

TRANSIT ORIENTED DEVELOPMENT: DESIGN RECOMMENDATIONS FOR A SITE  
ON THE ATLANTA BELTLINE, ATLANTA, GEORGIA.

by

MANASI MADHUSUDAN PARKHI

Under the Direction of

John F. Crowley

ABSTRACT

Public transportation is important on all scales of planning. In fact, cities can use it as a catalyst for larger infrastructural developments. In recent times, sustainability practices have become of prime importance and developing an efficient network of public transportation is a huge step towards the same. Efficient public transportation not only reduces our dependence on private vehicles, but also helps build walkable cities which foster social equity, public health, economic development and environmental sustainability. Therefore, in order to encourage the use of public transportation; it must be made convenient to access. That is when transit oriented development (TOD) comes into picture. A TOD is a holistic community development around a transit node, line or corridor that encourages high-density mixed-use. Ideally, people wouldn't mind walking up to quarter to half a mile to get to a bus or a train-stop. Hence, TODs are mostly planned and located within quarter to half a mile radius of a public transit facility. TOD sites indicate smart growth in the future by connecting people to diverse land uses. This thesis study focuses on TODs around light rail transit.

INDEX WORDS: Planning, transportation, development, transit, TOD, walking, light rail

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## CHAPTER 1

### BACKGROUND

#### 1.1 Introduction

The United States has been witnessing a boom in public transit in recently. An effort is being made to provide alternative transportation options to city dwellers. This transit movement is an outcome of many important issues we face in our urban settings. Some of the major ones being:

- Frequent car trips emitting greenhouse gases into the atmosphere
- Increased traffic congestion on roads and highways
- Increase in impervious surfaces due to increased demand for parking
- Lack of connectivity between various modes of transit
- No sense of place and belonging among the people

*The city of Atlanta has embarked on one of the largest redevelopment efforts in the country: A \$2.8 billion project known as the Atlanta BeltLine. “The Atlanta BeltLine Project is a 25-year initiative, started in 2005, to create a new light-rail system, a network of parks and trails, and nodes of mixed-income, mixed-use transit oriented development along a 22-mile, abandoned freight rail line that encircles the city’s core. The Atlanta BeltLine will pass through a cross- section of all the neighborhoods in Atlanta located within a two-to-four mile radius of downtown. Upon completion, Atlanta BeltLine’s network of transit and trails will connect 45 neighborhoods, including business districts, major attractions and job*

*centers, while also linking to the city's existing heavy-rail system, MARTA (Metropolitan Atlanta Rapid Transit Authority), which radiates outward from the city's downtown." More than a transit initiative, the Atlanta BeltLine project aims to spur new transit-supportive housing and commercial development, with an emphasis on new affordable housing. One of the city's primary goals for the Atlanta BeltLine is to produce or preserve 5,600 units of affordable housing over the 25 year period—a response to concerns about decades of unbalanced development in Atlanta and the potential for lower income household displacement as new transit and Atlanta BeltLine amenities elevate nearby property values.*

(Source: Hickey, Robert, "The Role of Community Land Trusts in Fostering Equitable, Transit Oriented Development: Case Studies from Atlanta, Denver and the Twin Cities." Lincoln Institute of Land Policy, 2013).

## **1.2 The Concept of Transit Oriented Development (TOD)**

*"Transit oriented development (TOD) is typically defined as a compact development within easy walking distance of transit stations (typically quarter to half mile) that contains a mix of uses such as housing, jobs, shops, restaurants and entertainment."* (As defined by the non-profit organization *"Reconnecting America"*). Transit oriented development is related very closely to one of the most transformative ideas put forth this century i.e. *"Placemaking"*. The concept of Placemaking first came across in the 1960's when visionaries like Jane Jacobs and William Whyte studied human behavior in urban settings and offered innovative ideas which involved "people" as the center of design and not just automobiles and build

It is an idea that helps us to reinvent our communities by providing them with a central public space or hub to concentrate on. Therefore, our connection with our communities can grow stronger if we respect and nurture our shared public spaces. Placemaking follows the basic principle of shaping the public realm by community-based participation in order to augment the shared value of a particular public space. It enables us to come together and share our common spaces. Well-functioning public spaces are a sign of an active city environment. Providing public transportation and transit stations is an activity. But connecting people to this activity and making their experience enjoyable is Placemaking, according to me. We must give the people a reason to “belong” to a shared space, in order to keep the space active and lively. Every public space is extremely unique to the community it serves. It is our job as planners, to use these shared public spaces to capitalize on our community assets.

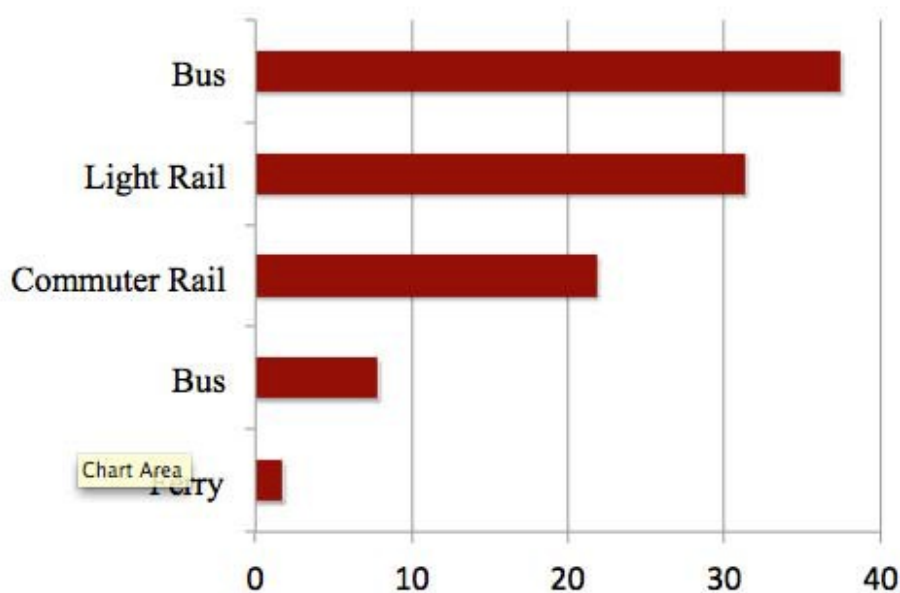
### **1.3. Why Encourage Transit Oriented Development?**

What does our vision for “*the Sustainable city for tomorrow*” look like? Well, similar to most of us, I can see our cities more people-friendly than car-friendly. I see myself walking to the grocery store because it is within a walking distance from where I live. I see myself taking a bus/train to almost anywhere in city, even to work. I see our cities respecting pedestrians and bicyclists by providing them with efficient walking and biking infrastructure. TODs have already started tapping into most of these opportunities. TODs enable us:

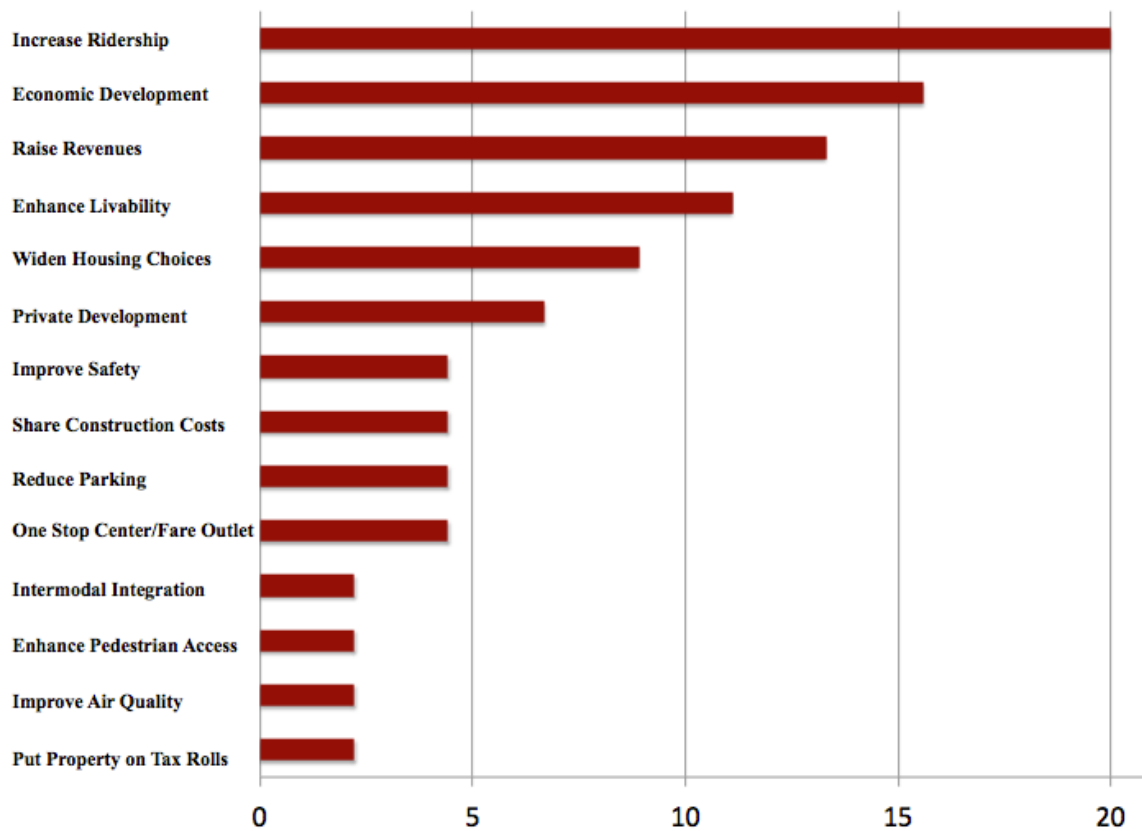
- To develop diverse land uses, including employment centers, residential and commercial developments and recreational public spaces.
- To increase density appropriate to the community context.
- To concentrate on a mix of housing options and dedicated housing affordability.
- To provide intermodal connectivity (connections between pedestrians, bicycles and other modes of transit).
- To facilitate green infrastructure and ample public open spaces.
- To provide alternatives to car ownership by minimizing the use of private vehicles and reducing parking requirements close to transit availability.
- To make an effort to contain sprawl by making city-centers more accessible and affordable.
- To improve the current car-centric urban conditions by providing efficient and practical urban design solutions.
- To create holistic communities with strong social networks and creating a sense of place among the people using these spaces.
- To try and achieve the goals of a sustainable future.

As planners, our solution to urban sprawl should be finding ways to augment the densities in our cities along transportation corridors (particularly public transit). Public transit is, according to me, the most tangible aspect that has the capacity to control all the other parameters of urban design. Transit oriented development is a key component of such a strategy. By prioritizing pedestrian-friendly spaces and mixing uses with respect to transit corridors, we may be able to

contain sprawl. In order to understand the concept of TOD's, some key principles can be kept in mind. First would be to encourage moderate to high housing densities and all the main services to support the same, around transit hubs. The goal should be to create multiple connections between housing and other services to minimize the travel times and distances from point A to point B. Public transit is all about achieving convenience. The more convenient the public transit is, the more ridership it attracts. TOD's can be very wholesome and great communities to live and work in. Transit is an alternative option, which can also reduce traffic congestions caused by cars.



**Figure1:** Percentage Distribution of TOD by Type of Transit Service: Adapted from Data provided by the Center for Transit Oriented Development (CTOD) website



**Figure 2:** Percentage of the Stated Goals for TOD: Adapted from Data provided by the Center for Transit Oriented Development (CTOD) website

## 1.4. Types of Transit Oriented Developments

Depending on the locations of the TODs, they can be classified into four categories:

Core TOD's

Center TOD's

Village TOD's

Destination TOD's

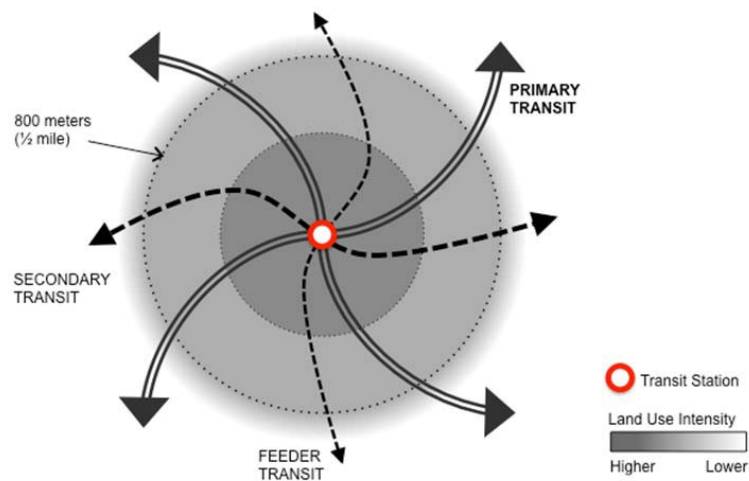
Source: <http://2030palette.org/>



## Core TOD's

Scale: Regional

Common to downtowns in cities, they are the main hubs for economic and cultural activities inside Central business districts. They can be identified by high-density mixed-use activities. These TOD's are usually characterized by more than one mode of transit (usually bus transit and light rail/street car) having both, a high frequency and a high passenger capacity. These TOD's are planned to achieve maximum street connectivity in order to make transit as accessible as possible by enhancing its mobility.



