Evaluating Transit-Oriented Development Effectiveness:

A Case Study of Oak Park, Illinois

April 23 2012

Evaluating Transit-Oriented Development Effectiveness:

A Case Study of Oak Park, Illinois

Prepared for
Miami University Honors Thesis

Prepared by
Chelsey Armstrong

Thesis Advisor
Damon Scott

Readers
Robbyn Abbitt
David Prytherch

Introduction

As resources become scare, transportation costs rise, and congestion gets worse, developing transit alternatives will become increasingly important. Transit-oriented development is a sustainable method for building communities that are less dependent on the automobile. Methods for evaluating the potential and effectiveness of a transit-oriented development include determining an area's vehicle miles traveled, normative characteristics, and a spectrum from transit-adjacent to transit-oriented. The purpose of this paper is to outline a method to evaluate the pedestrian-orientation of transit stations that can augment existing methods of measuring the characteristics of transit-oriented developments. The case study of the transit zone surrounding the Harlem/Lake El Station in Oak Park, Illinois is used to demonstrate the utilization of this method. The study area includes North Marion Street, the Pleasant District and the proposed Chelsea Station developments.

Overview of Transit Oriented Development

Transit-oriented development is an emerging topic in the planning field due to poor planning techniques in the past and its potential to bring vitality and create livable neighborhoods. It is important to understand what transit-oriented development actually is and why it is important in order for one to truly grasp its potential. It is also beneficial for one to

recognize characteristics of successful transit-oriented developments so that he or she can then analyze the effectiveness and impact of specific developments.

What is transit-oriented development?

According to the Center for Transit-Oriented Development, transit-oriented development is "higher-density mixed-use development within walking distance, or a half mile, of transit stations" (*Center*). Most often transit-oriented development is built around existing transit infrastructure in hopes that residents, employees, and consumers of the new development will choose to use public transit rather than their automobile ("Transit"). This construction takes form as both new development, as well as redevelopment of previously more car-oriented areas.

Brief history of transit-oriented development

When the United States was developing in the early 20th century, streetcars were built near developed communities to add value to the area; thus these communities could be accurately labeled as "development-oriented transit" (Belzer 4). As time progressed, however, the automobile eventually overtook streetcars, and the United States became a land of automobile-oriented developments (Belzer 5). This type of development created vast congestion issues throughout the

country, and it was clear that transit needed a new focus.

Therefore, in the 1970s public transportation systems, such as the San Francisco Bay Area Rapid Transit (BART) system, the MARTA in Atlanta, and Metro in the Washington, D.C. were all opened to alleviate the country's congestion problems (Belzer 5). Over time, developers and governments realized that developing around transit systems was beneficial, as well as profitable, and they began to develop in a manner similar to the historic streetcar suburbs (Belzer 6).

It wasn't until the late 1980s, however, that Peter Calthorpe at the University of California, Berkeley first coined the term transit-oriented development (Carlton 1). This term became more widely known after Calthrope published his paper, ""The New American Metropolis," in 1993 (Carlton 1). Since that time, some of the most notable locations for transit-oriented development include San Diego, Washington D.C., and Portland (Belzer 6).

Characteristics of effective transit-oriented development

There are several characteristics of effective transit-oriented development. Understanding these descriptors provides a thorough background for analyzing specific developments.

High-density

Density of an area is measured in two primary ways. Residential

areas are typically measured in number of housing units per acre, while commercial area densities are typically quantified by a floor area ratio (FAR), lot coverage, or building mass ("Transit"). High-density neighborhoods are vital for successful transit-oriented development for several reasons. First, there must be a density of people large enough to support the local businesses in a transit-oriented development. Dense areas also justify the transit station and make such infrastructure economically viable.

Mixed-use

According to the Chicago Metropolitan Agency for Planning (CMAP), mixed-use areas are "a mix of land uses that facilitate diverse activities in walkable distances around transit facilities" ("Transit"). This type of development encourages people to walk or use public transportation since more of their desired locations are in proximity to one another. There is not a minimum amount of uses that must be present in a mixed-use area, however, Douglass Farr suggests "at least three dwelling types are necessary to create architectural diversity" (Farr 129). The United States' Green Building Council requires that a neighborhood development have a minimum of four diverse uses that occupy 20% of the total square footage of the development in order to obtain a point toward LEED-ND certification ("LEED" 55). Additionally, CMAP recommends

TOD visioning and planning, TOD zoning and design guidelines, and TOD overlay zones as methods for developing mixed-use areas ("Transit). The City of Oak Park, Illinois has a Transit-Related Retail Overlay District, which has the purpose to "protect existing retail uses and encourage new retail development on the ground floor of buildings in areas adjacent to and in close proximity to mass transit stations" ("Oak Park Zoning" 3-46). Additionally, this zoning seeks to "prohibit uses that are incompatible with or detract from the retail vitality of such areas; encourage pedestrian activity; and provide retail services for residents and users of transit ("Oak Park Zoning" 3-46).

Close Proximity to Transit Stations

An essential characteristic of a transit-oriented development is that there are businesses, residences, and mixed-use development located adjacent or in close proximity to a transit station. People are typically willing to walk a quarter of a mile, thus transit-oriented developments must be within a quarter mile of the transit station (Farr 128). It has been found that those that live within walking distance of a transit station use public transit five times more than those who are required to drive to the station (Farr 114). Therefore, in order for a development to truly utilize the transit system and

encourage those in the area to use it, the system must be an integral and focused component of the development.

Low Automobile Dependency

Low automobile ownership and low automobile dependency are characteristics associated with successful transit oriented development. If other transit options are available and practical for people to use, then they can more easily make the choice to not own a car or to use it less. According to the CTOD, two methods for encouraging this characteristic are lowering the number of required parking spots in a development or designing an area in a way that it is practical for citizens to live without or with fewer cars by making necessary amenities within walking distance in pedestrian friendly areas (*Performance* 17). According to the LEED 2009 Neighborhood Development Rating System, a development must "use no more than 20% of the total development footprint area for all new off-street surface parking facilities, with no individual surface parking lot larger than 2 acres" ("LEED" 60).

