CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

THE GROWTH EFFECT:
COMMUTER RAIL IN SUBURBAN SOUTHERN CALIFORNIA

A thesis submitted in partial fulfillment of the requirements

For the degree of Master of Arts in Geography

By

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ABSTRACT

The Growth Effect: Commuter Rail in Southern California

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The Los Angeles Metropolitan region once hosted the world's largest interurban railway system in Henry Huntington's Pacific Electric Railway (P. E.) during the first half of the 20th century. By the early 1960's, this great system diminished and was replaced by the world's most extensive freeway system which defines the spatial landscape of the Southland today. In 1992, commuter rail returned to the Southland in the form of the Metrolink Commuter Rail system. Over the last 20 years this system has expanded greatly in both ridership and route mileage. This paper explores the role and impact of commuter rail in automobile-rich Southern California. By using rail passenger historical ridership data, Metrolink ridership data and surveys, corridor development, and property value assessments this thesis explores how the Metrolink system has impacted local geography. New geographies have emerged and continue to emerge throughout many Southland cities with the growth of Transit-Oriented Development (TOD). Despite the common literature that pertains to higher property values with convenient transit access, most TOD's in the Southland have yet to yield higher property values than nearby areas.

Chapter 1: Introduction

Prior to mid- 20th century, the Los Angeles area once had the world's most extensive urban and interurban railroad transportation system in Henry Huntington's Pacific Electric and Los Angeles Railways. When the last of the famed streetcar lines was discontinued in 1963, the automobile along with extensive freeways began to dominate the spatial landscape of the Southland. For the next two decades planning efforts focused on the freeway systems, and as a result many new freeways were built in order to keep pace with the ever expanding automobile traffic. It was during this period when the images of wide freeways and "fast cars" bolstered the Los Angeles area in obtaining the reputation as the "car capital" or "freeway capital" of the world (Bottles, 1987). However, a series of events coupled with a rapidly expanding population led many citizens and urban planners alike to recognize that an automobile dependent transportation system cannot be sustained in the Los Angeles Metropolitan Region. The main reasons why an automobile dependent transportation system is unsustainable in the Southland are gridlock and air pollution, since the freeway system alone cannot accommodate the capacity for the growing population and automobiles. The physical geography of the Southland creates a trap for air pollution, because the prevailing winds carry pollutants toward the surrounding mountain ranges which form a barrier and causes smog to accumulate, causing major environmental and health problems. This unsustainable system was in need of a mitigation solution. Recognizing this unsustainable transportation infrastructure, Los Angeles and many other county and municipal governing bodies embarked on an aggressive plan to reinstate rail service in the Southland during the 1980's (Dorothy Peyton Gray Transportation Library, 2015). This came in the form of the MTA Metro Rail in 1990 and the Southern California Regional Rail Authority's Metrolink commuter rail in 1992. Of these two systems, the Metro Rail is operated under the Los

Angeles County Metropolitan Transit Authority, and its routes are primarily urban, serving higher population density areas throughout Los Angeles and neighboring cities. The Metrolink, which operates under the Southern California Regional Rail Authority, is a commuter rail system that serves mainly suburban communities in Los Angeles, Ventura, San Bernardino, Riverside, Orange, and San Diego Counties.

1.1: Significance of the Study

The reason why this thesis focuses on the Metrolink rather than the Metro Rail system is that the Metrolink is interurban in nature, and some of its routes are highly reminiscent of the Pacific Electric Railway. The Pacific Electric is an appropriate comparison because it was a catalyst for the growth of the Los Angeles Metropolitan Region during the first half of the 20th century (Crump, 1965). The reason for this growth was that rail development coincided with real estate interests, especially that of Henry Huntington's (Crump, 1965). The Metrolink System has grown tremendously in both track mileage and ridership during the last 22 years, and this thesis investigates whether this expansion has been a catalyst for the many developments and revitalizations that have arisen on or near its corridors.

There have been many studies on the Pacific Electric, Los Angeles Railway, Metro Rail, and the Metrolink. An early study was a 1965 Master's thesis written by (Smith, 1965) at San Fernando Valley State College (now California State University, Northridge), entitled *The Role of Interurban Railways in the Los Angeles Area*. Smith analyzed the linear development patterns that were associated with the growth of the Pacific Electric Railway. He also emphasized the founding of several new municipalities during its expansion phase in the first two decades of the 20th century. This thesis will be similar in that it re-examines the impact in relation to the current Metrolink system. It will be different in the fact that it focuses on how the re-

introduction of regional rail service impacts communities that were mainly auto dependent for more than three decades. The variables that will be measured include Transit-Oriented Development (TOD) at various Metrolink stations, Transit-Adjacent Development (TAD), as well as new development and property values and their relation to distance from a station, and revitalization in the older communities it serves.

To the best of my knowledge, only a few studies have focused exclusively on commuter rail and its effects on Transit-Oriented Development, Transit-Adjacent Development and nearby property values. Most of the literature on TOD's is near urban core areas, not suburban areas. This thesis will also go beyond Transit-Oriented Development, since I also intend on checking population growth and property values within the municipalities that the Metrolink serves.

1.2: Limitations of the Study

As mentioned, not much of the literature regarding the impact of transportation corridors on development and property values has focused on the Los Angeles Metropolitan Region. There have been numerous studies of Transit-Oriented Development; however, these have been chiefly urban examples, not suburban. I attempt to bridge the gap in urban focused transit studies and see how high density rail development as well as Transit-Oriented Development can be applied to Southern California's Metrolink system, and analyze the development effects that the Metrolink has had on automobile-dependent Southern California since 1992. The spatial geography of Southern California may challenge traditional models and concepts due to its unconventional sprawl. However, by using a combination of indicators ranging from Transit-Oriented Development, chronological building assessment, local geography, ridership data, and property value assessments at selected stations, I may provide adequate information to draw conclusions on the effects of the Metrolink commuter rail system.

1.3: Research Question

A commuter rail station is an amenity, and when considering the pricing of property value and development, proximity to a commuter rail station should have an impact. (Kilpatrick, et. al., 2006) and (Seo, et. al., 2014) used the Hedonic Pricing Model to measure the impacts of transit corridors and property value, while (Boarnet & Crane, Public Finance and Transit-Oriented Planning: New Evidence from Southern California, 1998) wrote about the effects of Transit-Oriented Development. These are just a few examples of the vast array of transit literature that has focused on the success of transit related projects on the economy. The research question is whether commuter rail lines, and in this study the Metrolink induce growth and development? It is reasonable to say that commuter rail line stations offer the conditions that are favorable for lucrative residential and commercial developments within their proximities. In addition to development and re-development, commuter rail line stations are an attractive transportation node amenity that have a positive effect on property value and render it higher in areas within the vicinity of a station versus areas that are not in a close proximity.

Chapter 2: Literature Review

Commuter railroads transport millions of people between city centers and peripheral suburbs in several cities throughout the world. In addition to transporting millions of commuters they also play a role in reducing automobile traffic congestion and air pollution. For this reason as well as their rapid growth in the last three decades, there has been an abundance of research on commuter rail, which include historical commuter rail development, impacts on development, and their integration into urban/regional planning.

2.1: Commuter Rail in North American Cities

Commuter rail was once a staple in North American cities throughout the first half of the 20th century. The Interstate Highway Act of 1956 led to a dramatic decrease in commuter rail track mileage and many cities scrapped their systems altogether. Some of these cities, such as Chicago, New York, Boston, and Philadelphia maintained their historical commuter rail routes, and it should not come at a surprise that the great deal of research pertains to the systems of these respective cities. Chicago's Metra system, arguably one of North America's most extensive and successful commuter rail systems, has a vast array of scholarship. There are many other cities that have been on the rebound. For example, Minneapolis St. Paul has recently reinstated commuter rail, while others, such as Salt Lake City, Albuquerque, and Nashville have recently introduced commuter rail. An early example of a publication of commuter rail is "The Demand for Commuter Rail Transport" (McDonough, 1973), which explores the mechanisms that create demand for commuter rail. Commuter rail started to become a popular topic in transportation journals during the 1990's, which was a time when many cities were aggressively implementing rail transportation into their planning priorities. (Voith, 1997) did a study on the SEPTA commuter rail system in Greater Philadelphia in which he compared service levels and fares and

how they can impact commuter rail ridership in the long run. Voith's results of his statistical tests were significant in that changes in fares and service levels occurs with a lag and that the effects in the long run would be double that of the short run (Voith, 1997). As far as pricing, their elasticity effect was slightly larger in the short run than the long run. This is expected because changes in fares tend to have more of an impact on riders during the period immediately after and their effects level off as time passes (Voith, 1997). One of the biggest issues that commuter railroads have to contend with is freight railroads. The majority of commuter rail lines use host railroads which are privately owned freight railroads. Scheduling conflicts are common since freight railroads generally put scheduling priorities on their own freight trains. "Use of Freight Rail Lines for Commuter Operations: Public Interest, Private Property" (Spitnulnik & Rennert, 1999), explored the issues of freight railroads and the intersection between the issues surrounding public and private ownership as well as public-private partnerships.

2.2: Commuter Rail in Southern California

It is reasonable to say that the Los Angeles area was built on rails. Henry Huntington's Pacific Electric and Los Angles railways once comprised the most extensive urban and interurban rail systems in the world. For this reason, there is an abundance of research on the P. E. and LARY. An example is "Ride the Big Red Cars: How the Trolleys Helped Build Southern California" (Crump, 1965), which depicted how the development of many communities throughout the Southland coincided with the development of the Pacific Electric. Aside from the literature pertaining to the Pacific Electric Railway, there is also an abundant amount of research on the role of the automobile and the dismantling of the Pacific Electric. Included in this list is the book "Los Angeles and the Automobile" (Bottles, 1987), which argues how it was economic forces that dismantled the Pacific Electric and not the "Great Streetcar Conspiracy". Bottles

expanded his argument by expounding how the Pacific Electric was perceived as inefficient, corrupt, and dangerous, and how the automobile became a welcoming alternative for Angelinos. Other books that pertain to the demise of the local railways in the Southland is "From Railway to Freeway: The Motor Coach in Southern California" (Bail, 1984). Here, Bail investigated the growing usage of the motor coach and how the motor coach lines were instrumental in bringing down the Pacific Electric Railway. The Pacific Electric's own bus service, as well a National City Lines and Metropolitan Transit Lines were discussed as instrumental to bringing about the demise of rail service.

Aside from literature pertaining to the Pacific Electric and the demise of the system, there is a great deal of literature pertaining to the revival of urban and commuter rail systems in the Southland on both the Metro Rail and Metrolink systems. Much of the literature on the Metrolink system was completed during the 1990's, which is expected because the system began service in 1992. In 1995, Clark Brewerton published "Forging the Link," which explained Metrolink's rapid response and expansion following the 1994 Northridge Earthquake. Brewerton explained how the prompt action and cooperation between Metrolink and the host freight railroads allowed Metrolink to expand two of its lines to serve the transportation needs of many people following the Northridge earthquake. "Learning from Los Angeles: Transport, Urban Form, and Air Quality" (Wachs, 1993), depicted the aggressive policies of many public and private entities throughout the municipalities of Southern California that pertained to pro-rail transit policies, including the development and expansion of commuter rail. There is also an abundance of literature pertaining to commuter rail at the local level, such as "Transportation in Suburbia: Trends in Attitudes, Behaviors, and Policy Preferences in Orange County, California" (Baldassare, 1991). Much of this article investigates if auto dependent Orange County residents

will change their commuter travel habits from the automobile to mass transit. Based on the results, Baldassare was able to debunk the myth that suburban Orange County residents will refuse mass transit and remain auto dependent.

2.3: Impacts of Commuter Rail

This thesis measures the impact on the Metrolink system in terms of both residential and economic growth near the lines it operates on. In the last two decades there has been a growing interest in the effect of property values and rail transit stations. They include Transit-Oriented Developments, Hedonic pricing models, and commuter sheds. Topics about Transit-Oriented Development have been a trend since the revival of local and commuter rail systems began during the 1980's. There has also been a great deal of debate throughout the academic, government, and professional communities on how to go about Transit-Oriented Development in terms of creating, planning, and financing. "L. A. Story: A Reality Check for Transit-Based Housing" by (Boarnet & Crane, 1997) is about the effectiveness of Transit-Oriented Development and their research indicated that TOD's need to be of mixed use in order to be effective, not the common residential-only models. They also published "Public Finance and Transit-Oriented Planning: New Evidence from Southern California" in 1998 about public policy and Transit-Oriented Development, which was about how numerous cities throughout Southern California have adopted Transit-Oriented Development into their zoning policies.

