NEXT STOP: TRANSIT ORIENTED COMMUNITIES

A Study of Change Over Time in LA Metro Rail Stations Built Between 2010-2020

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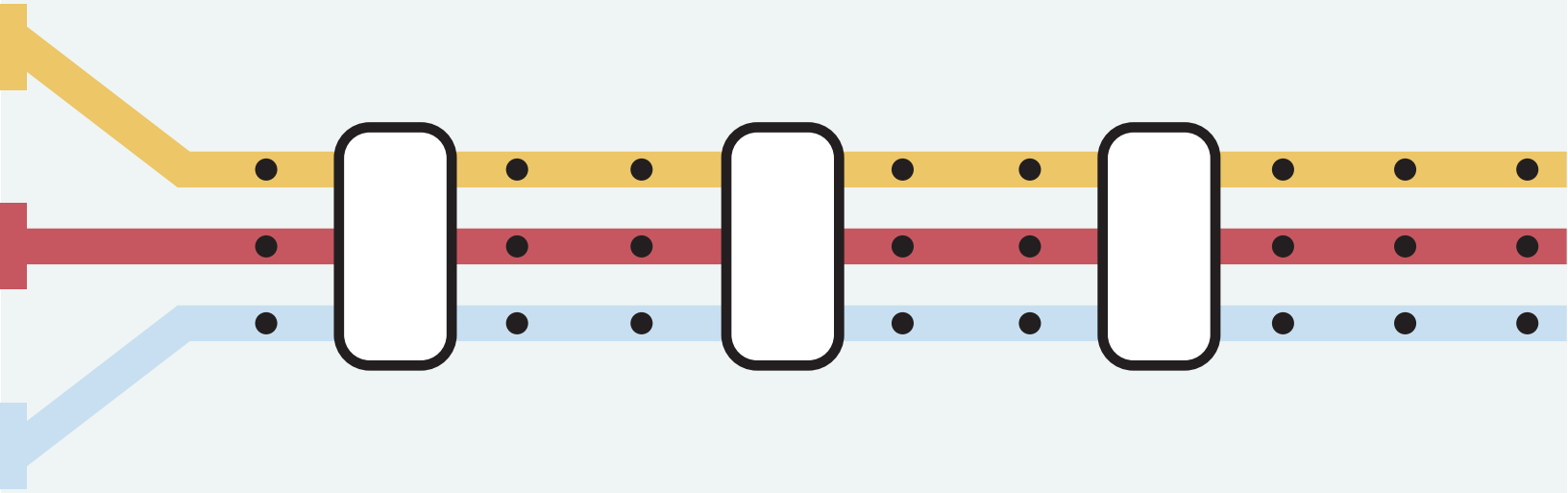
Client: Los Angeles Department of Transportation



UCLA Institute of Transportation Studies

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16. Abstract

Los Angeles County's 15-year initiative to overhaul its transportation infrastructure aims to reduce car reliance and promote public transit, walking, and cycling through dense, transit-oriented development (TOD) near stations. Despite significant investment, numerous challenges remain including bureaucratic obstacles, declining per capita ridership, and concerns about displacement and gentrification. The study evaluated LA Metro rail stations' impact on nearby communities, using ACS data from 2009 to 2022 to analyze demographic, housing, and mode choice changes within a half-mile radius of stations built between 2010 and 2020.

Findings indicated increased population density, racial diversification, and higher education levels near stations. Median household income and housing costs surged, signaling economic growth and gentrification. Urban renewal was evident with increased construction activity, rising rent and home values, and rise in remote work. Decline in public transportation usage was less significant near stations compared to city-wide.

To enhance Los Angeles' existing TOD policies, several recommendations were proposed. Encouraging diverse housing types near transit stations through mixed-use zoning, multi-family homes, and ADUs can increase density without major disruption. Innovative housing models like community land trusts and modular housing can improve affordability. Implementing robust anti-displacement measures, such as extending rent control, can safeguard low-income residents from gentrification. Promoting economic development near transit stations through local hire policies can reduce unemployment and foster economic stability. Lastly, expanded monitoring of TOD areas are necessary to better understand residential and travel behaviors, refining strategies to promote sustainable development and ensure inclusive, resilient, and thriving transit-oriented communities in Los Angeles.

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EXECUTIVE SUMMARY

Introduction

Los Angeles County has undergone a 15-year initiative to revolutionize its transportation infrastructure, investing billions to reshape regional mobility. This vision aims to diminish reliance on private cars, favoring alternatives like public transit, walking, and cycling to create a sustainable, livable urban environment. Yet, achieving this entails more than expanding transit; it demands land use policy shifts to encourage dense, transit-oriented development near stations. However, bureaucratic obstacles persist, hindering efforts to create transit-friendly communities. Despite transit expansion, per capita ridership has declined.

Los Angeles's sprawling, car-centric landscape necessitates high-density development around transit hubs to thrive. While promising for affordability and emissions reduction, densification raises displacement and gentrification concerns. The impact of transit-oriented development on neighborhoods is debated, with mixed findings on affordability and stability effects. Navigating these challenges requires balanced approaches prioritizing community engagement, equitable development, and displacement mitigation. Solutions must accommodate diverse local needs, ensuring growth enhances existing neighborhoods.

In summary, Los Angeles' journey towards a sustainable, equitable transportation system involves coordinated efforts across sectors. It's about more than transit expansion; it's about reimagining the built environment for inclusive, resilient communities. By embracing innovative planning and prioritizing equity and sustainability, Los Angeles can achieve accessible mobility and thriving neighborhoods in harmony with public transit.