Pedestrian Friendly

One last characteristic of successful transit-oriented development is that the area is pedestrian friendly. This is a multi-faceted characteristic. One of the most important aspects of making an

area pedestrian friendly is having a well-connected and maintained sidewalk system. This allows for the pedestrian to easily move around and throughout the streetscape. Small block sizes also help to make an area ideal for the pedestrian. These decrease the distances that individuals must travel to get from one location to another. Enchanting streetscapes add to the pedestrians experience as they walk throughout a development. If an area is enjoyable for people to travel through, they are more likely to choose commuting through that area over a different one. Lastly, interactive public plazas benefit pedestrian areas because they allow people to interact with others on their way to work, the store, or home. Overall, if a transit-oriented development is pedestrian friendly and well-connected, people will be more inclined to utilize the area.

Why is transit-oriented development important?

There are many reasons why transit-oriented development is important. Exploring these explanations emphasizes the necessity of this type of development.

Increasing Transportation Costs

As resources such as oil start to diminish, the costs of transportation are increasing dramatically. According to the Center for

Neighborhood Technology, "transportation is the second largest household expenditure after housing, ranging from 15 percent to almost a quarter of the average household's expenditures" (Bernstein 1). This is more than food, clothing, and health care combined ("Transportation"). The National Complete Streets Coalition states "even before the recent run-up in gasoline prices, Americans spent an average of 18 cents of every dollar on transportation, with the poorest fifth of families spending more than double that figure" ("Transportation"). In transit-oriented development areas, however, people have more transit options available and costs are likely to decrease to approximately 14% of their household budgets ("Transportation").

Traffic

A growing population has led to increased traffic and congestion on the streets. This congestion is harmful to the environment and is a drain on the economy. In 2007, $87.2 billion was lost due to hours spent in traffic jams and wasted fuel ("Ease"). Transit-oriented develop helps decrease congestion and allows for more people to get to their desired location at the same time. It also has a multiplier effect such that, "in 2008 when national vehicle miles traveled dropped by 3.6%, congestion plunged 30% in the nation's

most congested areas ("Ease").

Builds Community

Transit-oriented development aids in the creation of walkable communities that allow residents to live a healthier lifestyle (*Performance*). Such developments also encourage citizens to interact with each other since they are out walking around rather than commuting in their vehicles.

Mobility

Many recent developments have very much been built from a privileged perspective. They assume that everyone living in the area has car, which is often not the true scenario. This is especially important as much of our population begins to age. It is projected that by 2025 approximately one in five Americans will be over the age of 65 ("Older"). This population will soon no longer be able to drive their own vehicles and will need environments in which they are able to walk and use public transportation. People with disabilities are also many times overlooked in the planning process. Transit-oriented development also allows for those with physical disabilities to have better access to public transportation, thus leading to greater equitability in the community.

Safety

The recent sprawling development of the United States has posed many safety hazards for those not commuting via automobile. According to the National Complete Streets Coalition, "in 2007, there were 4,654 pedestrian deaths and 70,000 reported pedestrian injuries," which equates to almost one every eight minutes ("Create"). They also report, "in a poll of people over 50 years old, 47 percent said it was unsafe to cross the street near their home" ("Create"). Since transit-oriented development separates people from automobiles, it creates a pedestrian-friendly area that is safer for people to walk, bicycle, and get on and off of buses, the El, and commuter trains,

Environment

There are several negative environmental impacts from driving an automobile. Some of these impacts include climate change, air quality, noise, water quality, soil quality, biodiversity, and land take (Rodrigue). Transit-oriented development also lessens the negative environmental impacts of automobile transportation. The National Complete Streets Coalition found that "The transportation sector is the fastest growing carbon dioxide source in the United States with emission rates rising 2% per year" ("Climate Change"). As emissions

continuously increase, health problems, natural disasters, and changes in animal lifecycles will also increase due to the negative effects of these emissions. One method to mitigate these problems is an increase in walking, biking, and public transportation usage. The National Complete Streets Coalition believes "a solo commuter who switches from driving to transit to reduce carbon dioxide emissions by 20 pounds per day, or more than 4,800 pounds in a year ("Climate Change"). Transit-oriented development can lead to a healthier community and environment.

Economic Revitalization

One last reason that transit-oriented development is important is because it provides economic revitalization. When development is designed for the automobile, shoppers must intentionally decide to go to a specific store. With pedestrian developments, however, people are walking past stores and may enter stores that they would not have intentionally driven to on shopping trips.

Transit-oriented development also helps the economy as it provides for transportation to work. In 2006 Pittsburgh employers reported that transportation was the primary barrier to hiring and retaining qualified employees ("Economic"). TOD helps prevent the spatial mismatch that was first hypothesized by John F. Kain in 1968

(Gobillon 2401). This hypothesis stated that there is a disconnect between where the unemployed live and where the jobs are located (Gobillon 2401). Transit-oriented develops eliminates this disconnect by providing access to jobs through public transportation.

Lastly, transit-oriented developments increase the value of houses in the neighborhood. It was found that houses in Chicago that were within a half-mile of a public transportation station sold for approximately $36,000 more than those located at a distance from public transit ("Economic"). In a time when the economy, job market, and housing market are all struggling, transit-oriented development may offer some improvement.

Methods Previously Used for Evaluating Transit-Oriented Developments

Due to the importance of transit-oriented development, it is essential to evaluate whether a development is truly effective. There are several models that have been previously been used to analyze the effectiveness of transit-oriented developments.

1. Performance-Based Transit-Oriented Development Typology Guidebook

The Typology Guidebook was developed by the Center for Transit-Oriented Development, which is "a creative think-and-do tank that combines rigorous research with effective solutions" and "has been a leader in promoting urban sustainability" ("Center"). This guidebook provides a methodology for evaluating the relative effectiveness of urban transit nodes.