One of the great interests that both developers and municipal planners seek is the effect on property value when designing a rail line. A popular statistical model that is used to calculate such effects is the Hedonic Pricing Model. The Hedonic model measures the valuation of property value through locational attributes and is often used in statistical regression models. There has been an abundance of research on Hedonic pricing models. A notable work on the

Hedonic model is “The Impact of Transit Corridors on Residential Property Values” (Kilpatrick, et. al., 2006), a study on property values and the effects of the Interstate 90 corridor in two Seattle neighborhoods. The results of the study for the Mt. Baker neighborhood near the Interstate 90 corridor was that home prices increase with growing distance from the Interstate 90 tunnel, with the most prominent increase occurring at a distance of 0-300 feet away. They found that prices generally leveled off beyond 300 feet which supported the author’s hypotheses that potential home buyers were willing to trade off longer commute times in exchange for the noise, pollution, and potential crime that is often associated with transit corridors (Kilpatrick, et. al., 2006).

In addition, there was a similar publication written by (Seo, et. al., 2014) that tested the combined impacts of highways and light rail transit on residential property values in Phoenix, Arizona. This article built upon Kilpatrick’s article in that it combined transportation nodes, and compared and contrasted the impacts of both by using the Hedonic model. The results concluded that peak home prices were at intermediate distances from highway onramps and light rail stations, with 900 meters being the average distance from a light rail transit (LRT) station. (Dube, et. al., 2013) performed a study on Montreal’s commuter rail system, and concluded that premium property values were found 10 km or more from the central business district (CBD). Based on this study, it is safe to say that property values and commuter rail stations have a positive correlation when more than 10 km from the CBD.

2.4: Commuter Rail Ridership

Another heavily researched topic in commuter rail is station parking lots and commuter sheds. Since a large percentage of commuter rail passenger’s drive and park at the station for their daily commutes, parking lot capacity has a large impact on the ridership of a commuter rail

system. For this reason, many transportation scholars have published research on these issues. (Devajyoti, 2006) discussed the policies that many municipalities along the New Jersey Transit Commuter rail system have enacted that restrict commuter rail parking to residents only. Devajyoti found ample evidence that such practices can deter non-residents who are in close proximity to end up driving to their work destination and forgo the rail option. Commuter shed models were displayed in this paper. (Lindsey, et. al., 2010) published an article about the role of geographical proximity from rail transit systems for journey-to-work trips and ridership for the Chicago Transit Authority (CTA) and Metra rail systems. Parking lot size as well as commuter shed theories was included in this paper. They concluded that there is a higher ridership and greater potential for transportation mode shift on the CTA system due to the fact that it covers areas with higher population densities. Furthermore, they claimed that mode shifting from automobile to railroad in the outer suburbs can have the greatest reduction in carbon emissions.

Chapter 3: Methodology and Data

I used a methodology that consists of statistical data for property value assessment, chronological assessments on development, and Metrolink ridership data. These three methodological approaches will be used as the criteria to address the research question.

3.1: Methodology

Despite the fact that there are several adequate study site locations, it is impossible to collect enough data to support every indication of rail induced growth and development. The unconventional urban geography presents the biggest challenge since there are several factors that influence development and property values. Surveys and interviews were originally considered, however, getting interviews form elected officials or TOD landlords can prove quite difficult for the time frame. Also the information obtained in the interviews would likely be of only limited use toward the study, since answers would likely be biased and this would potentially prevent a fair assessment of the study. Surveying, such as mail surveys to TOD residents, may be difficult and unreliable to form decent data that can be statistically analyzed, so that was ruled out. The stations selected in the study site provide the best representations because each is a representative of the typical geographical and demographical factors that occur on every line in the Metrolink system. However, each of the study sites mentioned has their own unique conditions and may have limited representation of the factors that play out at every station in the entire system.

The Hedonic Pricing Model, which is a revered preference model for valuation is most commonly used in real estate by testing environmental factors in relation to property valuation (Gunimeda, 2014). However, the use of the Hedonic model would have been quite tedious for this project because of the magnitude of data that needs to be collected in order to obtain

favorable results. In addition to the high data volume collection, the unique geography of the Southland as mentioned would likely render the Hedonic pricing model results to limited use, since in real estate, the tested variables in the Hedonic model include interior, exterior as well locational features that affect the price of a house (Cebula, 2009).

The methodology used in this thesis for the property value assessments consist of cluster sampling of residential property data by Zillow and commercial property(Irvine only) by LoopNet to compare similar properties at different distances relative to the station in the case studies. All property comparisons had similar features, which included house configuration (no. of Bedrooms, Bathrooms), neighborhood characteristics, and local geography. For example, hill properties were avoided (with a few exceptions) because of the view effect. This comparison of property values can give an indication on whether close vicinity to a commuter rail station equates to higher property value, which can potentially validate my theory that Metrolink rail stations are an attractive locational amenity which will be reflected in nearby property values. In addition, I also conducted on-site observations at the case study stations.

3.2: Data

My primary data comes from Metrolink, specifically their quarterly reports and onboard surveys. Another major source of data came from the Dorothy Peyton Gray Transportation Library, which houses a large collection of historical archives for public transportation in Southern California. Real Estate data was obtained through the residential property website Zillow(sale and rent values) and the commercial property website LoopNet. In addition, I obtained secondary data from a vast array of literature, which include scholarly works on the subjects of transportation geography, real estate, urban planning, transportation engineering, and newspaper archives from local newspapers in Southern California, most notably the Los Angeles

Times and Orange County Register.

For the case studies selection, I selected sites that vary in spatial geography and are representative of the different characteristics of suburban communities throughout the Southland. They include: Fullerton, Irvine, Orange, Simi Valley, Santa Clarita, Covina, Rancho Cucamonga, and Corona-North Main.

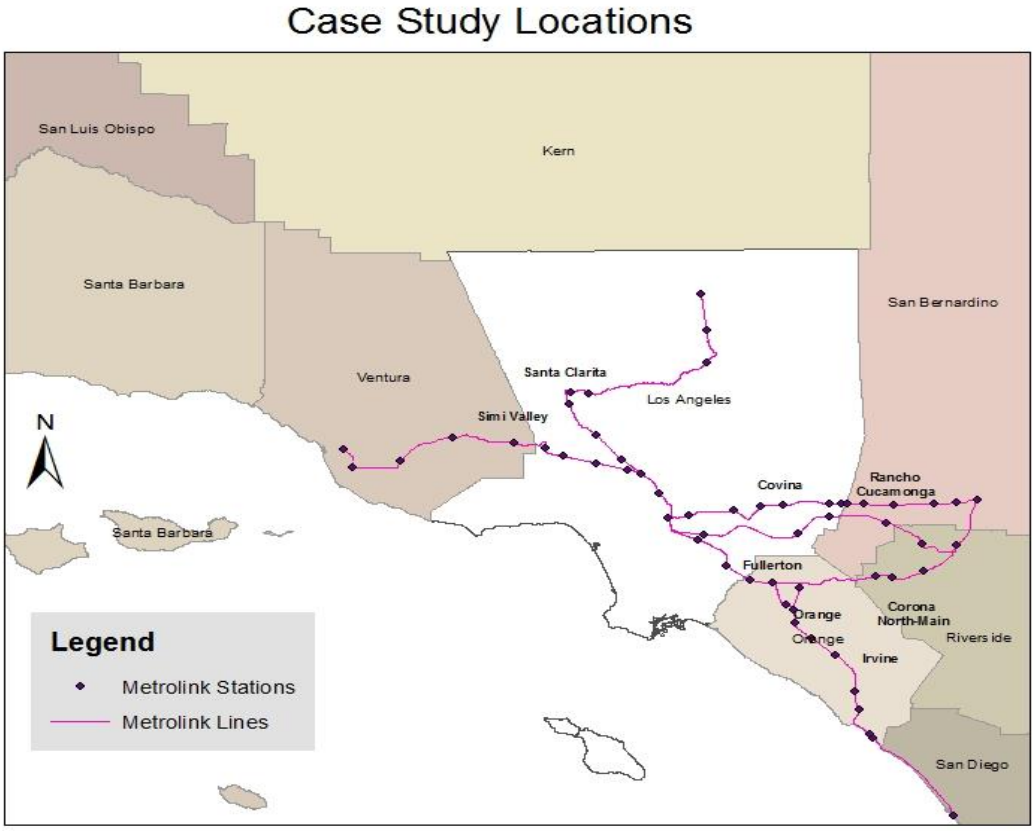

Figure 1 Case Study Locations (Map: Matthew Nordstrom)

Chapter 4: Historical Overview

When Los Angeles was incorporated as a city in 1852, the region was sparsely populated and the economy centered on ranching, which was reflected in the spatial landscape that consisted of numerous ranchos that were inherited from the Spanish and Mexican periods. When drought and debts took a toll on the ranching economy coupled by an increase of Anglo migration from the East and Midwest following the civil war, the economy began a shift from ranching to agriculture and real estate. The railroad was instrumental in supporting the rapid population growth in the late 19th century, and the Southland region would not be what is today if it weren't for the iron horse.

4.1: Phineas Banning and the Los Angeles and San Pedro

By 1867 the transcontinental railroad was completed linking Northern California with the East Coast. The boosters of the Los Angeles area knew that a link to the transcontinental railroad was vital for future growth. Even before the completion of the transcontinental railroad, a local freight tycoon named Phineas Banning devised a plan for a railroad that would span from Los Angeles to the harbor at San Pedro, a route that his stage coaches were using at the time (Nadeau, 1960). This link would give farmers a new outlet to ship their goods and offer a connection to a future transcontinental railroad (Nadeau, 1960). As a strategy to secure funding for his railroad, Banning successfully won a campaign and was elected to the State Senate in 1865. While serving in the senate Banning pushed for a bill that would authorize the city to vote for a bond that would finance his planned harbor railroad. The bond election was passed on 1868 and a year and a half later in 1869 Banning's 21 mile Los Angeles and San Pedro Railroad was completed (Nadeau, 1960). The completion of this railroad initiated the regions first agricultural boom in which agricultural production quadrupled (Nadeau, 1960). The result of

this railroad demonstrated the powerful economic potential the iron horse had and set Angelinos on the railroad development bandwagon. Historian Remi Nadeau quoted this as "paco tiempo was banished by American ingenuity." (Nadeau, 1960).

4.2: The Growth of Rail

The modest boom of the 1870's set the foundations for a much larger boom that would ignite in the following decade. These foundations were laid by a local group of prominent residents who would be the initial boosters of population and economic growth in the Southland. One of the most prominent of these early boosters was Judge Robert M. Widney. The Ohio native settled in Southern California in anticipation of a boom he sensed and became active in its civic affairs (Crump, 1965). Widney won an appointment for district judge which enhanced his influence over local affairs. In many ways Judge Widney can be considered the father of mass transportation development in Los Angeles. He directed the incorporation of the Los Angeles Chamber of Commerce in 1873, and he also engaged in engineering feats which included design for a breakwater for a deep water harbor development at San Pedro as well as later surveying a route through the Cajon Pass for a railroad to Los Angeles (Crump, 1965). Ironically, Widney's party arrived at the pass only two hours before Southern Pacific Railroad surveyors showed up. This timely move played a significant turning point in the history of Los Angeles because it prevented a railroad monopoly that could have had severe consequences for Southern California (Crump, 1965). Judge Widney also organized and built the first horse drawn street car line in Los Angeles, which was the first of many lines that would ultimately be incorporated into the Pacific Electric Railway. The Spring and Sixth Street railroad opened in 1874 and ran 2 ½ miles from Spring Street to Sixth Street. In addition, Judge Widney was also one of the founders of the University of Southern California.

4.3: The Arrival of the Southern Pacific

The success of the Los Angeles and San Pedro railroad prompted many prominent Angelinos to begin work to attract a major railroad to Los Angeles. The Southern Pacific Railroad (S. P.) was incorporated by the Big Four, which were Leland Stanford, Charles Crocker, Collis P. Huntington, and Mark Hopkins. The Big Four were known for their monopolizing strategies and ruthless tactics, where they always demanded subsidies by each municipality they served (Nadeau 1960). If a city pulled out, as Visalia did, the S. P. would reroute the tracts, which they did in Visalia, bypassing it by seven miles (Nadeau, 1960). Los Angeles was not immune to this fate and officials would do anything in their power to prevent that from happening. However, due to the insignificance of Los Angeles at the time, the Big Four were planning a more direct route from San Francisco to the Colorado River completely bypassing Los Angeles. Los Angeles was willing to pay a subsidy to the Southern Pacific, based on the fear that the railroad would bypass the city (Nadeau 1960). During city negotiations with Stanford and Huntington, the S. P. demanded controlling interest in Banning's railroad as part of the subsidy payment of $602,000 (Nadeau, 1960). This was a common Big Four monopoly tactic, since it would deny the city access to coastal steamers that competed with the railroad. In 1872, an election campaign for support of the subsidy ignited a political battle. The Texas Pacific Railroad offered a competing line that would run up from San Diego without demanding control of the Los Angeles and San Pedro Railroad. Judge Widney, who was arguably one of the most influential people in Los Angeles at the time, took sides with the Southern Pacific and wrote campaign pamphlets titled "Stanford's Road" (Nadeau, 1960). There was also a phrase that read, " make this county the second railroad center on the West Coast, but the other line would make it an insignificant terminus of a useless railroad" (Nadeau, 1960). With that being said and a

strong campaign behind the Southern Pacific and successful election for the subsidy, the S. P. moved ahead. The route traveled from the San Francisco Bay area to Los Angeles via the San Joaquin Valley, Tehachapi Pass, and Soledad Canyon. The line was completed in 1876 with the first revenue train arriving in Los Angeles on September 5th of that year (Nadeau, 1960). A year earlier, in 1875 a railroad was built from the wharf at Santa Monica to Los Angeles by Nevada Senator John P. Jones, who owned mines in the Mojave Desert and they needed a transportation outlet to the Pacific. Jones incorporated the Los Angeles and Independence railroad and bought up most of the Santa Monica and San Vicente Ranchos in which he would use as a terminal site (Nadeau, 1960). The route was to be built through Cajon Pass where it was rumored to eventually connect with the Union Pacific as well as a mainline to Independence, California to serve the mines (Nadeau, 1960). The Big Four were determined to keep competition out, and they sent a team of surveyors to Cajon Pass before Jones's to block his tracks and the railroad was bought out two years later by Southern Pacific (Nadeau, 1960). Overall, the arrival of the Southern Pacific brought a new wave of prosperity and population to the Southland.