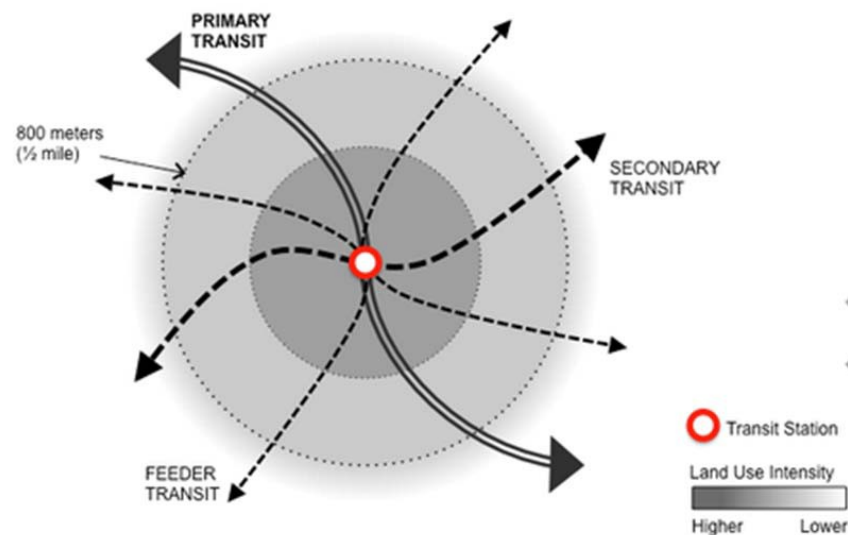
Adapted from Station Area Planning: How To Make Great Transit-Oriented Places, Reconnecting America's Center for Transit-Oriented Development.

**Figure 3:** Core TODs: Source: <http://2030palette.org/>

## Center TOD's

Scale: Regional

These are usually both, the starting point as well as the ending point for transit. Similar to core TOD's, center TOD's also provide more than just a single mode of transport. They foster *regional employment* by attracting people to a specific point. Moreover, they also create dedicated *employment and residential* centers inside the city. They also encourage high-density mixed-use development with a concentration on pedestrian and bicycle infrastructure.

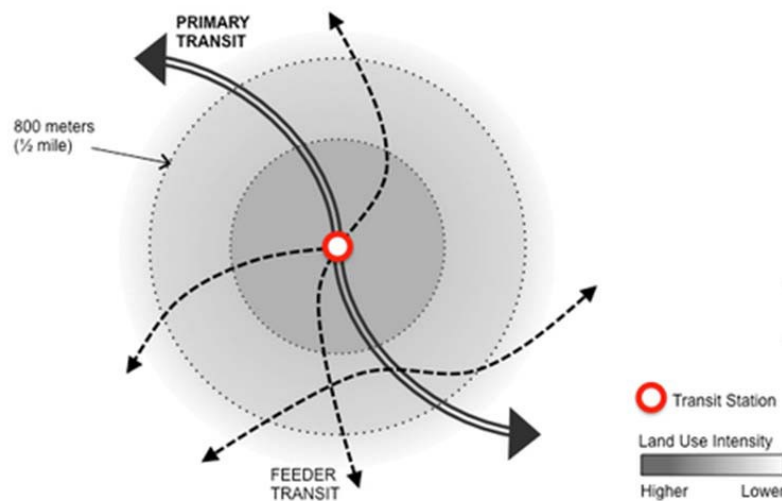


**Figure 4:** Center TODs: Source: <http://2030palette.org/>

## Village TOD's

Scale: Local

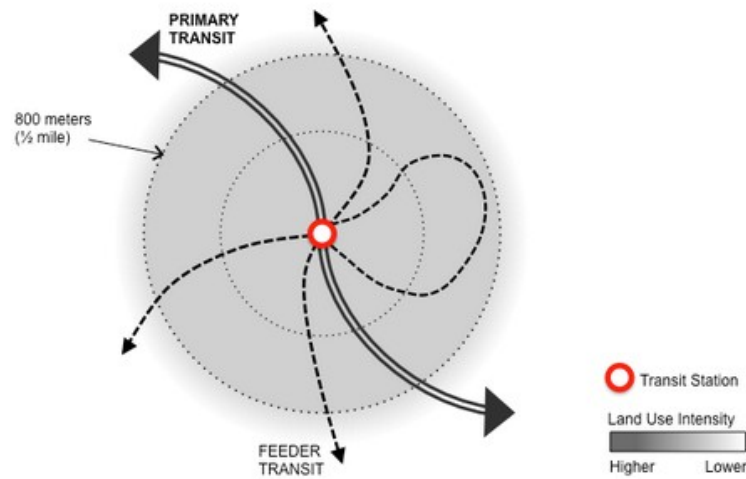
These TOD's are comparatively smaller compared to the core and center TOD's. Although their main goal is to connect commuters to employment centers, they also serve the local economic and cultural centers with usually one and/or more transit options. The transit capacity is comparatively lesser as people mainly use transit to travel from home to work and vice versa.



**Figure 5:** Village TODs: Source: <http://2030palette.org/>

## Destination TOD's

This type of TOD's is mostly used for just a single use, which attracts a huge number of people. Economic activities are generally not focal point here. For instance, transit that runs to retail centers, stadiums, university campuses, large parks, hospitals, large employment campuses, etc. fall under this category. They usually use one or two modes of transport with a high frequency and passenger capacity to transport a huge number of commuters to the required destination.



**Figure 6:** Destination TODs: Source: <http://2030palette.org/>

## 1.5. Comparing Types of TOD's

	Transit Oriented Development Types			
	Core	Center	Village	Destination
<b>Station Area Characteristics</b>	Primary center of economic and cultural activity	Significant center of economic and cultural activity	Local center of economic and community activity	Single-use activity focus
<b>Transit Mode</b>	All modes	All modes	Commuter rail, local/regional bus hub, light rail	Light rail/streetcar, bus rapid transit, potentially heavy rail
<b>Transit Peak Frequency</b>	< 5 minutes	5-15 minutes	15-30 minutes	15-30 minutes
<b>Land Use Mix and Density</b>	High-density mix of residential, commercial employment, and civic/cultural uses	Moderate- to high-density mix of residential, commercial, employment and civic/cultural uses	Moderate-density mix of residential, commercial, employment and civic/cultural uses	Concentrations of commercial, employment and civic/cultural/institutional uses
<b>Retail Characteristics</b>	Regional-serving destination retail; local-serving retail	Regional-serving destination retail; local and community-serving retail	Community-serving and destination-retail; local-serving retail	Regional and community-serving retail
<b>Housing Mix</b>	High-rise and mid-rise buildings	Mid-rise, low-rise, some high-rise buildings	Mid-rise, low-rise, attached and single-occupancy buildings	Limited residential

**Transit Oriented Development Type Characteristics** – Adapted from *Station Area Planning: How To Make Great Transit-Oriented Places, Reconnecting America's Center for Transit-Oriented Development*.

**Figure 7: Comparison:**  
Source: <http://2030palette.org>

- People
- Places
- Physical Form
- Performance
- Connectivity
- Design
- Density
- Diversity
- Demand Management
- Distance
- Destinations

## 1.6. The P's and D's of Transit Oriented Development

P's	D's
<p><b>People</b> – The number of people living and working in the area.</p> <p><b>Places</b> – The number of neighborhood-serving retail and other establishments.</p> <p><b>Physical Form</b> – The average block size and massing of buildings with respect to other spaces. Keeping the design to the scale of pedestrians is vital.</p> <p><b>Performance</b> – Frequencies of public transit services (bus, rail) in order to make the TOD function smoothly.</p>	<p><b>Design</b> – The quality and functionality of the public realm, which will be heavily used on a daily basis.</p> <p><b>Density</b> – Building form and massing – The density of people, buildings and activities should transition from the TOD center into the surrounding neighborhoods.</p> <p><b>Diversity</b> – Mix of uses – Animating the streets and blocks with a diversity of uses. A mix of housing types, uses, tenures, sizes, price points, retail, leisure and employment opportunities allows a resilient balance of activities and jobs in easy walking and biking range.</p> <p><b>Demand Management</b> – Incentives and Disincentives – Discouraging unnecessary use of private cars.</p>

- **Pedestrian and Bicycle Connectivity**

- Easy access to sidewalks and low stress bike lanes.

- **Distance** – Urban Structure and Street

- Network – By creating urban structure with a fine-grained network of pedestrian and bicycle-oriented streets, communities support use. The size, orientation and direct connections between blocks make walking distances manageable.

- **Destinations** – Land and Location – Focus on high- demand destinations along frequent transit corridors.

Adapted from Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy and Resilient Communities



