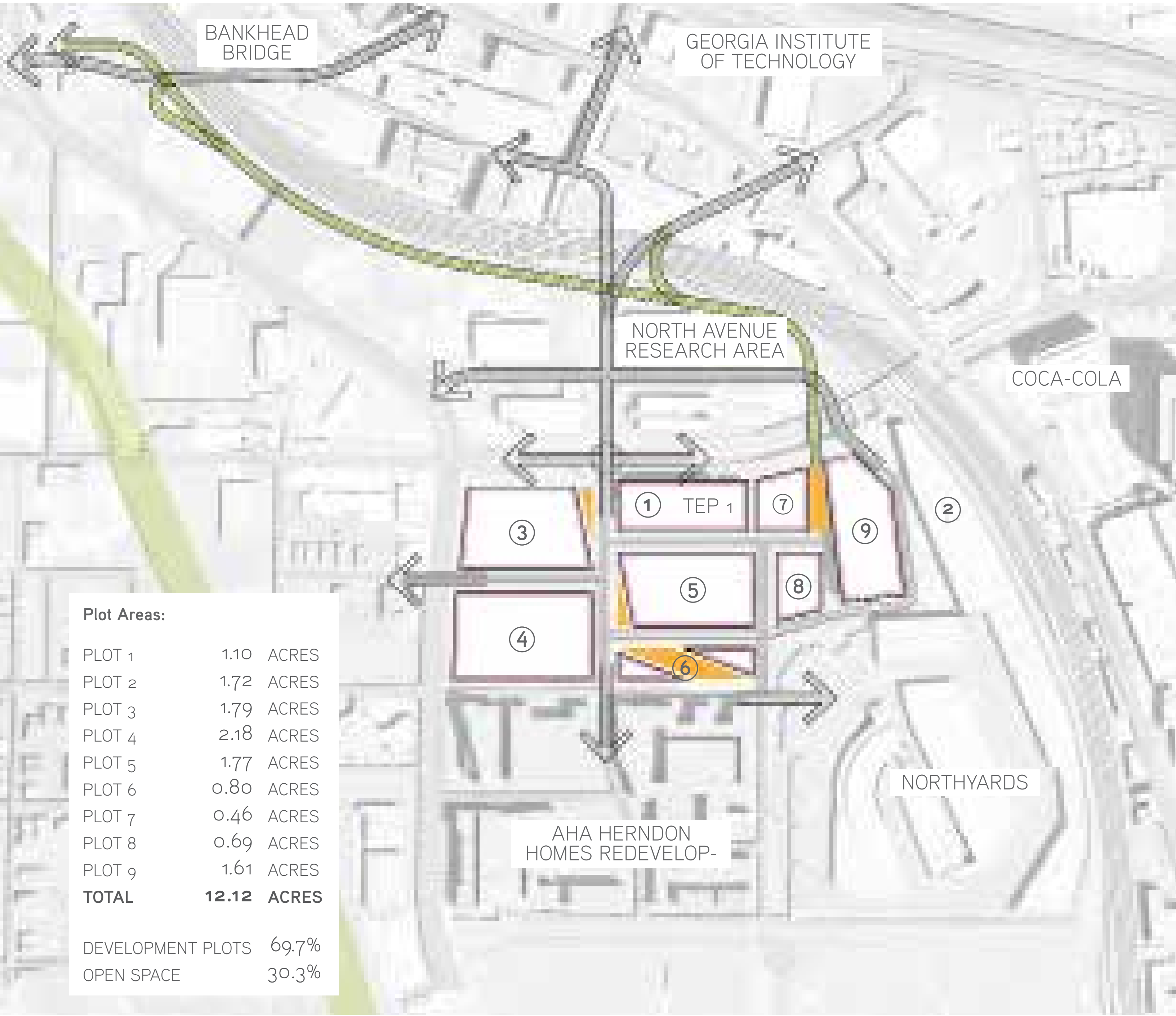


SITE FRAMEWORK

The three fundamental planning principles serve as the foundation for the overall framework plan: to be flexible and connectable, to make places for people (and connect them), and to create character.

Looking beyond the 12+ acre site to the surrounding urban context, creating new connections and improving existing ones is a top priority for the long-term success of the vision for an **industrial innovation district**. Re-stitching the Westside neighborhood to the TEP site, connecting to the AHA redevelopment to the south, and exploring the reuse of abandoned railroad viaducts as future connections from TEP into NARA, are just a few of the strategies and goals of this framework plan. The most crucial connection will be the connection of TEP to the Means Street Historic District and the Georgia Tech Campus to the north, across numerous active railroad tracks. Establishing a clear framework allows for future development flexibility along with a variety of options for finer-grain development within the blocks.



Plot Areas:

PLOT 1	1.10	ACRES
PLOT 2	1.72	ACRES
PLOT 3	1.79	ACRES
PLOT 4	2.18	ACRES
PLOT 5	1.77	ACRES
PLOT 6	0.80	ACRES
PLOT 7	0.46	ACRES
PLOT 8	0.69	ACRES
PLOT 9	1.61	ACRES
TOTAL	**12.12**	**ACRES**

DEVELOPMENT PLOTS	69.7%
OPEN SPACE	30.3%

CONCEPTS

Building upon the site framework, three concepts were explored to test their relative social, economic, and spatial merits. Common threads between the concepts include façade activation along key open spaces and the North-South (N-S) spine, and a sequence of open spaces and/or catalyst buildings along the N-S spine to strengthen the connection north to NARA and the Tech Campus and south to the AHA Redevelopment. All three concepts include a retail-oriented street at the primary E-W connection, which will not only activate the public realm but also further enhance the connections to Metlife Northyards and the Westside neighborhoods while creating a gateway into the site from Northside Drive.