4.4: The Arrival of the Santa Fe and the Fare War

Construction of the Atchison, Topeka and Santa Fe Railroad reached the Cajon Pass in 1885 and secured the route into Los Angles over a local road (Nadeau, 1960). The result of this competition was a rate war that would change the course of history of Southern California. The fierce competition brought plummeting fares to as low as one dollar between Kansas City and Los Angeles. The resulting price wars coupled with the advertising campaigns of the local boosters brought a population boom that quadrupled the area's population. This sharp increase in population led to the land boom of 1887 where the population reached 81,030 in Los Angeles County (Nadeau, 1960). The Santa Fe built a southern extension to San Diego, commonly

known as the “surf line” from Downtown Los Angeles; this would be the same right-of-way as today’s Amtrak Pacific Surfliner and the Metrolink Orange County Line. In addition the railroad built several branch lines. One of these branch lines, the Venice Short line, became an integral part of the Pacific Electric Railway.

4.5: Moises Sherman

In 1887 Frank Sponge invented the electric rail car, and this new technology was quickly adopted in Los Angeles (Crump, 1965). The first people to establish an electric streetcar railway in Los Angeles were General Moses H. Sherman who was a Phoenix Banker and utility operator, and his brother in law Eli Clarke (Nadeau, 1960). Together, they consolidated the Electric Railway Company and began to build rail lines in the Los Angeles area (Crump, 1965). By 1895 they had electrified all horse car lines in Pasadena and extended its rails along the south coast of the Santa Monica Bay to Redondo Beach, and the result was a doubling in population size of these cities (Crump, 1965).

4.6: The Henry Huntington Era

Henry Huntington, the nephew of Collis Huntington, was a VP with Southern Pacific and lived his life in admiration of his uncle Collis and would try to emulate his success whenever the opportunity presented itself. Henry expected to become the president after his uncle, the previous president of the Southern Pacific passed away. However, the railroad’s board of directors blocked Henry from becoming president which was probably a result of not wanting another Huntington in the presidency of the company (Crump, 1965). Henry felt this move was an insult and besides remaining as a VP he sold his Southern Pacific stock and looked for other opportunities in rail transportation. Observing the situation in Southern California and the success of its railways, Huntington foresaw its expansive potential and saw ways he could

consolidate, expand, and improve rail transport. Always in a position to surpass his uncle, Huntington moved to Los Angeles in attempt to build his own transportation empire that would be able to rival that of what his uncle did for the Southern Pacific. Using his railroad technical know-how, Huntington designed a way to consolidate the lines by building all of them in standard gauge (Crump, 1965). Previously, streetcar railroads generally ran on narrow gauge tracks. The standard gauge tracks meant that all lines could be integrated into one system as well as convenient interchange with other railroads (Crump 1965). The Pacific Electric Railroad was founded and commenced operations in 1901.

From 1901 to its peak in 1925 the Pacific Electric expanded its service reach to nearly every part of the Southland. Henry Huntington's development of the railway coincided with his real estate ambitions, where the railway played a central role in offering transportation access to potential buyers. This was not unique to Los Angeles at the time since the so called "street car suburbs" were spawning up in the outskirts of nearly every major city across the United States. Before the widespread use of the automobile, the streetcar provided an essential rail link which was crucial to the survival of these suburbs. Huntington Park and Huntington Beach were early suburbs that Huntington developed. Some of the older cities, such as Pasadena, Alhambra, and San Marino saw many of their most prominent years of development during the growth and height of the "Red Car Era". The rails also gave convenient and affordable access to the beach cities and caused a real estate boom in these cities as well. For example, Newport Beach would never have its population and real estate boom if it were not for the Pacific Electric, because the rail gave access and was an integral part of real estate marketing by boosters in the area (Schwieterman, 2004). The railway also operated freight in addition to passengers which offered other sources of revenue. In 1911, "The Great Merger" occurred when the Pacific Electric

merged with the Southern Pacific.

Huntington did not wish to engage in such a deal; however he was overruled by his board of directors (Crump, 1965). The railway continued to expand and it further benefited when Robert Mulholland completed the Los Angeles Aqueduct in 1913 which further enhanced the population growth of Greater Los Angeles (Crump, 1965). During these “golden years” of the railway, the sight of red cars into the Main Street Station and the subway terminal was a bustling scene and on some of the most lucrative lines cars were dispatched nearly every ten minutes (Crump, 1965). Overall, these red cars were an integral part of transforming Los Angeles into a world class city.

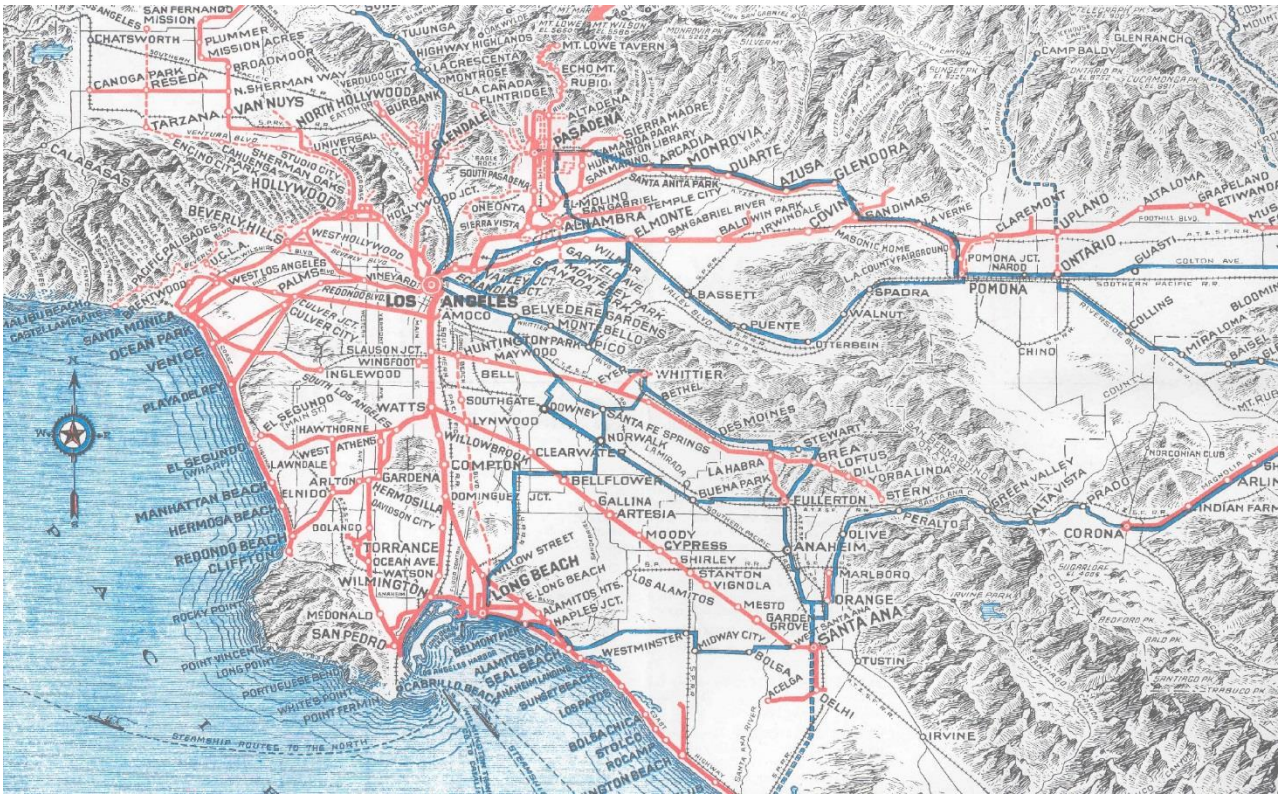

Figure 2 Pacific Electric System Map, 1925 (Source: Dorothy Peyton Gray Transportation Library)

Illustration 1 Pacific Electric in Colton, CA (Source: Robert T. McVay, Norm Suydam Collection)

4.7: The Decline of the Railway

The demise of the Pacific Electric and Los Angeles Railways and the conspiracy behind it will forever live in the legend and lore in the history of Greater Los Angeles. The 1988 movie, "Who Framed Roger Rabbit?" takes on a fictional account about the railway's demise. Although there could have been a conspiracy, technological and economic forces were putting pressure on the P. E. The peak of interurban rail travel in the Southland was in 1925. After that time Henry Ford and his "Fordism" would take shape throughout the country. Ford's method of production drastically reduced the cost of the automobile and automobile sales were significantly on the increase. In addition to the automobile, busses were also quickly making their way on to the

market and provided a more cost effective and flexible form of public transportation. During this time even the P. E. was adopting busses to replace trolleys on their less profitable routes (Bail, 1984).

The Great Depression brought the next blow to the Pacific Electric, debts were mounting and the railway was unable to recover such costs from their operation, therefore many services had to be reduced or terminated (Crump, 1965). The only exception to this demise was World War II where there was a steep resurgence in Pacific Electric and LARY service. The reason for this was the shortage of oil and rubber, the large aircraft industrial base in the region, as well as the many military installations. At the same time, the progress of the automobile was being halted as factories directed their production toward military vehicles for the war effort. Furthermore, these conditions created an economic environment where interurban rail travel was needed.

As the post war era began, conditions quickly changed once again, so what may have seemed like a renaissance during the war quickly fell apart. The P. E. once again fell into decline on many routes, as the large availability of new tract home subdivisions as well as the availability and affordability of the automobile was taking shape. These new subsidized housing tract projects that were taking shape across the Southland and the rest of America were creating new patterns of development that differed from the rail induced development that were typical of the older communities of the region. Since the proximity to rail lines was no longer taken into account in the development of these homes, the only solutions were roads and the automobile. One of the final blows was the Interstate Highway Act of 1956, which paved the way with federal money for new freeways and the expansion of existing ones. This was especially true for the 10 Freeway, which made it very difficult for interurban rail service to

compete with the speed and convenience that the freeway was able to offer, with the famed Santa Monica Air Line discontinuing service and ending an era of passenger rail service in that city (Schwieterman, 2004). Following the Interstate Highway and Defense Act of 1956, the political environment in Los Angeles as well as the rest of the State was geared toward highway development, therefore automobiles and roads would take priority over railroads. Much of this had to do with the readily available federal money, the growth of the Auto Club of California, and the associated cost benefits of freeway construction (Mathison 1968). Author Richard Mathison cited a 1958 edition of California Highways and Public Works magazine that "land prices have often multiplied five to ten times as a result of freeway construction" (Mathison, 1968). The land value factor alone made it easy for California politicians to garner support for freeway construction. Also in the late 1950's, senator Ralph Collier and the motor clubs agreed that there needed to be a more definite program and policy for freeway development. This led to the Freeway Act of 1958 (Mathison 1968). With support of the motor club and other road groups, the act called for the construction of some 12,000 miles of freeways and expressways for an estimated period of twenty years at a cost of roughly 10 billion dollars (Mathison, 1968). This new era of freeway construction and expansion was going to create an ever more challenging environment for local rail. In 1958 the state owned Los Angeles Metropolitan Transit Authority took over all public transportation in Los Angeles County in response to overcome community rivalries and to ease the growing frustration the public had toward private entities operating public transportation (Bail 1984). Both LA Transit Lines and Metropolitan Coach Lines were absorbed into the LAMTA. The LAMTA inherited much of MCL's staff therefore many of the policies were influenced by the MCL's way of doing business, which was a probable reason for a continued move toward busses (Bail 1984). By 1958 only three former

Pacific Electric "Red Car" lines remained, which were the Long Beach, Bellflower, and Los Alamitos lines. The LAMTA accelerated the diesel bus placement as a political move as freeways linked together and roadways improved (Easlon, 1973). Despite the fact that it was inevitable that LAMTA would replace all the lines, they surprisingly wanted to experiment with streamliners on the Long Beach Line by barrowing streamlined streetcars from San Francisco's MUNI and retrofitting them with standard gauge trucks. After a few successful runs, they were nevertheless returned to MUNI (Easlon, 1973). Easlon believed that the streamliner program might have succeeded if the MTA negotiated more favorable terms with Southern Pacific for the use of the right-of-way, which the S. P. owned (Easlon, 1973). The LA-Long Beach Line made its final run in 1961. However, it does not seem surprising that the LAMTA did not take a more assertive role in the negotiations, considering the many former MCL personnel who vacated their management positions. With the former P. E. off the map and only five LA Railway lines left operating, the LAMTA put its final nail in the coffin when it announced plans in 1962 to abandon all five of those remaining lines (Easlon, 1973). Although many of the P. E. lines were unprofitable, giving them a reason for abandonment, the five remaining LA Railway Lines were running at a profit, and the despite the fact they were remaining profitable, the LAMTA made the bold move of abandoning all of them, ending a longtime era in the fabled history of Los Angeles (Easlon 1973). This did not go over too well with the public, where people in the thousands showed up to take a final ride on the night of March 31, 1963. The iconic "sad tearing faces" were painted on the front of these streamlined street cars as they graced down the tracks into the sunset. The sight of piled up streetcars in San Pedro awaiting shipment to the scrapper symbolized a sad end to an era that built Los Angeles. For nearly the next three decades ahead, the Greater Los Angeles Area would come to see the effects of

overestimation of the automobile and the freeway.