CHAPTER 2

METHODOLOGY

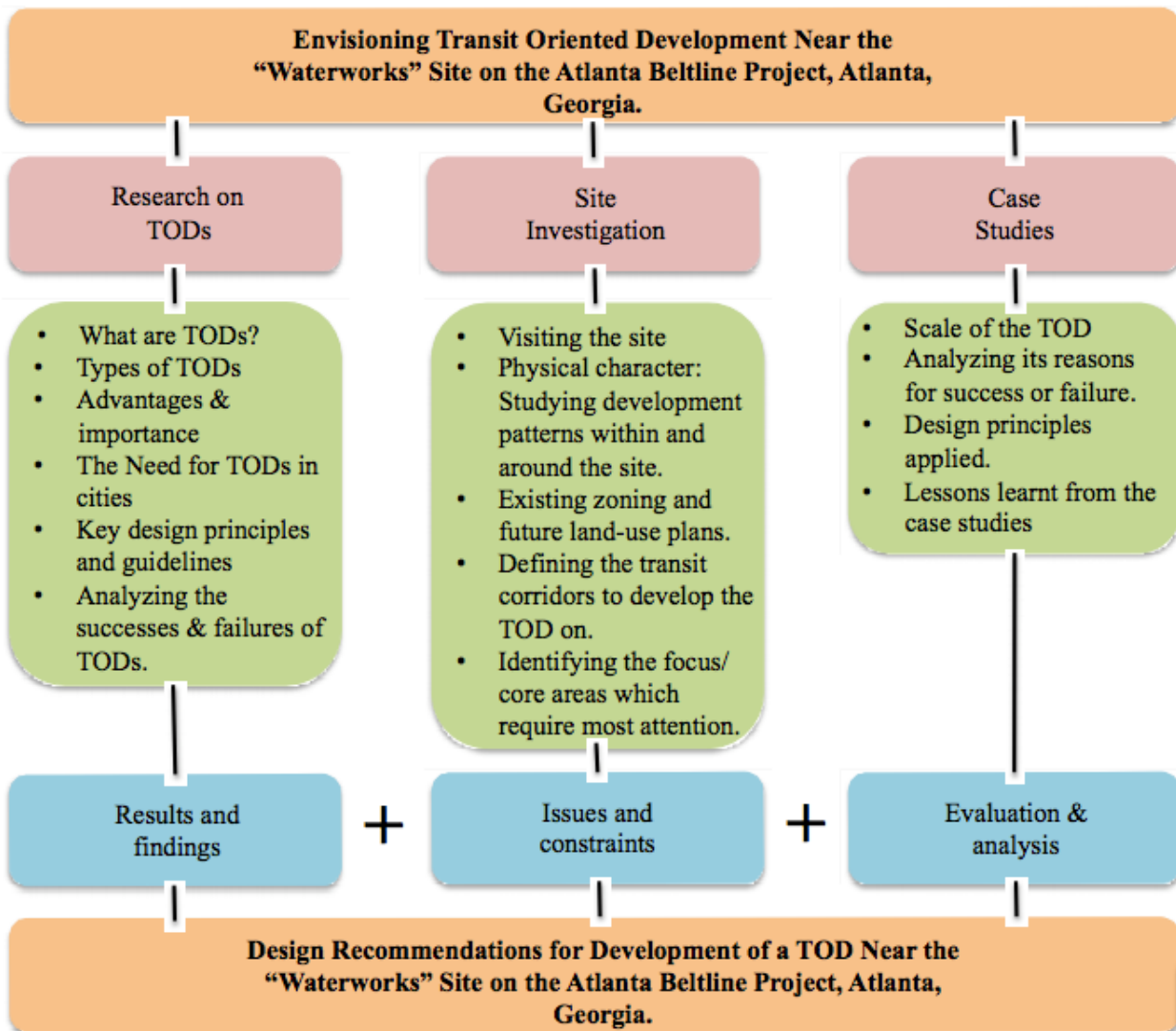


Figure 8: Methodology, Copyright: Manasi Parkhi

## CHAPTER 3

### CASE STUDIES

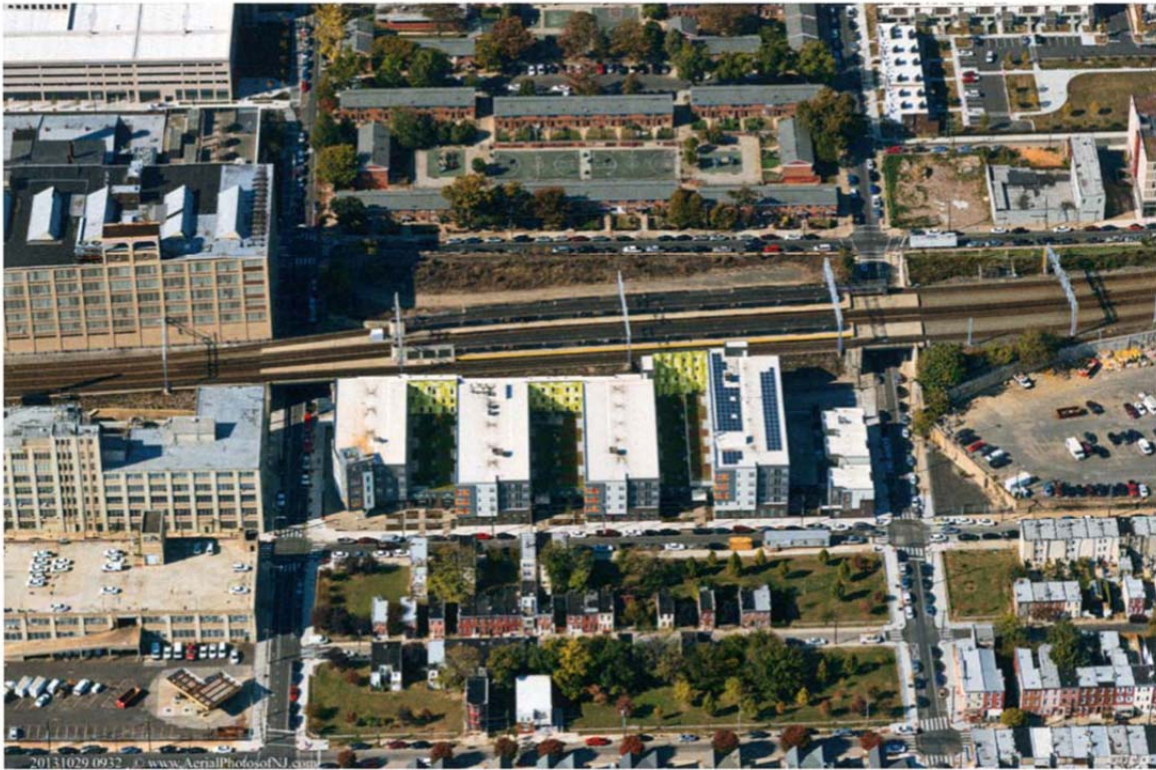
3.1 Case Study 1: Paseo Verde Mixed Use Development, Philadelphia, PA

3.2 Case Study 2: Orenco Station Town Center, Portland Oregon

3.3 Case Study 3: Mockingbird Station, Dallas, Texas

#### **3.1. Paseo Verde Mixed Use Development, Philadelphia, PA.**

This project is a mixed-use transit-oriented development that aims at offering affordable housing (67 housing units) along with commercial space (29,400 Sq. ft.) in North Philadelphia adjacent to the Temple University metro-train station. This is a green development as it has achieved the LEED (Leadership in Energy and Environmental Design) Platinum rating for neighborhood development. The Paseo Verde project is designed to revitalize the surrounding neighborhood and reintegrate the Ludlow community with neighboring Temple University and the broader Philadelphia area. The community surrounding the project site has a high concentration of low-income families and senior households, with minorities making up 75% of the local population. The project will help address residents' urgent need for quality affordable housing and retail as well as medical and social services. The project's retail component includes uses that will benefit not only local residents but the transit users of the adjacent rail station as well. Other features include green roof courtyards, permeable paving, bio-infiltration basins, rooftop solar panels, energy efficient building envelope/MEP systems and use of local, recyclable and renewable materials.



**Figure 9:** View of the Development with respect to the Rail Line, Source: [www.wrtddesign.com](http://www.wrtddesign.com)



**Figure 10:** View of the Buildings, Source: [www.wrtddesign.com](http://www.wrtddesign.com)







**Figure 13:** The development with its sound proof walls next to the train station,  
Source: [www.wrtddesign.com](http://www.wrtddesign.com)



**Figure 14:** Entrance, Source: [www.wrtddesign.com](http://www.wrtddesign.com)

### 3.2. Case Study 2: Orenco Station, Portland, Oregon

Orenco Station is a transit-oriented development located in Hillsboro, approximately 15 miles to the west of Portland. It is a mixed use light-rail TOD focused on pedestrians.

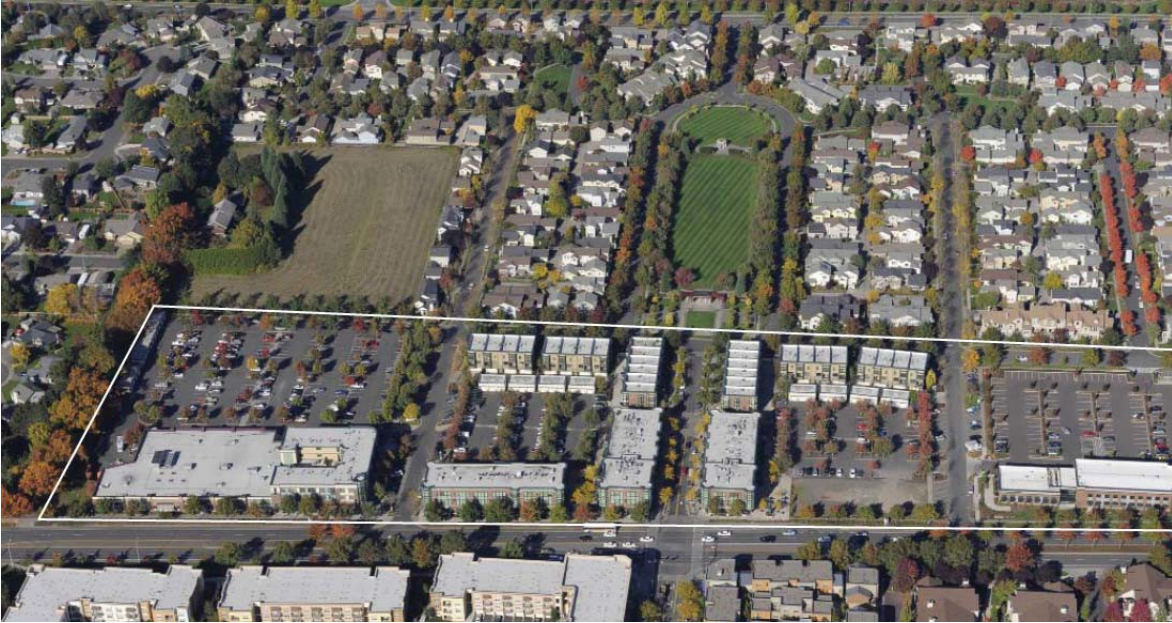


**Figure 15:** Plan View of Orenco Station – Source: Google Map Imagery

#### **Highlights:**

- Pedestrian access to Westside MAX (Metropolitan Area Express) light rail.
- Surrounded by a grid of pedestrian-friendly streets.
- A walkable town center consisting of commercial and residential services with limited on-street parking (realistic accommodation of cars in design).
- A wide range of housing types and prices including rental units, live-work units, lofts above retail with an average density of 25 units/acre.
- Pedestrian-friendly street design and scale.





**Figure 16:** Perspective View of the Development, Source: PacTrust Website



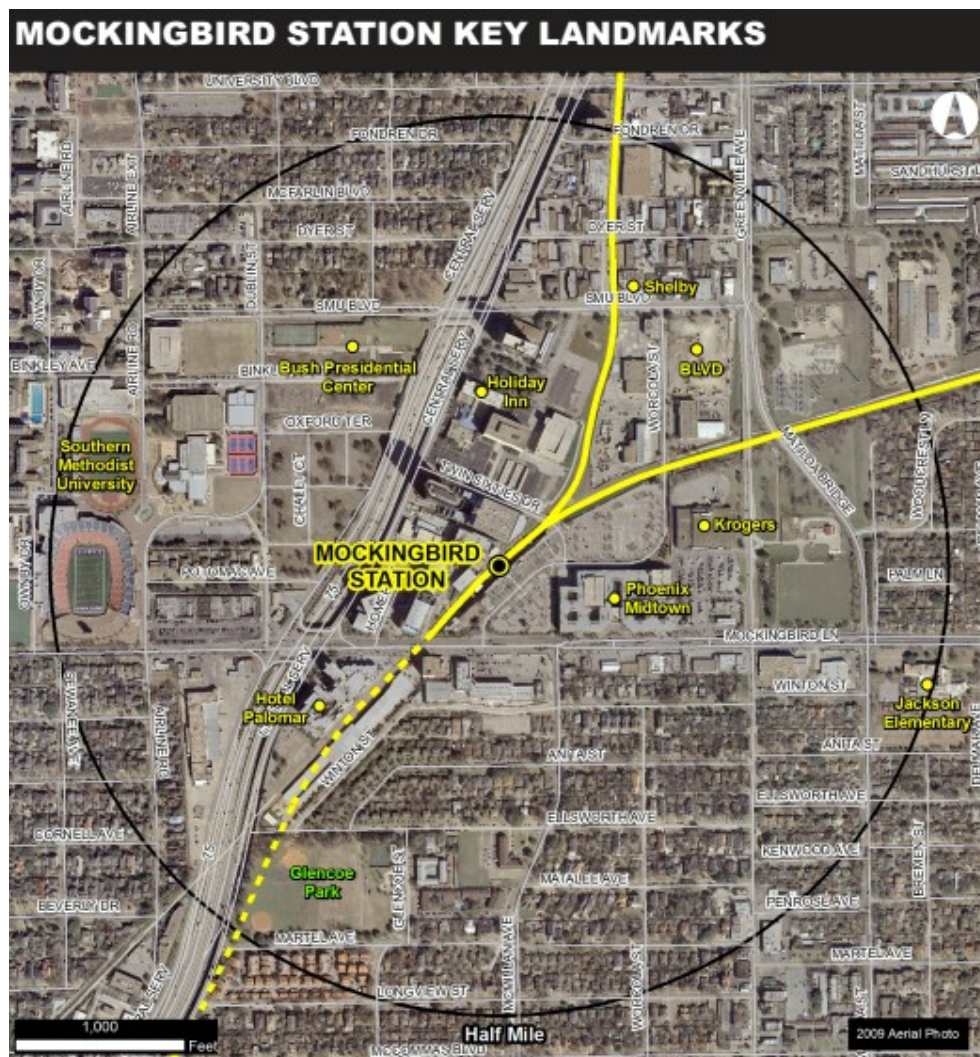
**Figure 17:** Photos showing what the development looks like today, Sources: PacTrust Website





### 3.3. Case Study 3: Mockingbird Station, Dallas, Texas

This is the first TOD project in the state of Texas around a DART (Dallas Area Rapid Transit) light rail station. Opened in 2001, Mockingbird Station is a 10 acre TOD. Today, this station is an urban destination linking residential and retail services to a busy transit station with an average daily ridership of about 3000.



**Figure 18:** Plan View of Mockingbird Station: Source: DART Website



**Highlights:**

- A mixed-use, two-phase development covering about 600,000 Sq. ft. with commercial, retail, residential services.
- Mixed-use development includes loft apartments above retail uses and a multiplex movie theatre.
- Parking provided for about 1500 cars, most of which is underground and wrapped with retail in order to integrate it with the rest of the development.
- The station design is an example of adaptive use for new construction. Two existing structures (historic Western Union Telephone Assembly building and an office building) formed the base of the project.
- Integrating pedestrians well within the inner environment as well as providing links to connect them to the outer areas.



**Figure 19:** Perspective of Both Phases of Mockingbird Station: Source: DART Website

### **3.4. Lessons Learnt**

- Prioritize pedestrians in any TOD design. A TOD can never be successful without efficient walkable infrastructure.
- A successful TOD design does not neglect the fact that cars (automobiles) are an important part of urban lifestyle. It accommodates them in the design. The design can aim at minimizing the use of cars, but not letting them in at all; will affect the usage of TOD.
- Designing, keeping human scale in mind. People will have a sense of belonging to the spaces, only if these spaces and structures are built to their scale. Do not overwhelm people by huge spaces that are not inviting in the first place. Thus, our communities must be built on a human scale if it intends to serve human needs.
- Orient buildings towards the street, as street appeal is the best way to sell any property. By making our buildings face the street, we also provide pedestrians with an easy access to enter the building from connecting sidewalks. Mixed-use communities can also have storefronts and small retail facing the streets to make the street-life more active.

## CHAPTER 4

### DESIGN CONSIDERATIONS

Rail definitely has a few advantages over our road-based transportation systems, but at the same time they also have some limitations and planners need to work around those limitations for a successful urban design. Advantages of rail as a mode of public transportation in a city:

- Trains require lesser land compared to roads and trains can also be built with an option of having most of their infrastructure underground.
- Light rail is the best option when the origins and destinations are densely populated areas that can generate enough ridership to justify the capital investments and operating costs.
- Trains are capable of achieving good point-to-point speeds, often higher than cars, but the route network of trains is inflexible as opposed to cars that have many options to reach from point A to point B.

The limitations of rail can be mitigated by having transit oriented development that locates all the major destinations within a comfortable walking distance from the train stations and limits the number of transfers to one (at the most). Another complaint that most people have about public transportation is its frequency. Having to wait for trains or buses for a long time discourages people from using public transport. Therefore, the more major destinations are included along the transit route, the more heavily the route will be used, which will increase the demand for more train/bus trips at quicker intervals of time.