Concept 1 | The Squares

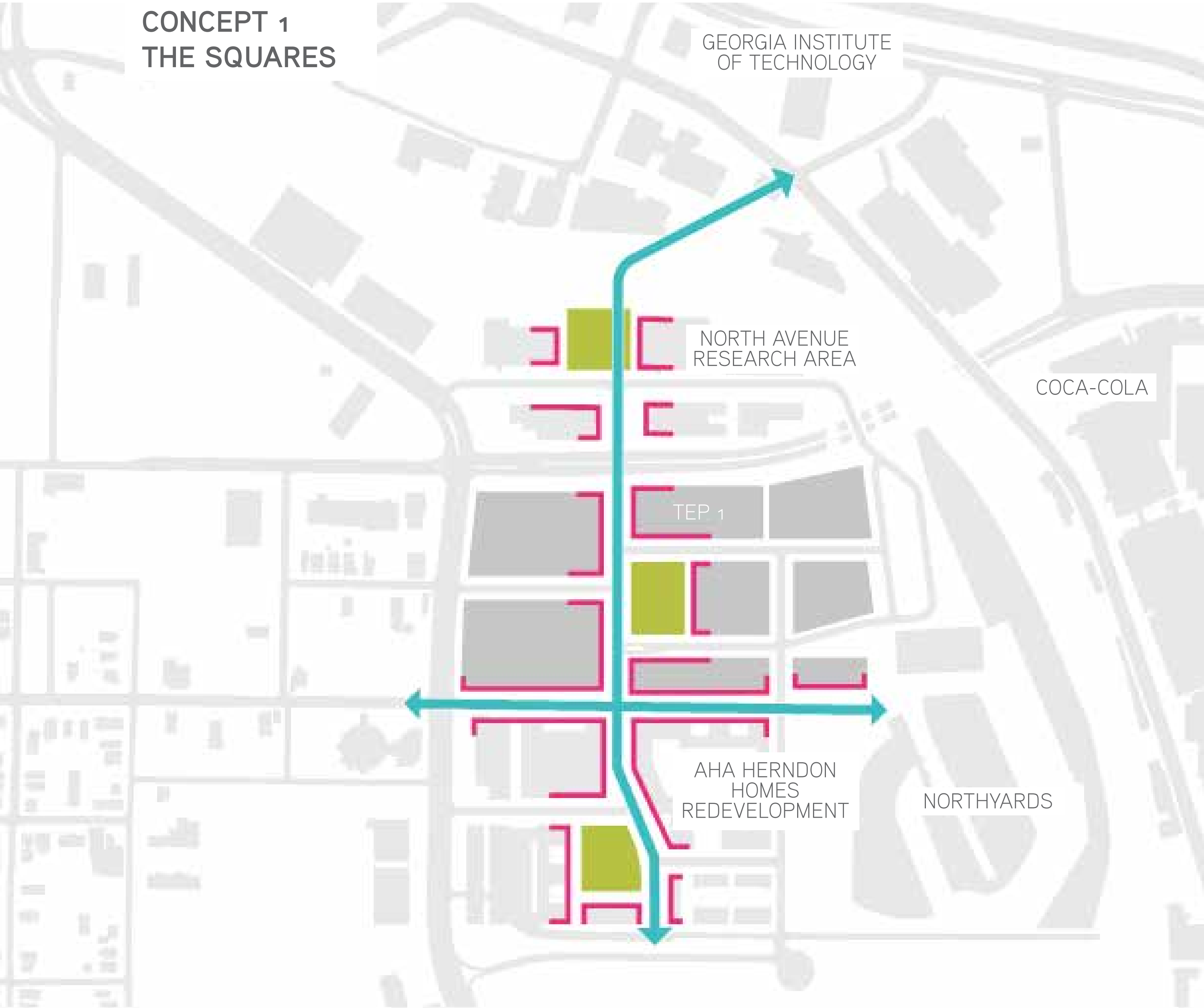
This scheme focuses on a sequence of three distinct open spaces, all situated along the main N-S corridor: one at the heart of NARA, the second centrally located within the TEP site, and the third being the proposed park for the AHA Redevelopment. These open spaces connect the TEP site to its context and provide a neighborhood feel to the area, while creating an opportunity for place-making, identity, and wayfinding within the future **Industrial Innovation District**.