Figure 3 Pacific Electric System Map, 1947 (Source: Metro)

4.8: The Auto Period

Between 1963 and 1990, the Los Angeles Metropolitan region was absent of local passenger rail service. However, this was briefly interrupted during a five month period with a Southern Pacific operated commuter rail service between Los Angles and Oxnard. This was a period of increased freeway construction and rapidly expanding suburban development. This was the period when the Los Angeles region was gaining fame and notoriety for the automobile and the freeway, a reputation that is still with the region today.

The 1960's through the 1980's brought unprecedented growth to Southern California. Bands like the "Beach Boys" and the counter-culture revolution of the 1960's and early 70's brought the thousands "California Dreaming" with many of them settling in Southern California.

The environmental movement was creating new ways of thinking about the use of automobiles and the promotion of mass transit. Large waves of immigration, either as a result of immigration reforms of the 1960's as well as refugees from Vietnam and Iran further added to the population of Southern California throughout the 1970's and 80's. The Oil Embargo in 1973 drastically raised the price of gasoline. It was quickly noted that freeways alone would not be able to solve the commuter problems of the ever growing population at the time. The freeways were creating endless sprawl, as housing tracks and office parks were dotting the landscape in irregular patterns. This created reverse commutes, increased gridlock, and the ever growing amounts of air pollution caused by automobiles. However, one of the forces working against a mass transit future was that many in the public perceived Los Angeles as a "car town" that was too vast and too decentralized to support a mass transportation system (Dorothy Peyton Gray Transportation Library). The bus only Southern California Rapid Transit District, commonly known as the RTD, was considered slow and inefficient. The first move the RTD made to counter this reputation was the construction of the eleven mile El Monte Transit Way, which ran (and still does) from Union Station down dedicated bus lanes on the 10 Freeway. Ironically, the 10 Freeway was constructed along a Pacific Electric right-of-way in which only one set of tracks was removed so freight service could continue (The Los Angeles Times, 1972). The decision by Southern Pacific to keep the railroad right-of -way in the center paid off when Metrolink commuter rail was formed since it became part of the San Bernardino Line, the busiest in the system. Although Los Angeles and the rest of Southern California were known as a "car" city with the freeways being as integral to its image as the beach and Hollywood sign, there was a growing movement toward mass transit. If there were any doubters that a mass transit rail system would return to the Southland, the dawn of the 1980's would prove otherwise.

4.9: The Return of Rail

A seldom known fact about passenger rail history in Southern California was the heavy use of the Amtrak San Diegan route between Los Angeles and San Diego. During the early 1970's, the train was only running a modest three daily roundtrips (Stevenson 1988). From the period of August 1978-July 1979, the San Diegan route reached a milestone of 1,017,590 passengers, which put the route as the second busiest in the Amtrak system behind the Northeast Corridor (The Los Angeles Times, 1979). Freeway congestion, and four to five hour driving times were often cited for the reason why ridership skyrocketed on the route. More trains were added to keep up with demand during the 1980's as ridership steadily rose (Stevenson 1988). By 1988 ridership reached 1.6 million passengers for the 125 mile long corridor (Stevenson 1988). In addition, the San Diegan expanded its route by adding a northbound sector to Santa Barbara.

The San Diegan laid the foundation for future commuter rail since many of the San Diegans patrons were using it as a commuter train. This proved that even if the geography of sprawl is dominant, rail corridors can still draw impressive ridership numbers and play a vital role in the transportation infrastructure.

Los Angeles County voters flocked to the polls for the 1980 elections and decisively passed proposition A, which was a one half of one percent sales tax on most retail sales in Los Angeles County which would be allocated toward funding of a Metro Rail system (Dorothy Peyton Grey Metropolitan Transportation Library). This vote proved that Angelinos were willing to bring back mass rail transit to the Southland. The first of these lines, the Metro Blue Line, began service form Los Angeles to Long Beach in 1990, which was a direct legacy of Huntington, since it uses the same right-of-way as the P. E. line once used.

Aside from Metro Rail, commuter rail was also on the agenda. For a short period of

1923-1983, a commuter rail line called “CalTrain” ran between Oxnard and Los Angeles. Like the CalTrain commuter line between San Francisco and San Jose at the time, it was a Caltrans service that was operated by the Southern Pacific. This service was planned as a three year trial run. However, billing disputes between Caltrans and Southern Pacific rendered the service obsolete after a short five months of service (Stein 1988). Despite the fact there was low ridership, the Southern Pacific was bitterly opposed to operating this service because it interfered with their lucrative freight service (Stein 1988). Despite the failure of the initial CalTrain service, plans from various political leaders and urban planners worked vigorously to re-establish commuter rail, and much of these plans would lay the basis for the Metrolink system. According to a 1988 Los Angeles Times article, commuter trains were scene as quick fixes to the regions congestion problems, because unlike subway or light rail systems, they do not need specialized track or locomotion, but rather travel on existing standard gauge tracks and use conventional diesel locomotives (Quinn, 1988). Again, the article also cited the success of the Amtrak San Diegan, and that 30% of its riders were daily commuters (Quinn, 1988).

During the late 1980’s the Southern Pacific was running a debt of over $1.2 billion in which it had incurred over the past two decades. It came to be known as the “struggling Pacific”. In 1989, billionaire Phillip Anschutz announced that the Southern Pacific was putting its Southern California right-of-ways up for auction. Seizing this opportunity, Neil Peterson of the Los Angeles Transportation Commission appointed Richard Stranger, who was the LATC director of rail development, to start the early stages of negotiations with the Southern Pacific. In November 1989, ballots for commuter rail funding emerged in San Bernardino and Riverside counties. San Bernardino passed a measure for 100 million dollars in funding at 59% of the vote. Voting was even more impressive in Riverside County, where Measure A, which set aside 100

million dollars toward commuter rail development, passed by 79 percent of the vote. Similar measures were passed in Los Angeles and Orange Counties in 1990. To supplement county measures, State Propositions 108 and 166 allocated a further $2 billion for rail development projects (Tyrrell 2003). These ballot elections alone clearly demonstrated that the majority of people in the Southland wanted rail service since they were passed by voters from different areas that likely represented both sides of the political spectrum.

In addition to the 1990 ballot measures, the Santa Fe, like the Southern Pacific, also began to put some of their Southern California right-of-ways up for sale. That put sister agencies in San Bernardino, Riverside, and Orange Counties into negotiations with two railroads. On October 12, 1990, The Los Angeles Transportation Commission (LATC), San Bernardino Association of Governments (SANBAG), and the Ventura County Transportation Commission announced the initial 450 million dollar purchase of right-of-ways and a maintenance yard adjacent to S. P.'s Taylor Yard. The Santa Fe right-of-way purchases were completed on June 18th, 1992(Tyrrell 2003).

The Southern California Regional Rail Authority was formed as a result of these purchases and adopted the name "Metrolink". The SCRRA was a collaboration of operating agencies and include the VCTC, LACMTA, SANBAG, RCTC, and OCTA. The service initially began on three lines in October of 1992, and 5,300 riders took to its trains on opening day (Tyrrell 2003).

Chapter 5: The Metrolink System

Today, the Metrolink commuter rail system consists of six lines and 388 combined miles of track (Metrolink, 2015). The system is operated by the Southern California Regional Rail Authority, which is a joint powers authority and is operated regionally at the county level with the Los Angeles County Metropolitan Transit Authority, the Ventura County Transportation Commission, the San Bernardino Associated Governments, the Riverside County Transportation Commission and the Orange County Transportation Authority.

Illustration 2 First Day of Metrolink Operations at San Bernardino, January 1993 (Source: San Bernardino Depot Museum)

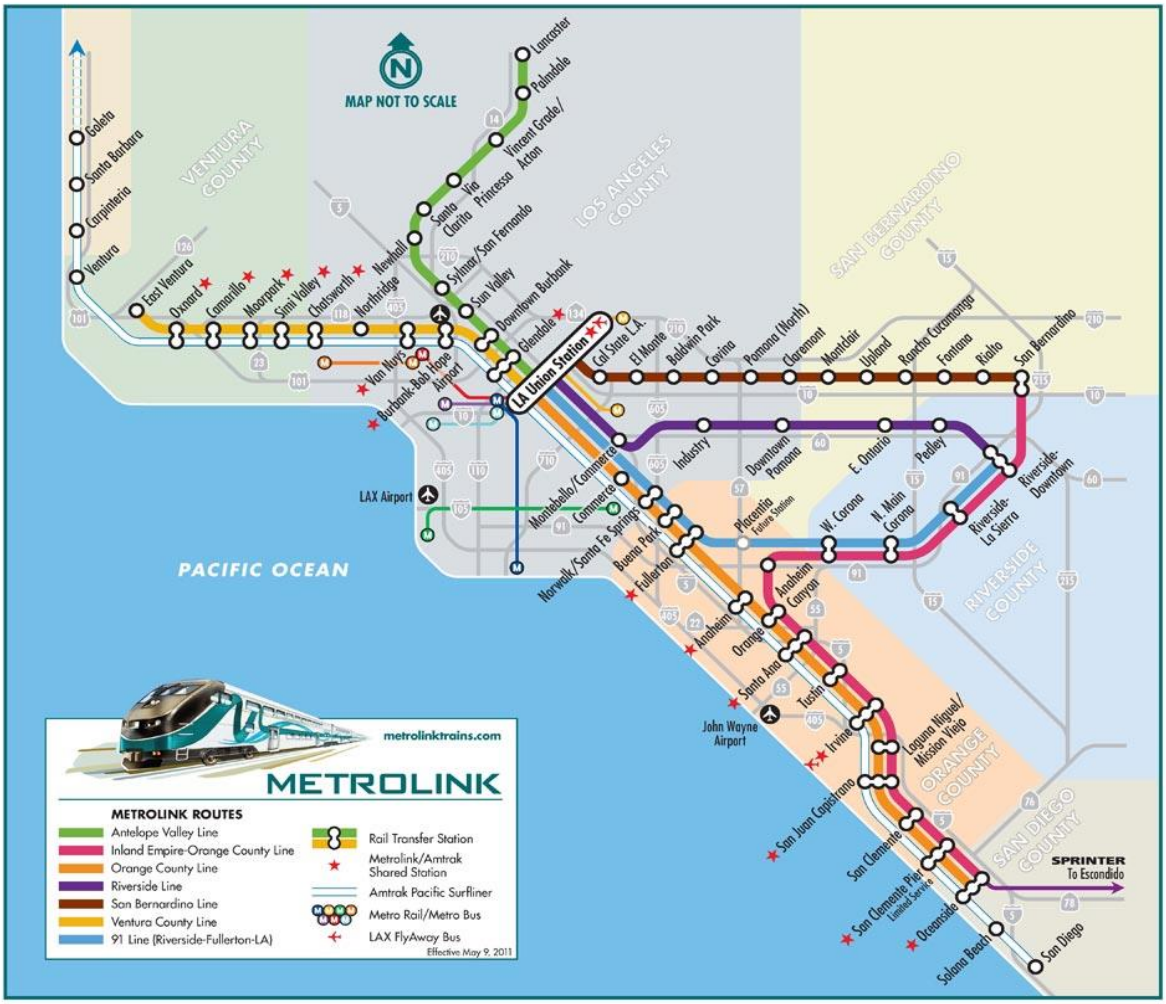

Figure 4 Metrolink System Map (Source: Metrolink)

5.1: San Bernardino Line

The San Bernardino Line is the most heavily utilized line on the Metrolink system with an average daily weekly ridership of 11,028 passengers during the first quarter of 2015 (Metrolink, 2015). The line is 56 miles long and has 13 stations between Los Angeles Union Station and San Bernardino. Service on this line originally began in 1992 between Los Angeles and the Pomona North Station, which was then the Southern Pacific portion of the Line. The line was later extended on the Santa Fe portion to San Bernardino in 1993 as a result of an acquisition by the SCRRA for the right-of-way. The segment between Los Angeles and Pomona

was originally a Pacific Electric right-of-way. Southern Pacific inherited the right-of-way with the demise of the P. E. For this region many of the municipalities it serves have favorable geographies for commuter rail service since they were designed around the Pacific Electric.