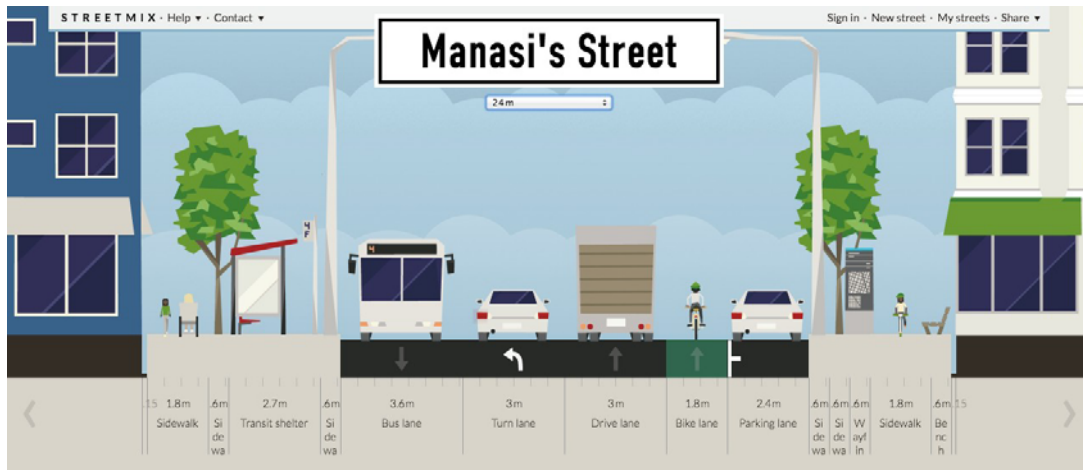
**Light rail** transit has been preferred over heavy rail due to its relatively lower cost. This difference in cost is mainly due to:

- Less extensive infrastructure
- Smaller and simpler stops
- Mostly at grade operation on city streets
- Quick deceleration in order to stop every few blocks

*“Light rail trains are usually one to four cars long (80 to 90 feet long) and can carry more than 200 passengers.”* The flexible and hybrid nature of the light rail transit has been used to connect different parts of the cities to the central business districts or city cores.

#### **4.1. Streets:**

Streets are the main movement corridors. They allow access in and out of places. Hence every street (whether major or minor) must support land uses around it. By doing so, the usual street chaos and mess will be automatically sorted out. Secondly, our streets must prioritize for the movement of different modes of transportation depending upon the modes, which are used the most. Our street hierarchies may dictate which mode of transport should be allowed where, but issues like pedestrian walkability should not be neglected on any street. Streets can be classified into four types: Arterial, Collector, Local and Alley.



**Figure 20:** Hypothetical Street created using the Street Mix Program <http://streetmix.net/>

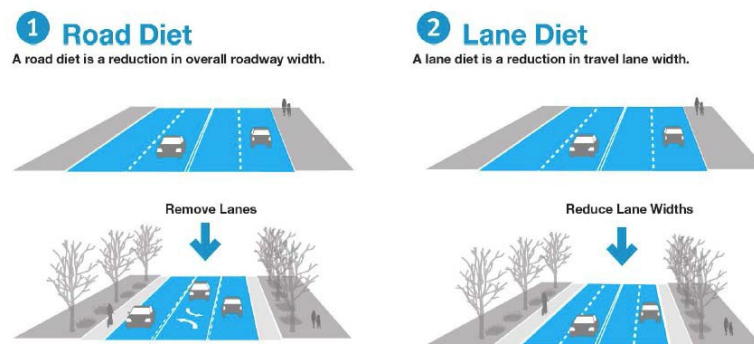
The concept of “*Complete Streets*” should be adopted. “*Complete streets can be defined as streets designed for safe, comfortable and convenient movement both, along and across the right-of-way by people of all ages and abilities, using multiple modes.*”

The elements of complete streets are as follows:

- Sidewalks (including landscaping and lighting)
- Bicycle lanes
- General travel lanes (in terms of design and operation) and parking lanes
- Off-street parks or trails
- Additional pedestrian and bicycle elements (crosswalks or bike boxes)
- Loading zones
- Access to the disabled
- Transit stops and stations

- Transit-only lanes
- Traffic signal improvements

There is certainly no doubt about the fact that there has been a shift in our preferences for movement. More and more of us want to walk, use public transit and bike and have a pleasant experience while doing the same. This experience is often termed as “*active living*”. Most of the times, streets can be improved by narrowing the existing street and adding more elements to it. This method is known as “Road Diet” or “Lane Diet”, which means reduction in the overall roadway or lane width in order to optimize the use of street space.



**Figure 21:** Road and Lane Diets, Source: <http://www.tooledesign.com/>

Street design, street widths and speeds have a fundamental impact on walkability. Thus, to understand the parameters of a good urban street, it is first necessary to define them.

- Identify the zones that the street can accommodate: For example, frontage zone, pedestrian zone, green scape/furnishing zone, curb zone, etc.
- Determine the widths of each of those zones: For example, frontage: 2-4 feet wide, pedestrian zone: 6-12 feet wide, Green scape/ furnishing zone: 6-12 feet wide, etc.

- Build a strong network of connecting streets: The denser the network and branching of streets, the more will be the overall walkable distance.
- Determine the operating speed for the road such that it is safe for pedestrians and bicyclists.



**Figure 22:** Picture trying to explain the concept of complete streets, Source: <http://www.tooledesign.com/>

#### 4.2. Pedestrians

They are the most important component to consider at the design phase. Planning for pedestrians starts with arranging all the daily necessities within a walking distance. This walking distance is ideally between quarter to half-a-mile. One of the easiest ways of achieving this would be connecting the buildings to sidewalks. Therefore, our hierarchy

should be such that it prioritizes access to sidewalks more than access to parking lots.

Eventually, these sidewalks can form a link that lead to all the important amenities and public spaces. Studies show that most urban streets may require sufficient investment to achieve that “pedestrian-friendliness”.

The main issue here is the feeling of safety – People will walk along a street if they feel safe to do so. Hence inviting landscape and street furniture together with consistent and adequate lighting are key design provisions. Another vital measure would be to achieve traffic calming by time synchronized traffic lights for an 18mph or less progression speed. This also relates to providing intuitive way finding by effective signage.

When William Whyte studied the behavior of people in public spaces in the 1960s, he noted a very distinct observation – movable benches and chairs – and art that can be appreciated from a pedestrian scale. As mentioned above, building at a human scale is extremely important, so that it is not intimidating for people to approach.

Also, introduce effective way-finding measures like directional signs, maps, markers, lighting, technologies (transit apps), etc.



### 4.3.Bicycles:

Biking is not only the most sustainable mode of transport, but also supports our physical health. It is one mode of transport that is workable for any density – low, medium or high. By making bike lanes an integral part of our streets, we can effectively link low-density areas to high-density centers (TODs). Portland, Oregon has added bike boulevards in addition to bike lanes in order to increase its bike-network throughout the city. There are examples where designers have gone a step ahead to provide dedicated bicycle parking near bus and train stations, work places and other commercial and retail uses. We need to understand that a bicycle network consists of much more than just bike lanes. Cities have been innovating to provide efficient bikeways. Bikes can go to places where both – other automobiles and pedestrians can go. Many cities have also adopted the “*Bikeshare*” to promote the bike culture in urban conditions. Hence, a bicycle network should be:

- ***Cohesive***, making connections throughout the community, including major destinations.
- ***Direct***, without unnecessary circuitousness.
- ***Understandable***, with clear destination-oriented signage for cyclists.
- ***Integrated***, with intersections, ensuring safe crossing.
- ***Enforced***, so that cycle-lanes are free of parked cars and other debris.
- ***Clear***, so that both motorists and cyclists know whether they have shared or separate spaces. (Source: Tumlin Jeffery, *Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy and Resilient Communities.*)

Therefore, we must first understand the basic requirements of bicyclists in order to provide them with biking infrastructure.

- The potential to achieve substantial shifts in modes
- Low stress routes and/or separation from main traffic
- Encourage a bike culture

## CHAPTER 5

### PROJECT OVERVIEW

In order to effectively trying to apply my research on Transit Oriented Development, I decided to select a site that could use some work in terms of its development as a TOD. Therefore, I got in touch with the Atlanta BeltLine Inc. and investigated if there was a site within a close proximity of the Atlanta BeltLine Project with such potential. Accordingly, I was informed about a site close to the “Waterworks” site in Atlanta that has a tremendous potential of being developed as a TOD.

#### **5.1. Atlanta, GA**

The rail has been the very founding principle of Atlanta. The “Terminus” was responsible for Atlanta’s origin with an intention to connect the port of Savannah to the Midwest by rail, in 1836. Thus, Atlanta has always been a place for transportation and mobility. But when the mode of transportation transitioned from trains to cars, the city core began losing its life. We failed to comprehend that the power of Atlanta’s mobility can never be captured by freeway systems.

In many conversations with different people for the purpose of this thesis, I found two distinct and extreme opinions about the city of Atlanta:

**1. The residents’ view:** That Atlanta is diverse, dynamic, active and entrepreneurial.

The very fact that it is so cosmopolitan makes it a vibrant place to live.

**2. The outsiders' view:** That Atlanta is this massive sprawling megalopolis filled with failed urban planning issues, crime and other such problems and it is not the first choice to settle down.

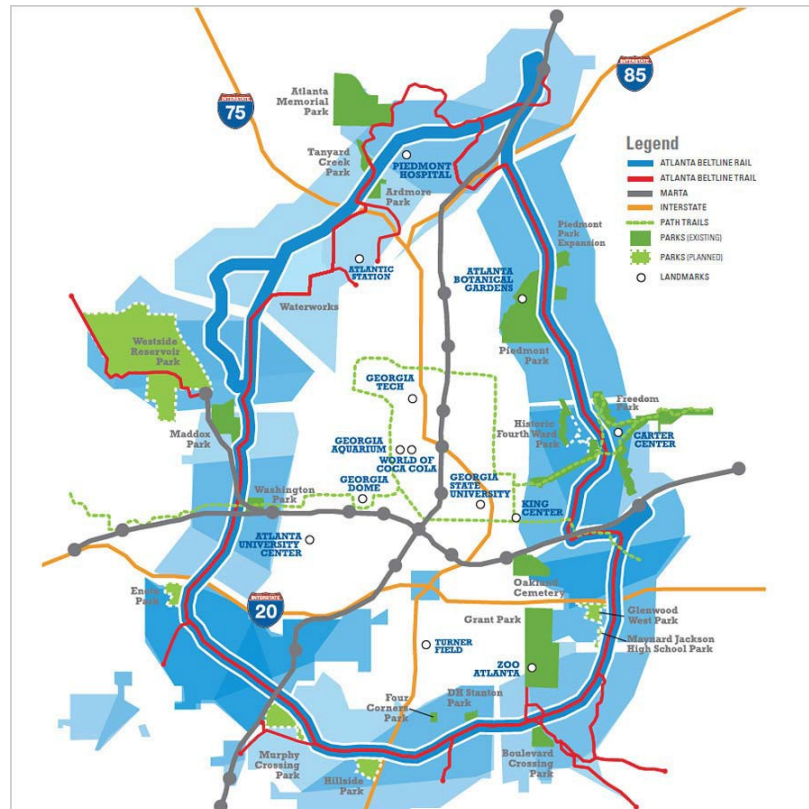
In my pursuit to find out more about Atlanta, I travelled in and around the city. I imagined myself living and working in different parts of the city and realized about Atlanta's hidden assets that most critics fail to observe. I fully agree with the view of the residents who view Atlanta as a city that has a potential to thrive on its cosmopolitanism. The city has always been under a racial divide, which is often seen as a hindrance. But in fact it is a great opportunity to change this idea of "not wanting to connect" – using urban design as a tool. As planners, we can create environments that are conducive to make people come together and Atlanta has a tremendous potential to achieve that.

## 5.2. The Atlanta BeltLine Project

As mentioned earlier, the Atlanta BeltLine is a *22-mile network* of trails and parks that uses old freight railroad corridors. This network will include Atlanta's *45 neighborhoods* and will have a huge impact on Atlanta's urban design. The Atlanta BeltLine model follows the principle converting unused freight rail lines into recreational trails. This project was initially a concept put forth by Ryan Gravel (A master's student at the Georgia Institute of Technology) in his master's thesis that reimagined old and unused freight rail lines as a transit corridor to tie together the communities around downtown Atlanta. Estimated to be completed by 2030, this project with a continuous public realm around downtown Atlanta will have 1,300 acres of new and restored parks, thousands of units of market rate and affordable housing, redeveloped industrial wasteland and the transformation of a quarry into a reservoir. The extent of the Atlanta BeltLine Project can be broadly divided into five zones: (Although from a design standpoint, the project is further divided into a total of 10 zones). Approximately 22% of Atlanta's population lives along the Atlanta BeltLine planning area.