Performance-Based TOD Place Types (*Performance*)

Performance-Based TOD Place Types are those determined by both the performance of the development (measured in vehicle miles traveled) and the place type of the development, which is determined by the users in the area (*Performance*). The ratio utilized to designate the place type is equal to the number of workers in the area divided by the total number of workers and residents in the area. Sorting developments by place type allows for one to compare a development's performance to others with a similar function. The Typology Guidebook sorts places into three place types: residential, balanced, and employment. They characterize a residential area as one with the percentage of workers compared to workers and residents being 33.3% or less,

balanced between 33.3% and 66.7%, and employment as more than 67% (*Performance* 10). Other studies may sort place types by zoning, the requirements set by the zoning code or other categories, such as LEED-ND requirements. Within the city of Chicago, the areas closest to the city center are principally employment areas, while those further from the city tend to be more residential areas, with the balanced areas in between those two regions (*Performance* 12).

Estimating Vehicle Miles Traveled (VMT)

One measurement of effectiveness for a transit node is the average vehicle miles traveled (VMT) for those living in the surrounding area. In the Chicago metropolitan area, those living closest to the city center have the lowest VMT, while those living on the outer suburbs have the highest VMT, which can be seen in Figure 1 below (*Performance* 12).

Figure 6. Chicago Region Place Types

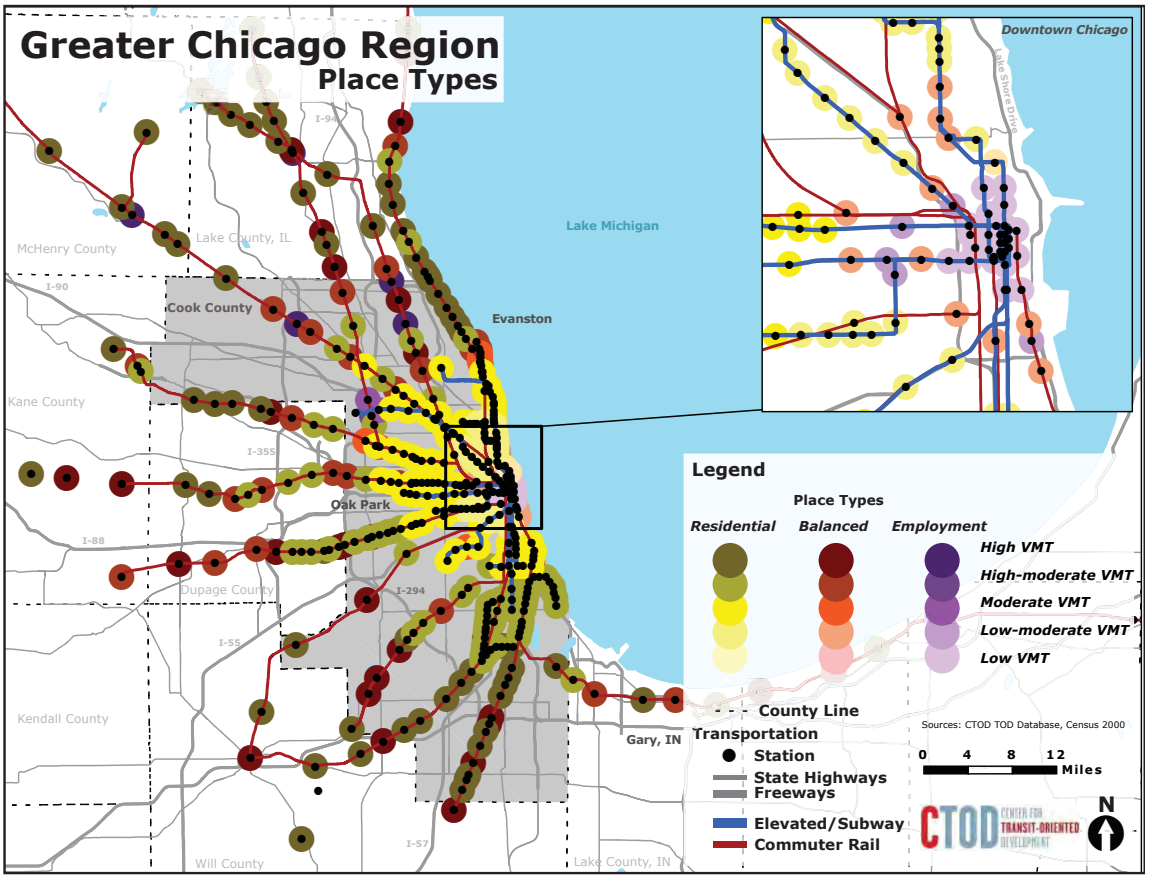


Figure 1
(*Performance*)

Key Findings from Normative Metrics

Normative metrics are other measures in addition VMT and place type that are used to compare different developments (*Performance* 14). These are important because they provide a more thorough description of characteristics typically associated with transit-oriented developments. Normative metrics that are often associated with successful transit-oriented developments include: low vehicle miles traveled, higher transit ridership, lower auto ownership, greater density, smaller blocks, and a higher

percentage of people that walk, bike, or take public transit to work (*Performance* 15).

2. Transit-Oriented Development vs. Transit-Adjacent Development

Another method for evaluating transit-oriented developments was suggested by Dena Belzer and Gerald Autler in 2002 (Renne 1). Belzer and Autler proposed that there is a distinct difference between transit-adjacent developments and transit-oriented developments. The primary difference between these two classifications is that transit-oriented development, "describes a station-area precinct that is compact, mixed-use, and facilitates transit connectivity through urban design," while a transit-adjacent development is "physically near transit but fails to capitalize upon this proximity. It lacks any functional connectivity to transit – whether in terms of land-use composition, means of station access, or site design" (Renne 1). Although the distinction between these two descriptions is rather subjective, John L. Renne, in his article "From transit-adjacent to transit-oriented development," proposes that developments lie somewhere on a spectrum from a transit-adjacent development to a transit-oriented development (See Figure 2) (Renne 1).