5.2: Santa Clarita/Antelope Line

The Santa Clarita/Antelope Line runs between Los Angeles Union Station and the suburban spillover city of Lancaster in the Mojave Desert. The Line uses the original Southern Pacific right-of -way that began service in 1877 and travels through the northern San Fernando Valley communities of Pacoima and Sylmar before climbing through the Newhall Pass and into the Santa Clarita Valley where it serves three station stops. From there the line travels through the rugged Soledad Canyon, formally called the Saugus Line passing the rural community of Acton and into the high desert cities of Palmdale and Lancaster.

As one of the original three lines, it was formally called the Santa Clarita Line since it terminated in Santa Clarita. Historically, the Southern Pacific ran various passenger trains on this segment which included "The Lark" and "San Joaquin Daylight". On October 12, 1990 an agreement was made between Metropolitan Transportation Commission and the Southern Pacific for the purchase of the right-of-way between Burbank and Palmdale (Serpico, 2001). Since the opening of the "Palmdale-Colton Cutoff" in 1967, the Southern Pacific opted to run the majority of its trains on that route leaving the old mainline through Soledad Canyon as a secondary option (Serpico, 2001). This likely created the pre-conditions for the sale since the S. P. could afford to give up ownership of the line. The S. P. did retain trackage rights through the agreement. In 1993 a test run was conducted through the Soledad Canyon to Lancaster to test the feasibility of commuter rail service. However, Metrolink officials deemed the line as insufficient for commuter service and the timeline for upgrades would not be completed until the late 1990's

(Serpico, 2001).

The 1994 destruction of the Northridge earthquake changed everything in that the collapse of the 5 Freeway prevented autos from entering the San Fernando Valley. As a response FEMA put in $50 million to rehab the tracks in Soledad Canyon and bring them up to commuter standards (Serpico, 2001). Service to Lancaster followed within three days (Metrolink, 2012). Ridership jumped from 950 daily riders before the quake to 16,000 after the quake, and although many returned to their automobiles once the freeway was repaired, the Metrolink retained 25 percent of those new riders (Serpico, 2001). The SC/Antelope Valley line was also one of Metrolink's best performing in terms of revenue (Serpico, 2001). Forces of demand prompted the Metrolink to add midday service in 1997 and Saturday service in 2000 (Serpico 2001). Today, Metrolink operates 20 trains per day on the Antelope Valley Line, though many terminate in the Santa Clarita Valley (Metrolink 2015).

5.3: Ventura County Line

The Ventura County Line is a 70-mile corridor between Los Angeles Union Station and East Ventura is one of the original three lines that began operation in 1992. The line services the heavily populated San Fernando Valley which includes stops at Downtown Burbank, Burbank Airport, Van Nuys, Northridge, and Chatsworth. From there it travels through three tunnels as it crosses the Santa Susana Pass into Simi Valley. The geography is suburban throughout the Simi Valley-Moorpark portion, and beyond Moorpark it enters the agricultural areas of Somis before making its way through the agriculturally rich Oxnard Plain. From Burbank to Montalvo cutoff, the line uses the "Coast Line" which was completed by the Southern Pacific in 1904 and hosted their infamous "Coast Daylight" train between Los Angeles and San Francisco. Today, the line is owned by the SCRRA between LAUS and Moorpark and from Moorpark to Montalvo cutoff it

operates on Union Pacific trackage, which acquired the railroad from the Southern Pacific in 1996. The low freight traffic on this line allows excellent on-time performance for the three daily round trips that operate beyond Moorpark to western Ventura County. As part of the Amtrak-Metrolink Rail-to-Rail program that was established in 2002, monthly pass holders are able to take advantage of Amtrak Pacific Surfliner trains, which share the route and eight of the ten station stops. At Montalvo Cutoff, the line enters a small portion of the original Fillmore Line that is now owned by the Ventura County Transportation Commission. Originally, the line terminated in Moorpark, however, as a result of cooperation between the Southern Pacific and the cities of Oxnard and Camarillo, the line was expanded to Oxnard in 1994 as a result of the 1994 Northridge Earthquake (Brewerton, 1995).

5.4: Riverside Line

The Riverside Line opened in 1993 and travels through the industrial areas to the east of Los Angeles and the Inland Empire. The Line is prone to delays, since it is part of the Union Pacific mainline which runs its many double stack container trains from the ports via the Alameda Corridor. Stations on the line include Commerce/Montebello, Industry, Downtown Pomona, East Ontario, Pedley, and the terminus of Downtown Riverside.

5.5: Orange County Line

This line runs between the Los Angeles Union Station and the coastal city of Oceanside in northern San Diego County. The line began operation in 1994 and replaced an existing commuter service operated by Amtrak, The Orange County Commuter, which ran between LAUS and San Juan Capistrano. This line runs on the original Santa Fe Surf Line, a corridor between Los Angeles and San Diego and shares trackage and stations with Amtrak's Pacific Surfliner the entire route. This is the most high density rail corridor on the West Coast. Many of

its scheduled trains make shorter runs within Orange County, since many of its commuting destinations are within the County.

5.6: Orange County/Inland Empire Line

Opened in 1995, this was the first suburb-to suburb commuter railroad service in the United States (Metrolink 2015). The Line runs between San Bernardino and Oceanside, a total of 100.1 miles(Metrolink 2015). The line operates on heavily utilized BNSF trackage between San Bernardino and the cutoff before Anaheim Canyon and SCRRA trackage between Orange and Oceanside. Most of the commuting destinations for people in the San Bernardino-Riverside Corridor are in Orange County. During the weekdays, the line currently has eight daily roundtrips. Additionally, the line also has weekend service, which is popular during the summer months because many Inland Empire residents use the service for beach access in San Clemente and Oceanside.

5.7: Route 91 Line

The latest edition to the Metrolink system, this line opened in 2002. It was built to add direct service to LAUS from the communities in extreme southeastern Riverside Counties. The line consists of SCRRA trackage between LAUS and Fullerton and the heavily congested BNSF Transcon Line between Fullerton and Downtown Riverside. Currently, a 24 mile extension will open in late 2015 to Perris as a response to the rapid population growth and sprawl in that region (Metrolink 2015). The addition of this line has improved commuter rail service in the city of Corona and the Southern portion of Riverside by providing more direct destinations on the system.

Illustration 3 Metrolink stopped at Covina Station (Photo: Matthew Nordstrom)

Chapter 6: Study Results

6.1: Corridor Development

The term "Transit-Oriented Development" has many definitions, which include housing and retail development in a dense layout adjacent to transit stations or even development that is that is within ½ mile of a station (Hondorp 2002).

Although the term seems innovative and modern, Transit-Oriented development has a long history that originated in the streetcar suburbs in the late 19th and early 20th centuries. A typical streetcar suburb would consist of small cottage type homes and a street pattern and scale that allowed for convenient walking distances to the train station (Hondorp, 2002). As local rail transit began its comeback in the late 1980's, so did the urban planning concepts of smart growth and new urbanism. However, it is important to note that new urbanism is not necessarily new or innovative within itself, but rather a return to pre-World War II housing principles (Hondorp, 2002).

There are several advantages in implementing Transit-Oriented Development. They include walkability through compact design and convenience with regard to the close proximity of attractive amenities, such as transit stations, parks, and shopping. These factors discourage driving and encourage transit use, walking, and bicycling, which all contribute to reducing traffic and air pollution, which improve the livability of an area.

There are many examples of Transit-Oriented Development at various stations throughout the Metrolink system, which is promising because these same principles that have more popularly taken off in urban areas are also being implemented in suburban areas, with several new ones that are either planned or in the construction phase. Below is a table that displays a system wide ridership table for stations that have TOD versus stations where TOD is absent

using criteria of a modern high density residential or mixed-use development within a quarter mile of a station and averaged more than 400 riders based on the Metrolink 2015 Q2 Report.

Station	TOD	Ridership
CSULA	No	507
Covina	Yes	920
Fullerton	Yes	1,521
Glendale	No	601
Industry	No	868
Irvine	No	1,336
Montebello/Commerce	No	424
North Corona Main	Yes	694
Norwalk/Santa Fe Springs	Yes	724
Oceanside	No	506
Orange	Yes	759
Pomona	No	526
Rancho Cucamonga	Yes	798
Riverside- Downtown	No	1,051
Riverside- LA Sierra	No	670
San Bernardino	No	712
Santa Ana	Yes	827
Sylmar/San Fernando	Yes	446
Tustin	No	1,101
Upland	No	502
Via Princessa	No	415
West Corona	No	407

Table 1 Ridership Levels of Over 400 Passengers and Transit-Oriented Development

Of the 54 current Metrolink stations, 25 of them have ridership levels that exceed 400 daily riders according to (Metrolink, 2015). Currently, there are 14 stations on the Metrolink system that have Transit-Oriented Development. Of those 14, nine of them have ridership that exceeds 400 passengers. The top tiers in this data set are the stations that exceed 800 daily riders. According to that statistic, five out of the nine stations in that category have Transit-Oriented Development. The stations that lack TOD's, which are Irvine, Tustin, and Downtown Burbank are major business destinations on the system, and have synchronized shuttle service to the nearby business centers, which help boost their ridership. There is a similar term for this type of development, and it is called "Transit Adjacent Development". Industry is the only true outlier in this sample, because it is a stop on the Riverside Line, which is one of the lower frequency lines, has no TOD, and is not a major business destination.

The move toward Transit-Oriented Development in suburban areas indicates a trend. Claremont, Montclair, and Downtown Pomona all have TOD under construction. This trend is further exhibited in Fullerton and Corona, where more TOD's are being added. It should be noted that TOD is not the only cause for an increase in ridership, since development in general, even at a considerable distance from stations, arbitrarily adds to the ridership levels, especially in Southern California where the suburban automobile infrastructure is synchronized with the large Park and Ride lots at many of the Metrolink stations.

Measuring the effectiveness of TOD's toward ridership increases is difficult because many of them are in their infancy stage. One measurement that can test the effectiveness is the percentage of commuters who arrive at the station by walking. According to the 2008 onboard survey, the percentage of those who walked as an access mode from home to the station was as high as five percent on the San Bernardino Line and as low as one percent on the Riverside and

Inland Empire/Orange county Lines, with an average of four percent across all lines (Metrolink 2008). Interestingly, no stations that are currently served by the Riverside Line have Transit-Oriented Development. The San Bernardino Line, which currently serves four stations with Transit-Oriented Development, is the highest number among all the lines. Although the Orange County Line contains five examples, they are all on shared stations with the Route 91 and Inland Empire/Orange County Lines. According to the "Metrolink Onboard Survey, Executive Summary of Key Findings, August 1994," the highest drive alone to station commuters was as high as 80% for the Orange County Line, which at the time lacked TOD's, with the exception of its inherited forms in Fullerton, Santa Ana, and Orange. By 2008 Fullerton and Orange had brand new TOD's, and the percentage of drive alone commuters to stations on the Orange County line dropped to 71%, and the Riverside Line became the line with the highest percentage of drive alone commuters, at 80% (Metrolink 2008). Although the system-wide average for walkers is only four percent, this number still adds 20-60 daily riders.

Illustration 4 Transit-Oriented Development Construction at Montclair Station (Photo: Matthew Nordstrom)

6.2: Case Study- Fullerton Transportation Center

Illustration 5 Historic Fullerton Santa Fe Depot (Photo: Matthew Nordstrom)

Fullerton California is at its heart a railroad town. Unlike the citrus boom that drove much of the industry in Southern California during the late 19th century, Fullerton had its origins in the Atchison Topeka and Santa Fe Railroad. This story began with a land deal in 1887 between Fullerton's founders, brothers George and Edward Amerige and railroad agent George H. Fullerton. For this reason, it should not come at a surprise that Fullerton has had uninterrupted passenger rail service since its inception. The Union Pacific Railroad also had a depot adjacent to the Santa Fe's for their "Overland Route". Historically, the Santa Fe served the station on its famed "San Diegan" route, and this service was later inherited by Amtrak in 1971. Rail passenger traffic was quite modest during the 1970's when compared to today's standards. However, from the 1980's onward passenger traffic increased substantially at Fullerton and the city of Fullerton set new standards for station improvement with conjunction of increased Amtrak

service in the late 1980's and the introduction of the Orange County Commuter in 1990 (City of Fullerton, 2015).