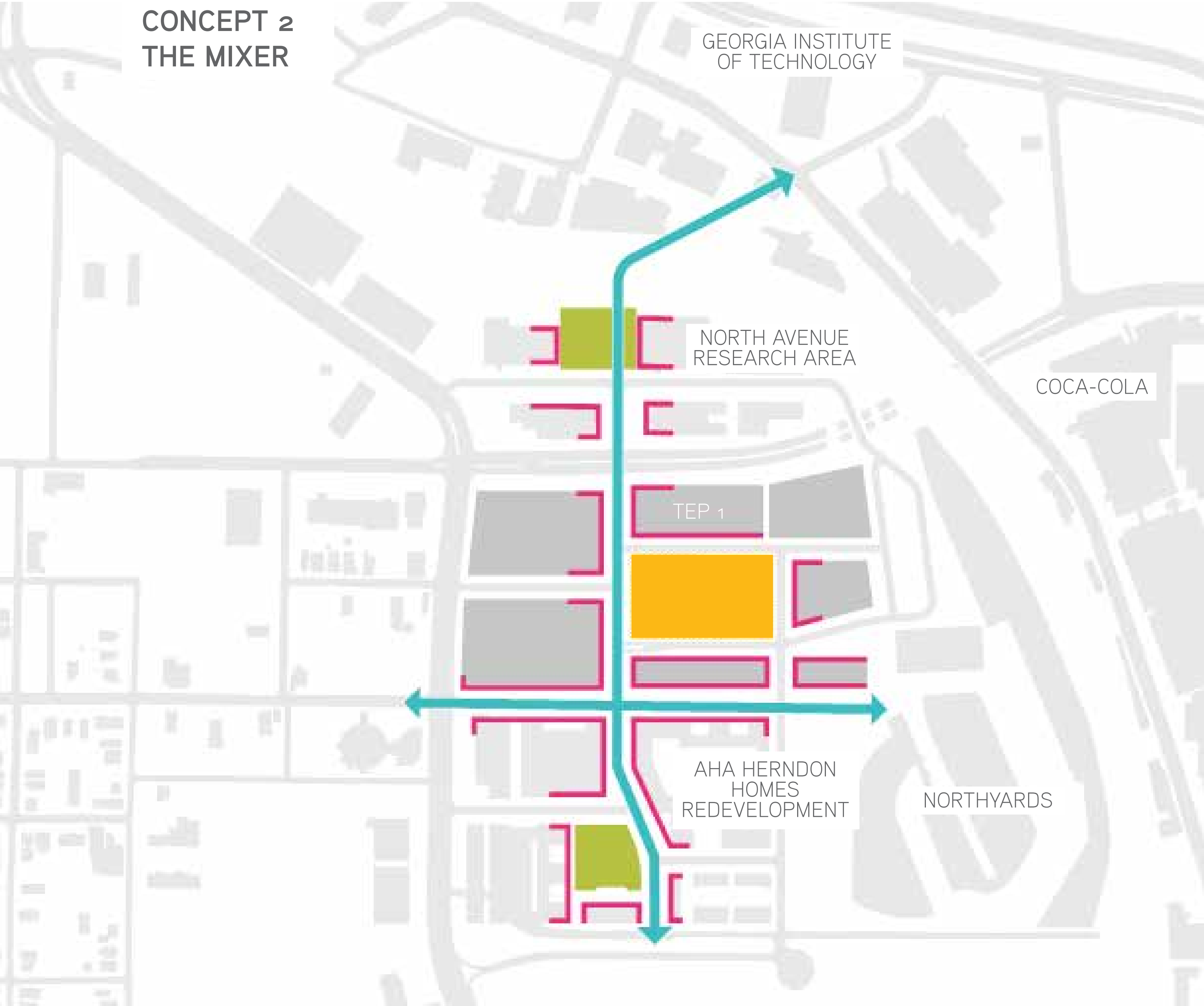
Concept 2 | The Mixer

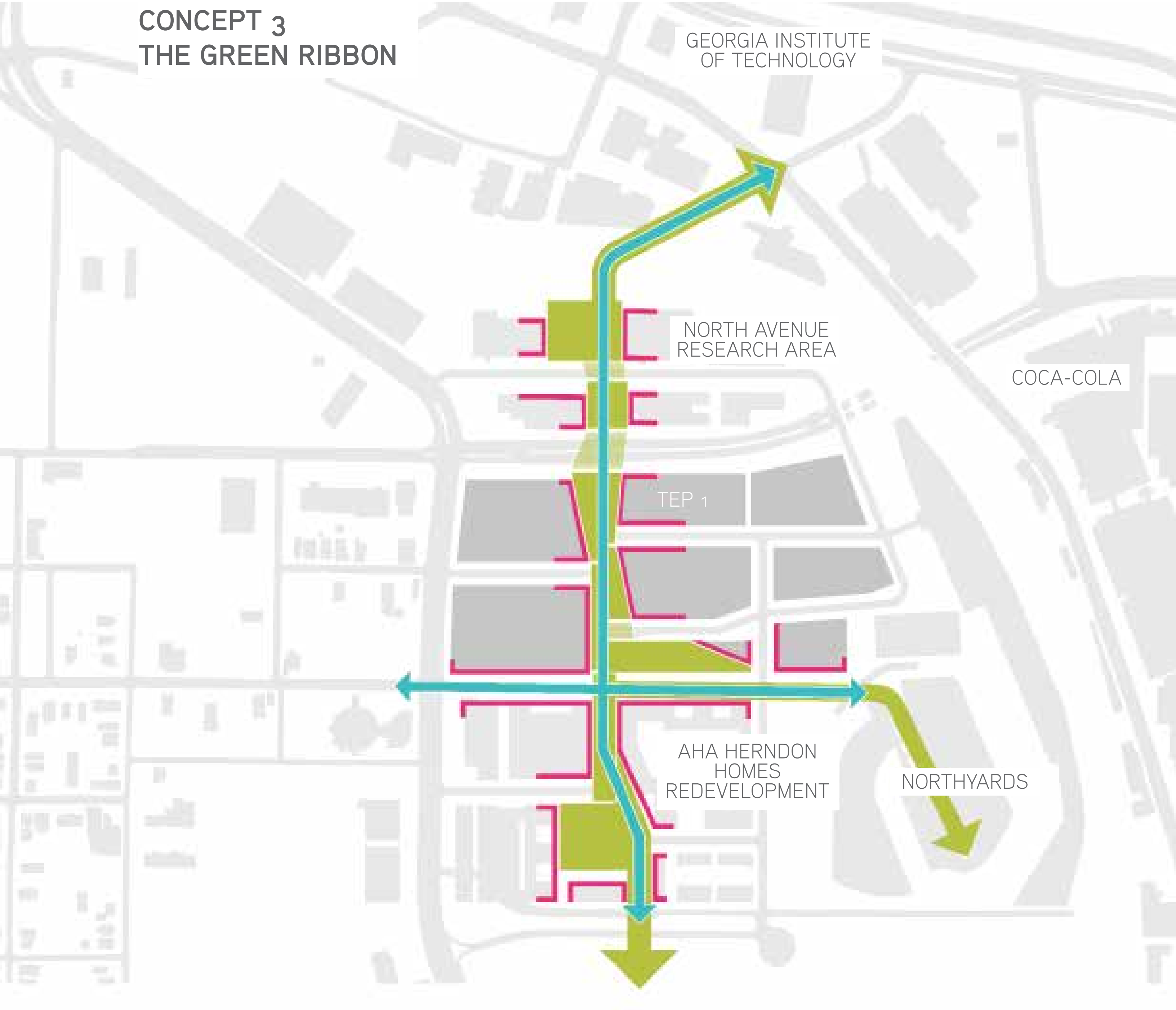
While generally similar to "The Squares" concept, this scheme replaces the open space at the center of the TEP site with a large, block-scale catalyst building. This building would act as the active heart of the district, where things are made, innovation is on display, and collaboration is cultivated.

Concept 3 | The Green Ribbon

Taking a more progressive, holistic approach to the open space, the third concept envisions a continuous, connected ribbon of "green space," stretching the full extent of the N-S corridor and connecting into the Northyards site. The ribbon will consist of parks, plazas, and public realm/streetscapes, all of which are part of a larger performative landscape for the district focused on storm water management and energy harvesting.