- Southeast – From Inman Park/Reynoldstown MARTA Station to I-75 and I-85.
- Southwest – I-75/I-85 to I-20
- West Side – I-20 to West Marietta Street
- North Side – West Marietta Street to I-85/Monroe Drive
- I-85/Monroe Drive to Inman Park/Reynoldstown MARTA Station

The project is managed by the Atlanta BeltLine Inc., which is a private non-profit organization. The main source of funding for this project is the 6,500-acre Tax Allocation District (TAD) that was set up in 2005.



**Figure 23:** The Atlanta BeltLine Planning Area, Source: <https://beltline.org>

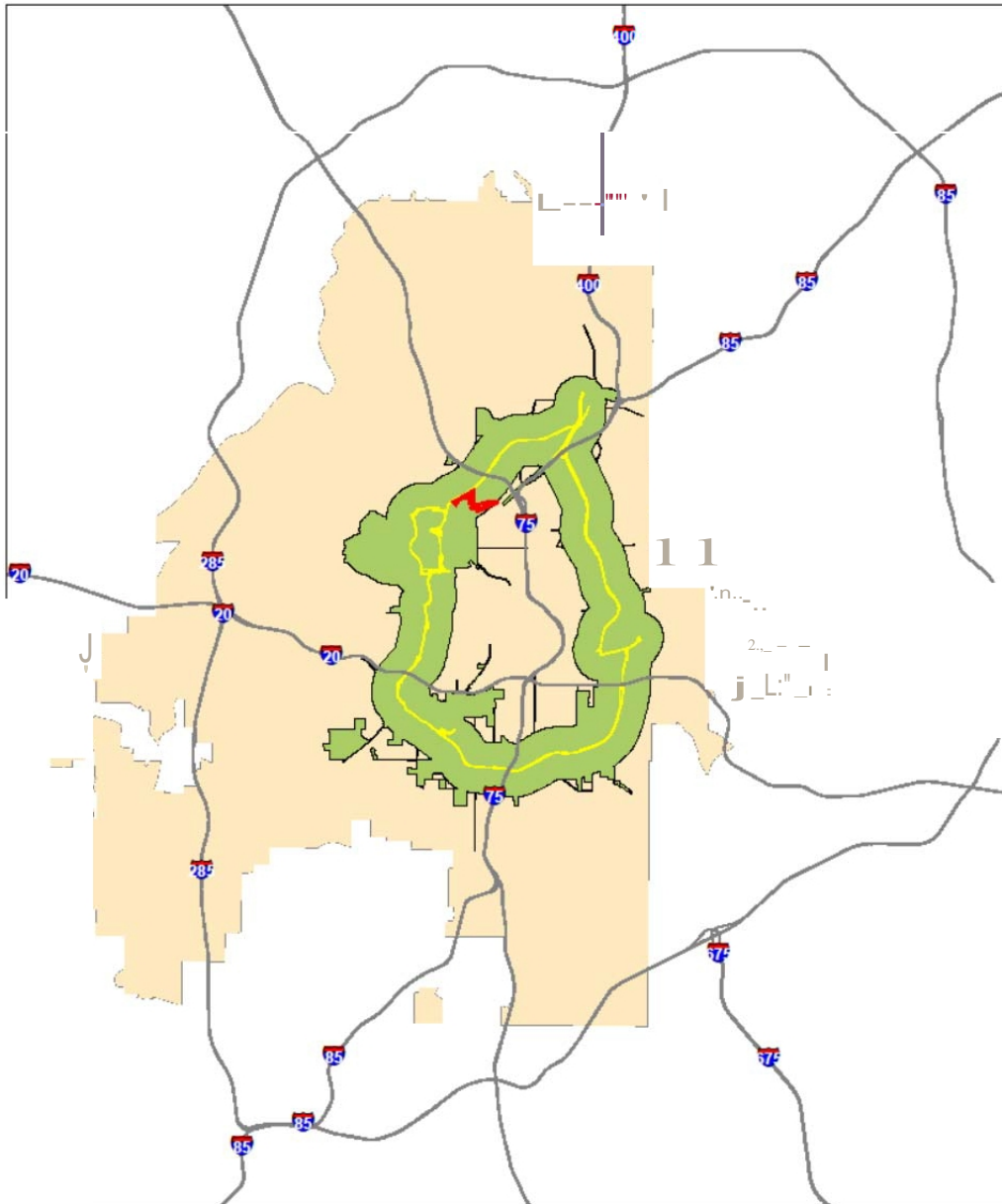
### 5.3. Site for TOD Design

The site is located to the south of the ponds managed by the Atlanta Watershed Department. The site is surrounded by the Northside drive on the west, 17<sup>th</sup> Street on the east and north and railroad to its south. The Atlantic Station development is located about half-a-mile away from the site. The fourth phase of the Atlanta BeltLine Streetcar passes around the southern and western parts of the site.



**Figure 24:** Map showing the location of Atlanta in the state of Georgia with reference to the major expressways, Copyright: Manasi Parkhi

## Site Context



**Figure 25:** Context of the Site with respect to Atlanta and the BeltLine Project,  
Copyright: Manasi Parkhi



The site is primarily zoned industrial. It is in close proximity to the Westside Provisions District, a mixed-use neighborhood that has turned out to be quite successful. Overall, this area is starting to witness some mixed-use development, as some of the industrial warehouses have been retrofitted to house offices, restaurants, cafes, retail and studios. During my visit to the site, I saw a quick shift in land-uses in and around the site. There were retrofitted industrial warehouses with retail on one side, while single-family homes right across the street from the warehouses. There is also a proposal of constructing an Amtrak station to the south of the site, across the street from Ikea.

Taking clues from the development trends around the site, following are some observations that are a part of my site analysis to help me come up with design recommendations for this site:

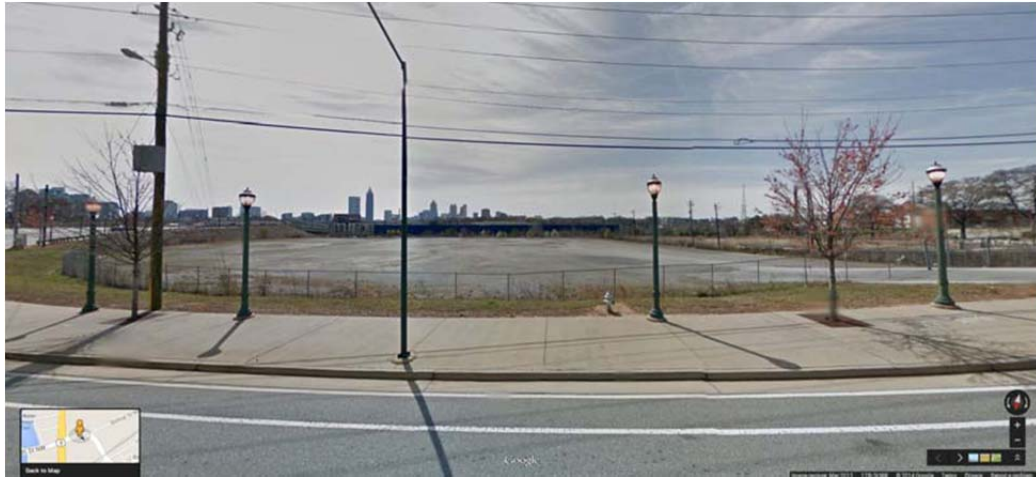
- Rezoning industrial properties in such a way that it is able to accommodate mixed-use development.
- Identifying connections of the community to the Atlanta BeltLine Streetcar, the future Atlanta BeltLine Streetcar and Amtrak train station, major destinations and amenities (schools, colleges, etc.) and making those connections possible through design.
- Try to make pedestrian and bike connections to the Atlantic Station in order to improve its current inaccessibility challenge.

#### 5.4. Existing Conditions on Site

Currently, the site is a vacant parcel that is zoned as industrial land-use. But the proposal is to rezone the site to mixed-use development for the future.



**Figure 26:** Aerial view of the site, Source: Google Imagery



**Figure 27:** Site as viewed from the 17<sup>th</sup> Street (Source: Google Imagery)

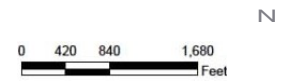


**Figure 28:** Half-a-mile Radius from the Center of the Site (Source: Google Imagery)

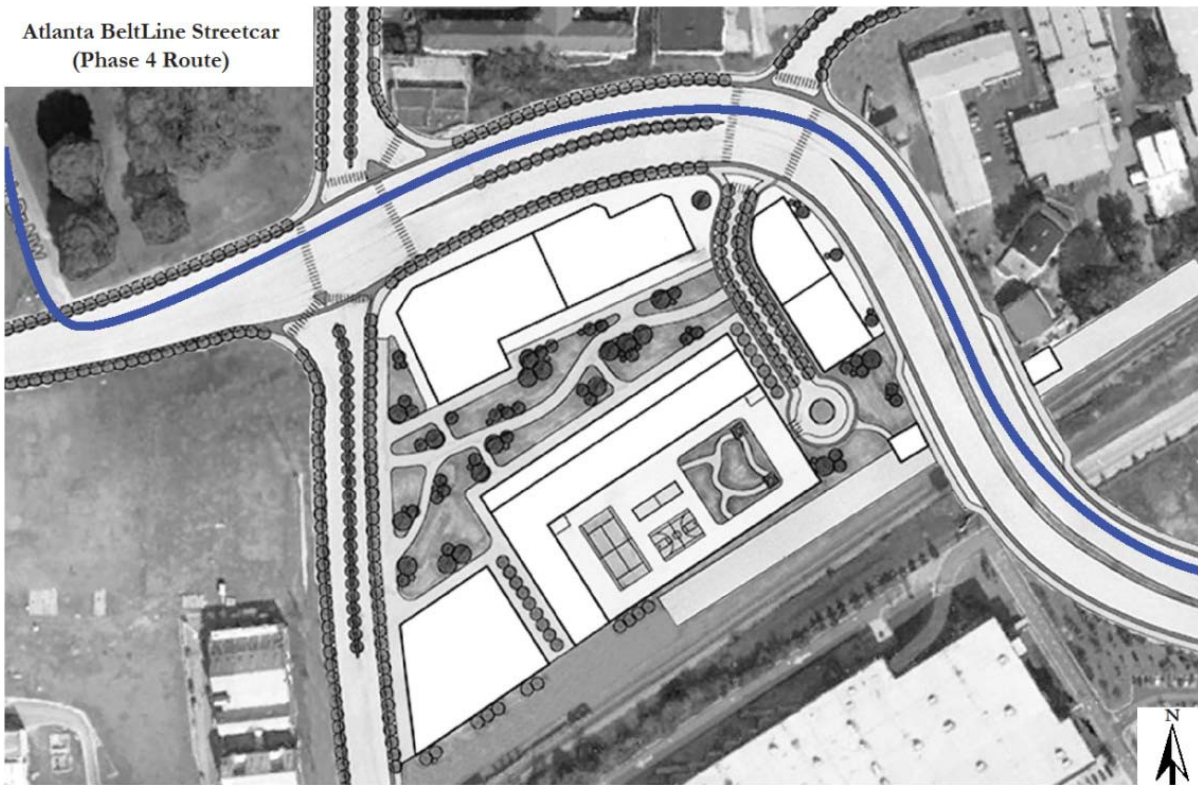




Site Context



**Figure 29:** Site Context, Copyright of the above drawings: ManasiParkhi



**Figure 30:** Map showing the Atlanta Streetcar route, Copyright: Manasi Parkhi

### 5.5. Similar Urban Design Trends around the Site

- Westside Provisions District: Signs of functional mixed-use development



**Figure 31:** Westside Provisions District, Source: <http://midtown.patch.com/>





**Figure 32:** Westside Provisions District, Source: <http://midtown.patch.com/>





**Figure 33:** Westside Provisions District, Source: <http://midtown.patch.com/>

Based on all the above observations, this thesis will recommend suitable design recommendations, which can be taken into account when the site is actually considered for transit-oriented development. This TOD design can be used as a recommendation/option/prototype for similar developments in the near future.