The first step in improvements was the creation of a new rail platform with palm lined landscaping to replace the old asphalt platform in 1993. This was followed by the construction of overhead pedestrian walkways in 1997 to create safer access to track no 3. In addition to improving safety, it was also an efficiency improvement because it allowed two trains to stop at the station at the same time since there was no pedestrian interference. In 1994, Metrolink's Orange County Line commenced service which significantly added to the rail passenger numbers at the station. The last service addition to the station was the Metrolink Route 91 Line in 2002. Today, the two Metrolink lines in addition to the Amtrak Pacific Surfliner make Fullerton the second busiest station on the Metrolink System behind LAUS (Metrolink 2015). This growth has made Fullerton a genuine commuter rail town, where residents have a variety of commuting options in three different directions via rail. Like many older stations, geography gives them a wild card for success. The reason for this is that Fullerton is an older suburb, and older suburbs that have been continuously served by rail generally have their rail stations located in the CBD where amenities are nearby. Furthermore, location also maximizes the effectiveness of TOD because it offers residents additional amenities to the rail station.

Once the historic depot was fully renovated, the City of Fullerton embarked on a task of creating a Transit-Oriented Development. The Olsen Company was contracted in the mid-2000's to develop SOCO walk, which was deemed as a transit village and lies just south of the station platform. This project was highly controversial, since eminent domain was used to displace residents from the Truslow neighborhood, a predominantly Latino and low income neighborhood (Esquivel, 2008).

By 2005 half of the SOCO's 120 units were sold, deeming the project an early success by the Orange County Register (Giasone, 2006). The development was completed and opened in 2006. How has this TOD, which was marketing its self as a place for urban living and live/work space favored out according to Zillow?

	Average
Size (sq. ft.)	1,705
Price	$552,600
Price (per sq. ft.)	$324

Table 2 SOCO Walk

Illustration 6 SOCO Walk, Fullerton (Photo: Matthew Nordstrom)

The Amerige Heights master planned community is located in the western portion of the city of Fullerton. The community was developed in stages during the early 2000's and additions are continuing today by Standard Pacific Homes. These homes offer the full amenities that most master planned communities offer, which includes a central park and an attached high end shopping center. They are located approximately 1.5 miles from the Buena Park Metrolink station, which translates to fairly good access because driving time for that distance is typically within five minutes. The distance to the nearest Freeway onramp is comparable to that of the SOCO walk. On Standard Pacific's website, rail station access was not mentioned, but not surprisingly freeway access is. Therefore, rail access is not important from a marketing perspective, because they are assuming the fact that potential residents have the transportation habits of typical Southern Californians which revolve around the automobile.

	Average
Size (sq. ft.)	1,180
Price	$372,224
Price (per sq. ft.)	$315

Table 3 Amerige Park Condominiums

The City of Fullerton along with private developers are continuing their efforts at Transit-Oriented Development with a 200 unit luxury apartment community that is currently under construction. The apartment complex is appropriately named Malden Station, most likely due to its walking proximity to the Fullerton station. The contractor for this development is Lennar Multifamily Communities.

Illustration 7 Malden Station Construction, Fullerton (Photo: Matthew Nordstrom)

Zillow data was collected for 3×2 in a neighborhood that borders the south and east sides of Fullerton College. The Fullerton Transportation Center is within walking distance.

	Average
Size (sq. ft.)	1,538.2
Lot Size	6,049
Price	$531,316
Price (per sq. ft.)	$345.41

Table 4 Single Family Homes

A second sample of 10 3×2 homes were sampled in a neighborhood that is located just south of the Cal State Fullerton campus. This neighborhood has convenient access to the 55

Freeway and was built in 1954.

	Average
Size (sq. ft.)	1,297.2
Lot Size	7,900.6
Price	$459,380
Price (per sq. ft.)	$354.13

Table 5 Single Family Homes

Robust Development is underway in both Downtown Fullerton and Amerige Heights. Based on the condo pricing samples, the difference in square footage price is so small that it appears inconclusive to determine which of these two locations contains the higher property value. Time will tell which location gives more pricing weight as development continues.

For single family homes, the neighborhood near Cal State Fullerton is actually yielding slightly higher average property value than the neighborhood downtown. Once again, the difference is not large enough to have a commanding conclusion.

6.3: Case Study- Orange Metrolink Station

Illustration 8 Depot Walk, Orange Station (Photo: Matthew Nordstrom)

The picturesque city of Orange, known for its quaint plaza, charming streets, and historic homes, traces its roots to 1860's when lawyers Alfred Chapman and Andrew Glassell accepted 1835 acres of land from the Rancho Santiago de Santa Ana as legal fees. This land was converted citrus orchards and a lucrative citrus industry followed. The city was incorporated in 1888 (City of Orange, 2015).

The Orange Metrolink Station is located in Downtown Orange on Chapman Avenue. The station was formally used by the Santa Fe and its depot still stands on the station site and houses a restaurant. The Santa Fe served the station with its San Diegan trains from 1985 through 1971. After a 23 year hiatus, passenger rail returned to the Station with the Metrolink in 1994. As of 2015, the Orange station is the busiest Metrolink-only station on the Orange County Line with an average of 759 daily riders (MetrolinkFY15 Q2 Report). System-wide, the only

two Metrolink-only stations that exceed a higher daily ridership than Orange are Industry and Rancho Cucamonga.

"Inherited Transit-Oriented-Development" is a term that fits the description of much of the layout of Orange. In the Downtown area, the streets are compact, and contain many historic turn-of-the century homes. The quaint CBD consists of a walkable layout with a central plaza. Chapman University is also located in the Downtown area.

The Depot Walk, built in 2007, is located on the west side of the Metrolink station. There were only three zestimates listed on Zillow, in which all were for 3x3 layouts.

	Average
Size (sq. ft.)	1,277
Price	$559,335
Price (per sq. ft.)	$438.00

Table 6 Depot Walk

The La Veta/Monterrey community is a condominium community located in the southern portion of Orange with convenient access to the Main Place mall and the 22 Freeway. Data from Zillow is limited, and there were no 3x3 layouts that were able to be compared with the Depot Walk. The three condos that had zestimates were in 2×2 and 2×2.5 layouts.

	Average
Size (sq. ft.)	1,060.6
Price	$284,918
Price (per sq. ft.)	$268.60

Table 7 La Veta/Monterrey Community

The Downtown Orange neighborhood sampled is located just south of Chapman Avenue in Downtown Orange. Nearly every home surveyed was built prior to World War II. There were ten homes sampled in the 3x1 configuration.

	Average
Size (sq. ft.)	1,124
Price	$594,521
Price (per sq. ft.)	$528.90

Table 8 Downtown Orange

To compare the Downtown neighborhood, a second neighborhood was sampled in the eastern portion of Orange. The neighborhood of these sampled homes is located just east of the 55 Freeway with convenient access. Unlike the downtown sample, these homes are in the 3x1.5 configuration.

	Average
Size (sq. ft.)	1,172.7
Price	$517,668
Price (per sq. ft.)	$441.40

Table 9 Orange- East

Illustration 9 Streetcar Suburb Layout, Downtown Orange (Photo: Matthew Nordstrom)

If Hedonic model pricing based on rail station distance correlated with higher prices, this may fit the profile of the city of Orange. Both samples reflected higher property values on the properties within walking distance of the station. However, the attractive downtown area along with Chapman University may give more weight to pricing than the rail station. Aside from that fact, the station yields nearly 800 riders per day, and it is likely that prior rail experience contributes to the effectiveness of commuter rail in Orange. Even before the Metrolink, it is likely that many Orange residents were using Amtrak as a commuter train, since the Anaheim and Santa Ana stations are within close proximity to Orange. Furthermore, the layout of much of the city brings many people within walking distance of the station, which is a large contributing factor, since employment centers such as Chapman University are within reasonable walking distance from the station.

6.4: Case Study- Irvine Transportation Center

The Irvine Transportation Center is the third busiest station on the Metrolink System behind Fullerton and LAUS. Irvine is one of the fastest growing cities in Orange County. The Metrolink system has played an important transportation link for both its residents and commuters.

Irvine has its roots in the Irvine ranch. This was originally part of a Mexican land grant that was acquired by James Irvine in 1864. James Irvine and his partners established the Irvine Company in 1890. This agricultural community would gradually evolve into a master planned suburb beginning in 1960 when Irvine was incorporated into a city. William Periera was commissioned by the Irvine Company to create the master plan that would originally include five neighborhoods, a campus of the University of California, open spaces, and business parks (The Irvine Company, 2015). From the 1960's onward, this up-scale community has seen phenomenal

growth, and this growth has coincided with the growth of passenger rail in recent years.

The railroad history in the Irvine Valley goes back to a dispute that the once friends James Irvine and the Southern Pacific's Collis Huntington had. Their bitter feelings led Irvine to block S. P. construction through the vicinity of the ranch and this was successfully done at gunpoint by locals (The Anaheim Colony 2015). As a result, the Santa Fe secured a right-of-way through the area for its Los Angeles-San Diego line (Surfline). More than one hundred years later Irvine was added to the Amtrak Timetable in 1990 which coincided with the opening of the Irvine Transportation Center. In addition to San Diegan Service, there was also the Orange County Commuter that operated one daily roundtrip during rush hour between Los Angeles Union Station and San Juan Capistrano with Irvine being one of the stops. The popularity of this train lead Metrolink to establish the Orange County Line in 1994 which offered more trains and more flexible times. One year later in 1995 a second Metrolink line was added to the Irvine station, which was the Inland Empire/Orange County line.

Since Irvine is a major business destination, commercial property was assessed to test the impact of rail. In addition, there were also a few apartment properties that were assessed. Single family homes were not included because it was difficult to find an adequate comparison because there are no single family homes within the immediate vicinity of the station.

Illustration 10 Irvine Transportation Center (Photo: Matthew Nordstrom)

The Calypso Apartments are located on the southeast corner of the intersection of Jamboree Blvd and Alton Pkwy, and served by the iShuttle Route B. They are 2×2 with an average square footage of 1,359 with an average monthly rate of $2,762, which is $2.03per square ft.

Config	Size (sq.)	Rate (per month)
2×2	1,448	$2,878
2×2	1,271	$2,647

Table 10 Calypso Apartments

The Avalon Apartments are located at the northeast corner on the intersection of Alton Parkway and Jamboree Blvd and is served by the Tustin Metrolink station via the iShuttle Route B. Of the four apartments listed on Zillow, the average rent rate per month is $2,397 with an average square footage of 1,138.

Config	Size (sq.)	Rate (per month)
2×2	1,127	$2,340
2×2	1,246	$2,565
2×2	1,028	$2,185
2×2	1,154	$2,500

Table 11 Avalon Apartments

The Santa Maria Apartment Homes are located approximately ¾ mile drive from the Tustin Metrolink Station on Irvine Center Drive. These apartments have an average square footage of 1,069 and average monthly rate of $2,195.

Config	Size (sq.)	Rate (per month)
2×2	1,073	$2,255
2×2	1,061	$2,200

2×2	1,073	$2,130

Table 12 Santa Maria Apartment Homes

The Solana Apartment Homes are owned by the Irvine Company and are just over two miles from the Tustin Metrolink Station. The average size of the 2×2's are 1,150 and the average monthly rate is $2,292.

Config	Size (sq.)	Rate (per month)
2×2	1,127	$2,225
2×2	1,174	$2,360

Table 13 Solana Apartment Homes

The Woodbury Apartment complex is located roughly equidistance between the Tustin and Irvine Metrolink stations at two miles. Of the three 2×2 plans, the average square footage is 918.8 with an average rate of $2,156.

Config	Size (sq.)	Rate (per month)
2×2	1,001	$2,410
2×2	905	$2,075
2×2	849	$1,985

Table 14 Woodbury Apartments

The Turtle Ridge apartments are the furthest ones from the two Metrolink Stations sampled. Their main feature that gives them pricing weight is hill views since they are located in the Laguna Hills near the UCI campus. Of the three 2×2 floor plans, the average square footage is 1,017 with an average monthly rate of $2,196.

Config	Size (sq.)	Rate (per month)
2×2	963	$2,190
2×2	1,164	$2,605

2×2	926	$2,155

Table 15 Turtle Ridge Apartments

The first samples of properties displayed on LoopNet are located in the Technology Business Park adjacent to the Irvine Metrolink station. Many of these commercial properties are located within walking distance or a short ride on the iShuttle. The average rent is $28.08/square ft. per year. Aside from the Metrolink station these properties are either located at or near the Irvine Spectrum which offers an array of amenities that likely have a greater pull on pricing influence than the Metrolink station.

Address	Rate (per sq. ft.)	Name
9838 Research	$26.40	
9861 Irvine Center	$25.20	
15375 Barranca	$12.60	
15310 Barranca	$23.40	LV Business Center
15615 Alton	$28.80	Palm Court
300 Spectrum	$40.80	Office Towers
2040 Pacifica	$42.00	Pacifica Towers
15420 Laguna	$23.40	Discovery Business Center
22 Odyssey	$33.00	
15525 Sand Canyon	$25.20	Sand Canyon Business

Table 16 Commercial Real Estate Assessment

The second set of offices sampled from (LoopNet, 2015) is located in the Woodbury section of Irvine just east of the 5 Freeway. This area does not have convenient connecting transportation to the Irvine Metrolink station. The average rate is 25.2/square ft. per year.