CONCEPT 1
THE SQUARES
GEORGIA INSTITUTE
OF TECHNOLOGY
NORTH AVENUE
RESEARCH AREA
COCA-COLA
TEP 1
AHA HERNDON
HOMES
REDEVELOPMENT
NORTHYARDS


CONCEPT 2
THE MIXER
GEORGIA INSTITUTE
OF TECHNOLOGY
NORTH AVENUE
RESEARCH AREA
COCA-COLA
TEP 1
AHA HERNDON
HOMES
REDEVELOPMENT
NORTHYARDS


CONCEPT 3
THE GREEN RIBBON
GEORGIA INSTITUTE
OF TECHNOLOGY
NORTH AVENUE
RESEARCH AREA
COCA-COLA
TEP 1
AHA HERNDON
HOMES
REDEVELOPMENT
NORTHYARDS


NORTH AVENUE
RESEARCH AREA
POTENTIAL FUTURE
BUILD-OUT
TEP 1
ENGLISH
AVENUE
AHA HERNDON
HOMES REDEVELOP-


GEORGIA INSTITUTE
OF TECHNOLOGY
COCA-COLA
NORTHYARDS


ATLANTIC STATION
GEORGIA INSTITUTE OF TECHNOLOGY
ENGLISH AVENUE


MIDTOWN
COCA-COLA
NORTHYARDS
AHA HERNDON
HOMES REDEVELOP-

BUILDING CHARACTER

The site's rich industrial history, coupled with the vision to create an innovative maker district, must be expressed through a character that celebrates the industrial and creative spirit of the place. While the buildings are all new construction, they can all share the use of honest materials, simple forms, and a transparency of structure and activity within, to express the industrial-inspired character of the maker district.






OPEN SPACE CHARACTER

The open spaces, which consist of parks, plazas, and streetscapes, are all centered around performative design and durability. Providing a spectrum of activity and gathering spaces for individuals or large groups heightens the user experience within this new maker district. Reusing existing infrastructure in creative ways keeps the site rooted in it's industrial heritage and tells the story of innovation and placemaking through adaptive reuse. From the various streetscape typologies to the signature plazas, every space is important as it contributes to the larger system of stormwater management and energy harvesting, celebrating the forward-thinking and sustainable initiatives of Georgia Tech's campus and the innovative spirit of the maker district.






IDENTITY & WAYFINDING

The character of Technology Enterprise Park, how it is perceived and navigated, will be a product of a recognizable brand and distinctive design features. Public art and displays should be related to the mission of the district, which is driven by industrial innovation, and exhibit elements that place "science on display."







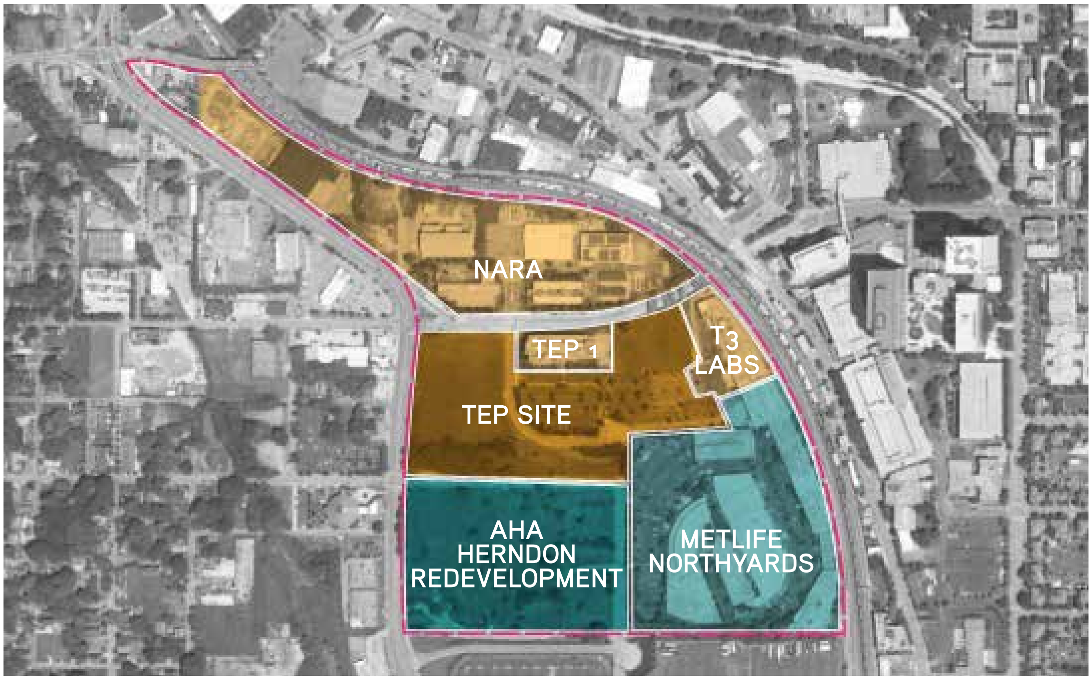
COFFEE

STRATEGIES

ACTIVITY DISTRIBUTION

RESIDENTIAL	**700k SF**
AHA Herndon Redevelopment (Planned)	700k
RETAIL	**55k SF**
AHA Herndon Redevelopment (Planned)	30k
TEP Retail	**25k**
HOTEL	**180k SF**
TEP Hotel (up to 200 keys)	**180k**
INSTITUTIONAL	**160k SF**
Step-up Space (near-term & long-term)	**120k**
Incubator (near-term & long-term)	**40k**
OFFICE / R&D / FLEX	**1.31M SF**
MetLife Northyards Business Park (Existing)	270k
North Avenue Research Area (Existing)	170k
Technology Enterprise Park 1 (Existing)	125k
T3 Labs / GTRI (Existing)	40k
Private Industry	**705k**
Parking	**1,500 spaces**

*Uses in bold are proposed for TEP.



1.34 M SF + **1.07 M SF**

EXISTING + PLANNED

TEP PROPOSED

(Not including 450K SF parking)