## CHAPTER 6

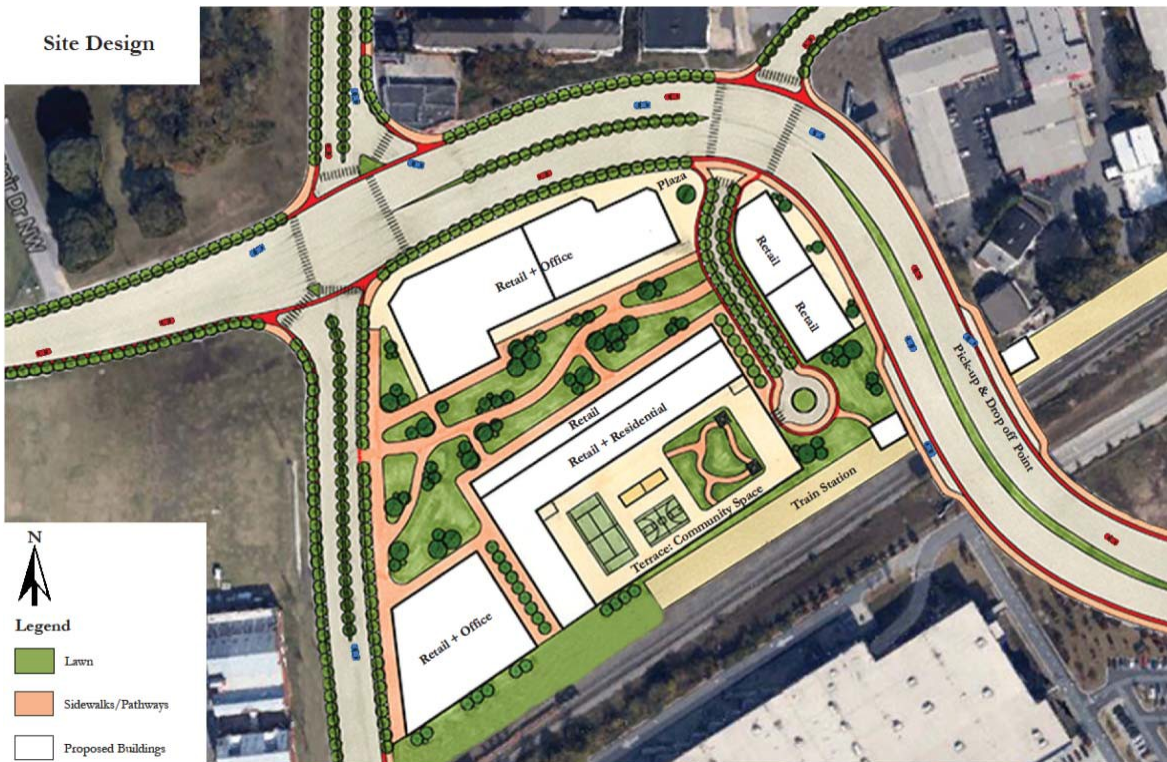
### DESIGN

This design incorporates my design research on transit-oriented development, the primary goals being:

- Efficient connectivity for everyone – pedestrians, bikes, cars and public transit.
- Smooth transition between different modes of transit through the site.
- Designing a community that will help hold together other communities and functions around it.

People (users) are the key factor here as they are the ones who must choose to live in a TOD. Therefore, attracting them is extremely vital for the TOD to be successful. The design aims at creating a cohesive pattern that will hopefully enable more and more people access transit in order to add to the overall ridership.





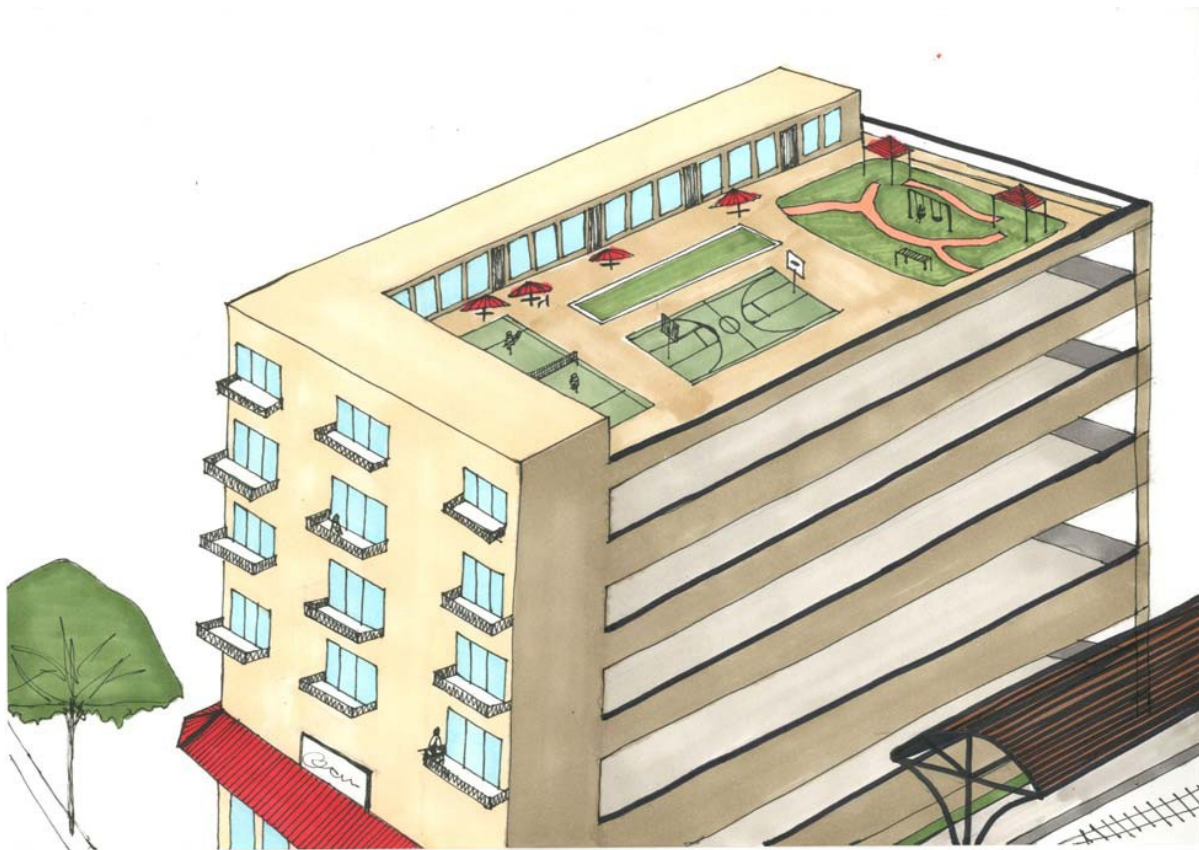
**Figure 34:** Plan view of the design, Copyright: Manasi Parkhi

## 6.1. Site Design Elements

### Buildings

The buildings are a part of the infill strategies, which lead to efficient use of land and gradually increasing density near the station areas. The buildings in the TOD design have been integrated with the existing uses that are complementary to the established neighborhoods around it. Overall, this region has started to show signs of a mixed-use fabric, and the design aims at enhancing the same. Mixed-use buildings in this design (vertically mixed-use development) will try to increase the building density in the future while integrating mutually supportive land uses.

Providing residential or office space above retail uses, will create all-day activities and functional places for pedestrians in order to increase the transit ridership. Here, the residential apartments are wrapped around the parking deck to give a convenient parking access to all the TOD residents. There is also the idea of providing some community spaces on the roof of the parking deck. The use of cars has been limited to just one part of the site in order maximize pedestrian and biking activities.



**Figure 35:** Sketch of Proposed Building on Site: Retail at the bottom + Residential on Top + Community Space on Terrace Attached to a Parking Deck (Approximately 1,000 parking spaces). Copyright: Manasi Parkhi

### **Building Typologies:**

- **Retail:** Building width = 40-60 feet

Floor to floor height = 12-20 feet

- **Residential:** Building width = 60 feet

Floor to floor height = 10 feet

- **Office:** Building width = 100-200 feet

Floor to floor height = 12-15 feet

### **Open Space**

The design consists of a central open green space divided by paths, which connects the pedestrians and bikers to other parts of the site. Having an open space adds to the vitality of a TOD mainly because they effectively connect various uses within (and sometimes outside) the TOD that are at a convenient walking distance for the residents, workers, transit riders as well as visitors. Apart from being a living room for the community, it serves as a place for stormwater management, rain gardening and other site sustainability initiatives. Ultimately, this central open space serves a dual purpose of resource protection and public access.

## **Transit First**

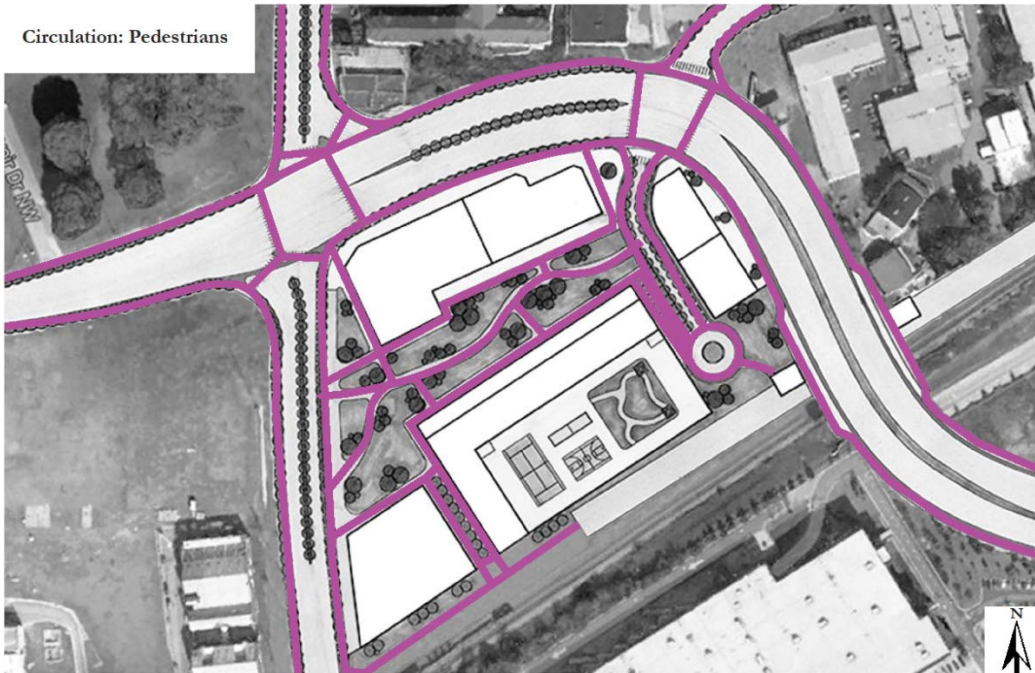
This site is a transition between the Atlanta BeltLine Streetcar (Amtrak rail in the future), private cars and Metropolitan Atlanta Rapid Transit Authority (MARTA) buses. Hence, it is quite clear from the site plan that the circulation of pedestrians, who get-on and get-off of the transit has been prioritized. The access to cars has been limited. People can enter the site using their cars and park them on in the parking deck on site. The entrance road that lets cars into the TOD culminates into a roundabout – So that it can be used as a drop-off point (kiss-and-ride) in addition to an entrance into the five-level parking deck. This is the only entrance and exit for cars on site.

The second entrance to the site is from the proposed train-station. The BeltLine Inc. mentions the possibility of an Amtrak station on site in the future. Moreover, the fourth phase of the Atlanta BeltLine Streetcar takes the same route. Therefore, the design includes a station that can drop the people off from the train/streetcar and allow them to access the transit-oriented development. All the other entrances into the site are meant specifically for pedestrians and bikers.

## **Pedestrian Friendly Land Use Design**

This design follows a human scale so that the pedestrians find the spaces comfortable to approach. Pedestrians are usually drawn to spaces that have a feeling of intimacy and enclosure. This feeling has been created by locating the buildings as close to the sidewalk as possible with a small amount of public-plaza space in the front. Pedestrians also notice and enjoy small design details such as windows, street lighting, trees, spillover spaces, signs, awnings, street crossings, etc. These smaller aspects have also been considered while designing the land-uses for the site. Moreover, the circulation network has served as a framework for placing and orienting different functions on site. The streets and pathways are interconnected to provide a continuous, uninterrupted travel path with multiple route options to the pedestrians. Increasing the likelihood that people will walk to and within a station area significantly increases the probability that they will use public transit and improves the viability of the entire station community.

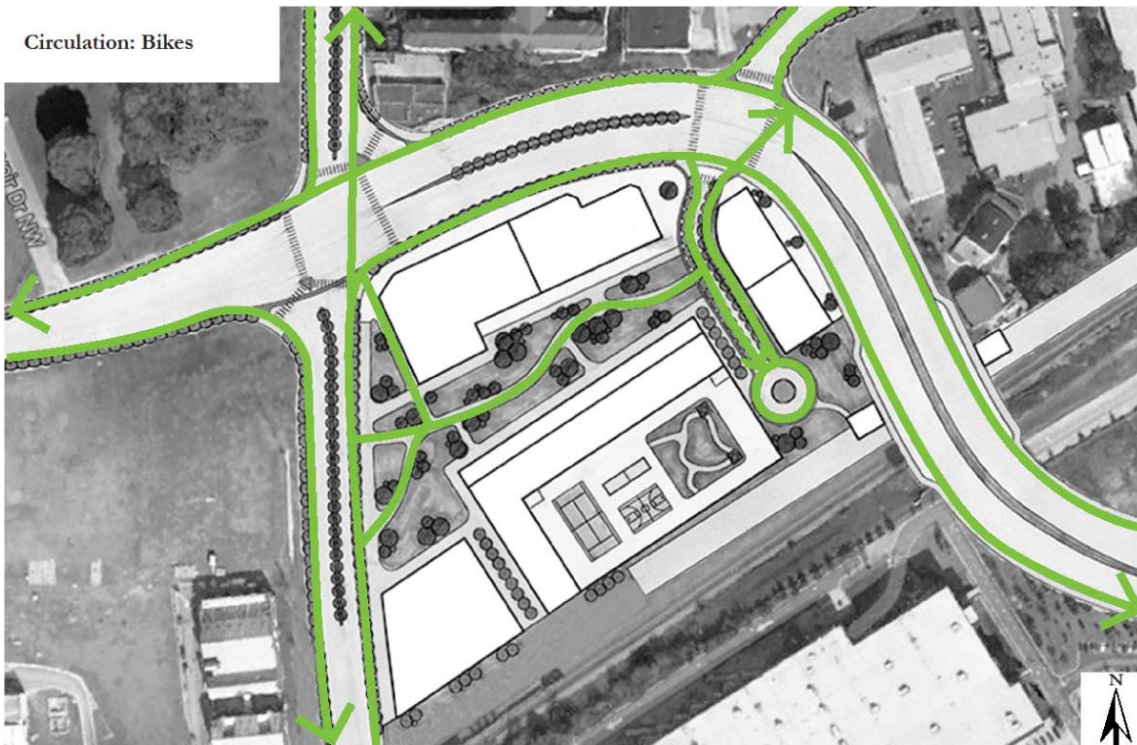




**Figure 36:** Map showing pedestrian circulation, Copyright: Manasi Parkhi

### **Bike Lanes and Paths**

Providing bike paths is a part of the “road improvements” section, which has been discussed in detail further in the document, but let’s focus on the design of these bike paths. It is quite interesting to see that people have already been biking around the site on the 17<sup>th</sup> Street. Hence, it is very important to provide them with efficient biking infrastructure. The design incorporates 6 feet wide bike lanes on 17<sup>th</sup> Street and Northside Drive and a 4 feet wide bike lane on Bishop Street. Within the site, the bicyclists and pedestrians share the 15-20 feet pathways. In terms of demarcating the bike lanes, the proposal is to paint them in a comparatively brighter and noticeable color. The pathways within the site will use a more porous paving material.