Address	Rate (per sq. ft.)	Name
910	$27.60	Jeffrey Office Park
650	$25.80	
5440 Trubuco	$22.20	Jeffrey Corporate

Table 17 Commercial Real Estate Assessment

The Jamboree corridor is served conveniently by the iShuttle route B from the Tustin Metrolink station. Of the three LoopNet samples, the average rent for office space in this area is $21.8/square feet per year.

Address	Rate (per sq. ft.)	Name
2691 Richter	$16.20	Jamboree Business
41 Corporate Park	$24.00	Corporate Park
20 Corporate Park	$25.20	Olen Corporate Park

Table 18 Jamboree Corridor

The Irvine Business Center near the John Wayne airport contains several office buildings and is served by routes A and B of the iShuttle from the Tustin Metrolink station. The average rent in this area is $25.05/square ft. per year.

Address	Rate (per sq. ft.)	Name
2062 Business Center	$18.60	Airport Plaza II
18400 Von Karmen	$32.40	Irvine Tower
1552 MacArthur	$26.40	Airport Business
19100 Von Karmen	$22.80	The Atrium

Table 19 Irvine Business Center

Despite the fact that the Irvine Transportation Center is the busiest on the system, there is no indication that it has influenced property value directly. According to LoopNet, the office

space in the Irvine Spectrum vicinity had the highest rates in the sample. However, it only beats the Northwood area, which was the second highest by $3. It seems more probable that proximity to the Irvine spectrum has the greatest influence on pricing.

However, it is evident that the Metrolink has had a strong impact in Irvine because much of the development occurred after the advent of commuter rail, and a good share of it is "Transit-Adjacent". The first phase of the Irvine spectrum opened one year after the start of Metrolink service in 1995 followed by a second phase in 1998. In addition to the Irvine Spectrum, the Irvine Technology Center, which is comprised of campus-style office buildings, was built by the Irvine Company adjacent to the Irvine Transportation Center. The now decommissioned El Toro Marine Corps Air Station lies to the east of the station, and plans for redevelopment are in the making. However, historically the presence of the base has restricted development and could explain why the Irvine Company did not pursue Transit-Oriented Development housing. Furthermore, the sprawled out geography of Irvine makes rail commuting to the city difficult because of connecting transportation services for the critical last mile. This is a common problem for distant suburban communities on the Metrolink system that share similar geographies to that of Irvine's. The City of Irvine, with its intent on furthering its commitment as a rail commuting business destination, came up with the iShuttle, which is a local internal bus system that shuttles passengers from the Metrolink stations at Tustin and Irvine to the Irvine Business Center and the Irvine Spectrum area respectively. The iShuttle bus schedules are coordinated with Metrolink schedules. Despite the fact that the iShuttle appears as an ideal solution to the "last mile" problems, it has had its share of criticism which include inefficient operation, low returns, and the use of county (OCTA) and state funds, not Irvine funds to support the 1.5 million dollar operation annually (Mickadeit, 2013). According to Joel Zoltnik of the

OCTA, the use of taxpayer funds of non-Irvine residents to pay for an Irvine service is commute efficiency, and that is achieved through taking cars off the road (Mickadeit, 2013). Zoltnik also cited that if the Metrolink system was absent in Orange County, a lane and a half would need to be added to the 5 Freeway in order to effectively accommodate commuters (Mickadeit, 2013). This fact alone is a testament to the effectiveness of the Metrolink system in Orange County. Furthermore, the City of Irvine is constantly creating incentives for employers to encourage employees to use the iShuttle, which include gift rewards for distributing iShuttle pamphlets and timetables (City of Irvine, 2015).

There were 1,377 daily boardings at the Irvine station and 1,123 at Tustin, according to (Metrolink, 2015). That is a total of a combined 2,500 passengers between the two stations. Another statement that owes to the magnitude of this growth is how much the Irvine Transportation Center has expanded since its inception in 1990. In 1990, there were only around 10,000 riders using the station that year. In 2005 that number has grown to more than 650,000 (Emery, 2008). The stations original parking lot was not large enough to support this level of ridership, since the vast majority of commuters make the trip by car to the stations parking lot (Pacific/West Communications Group, Inc., 1994). This led the City of Irvine to construct a 1,500 space parking garage to accommodate the growing parking demand. The new parking structure was completed in 2008. The rapid population growth of Irvine coupled with its large growth in office space will likely mean that the Metrolink will continue to play an ever more important role in transporting commuters efficiently while mitigating traffic and air pollution.

Illustration 11 Irvine iShuttle (Photo: Matthew Nordstrom)

6.5: Case Study- Simi Valley Amtrak/Metrolink Station

The Simi Valley Metrolink station is located in the eastern part of the city and shares the station with Amtrak's Pacific Surfliner and Coast Starlight. The station was first used as a stop

on the short lived CalTrain commuter service during 1982-1983. Simi Valley is a bedroom suburban community with no centralized downtown area, just many scattered strip malls and shopping centers throughout the city. Despite that lack of centralization and sprawl, Simi Valley boosts over 300 daily riders, making it the busiest station in Ventura County and has Transit-Oriented Development (Metrolink 2015).

The Hidden Valley Apartment Homes are a Transit-Oriented Development built adjacent to the Simi Valley Metrolink/Amtrak station.

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
1×1	708	$1,564	$2.20
2×1	993	$1,891	$1.90
3×2	1,300	$2,237	$1.72

Table 20 Hidden Valley Apartment Homes

Illustration 12 Hidden Valley Apartments, Simi Valley (Photo: Matthew Nordstrom)

Located in the western portion of Simi Valley, the Meadowood Apartments are

approximately Five miles from the Simi Valley station. This luxury apartment complex offers 2×2 and 3×2 apartment homes for rent.

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
2×2	875	$1,720	$1.90
2×3	1,040	$2,180	$2.09

Table 21 Meadowood Apartments

The first neighborhood surveyed is located directly to the east of the Simi Valley Metrolink/Amtrak station, and all the homes are within ½ mile of the station.

	Average
Size (sq. ft.)	1,804.50
Lot Size	6544
Price	$448,488
Price (per sq. ft.)	$248.50

Table 22 Single Family Homes

The second neighborhood surveyed was built in 1968 and is located in the western portion of Simi Valley. It has favorable freeway access and is more than five miles from the nearest rail station.

	Average
Size (sq. ft.)	1,538.20
Lot Size	6,049
Price	$462,117
Price (per sq. ft.)	$300.40

Table 23 Single Family Homes

The Hidden Valley Trans-Oriented Development does not have a higher price per square feet than the Meadowood's. The Meadowood apartments are within closer proximity to the 118 Freeway with additional amenities including the Simi Valley Town Center. The lack of

centralization and retail development are likely contributing factors to why the Meadowood Apartments are more expensive than the TOD Hidden Valley Apartments.

6.6: Case Study- Santa Clarita Metrolink Station

The Santa Clarita Valley is one of the fastest growing regions in Southern California. Originally, the Santa Clarita station was the terminus of the Santa Clarita line until the line was extended to Lancaster following the 1994 Northridge Earthquake. Historically, the Southern Pacific served the area since the 1870's when the original S. P. mainline was built south to Los Angeles. In the 20th century, it was known for its movie studio and the filming of "Westerns", most notably those who starred William S. Hart.

The Via Metro Homes TOD was compared the Belcaro condominium community in Copper Hill, which is located in the Northern part of the city at roughly five miles from the Santa Clarita Station. There were no single family homes within walking distance of the station; therefore, there was no single family home comparison in this study.

Illustration 13 Via Metro, near Santa Clarita Station (Photo: Matthew Nordstrom)

The Via Metro homes are a brand new development located on Soledad Canyon within roughly a quarter mile of the Metrolink station. This compact development features homes of contemporary Mediterranean architecture. The developer of the property is the New Home Company, and they advertise via Metro as “a place with a small town vibe with easy access to

Southern California's regional rail network".

	Average
Size (sq. ft.)	1,538.20
Price	$531,316
Price (per sq. ft.)	$345.41

Table 24 Via Metro Homes

	Average
Size (sq. ft.)	1,752.30
Price	$528,318
Price (per sq. ft.)	$301.49

Table 25 Belcaro Condominium Community

The Via Metro Homes yield higher property value than the Belcaro community. However, it is not reasonable to conclude that the convenience of the Metrolink station is necessarily putting a premium on property value. Both locations are about equal distance from the freeway. If there was a comparable community that had better freeway access the results may be different. There are some communities that fit into that category; however, they have favorable rail and freeway access since they are in Canyon Country and within the vicinity of the Via Princessa Metrolink station.

6.7: Case Study- Covina Metrolink Station

The areas that Covina occupies today were once part of the San Gabriel Mission Estate. During the Mexican period, three ranchos converged on this area, which included Rancho La Puente, Rancho San Jose, and Rancho Azusa. The drought of 1863-1864 and the decline of the gold rush in Northern California decimated the ranching industry (Pflueger, 1964). Migration from the East and Midwest brought in a new wave of Anglo settlers to the area following the Civil War, and this was the initial wave of settlers who established its lucrative citrus industry

(Pflueger, 1964). The land booms of the later 19th century brought more population growth, and by 1906 Covina had a population of 1500 (Pflueger, 1964). Henry Huntington expanded a Pacific Electric line to Covina in 1907. Getting the interurban railway to Covina was of such high priority to residents and civic leaders that many landowners gave up land to secure a right-of-way for Huntington's tracks (Pflueger, 1964). Like many other cities in the Southland, large scale suburban growth took shape following the Second World War. With this came more population growth, in which the population reached 25,000 by 1960. During the early 1960's population growth was so rampant that the decade became known as the soaring 60's (Pflueger, 1964). This growth coincided with a loss of agricultural land to make room for new subdivisions.

The Covina Metrolink Station is located near the site of the old Pacific Electric Depot. Since the station lies on the portion of the line that was formally a Pacific Electric right-of way, the layout of downtown Covina, like other older suburbs, has a compact "streetcar suburb pattern."

The TOD being represented in this study is located on Merlot Drive just to the west of Citrus Avenue and the Metrolink parking garage. The development was completed in 2011.

	Average
Size (sq. ft.)	1,425
Price	$415,380
Price per square ft.	$291.49

Table 26 Transit-Oriented Development Assessment

To compare the property value of the TOD, another condo complex of similar characteristics was chosen in the southern portion of Covina. The condo community is located in Calvaderos Avenue and is in closer proximity to the 10 Freeway than the Merlot Avenue TOD.

	Average
Size square ft.	1,021
Price	$321,163
Price per square ft.	$314.50

Table 27 Single Family Assessment

Representing the walking distance neighborhood is a 1952 built subdivision just north of the Covina Metrolink station.

	Average
Size (sq. ft.)	1,391.70
Lot Size	6,562.7
Price	$421,091
Price per square ft.	$302

Table 28 Downtown Covina neighborhood

The second neighborhood sampled is approximately three miles from the Metrolink station on the blocks of Albertson and Aldenville Avenues. The neighborhood is similar to the downtown sample, and was built between 1953 and 1956. The main difference between the two is location and their proximity to transportation nodes, with the latter being closer to the 10 Freeway Citrus Avenue onramp.

	Average
Size (sq. ft.)	2,929.5
Lot Size	8,403.2
Price	$451,133
Price per square ft.	$153.90

Table 29 Covina South neighborhood

The Merlot Avenue Transit-Oriented Development had a higher average price than the Calvados Avenue development but a lower average price per square foot. The opposite was the

case in the single family homes sample, where the downtown neighborhood actually has a higher price per square feet than the other sample. However, the actual average price was lower. Therefore, it is inconclusive whether the downtown neighborhood near the Metrolink station yield higher property values as a result of that amenity based on the samples studied. The same can be applied to the TOD.

6.8: Case Study- Rancho Cucamonga Metrolink Station

Rancho de Cucamonga was the once a 1300 acre Mexican Land Grant to Tubercio Tapia. In addition to cattle ranching, Tapia also founded a winery on the rancho, which still has its legacy in the present day Thomas Winery. By the 1860's American settlement in the region became prominent and the landscaped transformed from cattle ranches to citrus orchards. The Union Pacific and Santa Fe railroads reached the area by 1887 followed by the Pacific Electric in 1913. During this early agricultural period three towns were formed, Etiwanda, Alta Loma, and Cucamonga. The area was experiencing rapid growth during the 1970's. In order to manage such growth the Tri-Community Incorporation Committee was formed for the purpose of creating a new city as a strategy to manage such growth. In 1977, Etiwanda, Alta Loma, and Cucamonga passed a vote by 59 percent that lead to the incorporation of Rancho Cucamonga (City of Rancho Cucamonga, 2015).

The Metrolink began service to Rancho Cucamonga in 1993 with the extension of the San Bernardino Line to San Bernardino. The station contains a 960 space parking lot and a recently constructed under-track pedestrian way. There is Transit-Oriented Development to the south of the station on Milliken Avenue, which are the AMLI and Empire Lakes Apartments. Also in the vicinity is an office building, which can be classified as Transit-Adjacent Development.