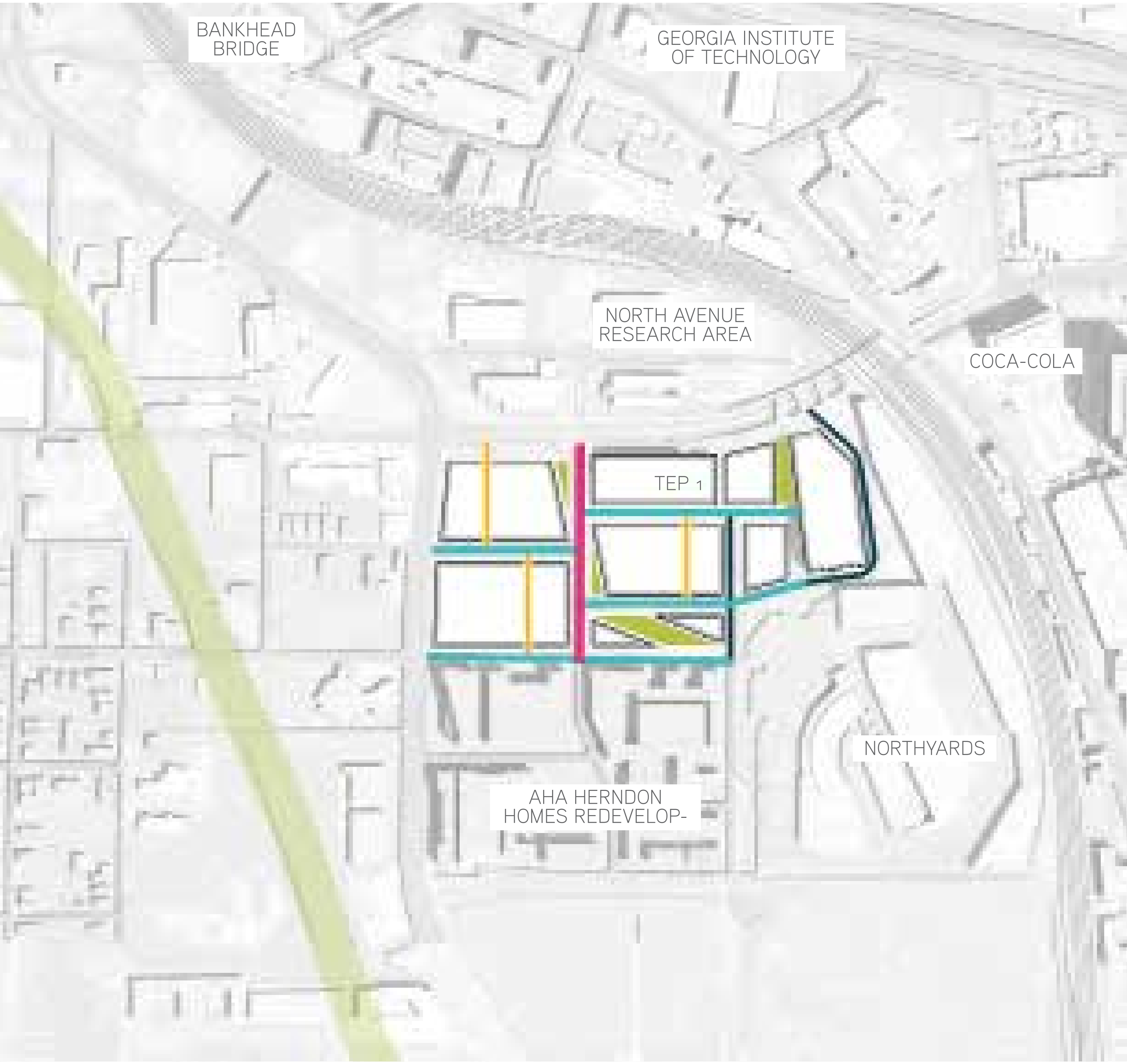
2.41 M SF

EXISTING + PLANNED + PROPOSED

STREETSCAPES

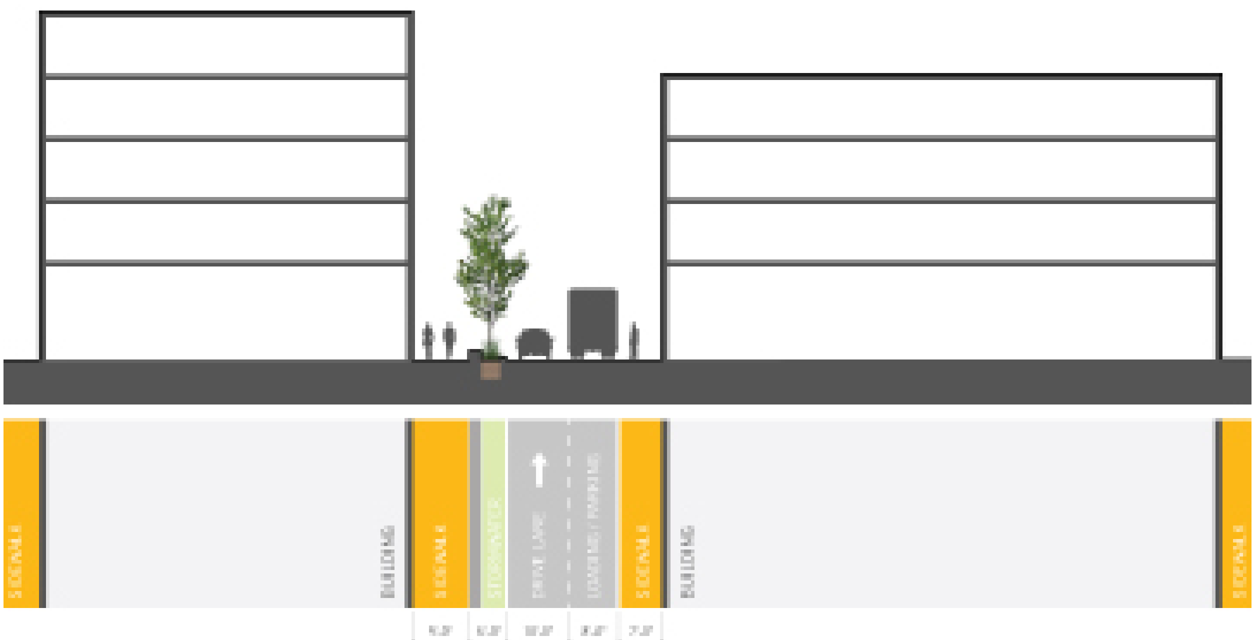
Building on Georgia Tech's vision for more performative landscapes, the vision for TEP and the broader district is to incorporate stormwater infrastructure throughout the streetscapes while also creating a walkable, beautiful, hierarchical, and multi-modal set of street typologies.

A finer grain of streets and blocks within the larger framework, as well as a diverse palette of street types that vary in width, material, activity, and function, contribute to this vision. This will be a place where innovation and makerspace activity is not limited to the interior of buildings, but can be seen from the street, can be brought out into the alleys, and can be exhibited in the parks and plazas as a signature of the **industrial innovation district**.