**Figure 37:** Map showing bike circulation, Copyright: Manasi Parkhi

## Road Improvements & Safety Considerations

Both, road improvements and safety measures go hand in hand in order to effectively connect the site to other areas around (especially the Atlantic Station development). They are a part of making the whole pedestrian and bike experience as pleasant as possible. Therefore, the road improvements include:

- **Wider Sidewalks:** At least a 10-12 feet width on major roads (Northside Drive and 17<sup>th</sup> Street) and 6-8 feet on smaller streets (Bishop Street).
- **Bike Lanes:** Bike lanes have been proposed for all the streets. They then connect to the pathways that pass through the site.



**Figure 38:** 17<sup>th</sup> Street Before Proposed Road Improvements



**Figure 39:** 17<sup>th</sup> Street Post Proposed Road Improvements

17<sup>th</sup> Street and Northside Drive: 6 feet wide bike lanes

Bishop Street: 4 feet wide bike lanes



- ***Trees:*** A continuous line of trees between the sidewalks and the bike lanes, as well as tree medians wherever possible.
- ***Street Crossings:*** Adequate number of street crossings to facilitate pedestrians.
- ***Traffic Calming and Signs:*** To slow down traffic on the 17<sup>th</sup> Street, some traffic calming measures can be adopted, as well as signage, which will indicate directions.
- ***Lighting:*** The roads as well as the site should be well lit to make people feel safe when they are approaching it and also when they are inside it. The lighting includes street lighting as well as lighting in the central open space and other plazas. White lighting can be used versus yellow lighting to increase the safety factor.
- ***Bump-outs:*** Bump-outs have been added on the 17<sup>th</sup> Street just above the proposed train station. There is a staircase and elevator block right next to each bump-out which provides a direct access to the train station below. These bump-outs can thus be used as pick-up or drop-off points for the people wanting to access the train station from the 17<sup>th</sup> Street.

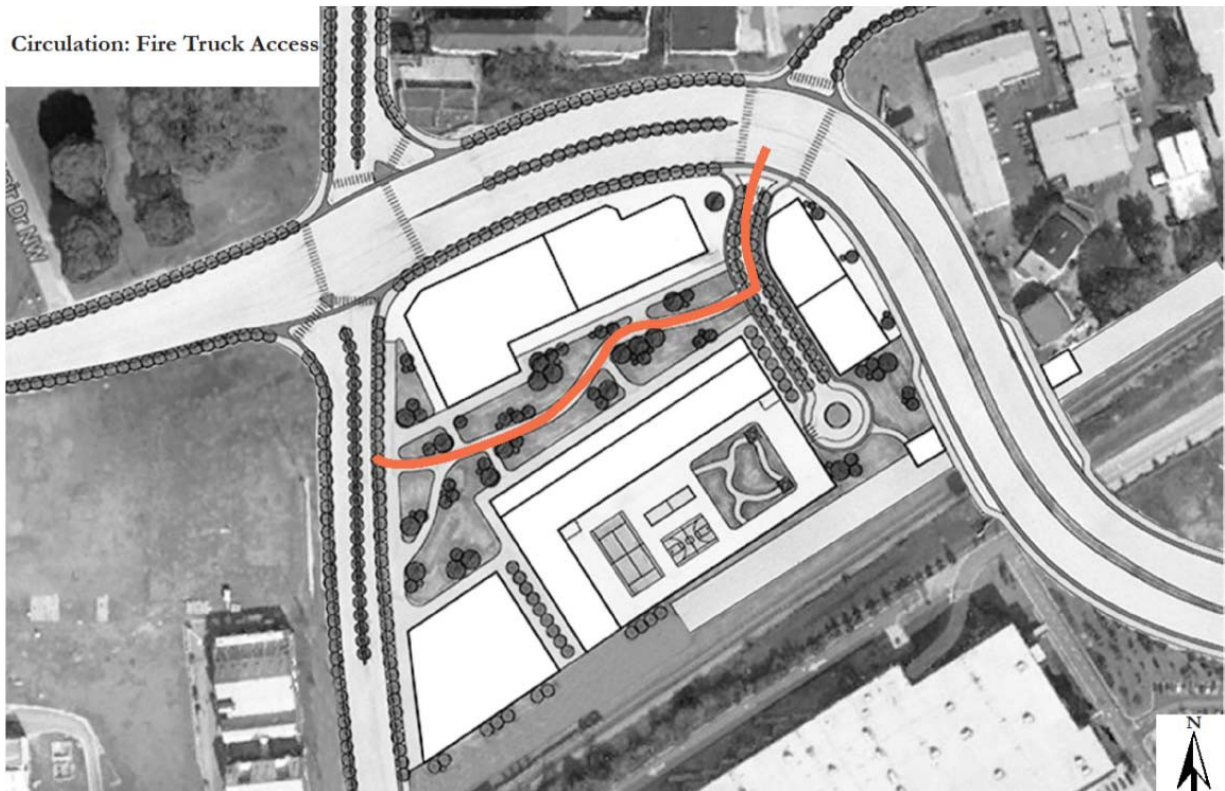


**Figure 40:** 17<sup>th</sup> Street Before Proposed Bump-outs (Source: Google Imagery)



**Figure 41:** 17<sup>th</sup> Street Post Proposed Bump-outs (Copyright: Manasi Parkhi)

- **Fire Truck Access:** A 20-foot wide path is provided to allow fire truck access in case of emergencies.



**Figure 42:** Map showing the fire truck access, Copyright: Manasi Parkhi

## 6.2. Sustainability

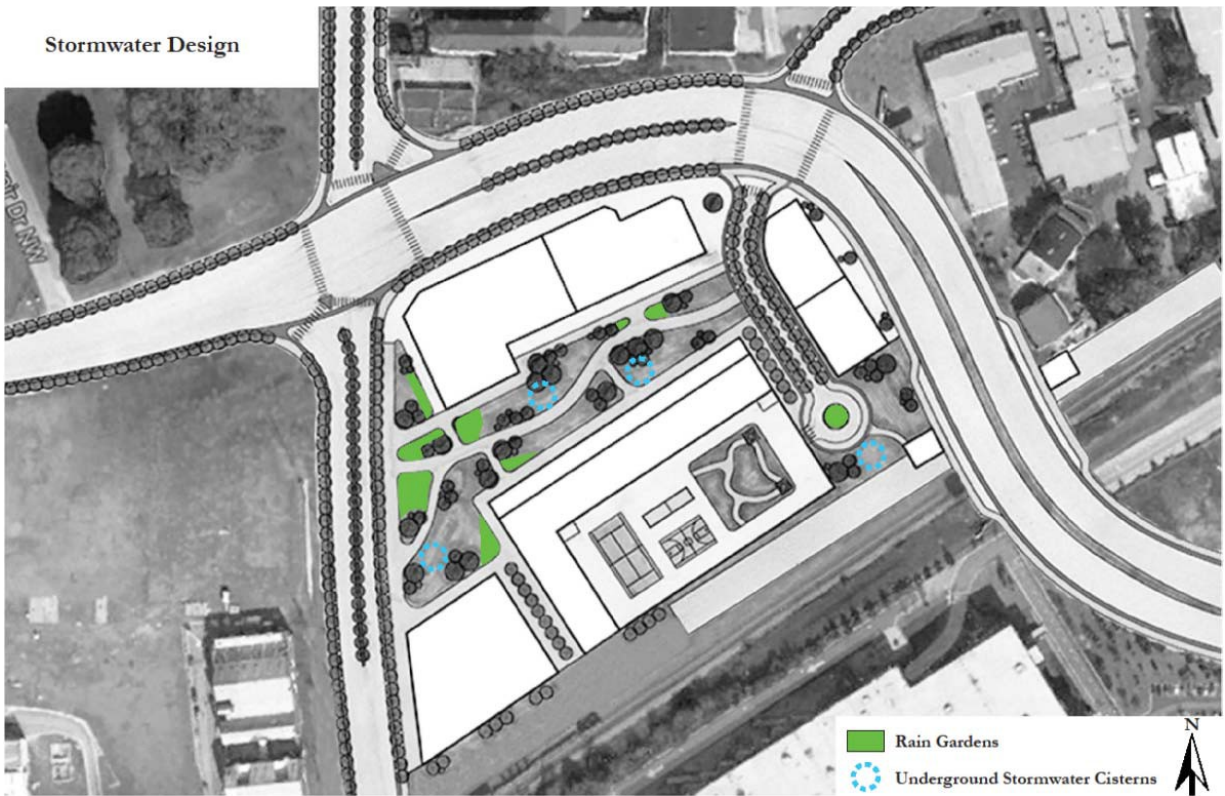
**Stormwater Design:** Since the site is almost flat in nature, the stormwater cannot be directed to a particular point, using slope. The idea is then, to provide underground cisterns to capture stormwater. The following types of underground cisterns have been placed at different places throughout the site:

- Rainwater reuse cisterns for water conservation
- Stormwater detention cisterns for flow-control

**Rain Gardens, Porous Paving and Tree Medians:** These will add to the amount of rainwater that enters the ground in order to recharge the local aquifers.

Rain gardens can be maintained with little effort after the plants are established. Some weeding and watering will be needed in the first two years and perhaps some thinning in later years as the plants mature. Rain gardens actively manage stormwater on site, and by doing so, actively work to stop our greatest cause of water pollution in its tracks.

Porous pavements are permeable pavement surface with a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil. The runoff is then infiltrated directly into the soil and receives basic water quality treatment.



**Figure 43:** Map showing stormwater design on site, Copyright: Manasi Parkhi

Tree canopy coverage is vital for urban stormwater management as trees capture and store rainwater in their canopies and root zones, eventually releasing this water over time into the atmosphere through evapotranspiration. Trees also help to slow down the temporarily stored stormwater runoff and the tree roots improve soil conditions to promote infiltration. Apart from the above facts, trees in urban areas also add to aesthetics, improved air quality, shading, etc. Some important pointers for street trees are:

- Street trees corresponding to street types
- Choosing the right trees (preferably native varieties)
- Root environment for street trees

The Onondaga County in New York State has developed a stormwater management program called “Save the Rain” in order to reduce pollution to the Onondaga Lake and its tributaries.

This program lists five methods to plant trees:

- *Balled and Burlapped Trees*
- *Tree Pits*
- *Trees in Planter Beds*
- *Bare Root Tree Planting*
- *Modular Tree Cells*

(Source: <http://savetherain.us/>)

Such tree planting methods can be adopted to control soil erosion and reduce pollution.



**Solar Energy:** All the buildings will have solar panels mounted on their roofs, facing the southern direction. Thus, buildings will be able to generate and consume energy on-site.



### **6.3 Paving Materials**

Choice of the type of paving is an opportunity to use materials that will help water permeate through them and soak into the ground. Unlike conventional pavement, porous pavements reduce stormwater runoff considerably and enhance the water quality. It is a best management practice to recharge local aquifer and reduce the speeds of stormwater runoffs. From an economic perspective, it uses lesser infrastructure (lesser piping, ditches, catch basins, ponds, etc.). The overall maintenance of porous pavements is relatively simple (vacuum sweeping, pressure washing and inspecting for sedimentation and clogging).

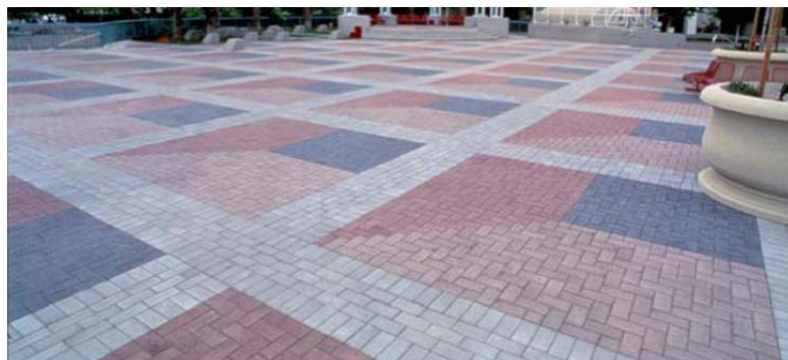
- ***Sidewalks:*** Porous concrete is recommended for the sidewalks to facilitate rainwater infiltration.