Literature Review

The literature review delves into the transformative impact of rail stations on urban development and transportation modes. Rail stations serve as pivotal hubs, fostering economic revitalization, demographic shifts, and changes in commuting behaviors. Research in cities like New York and Hong Kong demonstrates that TOD promotes transit usage, influenced by factors beyond transportation access. However, studies on the LA Metro system reveal mixed results, with minimal employment changes near new stations and uneven TOD emergence. Los Angeles' car-centric culture perpetuates transit disinvestment, exacerbating mobility challenges and social inequities despite recent transit expansions. Efforts to densify around stations aim to reduce car dependency but can lead to gentrification, displacing existing residents. While some studies identify gentrification around rail stations, others find inconclusive evidence, highlighting the complex interplay between transit-oriented development and neighborhood change in Los Angeles.

Methodology

The study aimed to answer three main questions: (1) Does the establishment of a rail station lead to significant changes in adjacent communities compared to average Los Angeles neighborhoods? (2) Do these changes indicate positive or negative shifts over time? (3) Did the installment of a rail station in 2010 have different long-term effects compared to the installment in 2020? The study utilized American Community Survey (ACS) data from 2009 to 2022 at the census tract level, focusing on demographics, housing, and mode choice variables. Analysis involved comparing changes in census tracts within a half-mile radius of stations built between 2010 and 2020 to average changes across all City of LA census tracts. Additionally, three stations were selected for closer examination based on qualitative measures such as safety improvements, displacement risk, and mode choice. This qualitative analysis aimed to provide context for understanding neighborhood changes and their effects.

Findings

Analysis of the study data compared demographic, housing, and mode choice changes in LA from 2010 to 2022, focusing on areas within ½ mile of rail stations. Population density significantly increased near stations, while racial demographics diversified, and educational levels rose. Median household income and housing costs surged more around stations, indicating economic growth and gentrification. Construction activity slightly increased around stations, reflecting urban renewal efforts. Rent and home values escalated more rapidly near stations, likely due to increased demand and revitalization. Commute times decreased near stations, especially for shorter trips, but increased for longer commutes, with a notable rise in remote work. Public transportation usage declined both near station areas and city-wide, signaling a shift away from transit.

Policy Implications

Based on LA's existing policies and the findings from the report, several recommendations can be made. Encouraging diverse housing types near transit stations is crucial, including multi-family homes and expanded accessory dwelling unit laws to increase density without major urban disruption. Promoting affordable housing can be achieved by raising the required number of inclusionary units for developers, targeting moderate-income residents as well. Complete streets redesigns within TOD areas should enhance pedestrian and cyclist safety, particularly near community amenities. Streamlining evaluations of streets within a half-mile to one-mile radius of transit stops can identify effective safety improvements. Promoting economic development involves providing incentives for businesses to locate near transit and supporting small businesses with grants and affordable commercial spaces. Finally, implementing robust anti-displacement measures, such as stronger rent control and tenant protection ordinances, is essential to maintain affordable housing near transit.

Conclusion

The introduction of rail stations significantly transforms neighborhoods by shifting transportation modes and promoting economic revitalization. These hubs drive demographic changes, spur commercial and residential development, and encourage sustainable mobility solutions, reducing car dependency. This report highlights that new light rail stations in LA can notably alter local demographics, housing, and economic landscapes. However, the study is limited to transit-oriented communities around the Expo Line and stations built between 2010 and 2020. Further research on other LA Metro stations and non-transit-adjacent areas is needed. Effective rail station integration requires community engagement, equitable development, and measures to mitigate displacement, fostering inclusive, resilient communities and enhancing Los Angeles' sustainable and equitable transportation system.

INTRODUCTION

Over the past 15 years, Los Angeles County has embarked on an ambitious journey to transform its transportation infrastructure, investing billions of dollars to reshape how people move throughout the region. This transformative vision for Los Angeles seeks to reduce reliance on private automobiles and promote alternative modes of transportation, such as public transit, walking, and cycling. The overarching goal is to create a more sustainable and livable urban environment that enhances the quality of life for residents. However, achieving this vision requires more than just expanding transit networks; it necessitates fundamental changes in land use policies to encourage dense, transit-oriented development around stations. The term transit-oriented development is sometimes used interchangeably with transit-oriented communities. However, for the purposes of this report, the term transit-oriented development is in reference to the physical infrastructure and economic development near transit hubs, while transit-oriented communities focus on not only these aspects, but also the overall connections to communities. The synergy between transportation investments and land use planning is critical to fostering vibrant, amenity-rich neighborhoods where people can live, work, and play within close proximity to public transit options. Despite significant progress, challenges persist in realizing transit-supportive densities around station areas. Zoning regulations and other bureaucratic barriers often hinder efforts to create transit-oriented communities.

Los Angeles, with its sprawling, automobile-oriented landscape characterized by low-density development and ample parking, presents a unique context for promoting public transportation. Transit thrives when complemented by high-density residential and commercial developments near transit hubs, fostering a symbiotic relationship between urban form and transit ridership. However, the mere presence of transit infrastructure does not guarantee increased ridership, as evidenced by the decline in U.S. transit ridership per capita since 2000 despite the significant investments and network expansion during the same period.[1] Multiple factors contribute to shifts in transit ridership including various social, demographic, and economic characteristics, pushing policy makers to look beyond surface level features for answers. At the county level, many transit-intensive areas are not growing comparatively with transit-limited areas. While Driscoll et al proved that increasing population does often suggest an increased ridership, the ridership per capita overall has decreased partially as a result of where population has increased – typically areas with less transit.