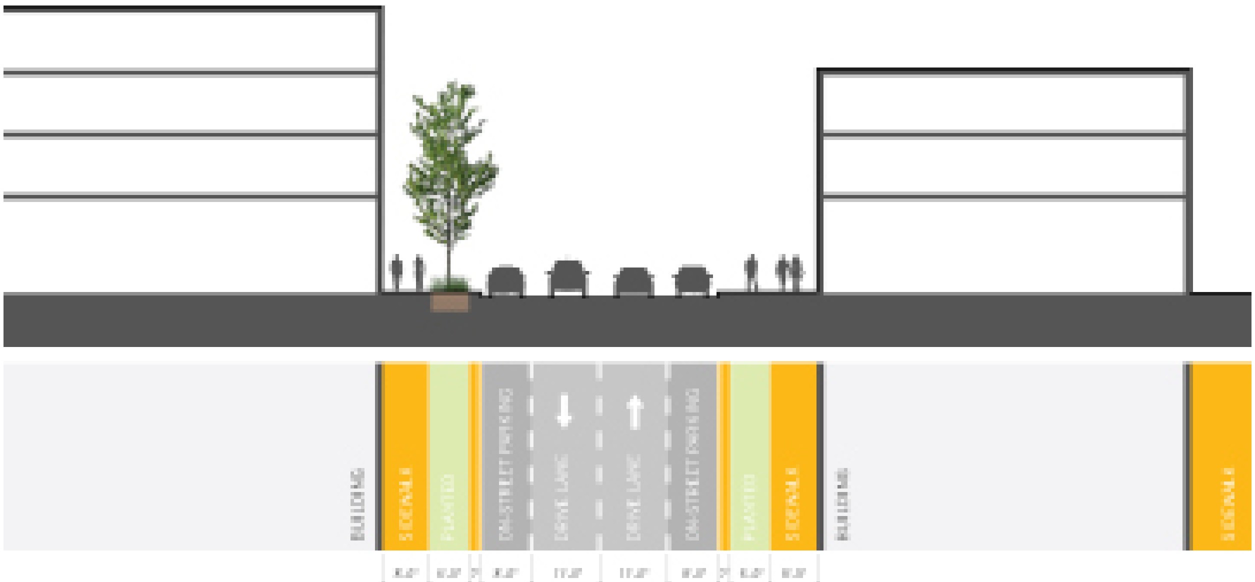

BANKHEAD
BRIDGE
GEORGIA INSTITUTE
OF TECHNOLOGY
NORTH AVENUE
RESEARCH AREA
COCA-COLA
TEP 1
NORTHYARDS
AHA HERNDON
HOMES REDEVELOP-