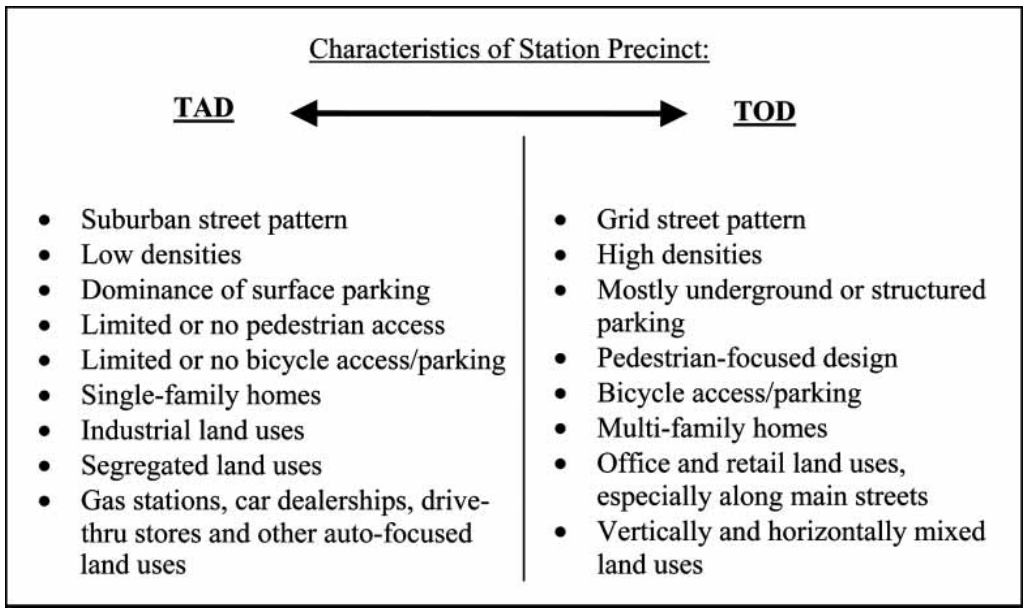


Figure 2
(Renne 3)

3. The Machine Space Method

Ronald Horvath introduced the Machine Space Method in his article in the 1974 *Geographical Review* (Horvath). Horvath identifies machine space as "territory devoted primarily to the use of machines" and "when machines have priority over people in the use of territory" (Horvath 168). More specifically, Horvath refers to the modern type of this issue as "automobile space" and defines this term as "any area that is devoted to the movement, storage, or servicing of automobiles" (Horvath 169). According to Horvath, "people and machines have many of the same needs, including air, territory, water, and energy," thus making them mutually exclusive (Horvath 174). "Therefore, an inherent conflict between people and machines exists, and it becomes manifest through

the process of growth" (Horvath 174). Machine space then becomes an issue of whether people or the automobile is given priority in such conflict (Horvath 169).

Historically, planners have dealt with congestion and traffic issues from a demand side perspective, rather than controlling for supply. As they have worked to ease congestion, planners have continuously expanded machine space by building and widening roads and increasing parking availability. This type of growth is what Jane Jacobs refers to as "the erosion of cities" (Horvath 172.) Furthermore, Horvath states that he believes "viewing the city as property rather than as people is a fundamental factor in such planning practices" (Horvath 173).

The presence and growth of machine space has many negative consequences. One such consequence is what Horvath refers to as "territorial alienation" (Horvath 179). Horvath defines this term as "separation or estrangement between people and the spaces that they depend on for their livelihood or well-being" (Horvath 179). This alienation leads to another negative consequence, which is the reliance on automobiles rather than walking, biking or taking public transportation. Since people are disconnected by machine space, it is unsafe and unappealing for them commute through modes other than an automobile. This behavior contributes to further negative effects, such as increasing obesity, congestion, harm to the environment, and an isolated

society. The concept of machine space can be used to evaluate the interconnectedness of transit-oriented developments and is, therefore, beneficial in providing an overall assessment of the area surrounding the transit node.

The Study Area

There are many areas in Chicago that are known for their transit-oriented development. Oak Park was chosen for this study due to its focus on transit while developing, its current developments, and the village's goals and plans for the future. The specific area used in this analysis is the transit zone around the Harlem/Lake El station, which is a quarter mile radius and includes the North Marion Street development, the Pleasant District, and the proposed Chelsea Station (See Figures 3 and 4). Using a case study is beneficial as it provides a setting to apply the different methods for evaluating transit-oriented developments and their surrounding areas.