While densification around transit stations holds promise for addressing housing affordability and reducing carbon emissions, it also raises concerns about displacement and gentrification. The impact of transit-oriented development on surrounding

[1] Driscoll, R. A., Lehmann, K. R., Polzin, S., & Godfrey, J. (2018). The Effect of Demographic Changes on Transit Ridership Trends.

neighborhoods is a topic of ongoing debate, with studies yielding mixed findings on its effects on affordability and community stability. Previous studies have found that real estate premiums associated with rail investment can significantly influence the demographic composition of surrounding neighborhoods.[2][3]

This study focuses on Los Angeles to examine the relationship between neighborhood change over time and fixed rail transit. The first section of the report is a literature review of existing research efforts to characterize and model the relationship between transit access, neighborhood change, and mode shift. This report builds off a dataset created with ACS 5-year data on the census tract level. Analysis will look at change over time with LA Metro stations built between 2010 and 2020, considering changes in demographics such as income, race, education as well as other neighborhood level factors such as home values, commute times, and mode choice. This will then be compared to changes in all census tracts within the City of LA. Three LA Metro rail stations from this dataset were highlighted for additional qualitative analysis based on displacement risk and travel habits. The final sections of this report will consider the results of the aforementioned analysis and provide policy implications and recommendations for future research.

[2] Cervero, R., & Duncan, M. (2004). Neighbourhood Composition and Residential Land Prices: Does Exclusion Raise or Lower Values?
[3] Lin, J. (2002). Gentrification and transit in Northwest Chicago.

LITERATURE REVIEW

In the following sections, I review the significant findings of scholarly articles that measure the relationship between rail transit and the surrounding neighborhood. First, I outline the presumed and proven effects of rail transit on mode shift, discussing comparative studies on TOD areas and highlighting research conducted in dense, transit-friendly cities like New York City and Hong Kong. Next, I explore TOD features such as densification, mixed-use development, and pedestrian-oriented design and their impact on travel behavior. I specifically look to a few studies focused on the LA Metro rail system to provide a baseline understanding of transit usage in the city. I then review the effects of rail transit on neighborhood change, focusing on the relationship between TOD and gentrification in Los Angeles. Lastly, I address the contributions this research can make to the existing literature, with the use of census tract analysis over a 10-year period to test for pre-station anticipation effects and lagged changes.

Effects of Rail Transit on Mode Shift

An approach often used to identify TOD's potential in reducing driving is to compare travel by residents living inside the TOD area versus those living outside the TOD area. Research conducted in New York City and Hong Kong, both dense, transit-friendly cities, have shown that residents living in TOD neighborhoods used transit more frequently than people having similar socioeconomic backgrounds but living elsewhere. Loo, Chen, and Chan further identified characteristics beyond the access to transportation that were factors in rail transit ridership. These characteristics included surrounding land use, station features, socio-economic and demographic characteristics, and intermodal competition.[4] Zhang utilized traffic demand modeling techniques to look at the Austin, Texas, area where a commuter rail line is under construction and TOD proposals are being developed.[5] Zhang found VMT to be reduced in the region, but overall, no major modal shift from driving to transit or non-motorized modes in the analyzed TOD scenario. TOD's actual role as a congestion relief strategy predominantly came from the concentrated development that shortened average trip length and thus generating less VMT and PMT than low-density sprawl. Research has also identified a potential issue with traffic conditions in the TOD areas potentially worsening due to the TOD-based concentration of people and jobs, further highlighting the need for active and public transportation use in these areas. If the increased use of transit in the area is coupled with a decrease in driving, traffic conditions in the roadway may improve. However, this may only be a temporary improvement in light of induced traffic demand – travelers are induced to drive and converge in the times and places where congestion has been lessened.

[4] Loo, Chen, and Chan E. 2010. "Rail-Based Transit- Oriented Development: Lessons from New York City and Hong Kong."
[5] Zhang. 2010. "Can Transit-Oriented Development Reduce Peak-Hour Congestion?"

Other studies have focused on specific TOD features and their effect on travel. Main strategies include densification, mixed-use development, and pedestrian-oriented design. Numerous studies have analyzed the effects of these strategies on travel mode choice and transit ridership. Ewing and Cervero concluded in an extensive literature on travel and the built environment that local density is a primary factor for increasing transit ridership.[6]

Only a limited number of previous investigations have focused on the LA Metro system, a relatively recent addition compared to established "legacy" systems like those in New York City, Boston, and Chicago, or even second-wave subways such as the Bay Area Rapid Transit (BART) in the San Francisco Bay Area and Washington, D.C.'s Metro. Kolko and Schuetz conducted analyses of employment patterns in proximity to newly opened rail stations in Los Angeles and several other major California metropolitan areas. Both studies concluded that there was minimal change in employment levels near these stations.[7] Additionally, Schuetz, Giuliano, and Shin conducted a qualitative examination of physical redevelopment around five LA Metro stations, revealing an uneven emergence of TOD in station neighborhoods.[8] The study identified factors contributing to this disparity, such as localized real estate market strength, zoning permissions for high-density development, and targeted local government engagement, contrasting with weak property values and incompatible zoning that hindered redevelopment near certain stations.

Effects of Rail Transit on Neighborhood Change

The city has made attempts to focus development efforts on increasing the density around rail stations, with the goal of increasing overall transit usage and decreasing car dependency. However, the implementation of these programs and policies can often lead to adverse neighborhood changes, pushing out existing residents who are unable to afford the escalating real estate market produced by the newer developments in the area.