Without a neighborhood of single family homes within walking distance of the station, only apartment rents were used in this study, which were compared to the TOD with other apartments outside the stations vicinity.

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
3×2	1,383	$2,043	$1.47

Table 30 AMLI/Empire Lakes Apartments

The AMLI were compared with two other complexes that are located further from the station.

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
3×2	1,312	$2,213	$1.68

Table 31 Camino Real Etiwanda Apartments

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
2×1	875	$1,550	$1.77

Table 32 Vineyard Village Arrow Rite

The non-TOD apartments sampled had a higher rate per square foot than the EMLI TOD. The Camino Real at Etiwanda had a substantially higher rate. Based on this assessment, it is conclusive that the EMLI Transit-Oriented Development does not yield higher rent rates compared to other apartment communities in its class within Rancho Cucamonga. There are several reasons for this. One is that Rancho Cucamonga has its roots in three unincorporated towns. The merging of the three and population growth aided in the suburban sprawl of the region. Even though there have been new attractions, most notably the Victoria Gardens shopping center, they were not built near the station, and development in those areas probably holds more pricing weight than the areas near the station. However, the station does yield high ridership numbers, and this can be attributed to ample parking space and wide streets which does shorten driving time from home to station.

Illustration 14 Parking Garage, Corona North-Main Station (Photo: Matthew Nordstrom)

6.9: Case Study- Corona North Main Metrolink Station

Robert Taylor and partners Adolph Rimpau, AS Garretson, and George Joy formed the South Riverside land and Water Company in 1866. They hired Anaheim engineer HC Kellog to design a circular boulevard that would form the basis of this town in the Santa Ana River canyon. Trying to emulate the success of nearby Riverside, new residents planted lemon and orange trees and the citrus industry came to play a dominant role. The city's name was changed from South Riverside to Corona in 1896. During the second decade of the 20th century, the Lemon Exchange By Products Company was formed in Corona in response to the growing demand for lemons in the country. This company helped give Corona the nickname of "Lemon Capital of the World." The Pacific Electric Railway also reached Corona during this period, which provided a crucial interurban connection of passengers and freight for Corona. When the Pacific Electric ceased operations in the mid-20th century and the freeways took over, so did the population boom.

However, in 1995, Metrolink re-established passenger rail service in West Corona with the Inland Empire-Orange County Line and in 2002 with the route 91 Line.

The Corona-North Main Station opened in 2002 along with the introduction of the Route 91 Line. The station is located north of the CBD and 91 Freeway. Currently, the area is undergoing major re-development that is going to be more complementary to the rail service. Much of the previous and current infrastructure was geared toward rail freight, with a line of warehouses along the rail corridor. The station has a three track layout, which helps relieve congestion on this busy rail corridor that consists of many BNSF freight and Metrolink commuter trains.

Currently, the City of Corona is undergoing a project titled "Main Street Metro", which is currently entering its second phase. The Artisan Apartments, the first of the Transit-Oriented Development, were part of the first phase. In order to secure this development, the old shopping plaza that contained a rite-aid pharmacy and pizza restaurant has been torn down in order to make way for the new project (Hurt, 2014). Developer Watermarke Properties and San Diego based home construction company Wermer Multi-Families are taking on the project that is going to include mixed residential, retail, and offices all within close vicinity of the Metrolink Station(Hurt 2014).

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
2×2	1,679	$1,134	$1.48

Table 33 Artisan at Main Street Metro

The next two sets of sampled apartment complexes are located at considerable driving distance of the North Corona-Main Station.

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
2×2	870	$1,370	$1.57

Table 34 Lincoln Park Apartments

Config	Size (sq.)	Rate (per month)	Rate (per sq. ft.)
2×2	1,070	$1,909	$1.78

Table 35 Palisades at Sierra Del Oro

Both of the sampled properties are within convenient distance of 91 Freeway access. As of now, being within a close distance to the Corona-North Metrolink station does not mean that rates and property values will be higher. However, this may change in the near future once the "Main Street Metro Project" is completed. With the negotiations it took on behalf of the city of Corona to get the TOD project underway, this demonstrates the city's commitment to perusing suburban smart growth through Transit-Oriented Development.

Illustration 15 Main Street Metro Project TOD Construction, Corona (Photo: Matthew Nordstrom)

6.10: Discussion of Results

Although the samples are limited in information, it is reasonable to suspect that proximity to the rail station does not mean that there will be higher property values compared to areas not in the vicinity. The only station that played an exception to that rule was Orange. A likely reason why commuter rail has not impacted property values as much in the Southland as it has in other parts of the country is the freeway image. The Southland has a notorious reputation for the automobile and the freeway, which renders many people away from mass transit options to the automobile and the complex web of freeways. This can historically be traced to urban sprawl and the Interstate Highway Act of 1956. The linear branch patterns that characterized the development of the Pacific Electric years gave way to infill and sprawl from the end of World War II onward. The web of Freeways facilitated the geography of sprawl, and this sprawl in many ways rendered mass transit ineffective. However, the base rail infrastructure on which the core cities of the Southland were built on contain the inherited development patterns and infrastructure that support a mass commuter rail system. Despite the sprawling geography and available freeway space, the freeway system can only handle so much traffic, and the Metrolink has proven to be an important asset in addressing the regions congestion problems. Reiterating on the OCTA's Joel Zoltnik's statement, Metrolink trains in Orange County take the equivalent on 1.5 freeway lanes (Mickadeit, 2013). This fact benefits both rail and automobile commuters, since the more rail commuters there are means more cars off the freeway.

Transit-Orient Development is likely going to be on the rise in many suburban cities throughout the Southland. It seems that TOD's are the most logical solutions for station maximization and smart growth. However, they are not necessarily being adopted system wide, and as of today most stations on the Metrolink system lack TOD. This trend is reflected

statewide since TOD is still “the exception, not the rule” (Parker & Mori, 2002). Why aren’t all cities served by mass rail transit jumping on the TOD bandwagon? The answer is zoning, since most zoning laws across California were implemented during the suburban growth period of the 1950’s through 1970’s, and they favor low density, which was intended to protect residents from intrusive industries (Parker & Mori, 2002). Most transit stations in California today have not had their zoning laws changed “to reflect the presence of transit” (Parker & Mori, 2002). Another obstacle to TOD implementations are local opposition (NIMBY), as well as the lack of coordination between transit agencies and cities for zoning (Smith-Hiemer & Golem, 2002). Further adding to these obstacles is risk, since TOD’s are often of high quality designs and many cases face more restricting regulations than sprawl development (Parker & Mori, 2002). Despite these obstacles, there are strong planning and financial incentives to peruse TOD. Statewide, there were 23 million on-road vehicles in 2000. In 2020 this number is expected to be at about 35 million (Parker & Mori, 2002). Today, in 2015 the number is about 29 million. More TOD development means traffic mitigation, since freeways can only carry so-many vehicles. An incentive for local governments to change zoning laws is infrastructure costs. Sprawl development simply means higher infrastructure costs. TOD’s can save local governments and property owners up to 25 percent (Parker & Mori, 2002).

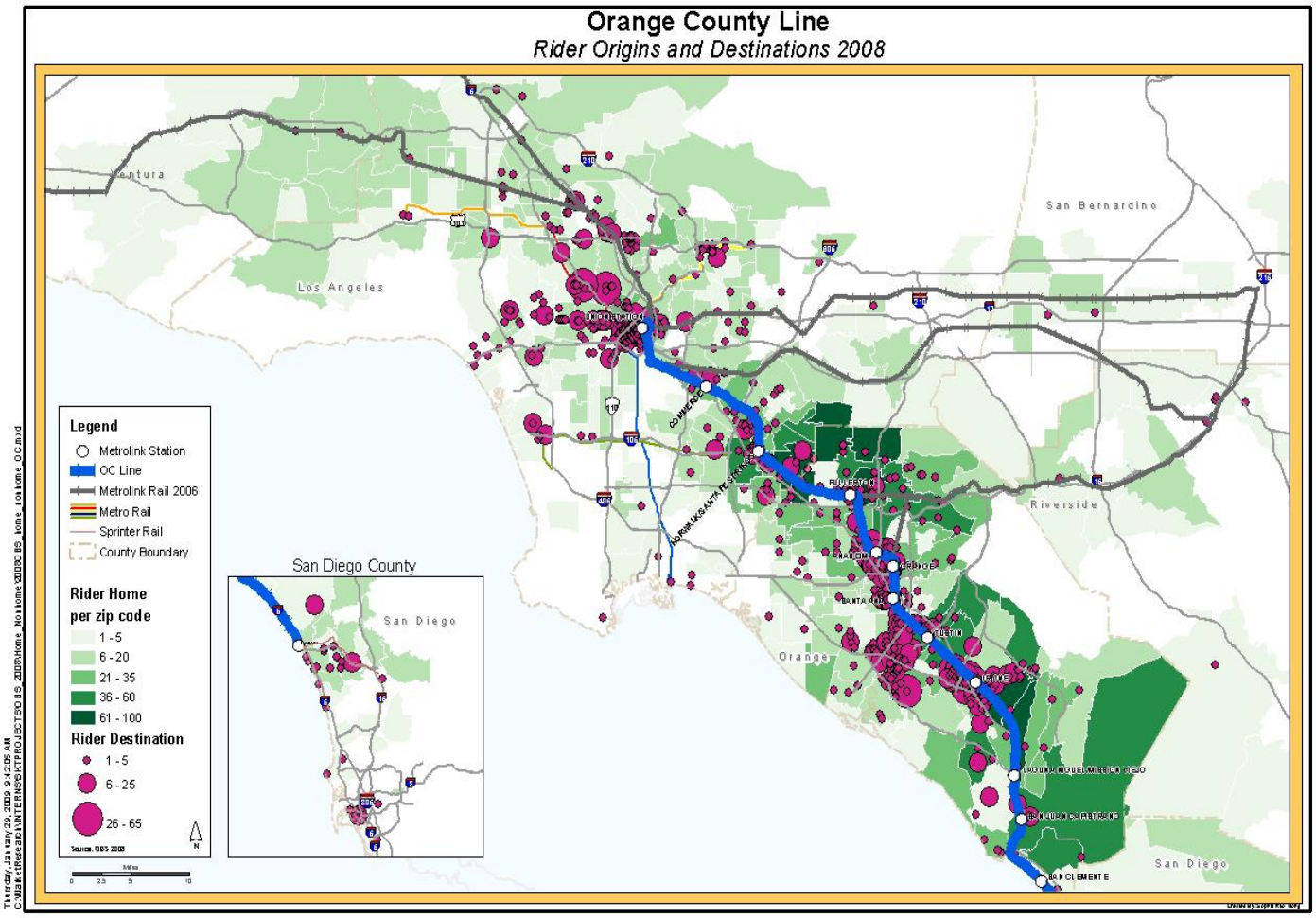

Figure 5 Orange County Commuter Destinations in 2006 (Source: Metrolink)

The above map displays the diversity of rider destinations for the Orange County line. Note the high concentration in southern Orange County; this may be largely attributed to "last mile" transportation services provided. Adaption to the spatial landscape is essential for the success of a commuter rail service. Since the above map indicates that many destinations for riders are in fact a few miles away from the station, "last mile" solutions, which mean integrated rail-bus service are needed in order to maximize the effectiveness of mass transit in a decentralized region like the Southland. Overall, a successful commuter rail station in Southern California needs to have a combination of parking infrastructure in order to accommodate park and ride patrons, as well as Transit-Oriented Development in order to help mitigate growth and

maximize the effectiveness of the station. Municipalities that adopt such improvements for their stations are likely to see an increase in ridership.

Chapter 7: Conclusion

The Pacific Electric Railway, once the world's greatest interurban railway system, was the catalyst for growth in the Southland. Wherever Huntington built his tracks, growth followed, and the "street car/citrus suburb" in which many Southland cities can trace their origins to characterized development during the first half of the 20th century. The post war rise of the automobile and the Interstate Highway Act of 1956 decimated the interurban railway and left the Southland without local rail by 1963. However, the sprawl took its toll on an automobile dependent transportation system with chronic congestion problems. Residents and urban planners alike saw the need for a return to rail and by the early 1990's the Los Angeles Metropolitan Region had once again commuter and urban rail transportation.

However, the Metrolink Commuter Rail system did not induce growth as did Huntington's Pacific Electric. Rather, it followed growth to the far flung suburbs, where it played and continues to play a mitigating role in solving traffic congestion, commute efficiency, and air pollution while influencing local development patterns. Therefore, it can be concluded that population growth and even suburban sprawl induce commuter rail development, not rail inducing growth. However, there is a legacy of urban design in which rail induces growth, and that is in the modern form of Transit-Oriented Development. TOD's will continue to play a crucial role in population growth, traffic, and climate change mitigation on the Metrolink commuter rail system in the future. Overall, it is reasonable to conclude that the growth and expansion of commuter rail in the Southland will continue to impact the spatial landscape and have a positive impact on development and property values. This commuter rail expansion can appropriately be titled as a "legacy of Henry Huntington".

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