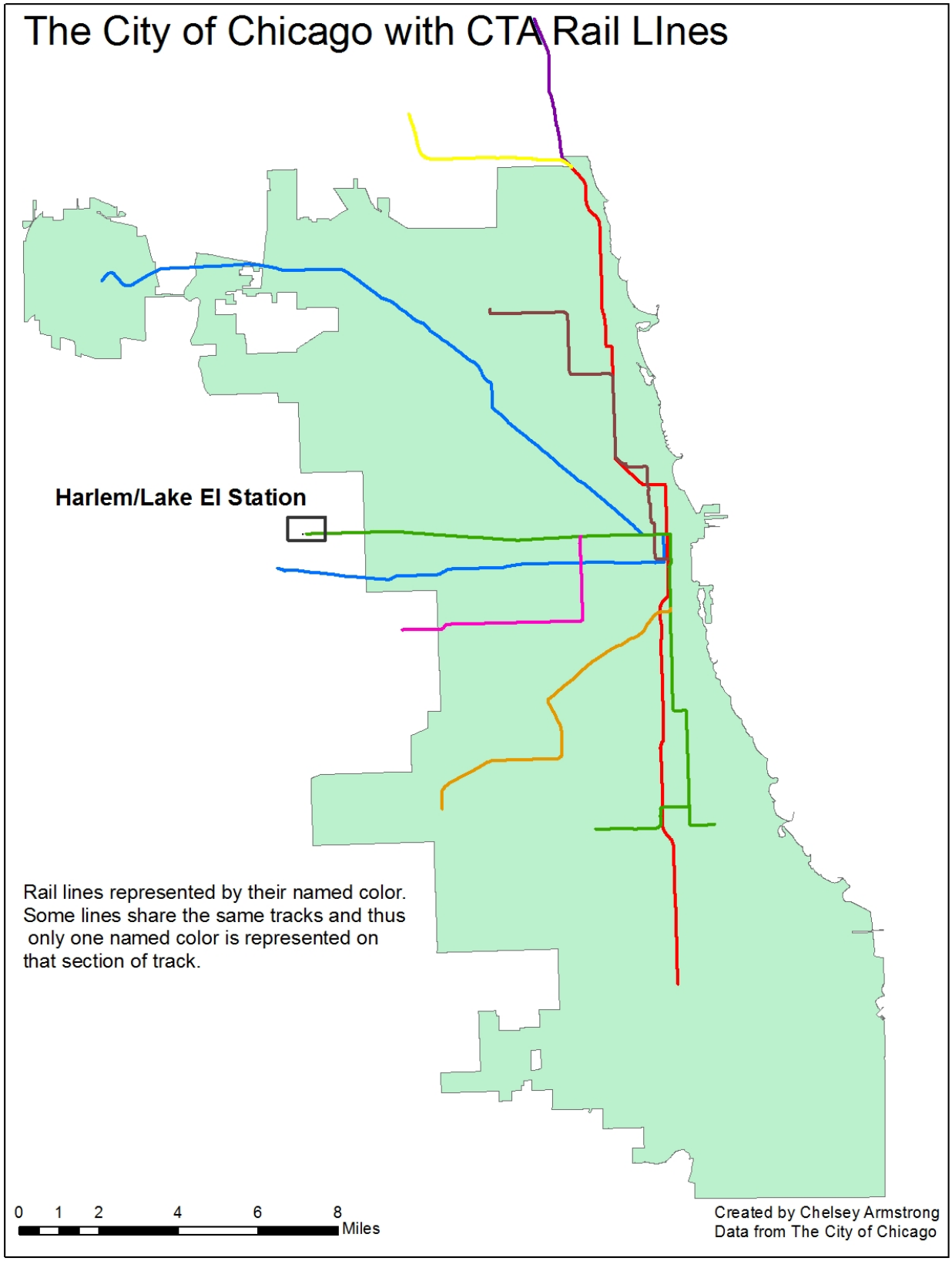


Figure 3: Harlem/Lake Locator Map

Map created by author

Figure 4: Transit Zone Surrounding the Harlem/Lake El Station

Map made by author

Current Development

The current development of Oak Park contributed to its selection for this report. There are many areas throughout the village known for pedestrian traffic and a combination of commercial and residential uses. Mixed-use development is ideal for areas adjacent to transit stations and is another reason why Oak Park was an ideal case study for this report. This village is also known for its immense amounts of transportation options. It is located along both the blue and green El lines, the Metra line, has cars from two car-sharing organizations, many bicyclists, and its own pedicab service (*Performance*). Oak Park also has ten Pace bus lines and eight CTA bus lines ("Getting Around"). Due to the village's many transportation options, in the year 2000, Oak Park residents were found to have one of the lowest VMT rates in the Chicago suburbs ("Getting Around").

North Marion Street Development

The North Marion Street development is located along the far western edge of the Village of Oak Park. This project was a collaborative effort of the Lakota Planning Group, Metro Transportation, Strand Associates, Village Staff, and the Streetscape Design Committee ("Marion Street Presentation"). The main goals of the project were to update the sewer and water system, open the streets to autmobiles, and improve the streetscape of the area ("Maron Street Presentation").

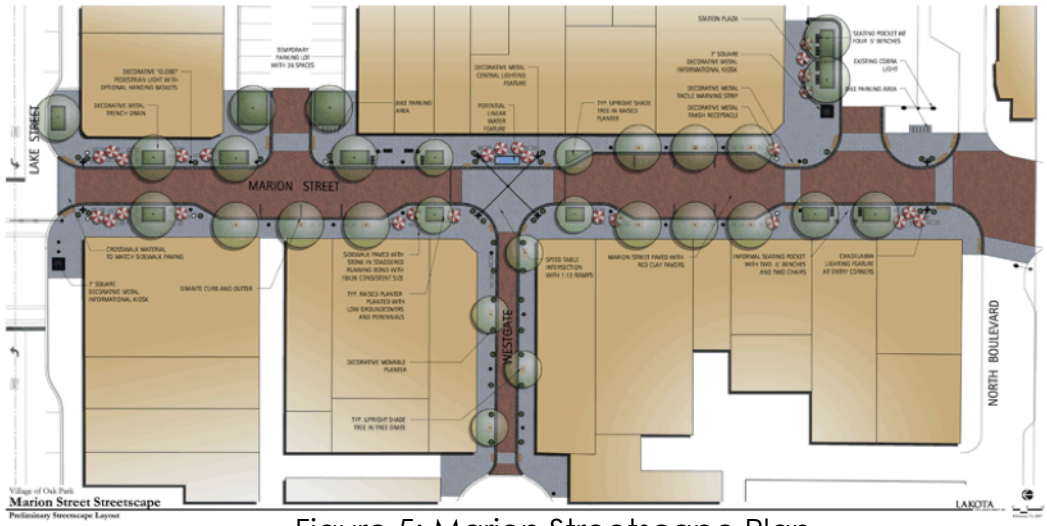


Figure 5: Marion Streetscape Plan
("Marion Street Presentation")

Figure 6: Marion Streetscape Plan
("Marion Street Presentation")

The section of North Marion Street from North Boulevard to Lake Street was the only piece remaining of what once was a pedestrian mall created in 1974 ("Planning Marion Street"). It was decided that in order to

boost economic development that the mall would be reopened to automobile traffic, but the streets would be very narrow to slow traffic and maintain a pedestrian friendly area ("Planning Marion Street"). Additionally, in an effort to maintain the historic feel to the area, bricks were laid in the street and bluestone pavers were used to line the sidewalks ("Planning Marion Street"). The sidewalks were projected to be approximately 10 to 18 feet in width in order to promote walking and community interaction on the sidewalks ("Planning Marion Street"). This project was completed and first opened on November 20th, 2007 ("Planning Marion Street"). On May 8th, 2008, fountains were added to the streetscape of the North Marion Street development in attempt to improve the aesthetic of the area ("Planning Marion Street").

Due to the successful execution of the North Marion Street development, the Illinois Chapter of the American Planning Association granted it an award in 2008 in its *implementation of a plan* category ("Planning Marion Street"). Shortly after receiving the award from the APA, the development also won an award from the Center of New Urbanism for its streetscape and the way that it framed the area's buildings ("Planning Marion Street"). Additionally, the project won an award from the Brick Industry Association for its use of bricks in architecture in 2008 and was featured in *Landscape Architecture and Specifier News* ("Planning Marion Street"). Lastly, in December of 2009 the

North Marion Street development won the highest urban design award from the Illinois Chapter of the American Society of Landscape Architects, and in May of 2010 it won the highest merit award from the Chicago Building Congress in the infrastructure construction category ("Planning Marion Street").