The existing research highlights the complex relationship between transit-oriented development and gentrification in Los Angeles. While some studies found evidence of gentrification around certain rail stations, others did not observe significant changes in adjacent communities. Dominie, Coleman, and Stephens all noted gentrification around heavy rail and light rail transit stations. Dominie found that areas within one half-mile of rail stations added high-income households, lost transit riders, and gained solo car

[6] Ewing and Cervero. 2001. “Travel and the Built Environment: A Synthesis.”
[7] Schuetz, Giuliano, and Shin. 2018. “Can a Car-Centric City Become Transit Oriented? Evidence From Los Angeles.”
[8] Kolko. 2011. “Making the Most of Transit: Density, Employment Growth, and Ridership Around New Stations.”

drivers at a faster rate compared to Los Angeles County.[9] In Los Angeles, 70% of heavy rail and 60% of light rail stations gentrified between 1990 and 2010.[10] Coleman further discerned that average educational attainment around rail stations grew at a faster rate compared to areas farther from stations, and heavy rail stations had above-median rental costs and higher proportions of above median income households compared to non-station areas.[11]

Takeaways and Next Steps

This research makes several contributions to the existing literature. First, relatively few studies have examined the impacts of rail transit and accompanying TOD on pedestrian and active transportation activities in the right-of-way. Second, we can conduct census tract analysis on the study areas over a 10-year period, which allows us to test for pre-station anticipation effects and lagged changes. Third, impacts of transit in Los Angeles often focus on the county level instead of the city level. Since most of LA Metro rail stations are located within the City of LA, the resulting analysis more accurately reflects the transit-oriented communities in the comparison groups. Los Angeles' history as a car-centered city makes this a particularly interesting empirical setting to determine the ways in which the introduction of a robust transit system changes land use and demographic patterns. This research is particularly relevant considering the steep increase in rail and streetcar investment throughout Los Angeles leading up to the 2028 Summer Olympics.

[9] Dominie, Will. 2012. "Is Just Growth Smarter Growth?"
[10] Stephens, Pamela. 2012. "Evaluating Relationships between Rail Development and Neighborhood Change: Light Rail in the City of Los Angeles."
[11] Coleman, Erin. 2012. "Evaluating Relationships between Rail Development and Neighborhood Change: Heavy Rail in Los Angeles."

METHODOLOGY

This study set out to address the following questions: (1) Does the establishment of a rail station induce more significant transformations in adjacent communities compared to the change within an average City of Los Angeles neighborhood? (2) Do the observed transformations indicate positive or negative shifts in neighborhoods over time? (3) Lastly, can the introduction of rail transit induce additional effects related to displacement risk and right-of-way improvements? To explore these questions, the study utilized data from the American Community Survey (ACS) to analyze temporal shifts across various indicator variables and to devise an index for gauging levels of change. I chose to use the 5-year estimate as this provides data collected over a period of time, increasing the statistical reliability of the data, particularly for less populated areas and small population subgroups. Variables were chosen from three main categories – demographics, housing, and mode choice (refer to Table 1). These variables were deemed most suitable for capturing shifts in resident composition, housing dynamics, and mode choice within neighborhoods.

Table 1. Independent Variables

Demographic	Population Density Race/ethnicity by percent Education level by percent Median household income
Housing	Median gross rent Median home value Median year-structure built
Mode Choice	Travel time to work Commute mode: drive alone, carpool, transit, bike, walk

This study used ACS data covering 2009 to 2022 at the census tract level. Census tracts provide the smallest geographic unit possible for analysis across periods without introducing unreasonably high margins of error. The analysis looked at change over time with LA Metro stations built between 2010 and 2020 (refer to Table 2), considering changes in demographics such as income, race, education as well as other neighborhood level factors such as home values, commute times, and mode choice. Census tracts within a half mile radius of the station were chosen as part of this group. Aggregated and averaged data from this group were then be compared to average changes in census tracts across the City of Los Angeles. T-tests were used to determine statistical significance.

Table 2. Stations Built Between 2010-2020 in the City of LA

Station Name	Neighborhood	Date Opened
Expo/La Brea	West Adams	4/28/12
Expo/Vermont	Exposition Park	4/28/12
Expo/Western	Exposition Park	4/28/12
Expo Park/USC	University Park	4/28/12
Jefferson/USC	University Park	4/28/12
La Cienega/Jefferson	West Adams	4/28/12
LATTC/Ortho Institute	North University Park	4/28/12
Expo/Crenshaw	Jefferson Park	4/28/12
Culver City	Culver City	6/20/12
Farmdale	West Adams	6/20/12
Expo/Bundy	West Los Angeles	5/20/16
Expo/Sepulveda	West Los Angeles	5/20/16
Palms	Palms	5/20/16
Westwood/Rancho Park	Rancho Park	5/20/16

I then identified three stations for which I conducted a deeper dive into the surrounding area using additional demographic data and qualitative measures for safety improvements, displacement risk, walk and bike-ability. These stations were chosen because each had one or more changes to their independent variables that were significantly higher or lower than the station average and City of LA average. The purpose of these case studies was to identify features in transit-adjacent neighborhoods that may have influenced shifts in the independent variables.