STREETSCAPES

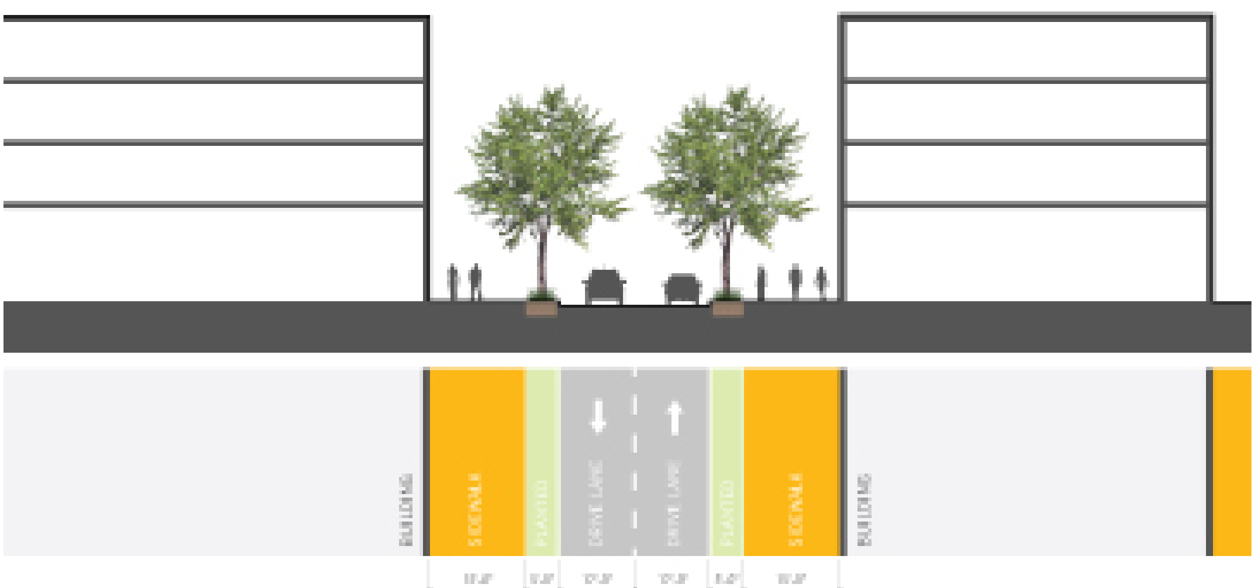
main street section



typical alley section



typical on-street parking street section



typical street section

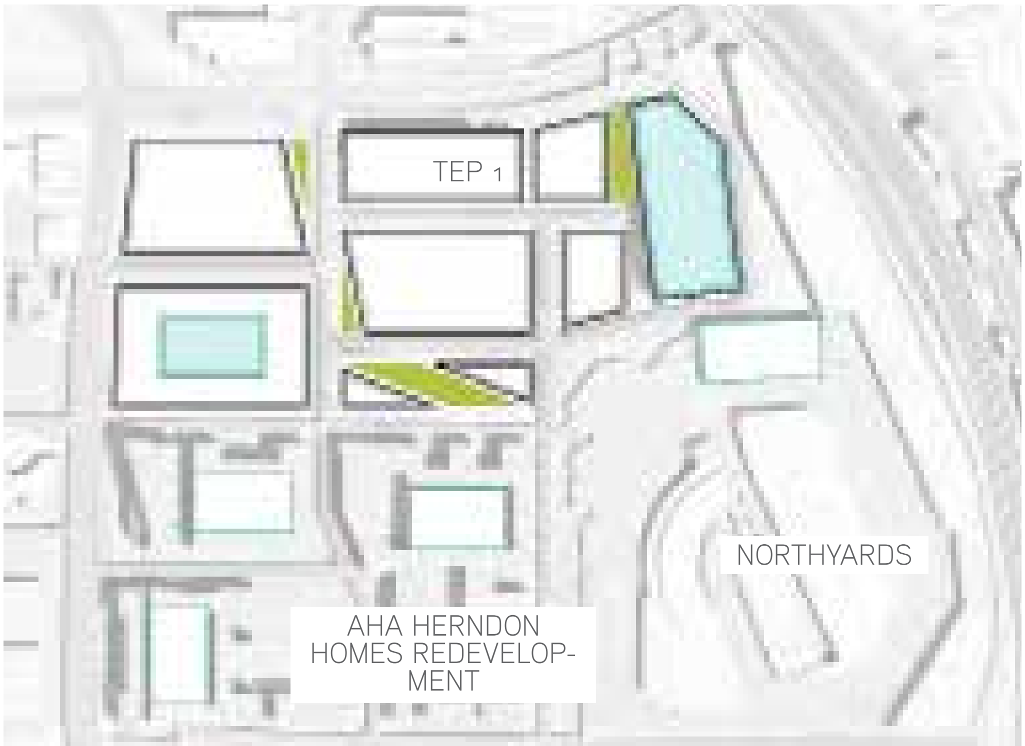

BOT POR
< COFFEE

PARKING

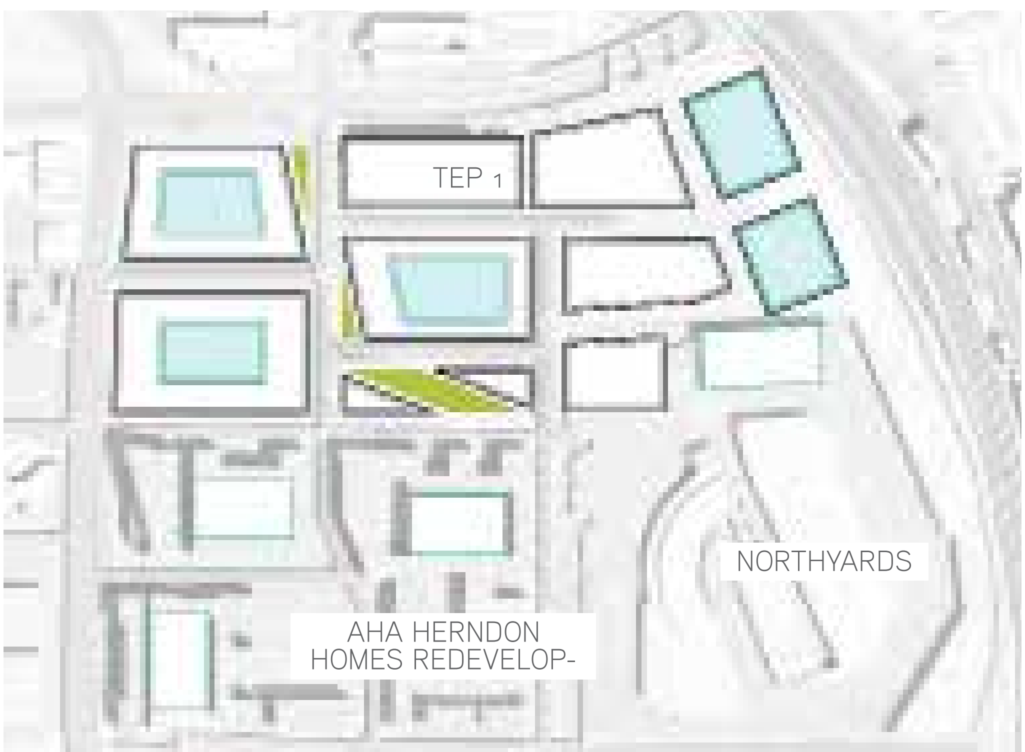
The demand for and eventual supply of parking is central to the long-term development of TEP. On the one hand, parking is as necessary to TEP as it is to daily life throughout Atlanta. On the other hand, the City of Atlanta is growing into a more dense urban city with alternative modes of transportation such as bicycles and transit becoming increasingly more viable. Further, technological change including automation and ride sharing will radically change mobility in coming years. It will not be long before personal car ownership is outside the norm or seen strictly as a luxury. These changes will decrease the demand for on-site parking. Without knowing how quickly the site will be developed, this plan recommends two alternate approaches to parking that are both easily phased and responsive to changing demands for parking.

A consolidated parking solution, with a central parking structure, would allow each development block to be parking-free. With centralized parking, also used on Georgia Tech's main campus, movement within the district would be primarily pedestrian. This solution would be implemented in early phases with temporary surface parking lots. The construction of a parking deck would be triggered once the demand for buildings on the site surpasses the surface parking capacity.

A distributed parking solution would require each development block to accommodate its own parking needs with an internalized parking deck. Over time, as parking demands decrease, so to would the amount of parking provided on each development block. While distributed parking provides the most flexibility to individual developers and the most convenient parking access for tenants, it also has a higher initial cost because parking structures at present-day demand levels will be needed in early phases.



CONSOLIDATED
PARKING



DISTRIBUTED
PARKING

PHASING

Three phasing strategies have been explored based on parking accommodation:

- Distributed parking - building small parking decks within each block
- Consolidated parking - providing a large parking deck that accommodates all TEP parking needs
- Shared parking - negotiating an agreement with AHA Herndon Homes to share their parking decks during daytime

CURRENT SITE CONDITIONS

ⓐ Existing parking_180 spaces
ⓑ Existing parking_70 spaces
ⓒ Existing parking_65 spaces
ⓓ Existing parking_40 spaces

Legend
Parking
New building
New road
Open space
Surface parking

DISTRIBUTED PARKING

DISTRIBUTED PARKING
PHASE 01
With the development of TEP 02 on the SW corner; a deck is built within the same block to supply new building parking needs.

ⓐ TEP 02

ⓑ 4 stories parking deck
350 spaces

ⓒ AHA Herndon Homes
redevelopment phase 01

DISTRIBUTED PARKING
PHASE 02
TEP 03 is built on the NW corner; a deck is constructed within the same block to supply new building parking needs. The central axis road and Meldrun St. extension are built.