One of the weaknesses of this project is that there is not evidence that the development on North Marion Street has been effective in increasing public transportation usage. Data from the Chicago Transit Authority documents that there was slight growth in daily ridership following the completion of the North Marion Street development, but after a year ridership returned to levels similar to those before the implementation (City of Chicago). Additionally, there are still a large number of people relying on their automobile to commute to the area. This has caused congestion issues and problems due to a lack of parking. Oak Park Trustee, Ray Johnson, stated that "he thinks Oak Park should focus more on getting people to bike and ride the train to its main shopping districts rather than building hundreds of new parking spots, as called for in the plan ("Is Oak Park ready").

Figure 7: North Marion Street Development
Photo taken by author

Pleasant District

The Pleasant District is the name that was given to the area previously called South Marion Street. This area was also one designed by the Lakota Group, which started the reconstruction on June 6th, 2011 ("Planning Marion Street"). This construction is an extension of the work done on North Marion Street in 2007 and will improve the sewer system as well as the aesthetics of the area ("Planning Marion Street"). This project is estimated to cost $5.5 million, and thus is controversial among both Oak Park business owners (Jaworski). Some business owners are in support of the construction, while others are struggling to maintain their businesses in the process. A restaurant in the area has seen sales drop 15% since the start of the construction, and another business owner had to get a second

job to save his business (Jaworski). Other business owners do not mind the construction and are looking forward to its benefits once it is finished. The Marion Street Cheese Shop was previously located on North Marion Street and saw the benefits of the construction at that site. The owner is now looking forward to the same outcome occurring in the Pleasant District as well (Jaworski). Compared to previous controversy over the construction of North Marion Street, officials were more in support of the construction in the Pleasant District due to the areas aging utilities and the dilapidated streets ("Oak Park trustees").

Figure 8: Current Status of the Pleasant District
Photo taken by author

Chelsea Station

In 2006, the Village of Oak Park approved Morningside Equities Group to develop the area at the intersection of South Boulevard and Harlem Avenue ("Is Oak Park ready"). This development was going to be the first development specifically planned around mass transit and was planned to consist of 96 condominium units and 12,500 square feet of retail space (Harlem&South). Within its Downtown Master Plan, Oak Park identified this intersection, the future site for the Chelsea Station, as an area in need of improvement due to its heavy automobile traffic ("Greater Downtown" 46). OakPark.com editor and publish, Dan Haley, also referred to Harlem Avenue as the ugliest street in Oak Park and commented on the area saying, "The Whiteco/Oak Park Apartments on Harlem is a travesty against all that is good about Oak Park. That structure is the symbol of every political, planning and financial failing Oak Park could muster. And there it sits" (Haley). Unfortunately, as of 2008, the Chelsea Station project was delayed indefinitely due to downturns in the market ("Is Oak Park ready").

Figure 9: Current status of proposed Chelsea Station
Photo taken by author

Field Study

I was able to spend time in the study area analyzing the transit zone. Once I arrived at the Harlem/Lake El station in Oak Park, I exited the station and walked north on Harlem Street to the corner of Harlem and Lake. I started my observations from this intersection and began walking down the street capturing photographs, taking notes, and listening for any comments that passersby made about the area. After walking down the primary development on Lake Street, I entered the Visitors' Center to speak with the employees about what they knew about the areas of interest. Once I finished speaking with the individuals at the Visitors' Center, I returned west on Lake Street to the intersection of Lake and

North Marion. At this point, I took the time to make an in depth analysis of the North Marion Street development. I took note of the brick roadway, the fountains, the decorative lights, and which stores were located on this street. I also observed the way that people moved throughout the area and the way in which they utilized the public space. From the North Marion Street development, I proceeded south down Marion Street to the construction site of South Marion Street, which has been renamed the Pleasant District. The time spent in this area was primarily spent taking pictures and envisioning how it will connect to the area north of the El tracks. The area was almost desolate, so I was not able to make note of how people moved throughout this area. Once my observations in the Pleasant District were complete, I then returned west to Harlem Avenue. I walked down Harlem Avenue from North Boulevard to Lake Street and then returned to North Boulevard. While walking down Harlem, I attempted to reconcile how this street and its developments connected with those on Lake and Marion and what the developer's intent may have been for designing and building the area in the chosen fashion. After spending some time on Harlem Avenue, I walked south down Harlem to the intersection of Harlem and South Boulevard, the location for the future Chelsea Station. I investigated the area, searching for any sign of the future development. Lastly, I observed the individuals who currently use this area and envisioned how the demographics and use of the area

is likely to change following construction.

These observations and inquiries produced valuable information for my study. One noticeable aspect of the developments around the Harlem and Lake Street El stop is that it is a very dichotomous area. The main contradiction is one between a transit-oriented development and a car-oriented development. There is a mixture of mixed-use and transit-oriented development with big box stores and large parking lots.

The North Marion Street development was very clearly built for the pedestrian. Proceeding from Marion Street onto Lake Street, there are more cars and a wider road, yet it is still a fairly dense area with mixed uses. Continuing west Lake Street, however, the development changes from dense, mixed-use to low-density, single story, big boxed stores with large, sprawling parking lots.

A perplexing aspect of the area surrounding the Harlem/Lake El Station is the presence of so many automobiles. The North Marion Street development possesses many of the normative characteristics suggested by the performance-based typology for transit-oriented developments, however, just beyond this development there is a large number of cars. Pedestrians move comfortably throughout the North Marion Street development and along much of Lake Street, but they then disperse into their automobiles. This contradiction suggests that the performance-based typology might not fully evaluate the effectiveness of a transit-

oriented development.

The Pedestrian Space Method

The study area of the transit zone surrounding the Harlem/Lake transit station suggests that there may be limitations to the traditional performance-based place-type typology that is used to measure the effectiveness of a transit node. Therefore, I would like to propose an alternative method for evaluating the transit-orientation of an urban area called the Pedestrian Space Method.