Safety improvements were identified based on LADOT's map of Vision Zero safety improvements, last updated in January 2024. To determine displacement, I located the stations on the UCLA Urban Displacement database map which identifies areas that are vulnerable to gentrification in Southern California. It shows whether individual Census tracts gentrified between 1990 and 2000; gentrified between 2000 and 2015; gentrified during both of these periods; or exhibited characteristics of a "disadvantaged" tract that did not gentrify between 1990 and 2015. Walk and Bike Scores were taken from

WalkScore.com. To determine a Walk Score, they analyze hundreds of walking routes and award points based on distance to amenities in each category. Population density and road metrics are included in their analysis of pedestrian friendliness. Bike Score is calculated by measuring bike infrastructure, hills, destinations and road connectivity, and the number of bike commuters. See Table 3 for score descriptions.

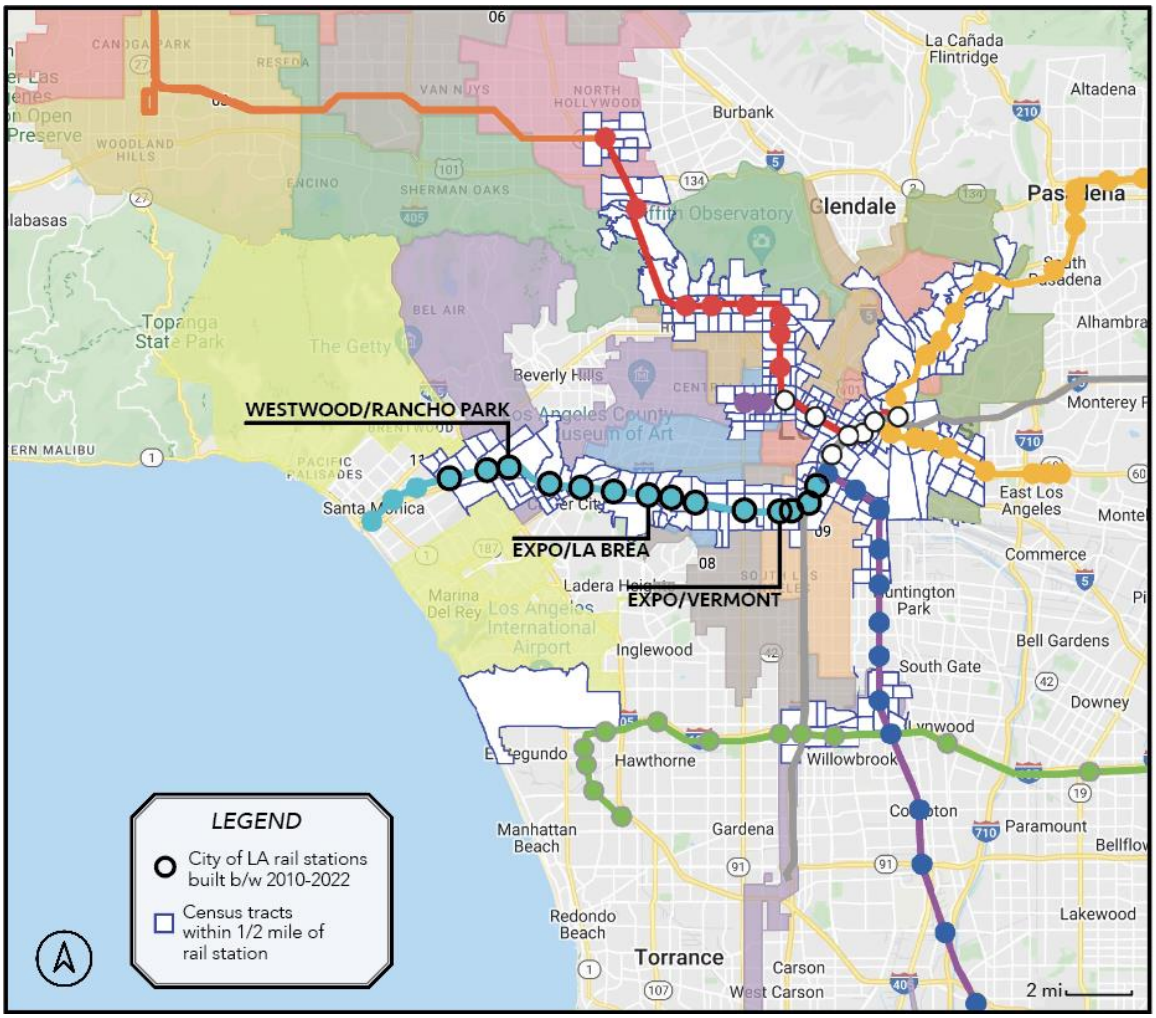
Table 3. Walk Score and Bike Score Descriptions[12]

Range	Walk Score	Bike Score
90-100	Walker's Paradise – Daily errands do not require a car	Biker's Paradise – Daily errands can be accomplished on bike
70-89	Very Walkable – Most errands can be accomplished on foot	Very Bikeable – Biking is convenient for most trips
50-69	Somewhat Walkable – Some errands can be accomplished on foot	Bikeable – Some bike infrastructure
25-49	Car-Dependent – Most errands require a car	Somewhat Bikeable – Minimal bike infrastructure
0-24	Car-Dependent – Almost all errands require a car	Somewhat Bikeable – Minimal bike infrastructure

The three chosen stations are (1) Expo/La Brea, (2) Westwood/Rancho Park, and (3) Expo/Vermont. Additional qualitative analysis can provide a more comprehensive understanding of the changes undergone around these station areas, providing some context under which these areas may have been more or less susceptible to neighborhood changes and if these changes had positive or negative effects.