- ***Pathways:*** All the pathways on site use porous concrete too, but a different variety of the same.



- ***Plazas:*** The public plazas in front and back of the proposed buildings will also be provided with porous concrete/asphalt paving.





## CHAPTER 7

### AREA CALCULATIONS

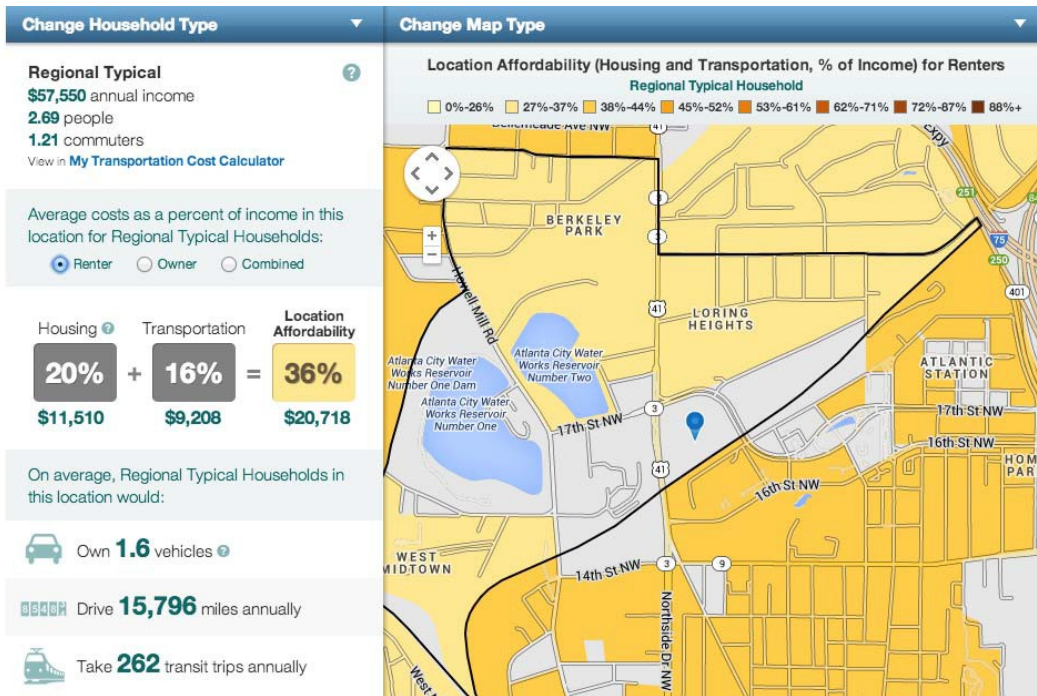
Total Residential Built-Up = 210,660 Sq. ft.

Total Office/Commercial Built-up = 343,102 Sq. ft.

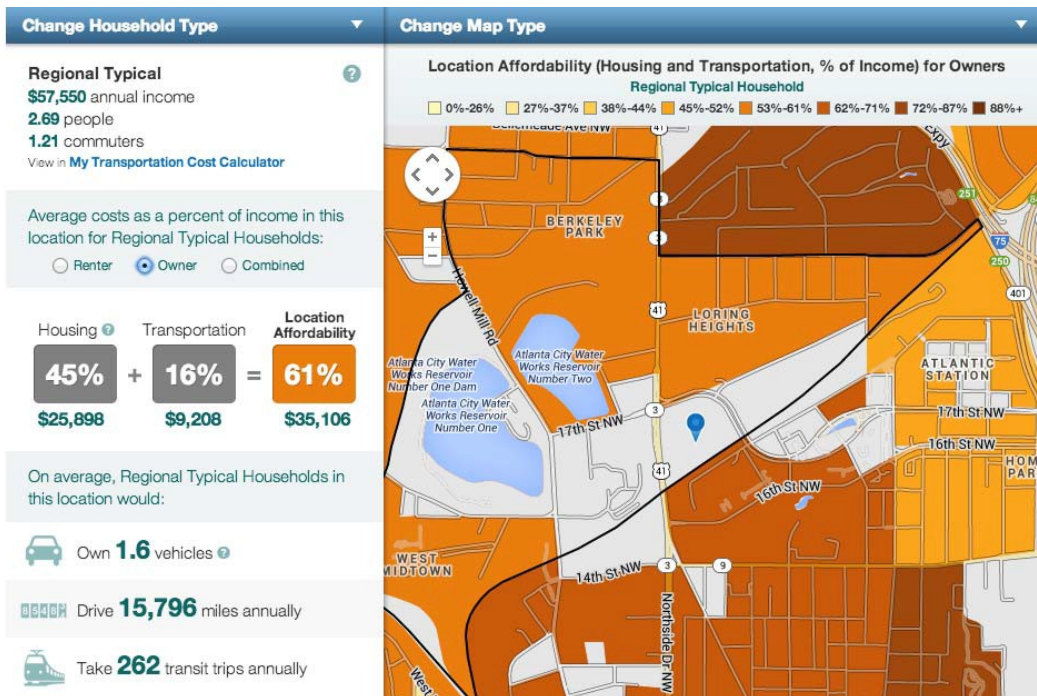
Total Retail Built-Up = 192,262 Sq. ft.

Total Built-Up Area = 746,024 Sq. ft.

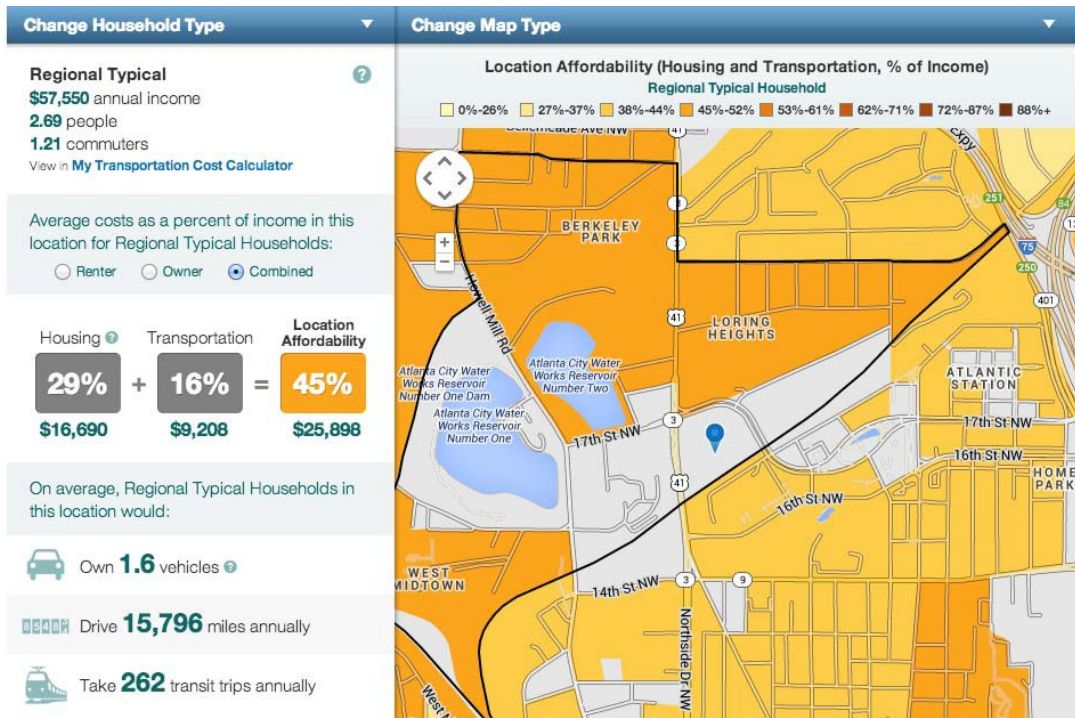
The United States Department of Housing and Development (HUD) has developed the Location Affordability Portal (<http://www.locationaffordability.info/>). This online portal helps to estimate the affordability of a region with respect to the housing and transportation costs in terms of the annual household income, according to current trends. The images below show these costs in terms of percentages of annual household incomes on site.



**Figure 44:** Case 1: Rental Housing, Source: <http://www.locationaffordability.info/>



**Figure 45:** Case 2: Home Ownership, Source: <http://www.locationaffordability.info/>



**Figure 46:** Case 3: Combined, Source: <http://www.locationaffordability.info/>

## 7.1. Parking Calculations

- Total built-up area for the parking deck = 359,370 Sq. ft.
- The design includes a three-bay parking deck, each bay being 60 foot wide.
- Approximately 194 parking spaces per floor (5 floors total).
- Therefore, total number of parking spaces in the deck = 970

## CHAPTER 8

### CONCLUSION

A household in a single-family home with two cars generates 12-14 metric tons of carbon dioxide each year. A household in a comparatively denser urban setting with one car generates 6-8 metric tons of carbon dioxide each year. And finally, a household in even denser urban environment with no car generates 3-5 metric tons of carbon dioxide each year. Similarly, about 30-35 years ago, 75% of 17 year olds had drivers' licenses. Whereas today less than 50% of the 17 year olds in the United States have drivers' licenses (*Adapted from Source: Climate Trust, Portland, OR*). Thus the effects of living closer to transit are far more implications than we can possibly imagine.

Some pointers that this thesis study and project helped me understand:

- Understand the organizational pattern of the city. For Example: Boston – web, Manhattan – grid, Portland – compressed grid, Salt Lake City – Super grid, Bellingham – Shifting grids, Seattle – Water Oriented, etc.
- Select the best locations for TOD's and study examples of best management practices.
  - Rediscover the public realm on a local, as well as a regional scale.
  - Advocate for a street network that enhances mobility, ecology, sociability and livability.

- Make the streetscape active by storefront zones, retail, sidewalk cafes, live-work buildings, curbside gardens, street markets, art, etc.
- Provide support for small local businesses.
- Transit-oriented development is all about proximity, mix and intensity of uses, public spaces and connections.
- Provide people with the luxury of choices for different modes of transportation.
- In order to overcome the difficulty of mixing land uses, break zoning barriers to some extent.
- Public spaces should:
  - Be visible and accessible
  - Give choice for engagement for different age-groups
  - Be safe and secure and easy to maintain
- Parameters for complete communities: Accessibility, diversity, proximity, connectivity, sustainability, economy, mobility, livability

The quality of our public realm is mostly, but not completely defined by aesthetics and accessibility. The major driving factor is economy, and Atlanta is a great place for business. We need to revisit the transportation principle that was responsible for the very inception of Atlanta: Connection. There is a desperate need to connect Atlanta's transportation infrastructure in a way that it is available, accessible, safe and beautiful. We as planners should elevate the experience of public transit in cities with clear and simple designs

Transportation is the single most important investment that every city can venture into. Atlanta possesses all the qualities of a sustainable city, but there has been a failure to connect all the functions and services together. The more we connect these dots, the more successful we will be in developing patterns that will bring different people and places together. Our cities are a reflection of us and what makes a city successful is that fact that how everything; the good, the bad and the ugly converge to form an environment that fosters social, economic, environmental and intellectual growth.

## CHAPTER 9

### REFERENCES

#### **Books**

Crawford, J.H.. *Car Free Cities*. Utrecht, The Netherlands: International Books, 2000.

Tumlin, Jeffery. *Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy and Resilient Communities*. Hoboken, New Jersey: John Wiley & Sons Inc., 2012.

Dickey, John W. *Metropolitan Transportation Planning*. Washington D.C.: Scripta Book Company, 1975.

Hanson, Susan. *The Geography of Urban Transportation*. New York: Guilford Press,

1995. Boarnet, Marlon G. and Randall Crane. *Travel By Design: The Influence of Urban*

*Form on*

*Travel*. New York: Oxford University Press, 2001.

Levinson, David M. and Kevin J. Krizek. *Access to Destinations*. Oxford, U.K.: Elsevier Ltd., 2005.

## **Journals**

Garvin, Alexander, "Emerald Necklace, Southern Style." *Planning: The Magazine of the American Planning Association* 80(1) (2014): 21-28.

## **Online Resources**

Hickey, Robert, "The Role of Community Land Trusts in Fostering Equitable, Transit Oriented Development: Case Studies from Atlanta, Denver and the Twin Cities." *Lincoln Institute of Land Policy*, 2013.

Atlanta BeltLine: Connecting Atlanta's Rich History to a Vibrant Future. <http://beltline.org/>.

Reconnecting America. <http://www.reconnectingamerica.org/>.

Center for Transit Oriented Development. <http://www.ctod.org/>.

Atlanta Regional Commission. <http://www.atlantaregional.com>

2030 Palette: Design and Planning Strategies for the Next Built Environment, Today.  
<http://2030palette.org/>.

DART.org - Dallas Area Rapid Transit. <http://www.dart.org/>.

TriMet: MAX Light Rail Service. <http://trimet.org/max/>.

Location Affordability Portal. <http://locationaffordability.info/>



Wallace Robert and Todd Architects. [www.wrtddesign.com](http://www.wrtddesign.com)

Google Maps. <https://www.google.com/maps/>