Implementing the Pedestrian Space Method

I developed the Pedestrian Space Method based on Horvath's machine space method to evaluate a transit zone (Horvath 1974). In this method, I delineated "people" spaces (green) and "machine" spaces (red) in the ¼-mile radius surrounding the Harlem/Lake El station. A ¼-mile radius was chosen for this method since it is a walkable distance for most demographics within the population. This was done using my own field observations, an aerial photograph and ArcGIS. Figure 10 displays the Pedestrian Space Method implemented for the transit zone around the Harlem/Lake transit station.

A machine space is one in which a machine (automobile) is given priority, whereas a people space in one where people are given priority

(pedestrian-friendly). I defined specific characteristics to classify each type of space. Those types of characteristics are:

People Space:

- Mixed use
- Wide sidewalks
- Aesthetic streetscape (fountains, street lamps, tree-lined)
- Retail space directed toward pedestrians
- Traffic calming devices (speed bumps, tree medians)
- On-street parking

Machine Space:

- Wide traffic lanes
- Large off-street parking lots
- Alleys
- Areas without sidewalks
- Narrow sidewalks near busy streets

Results and Discussion

Figure 10: Pedestrian Space Method for Harlem/Lake Transit Zone

The green areas on this map are people spaces. These are areas in which people are given in the priority. The red areas on the map are machine spaces. These are areas in which machines, such as automobiles, are given priority.

North Marion Street

One can see that North Marion Street is green, which suggests that the area is primarily designated for people. This characterization also suggests an effective transit-oriented development, however, the North Marion Street development is not connected to a network of other green, people spaces. Such disconnect discourages people from walking or biking to take the area or to the public transit station. As automobiles are given greater priority in space, people feel less safe and less inclined to move through it outside of a machine. In order for North Marion Street to truly be effective in increasing the use of public transit, the network of people space must be expanded further, especially to the surrounding residential area.

The Pleasant District

The Pleasant District is in the process of becoming a people space. Additionally, once the development is complete, it will be connected to the North Marion Street development. Although these two pedestrian-friendly developments will be connected, the area's network does not comfortably lead people much further due to lack of connectivity. The Pleasant District will be a truly effective transit-oriented development when more space is designated for

people, it is better connected, and people are encouraged to walk, bike, and take public transportation.

The Chelsea Station

The proposed Chelsea Station is one with intense machine space. Not only is this area disconnected from people spaces, but it also has very dense machine space. The streets are wider, the parking lots are larger, and thus people feel less comfortable outside of a vehicle. This is an area with great potential for improvement, but if this area is going to be successfully transformed into a transit-oriented development, traffic-calming devices must be implemented, parking lots must be consolidated, and more space must be given to people rather than machines.

The results of this project demonstrate that although this transit zone fits the definition of a transit-oriented development, there are few pedestrian spaces, and those that do exist are bounded on the west due to large parking lots. This situation creates an environment in which the automobile is still needed because pedestrians are not given priority when traveling from residential areas to the transit-oriented development. This rationale explains why the development possesses many of the characteristics and normative metrics of TOD models, yet after the completion of the North Marion Street Development the area did not

maintain increased transit ridership but instead faced increased automobile usage.

The results also provide a quantitative metric that can be used in addition to the qualitative analysis. The ratio of the people space to machine space gives a numerical representation of the pedestrian-orientedness of the development. Within the study area, there is 0.0057 square miles with priority given to people and 0.08 square miles with priority given to automobiles, thus there is a ratio of 0.07125 between people and automobile space. Since this metric has not been calculated previously, it is difficult to compare to the areas surrounding other transit stations.

Applications and Future Directions

This study found that in addition to the metrics provided by the Performance-based Place Type Typology, another metric, the ratio of people spaces to machine spaces can be employed to characterize transit zones. Additionally, this new method of coding people and machine spaces in a transit zone allows us to begin analyzing the extensiveness and connectivity of the pedestrian network. The Pedestrian Space Method provides the ability to start comparing transit zones within the same system and across different cities.

The evaluation of transit zones is important in time when resources

are diminishing and the use of public transportation is becoming more important. Transit-oriented developments build community, provide safer traveling spaces for pedestrians, and stimulate economic development. Analysis of transit zones provides insight regarding whether transit zones are pedestrian-oriented and direct people toward the transit station.

Further study of the Pedestrian Space Method should provide more resolution and broaden the number of categories that differentiate between people and machine space. Additionally further analysis of pedestrian extensiveness and connectivity would be beneficial for a more thorough evaluation.

Works Cited

Belzer, Dena, and Gerald Autler. "Transit-oriented The Brookings Institution Center on Urban and Metropolitan Polic, June 2002. Web. 9 Dec 2011. <http://www.brookings.edu/es/urban/publications/belzertod.pdf>.

Bernstein, Scott, and Carrie Makarewicz. "Rethinking Affordability." *Community Wealth*. N.p., n.d. Web. 16 Oct 2011. <http://www.community-wealth.org/_pdfs/articles-publications/tod/article-bernstein-mak.pdf>.

Carlton, Ian. " Histories of Transit-Oriented Development: Perspectives on the Development of the TOD Concept." MA thesis. University of California, Berkeley, 2007. Web. <http://iurd.berkeley.edu/publications/wp/2009-02.pdf>.

"Center for Transit-Oriented Development." *Center for Neighborhood Technology*. Center for Neighborhood Technology, n.d. Web. 16 Oct 2011. <http://www.cnt.org/tcd/ctod>.

Center for Transit-Oriented Development. Center for

Transit-Oriented Development, n.d. Web. 30 Sep 2011. <http://www.ctod.org/portal/>.

The City of Chicago. Chicago Transit Authority. CTA – Ridership - 'L' Station Entries - Daily Totals. Web. <http://data.cityofchicago.org/Transportation/CTA-Ridership-L-Station-Entries-Daily-Totals/5neh-572f>.

The City of Oak Park, Illinois. Community Planning and Development. *Oak Park Zoning Ordinance*. 2002. Web. <http://www.oak-park.us/public/pdfs/zoning/Ordinance Updates/03.10.09_revised_zoning_ord.pdf>.