[12] https://www.walkscore.com/methodology.shtml

Figure 1. Study Area with ½ mile census tracts and study rail stations



FINDINGS

The analysis below measures the change in the study's independent variables from 2010 to 2022. The averaged data from all census tracts in the City of LA was compared to the averaged data from census tracts located within a ½ mile of the chosen rail stations (refer to Table 3). See Appendix A for the full dataset by station. Overall, study results suggest the introduction of rail stations had several effects including racial diversification, significant increase in density, and an increase in educational level.

Mode Choice

Both station areas and the city experienced shifts in commute times, marked by declines in shorter commutes and increases in longer ones. Stations notably see larger decreases in commute times across various brackets, particularly for trips under 40 minutes. Conversely, both areas witness rises in longer commutes of 40 to 59 minutes and 90 or more minutes, with stations showing more pronounced increases. Noteworthy is the substantial surge in remote work, with both station areas and the city recording significant increases, though slightly higher for the city. This highlights a growing trend toward remote work following the COVID-19 pandemic.

Regarding means of transportation to work, there are declines across several categories for both stations and the city. These include car, truck, or van; drove alone; carpooled; public transportation; motorcycle; bicycle; and walked. Notably, public transportation sees a substantial decrease for both stations and the city, indicating a shift away from public transit usage.

Demographic

Census tract level analysis reveals notable shifts in population density, with station areas experiencing a substantial increase of 39.6%, suggesting a trend towards denser residential concentrations. Conversely, the city's average remains relatively stable at 2.5%, indicating a more gradual change in overall density over the same period. Examining racial demographics, the data highlights divergent trends between station areas and the broader city. Stations show significant increases in categories of American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, and Two or More Races. In contrast, the City of LA witnesses declines in White Alone, Black or African American Alone, and Some Other Race Alone categories. These shifts suggest ongoing demographic transformations within neighborhoods surrounding stations, reflecting changing patterns of migration, settlement, and cultural diversity over the past decade.

Educational attainment among individuals aged 25 and over demonstrates a notable upward trajectory for station areas across all levels, indicating a growing presence of educated residents in these areas. This trend contrasts with the city's more modest

increases, suggesting that stations may have become focal points for access to educational opportunities and workforce development initiatives over the years.

Moreover, the data underscores disparities in median household income, with station areas experiencing a more pronounced rise to 63.4% compared to the City of LA's 55.2%. This suggests that areas surrounding stations have seen greater economic growth and prosperity over the past decade, potentially driven by factors such as gentrification, urban redevelopment, or investments in local infrastructure and amenities.