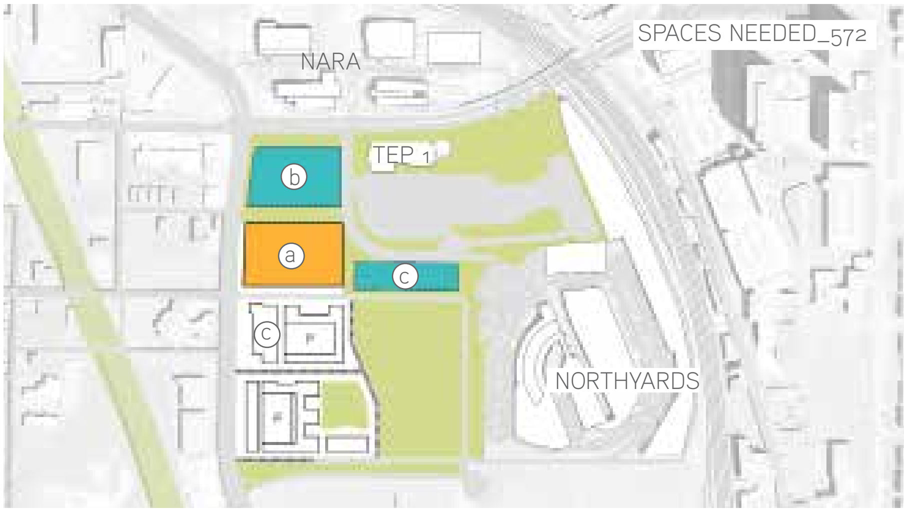
ⓐ TEP 03

ⓑ 4 stories parking deck
350 spaces

DISTRIBUTED PARKING
PHASE 03
TEP 04 is built South of TEP 01. Deck is built on the east edge to accommodate TEP 01 parking needs as well as new TEP buildings. Remaining roads and NARA connection are built.

ⓐ TEP 04
ⓑ 4 stories parking deck
350 spaces
ⓒ 7 stories parking deck
1,500 spaces
ⓓ AHA Herndon Homes
redevelopment phase 02

CONSOLIDATED PARKING

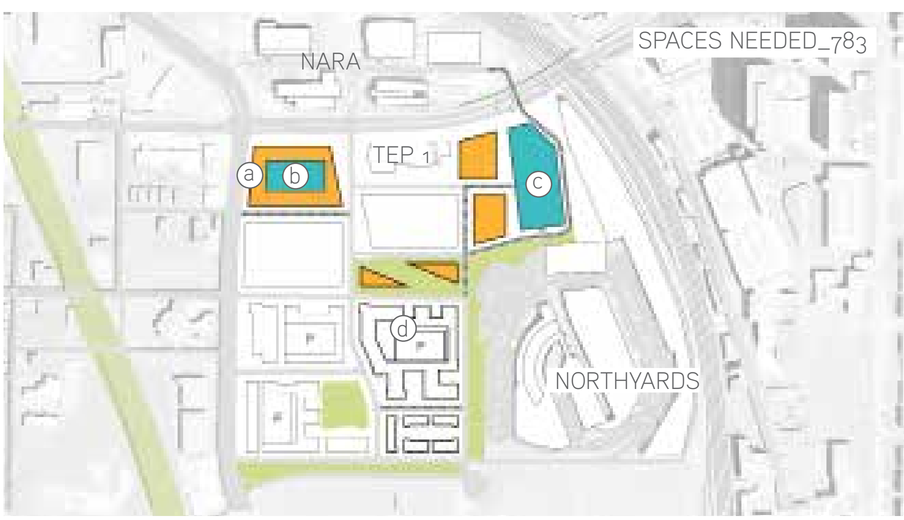


CONSOLIDATED PARKING PHASE 01
TEP 02 is developed on the SW corner. Temporary surface parking is built at the NW corner and south of TEP 01 existing surface parking.

- ⓐ TEP 02
- ⓑ Temporary surface parking 86,010 sf /250 spaces
- ⓒ Temporary surface parking 45,990 sf / 135 spaces
- ⓓ AHA Herndon Homes redevelopment phase 01

CONSOLIDATED PARKING PHASE 02
TEP 03 is built on existing TEP 01 surface parking. Temporary surface parking is built east of TEP 01 along North Ave. The central axis road is built along with road between TEP 01 and TEP 02.

- ⓐ TEP 03
- ⓑ Temporary surface parking 84,000 sf / 245 spaces



CONSOLIDATED PARKING PHASE 03
TEP 04 is built on NW corner with integrated deck. Remaining TEP buildings are constructed. A large deck is built on the east edge. Remaining roads and NARA connection are built.

- ⓐ TEP 04
- ⓑ 4 stories parking deck 350 spaces
- ⓒ 7 stories parking deck 1,500 spaces
- ⓓ AHA Herndon Homes redevelopment phase 02

SHARED PARKING OPTION A

SHARED PARKING
PHASE 01 A
TEP 02 is developed on the SW corner. Temporary surface parking is built south of TEP 01 existing surface parking.

ⓐ TEP 02
ⓑ Temporary surface parking 45,990 sf /135 spaces
ⓒ AHA Herndon Homes redevelopment phase 01
ⓓ AHA Herndon Homes shared deck

SHARED PARKING
PHASE 02 A
TEP 03 is built on the NW corner. Temporary surface parking is built east of TEP 01 along North Ave. Meldrun St. extension is built to connect to Northyards blvd.

ⓐ TEP 03
ⓑ Temporary surface parking 84,000 sf / 245 spaces

SHARED PARKING
PHASE 03 A
TEP 04 is built South of TEP 01. Deck is built on the east edge. Remaining buildings, roads and NARA connection are built.

ⓐ TEP 04
ⓑ 4 stories parking deck 350 spaces
ⓒ 7 stories parking deck 1,500 spaces
ⓓ AHA Herndon Homes redevelopment phase 02
ⓔ AHA Herndon Homes shared deck

SHARED PARKING OPTION B

SHARED PARKING
PHASE 01 B
TEP 02 is developed on the SW corner. Temporary surface parking is built south of TEP 01 existing surface parking.

- (a) TEP 02
- (b) Temporary surface parking 45,990 sf /135 spaces
- (c) AHA Herndon Homes redevelopment phase 01
- (d) AHA Herndon Homes shared deck

SHARED PARKING
PHASE 02 B
TEP 03 is built on the NW corner. Temporary surface parking is built east of TEP 01 along North Ave. The central axis road and Meldrun St. extension are built.

- (a) TEP 03
- (b) Temporary surface parking 84,000 sf / 245 spaces
- (c) AHA Herndon Homes redevelopment phase 02
- (d) AHA Herndon Homes shared deck

SHARED PARKING
PHASE 03 B
TEP 04 is built South of TEP 01. Deck is built on the east edge. Remaining buildings, roads and NARA connection are built.

- (a) TEP 04
- (b) 4 stories parking deck 350 spaces
- (c) AHA Herndon Homes redevelopment phase 03
- (d) 7 stories parking deck 1,500 spaces