"Climate Change." National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 20 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/climate-change/>.

"Community." Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/public/pdfs/new_resident/02_community.pdf>.

"Create Livable Communities."National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 20 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/livable-communities/>.

"Ease Traffic Woes." National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 20 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/ease-congestion/>.

"Economic Revitalization." National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 21 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/economic-revitalization/>.

Farr, Douglas. Sustainable Urbanism: Urban Design with Nature. Hoboken, New Jersey: John Wiley & Sons Inc., 2008. Print.

Foote, Kenneth E., and Shannon Crum. "Machine

Space: A Case Study in Urbanization and Environment." . The University of Texas at Austin, 1996. Web. 11 Nov 2011. <http://www.colorado.edu/geography/virtdept/stylesheets/samples/machine_space/html/body.html>.

Gobillon, Lauren, Harris Selod, and Yves Zenou. " The Mechanisms of Spatial Mismatc." *Urban Studies.* 44.12 (2007): 2401-2427. Web. 2 Mar. 2012. <http://www.parisschoolofeconomics.eu/IMG/pdf/ArticleZenou1.pdf>.

"Getting Around." Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/About_Our_Village/getting_around.html>.

"Greater Downtown Master Plan."Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/public/pdfs/Downtown Plan/03.21.05 GDMP.pdf>.

Haley, Dan. "Ugliest street in Oak Park? Harlem, hands down."OakPark.com 26 Apr 2011. n. pag. Web. 23 Oct. 2011. <http://www.oakpark.com/News/Articles/04-

26-2011/Ugliest_street_in_Oak_Park?_Harlem,_hands_down>.

"Harlem&South." Oak Park. n.d. Web. 23 Oct 2011. <http://www.oak-park.us/News/Special_Report_Harlem-South_Planning.htm>.

Horvath, Ronald J. "Machine Space."Geographical Review. 44.2 (1974): 167-188. Web. 11 Nov. 2011. <http://www.jstor.org.proxy.lib.muohio.edu/stable/213809?&Search=yes&searchText=Machine&searchText=Space&list=hide&searchUri=/action/doAdvancedSearch?q0=Machine+Space&f0=ti&c1=AND&q1=&f1=all&acc=on&wc=on&Search=Search&sd=&ed=&la=&jo=&prevSearch=&item=1&ttl=14&returnArticleService=showFullText>.

Jaworski, Jim. "Opinions Mixed on Marion Street Construction." *Trib Local* 05 Aug 2011. n. pag. Web. 21 Oct. 2011. <http://triblocal.com/oak-park-river-forest/2011/08/05/opinions-mixed-on-marion-st-construction/>.

"LEED 2009 for Neighborhood Development Rating System." LEED 2009 for Neighborhood Development. USGBC, Nov 2011. Web. 2 Mar 2012.

"Marion Street Presentation." Oak Park. n.d. Web. 21 Oct 2011. <http://www.oak-park.us/public/pdfs/Downtown Plan/Marion Street/Presentations/02.15.07_Village_Board_Presentation.pdf>.

"Older Adults." National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 20 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/older-adults/>.

"Oak Park History." The Historical Society of Oak Park and River Forest. n.d. Web. 21 Oct 2011. <http://www.oprfhistory.org/explore_local_history/oak_park/default.asp&xgt;.

"Oak Park History." *Oak Park Public Library*. 2011. Web. 15 Sep 2011. <http://www.oppl.org/research/ophistory.htm>.

Performance-Based Transit-Oriented Development

Typology Guidebook. Center for Transit-Oriented Development, Dec 2010. 1-90. Web. 16 Oct 2011. <http://www.cnt.org/repository/TOD.TypologyGuidebook.pdf>

"Planning Marion Street." Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/planning/Planning_Marion_Street.htm>.

Renne, John L. "From transit-adjacent to transit-oriented development." Local Environment. 14.1 (2009): 1-15. Web. 9 Dec. 2011. <http://web.ebscohost.com.proxy.lib.muohio.edu/ehost/pdfviewer/pdfviewer?sid=2f28327e-ebae-48d7-ba62-192ba056490a@sessionmgr15&vid=6&hid=10>.

Rodrigue , Dr. Jean-Paul , and Dr. Claude Comtois. *The Geography of Transport Systems*. Routledge, 2009. Ch. 8. Web. <http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/ch8c1en.html>.

Stempniak, Marty. "Is Oak Park ready to start building again?."OakPark.com 20 Sep 2011. n. pag. Web. 21 Oct. 2011.

<http://www.oakpark.com/News/Articles/09-20-2011/Is_Oak_Park_ready_to_start_building_again?>

Stempniak, Marty. "Oak Park trustees give South Marion redo the go-ahead, Avenue on back burner."OakPark.com 10 May 2011. n. pag. Web. 23 Oct. 2011. <http://www.oakpark.com/News/Articles/05-10-2011/Oak_Park_trustees_give_South_Marion_redo_the_go-ahead,_Avenue_on_back_burner>.

"Transit-Oriented Development."*Chicago Metropolitan Agency for Planning* . Chicago Metropolitan Agency for Planning , n.d. Web. 16 Oct 2011. <http://www.cmap.illinois.gov/strategy-papers/urban-design/transit-oriented-development>.

"Transportation Costs." National Complete Streets Coalition. National Complete Streets Coalition, n.d. Web. 20 Oct 2011. <http://www.completestreets.org/complete-streets-fundamentals/factsheets/transportation-costs/>.

United States. Federal Transportation

Administration. *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*. Transportation Research Board, 2004. Web. <http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_102.pdf>.

"Village Background." Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/village_background/Village_Background.html>.

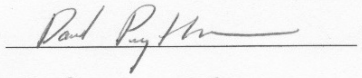
"Village History." Oak Park. Oak Park, n.d. Web. 21 Oct 2011. <http://www.oak-park.us/village_background/Village_History.html>.

Evaluating Transit-Oriented Development Effectiveness:

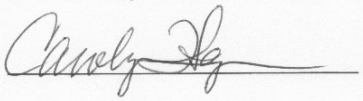
A Case Study of Oak Park, Illinois

Approved by:


Thesis Advisor


Thesis Reader


Thesis Reader


Director of University Honors Program