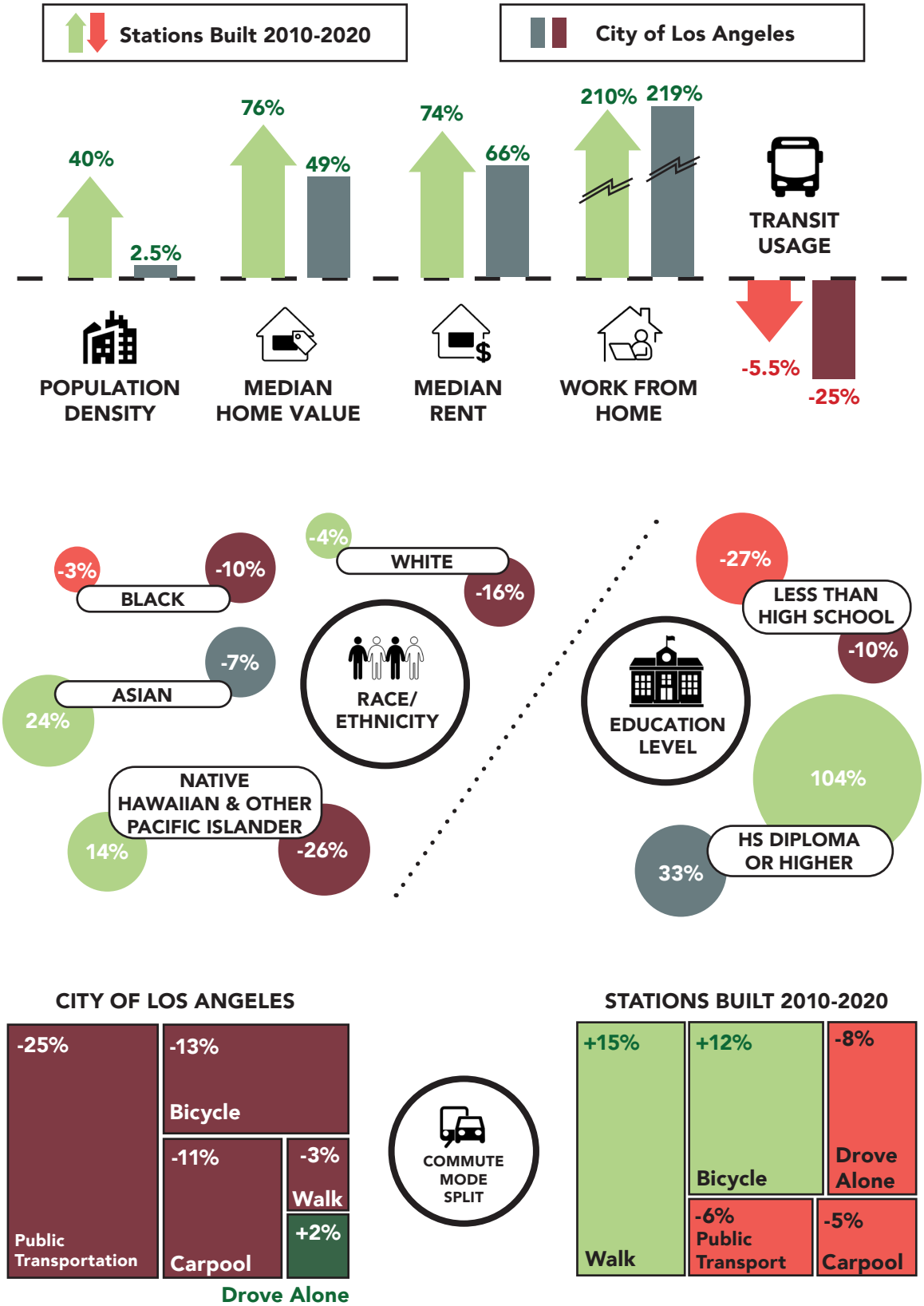
Housing

Regarding the median year structure built, both station areas and the city exhibit modest increases, with stations showing a slightly higher average at 0.7% compared to the city's 0.2%. This suggests ongoing construction activity and potential urban renewal efforts around newer Metro rail stations, contributing to the modernization and redevelopment of housing stock over the past decade.

In terms of median gross rent, both station areas and the city experience considerable rises, with stations showing a notably higher average increase of 73.6% compared to the city's 66.3%. This suggests that rental costs have escalated more rapidly in neighborhoods surrounding stations, potentially reflecting increased demand for housing against a limited supply, as well as the effects of gentrification and urban revitalization efforts in these areas.

Examining median house values for all owner-occupied housing units reveals a similar trend, with both station areas and the city seeing substantial increases. However, home values around these stations demonstrate a more significant rise at 75.9% compared to the city's 48.5%. This suggests that property values have appreciated more rapidly in these neighborhoods, possibly driven by factors such as increased investment, improved infrastructure, and changing neighborhood dynamics.

Figure 2. Key Study Findings



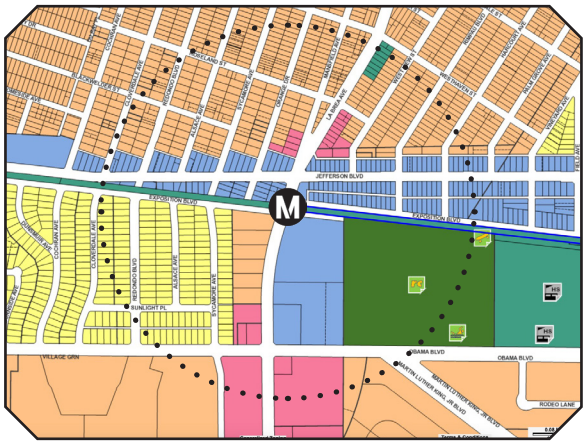
EXPO/LA BREA STATION AREA

Aerial View of Station Area

PLANNING	West Adams-Baldwin Hills-Leimert Community Plan updated in 2016
TRANSPORTATION	Expo Line Station – 1,400 boardings/weekday Metro Local 212, 35 Bus DASH Crenshaw Bus
HOUSING & POPULATION	22,244 people 15,457 people per square mile 8,885 housing units (8% vacant) 2.2% of rental occupied housing units built in 2010 or later Median gross rent of $1,707 Median home value of $815,020
DEMOGRAPHICS	$69,290 median household income 56% Hispanic or Latino, 29% Black, 10% White, 2.5% two or more races, 2.3% Asian
WALK SCORE	83 – Very Walkable
BIKE SCORE	79 – Very Bikeable

KEY DESTINATIONS	Michelle and Barack Obama Sports Complex, Susan Miller Dorsey Senior High School, Charmette Bonpua Skate Plaza, Superior Grocers, Wells Fargo Bank, Ralphs, Baldwin Hills Shopping Center, St Paul's Presbyterian Church, Village Green Apartment Complex
GENTRIFICATION RISK	Vulnerable to gentrification: Yes Gentrified from 1990 to 2000: No Gentrified from 2000 to 2018: No

General Zoning Map



LEGEND

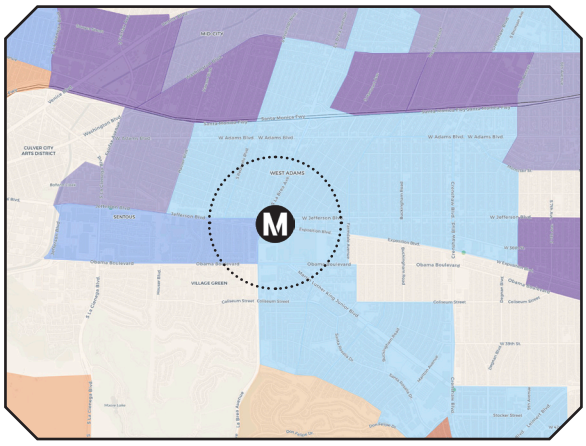
Residential
- Low Residential
- Low Medium Residential
- Medium Residential

Commerical
- General Commercial
- Neighborhood Commercial

Industrial
- Light Manufacturing

- Open Space
- Public Facilities

Gentrification Risk Map



LEGEND

Displacement Typology
- Susceptible to Displacement
- Ongoing Displacement
- At Risk of Gentrification
- Early/Ongoing Gentrification
- Advanced Gentrification
- Stable Moderate/Mixed Income
- At Risk of Becoming Exclusive
- Becoming Exclusive
- Stable/Advanced Exclusive
- High Student Population
- Unavailable or Unreliable Data

The Expo/La Brea Station area had the highest increase in population density of the 14 stations examined in this report. In 2010 the area reported roughly a population of 6,954 per square mile; in 2022 this rose by 122%, resulting in a density of 15,457 people per square mile. This is a stark contrast to the more conservative 2.5% growth observed across the broader City of LA and even exceeds the 39.6% average increase across all station areas.

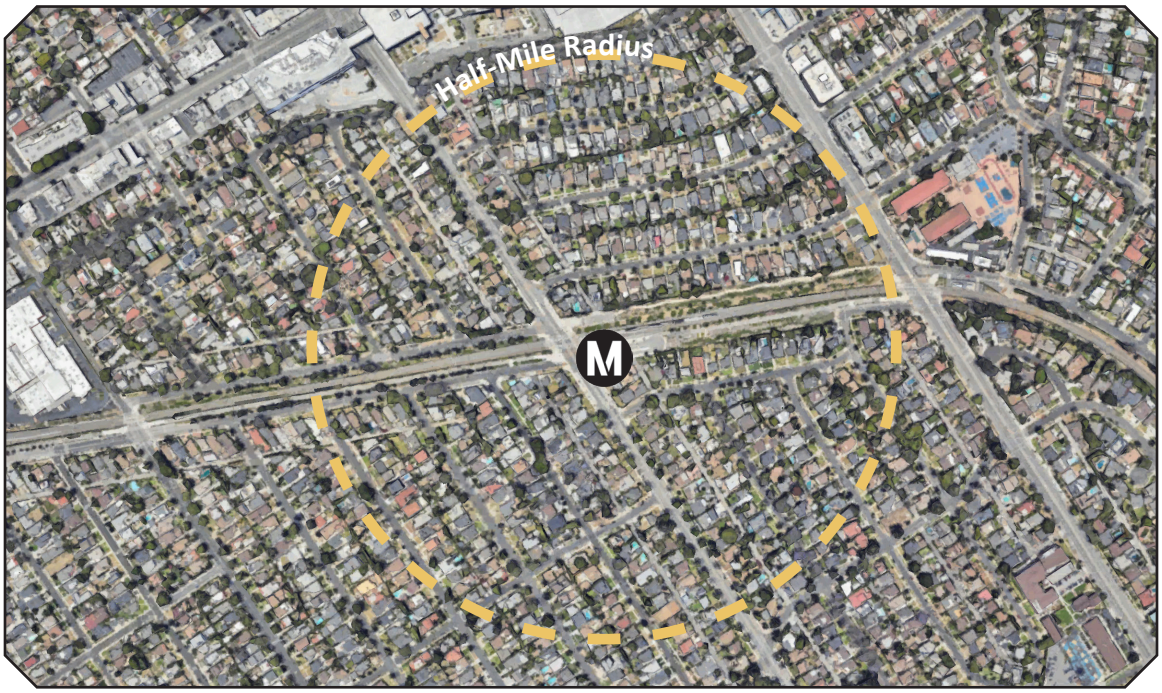
The area consists of hybrid industrial zoning along the main corridor, Exposition Boulevard, and low to medium residential zoning. A high school and sports complex is located to the south of the station as well. Much of the station area's residents are employed in educational or health services (21%) followed by professional services (15.3%) and arts, entertainment, and recreation services (14.1%).

A significant portion of households have moved in relatively recently, with 21.6% arriving in 2018 or later, indicating ongoing influx and turnover. Compared to the City of LA and the overall station average, this area experienced a notable demographic shift, with an increase in the White population (35.7%) and a decrease in the Asian population (-23.5%).

Despite limited new construction, the area's housing landscape is predominantly rental based, with a sizable portion of residents experiencing housing cost burdens. Most residents occupy one or two-bedroom units, suggesting a preference for smaller living spaces. However, affordability challenges are evident, with over half of renters allocating more than 30% of their income towards rent and another 25.6% spending over 50%. The median gross rent increased by 82.7% from 2010 to 2022, notably higher than the increase in the City of LA (66.3%) and all station areas (73.6%).

On the transportation front, the area has seen an increase in commuting via public transit, possibly driven by factors such as congestion or accessibility. However, there's also a noteworthy rise in longer commutes, particularly in the 40-60 minute range, indicating potential strains on transportation infrastructure or shifts in employment patterns. A significant portion of renters in 2022 lack personal vehicles, indicating a possible reliance on public transit options in the area. This is a possible contributor to the increase in transit usage as a commuting mode in this station area – an increase of 8.5% compared to a -24.8% decrease in the City of LA and a -5.5% decrease across station areas.

WESTWOOD/RANCHO PARK STATION AREA

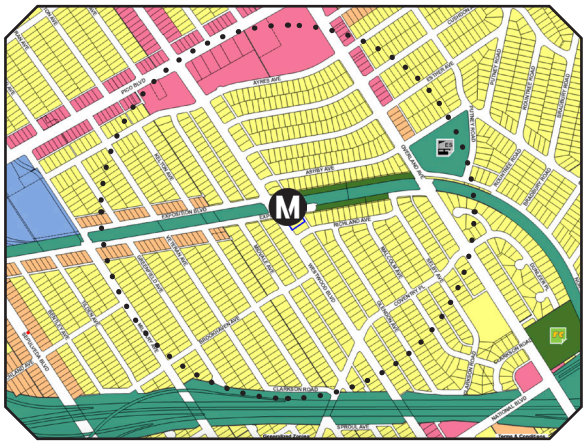


Aerial View of Station Area

PLANNING	West Los Angeles Community Plan adopted in 1997 currently in effect; community plan update process is actively underway
TRANSPORTATION	Expo Line Station – 923 boardings/weekday BigBlueBus 8, R12 Bus; CulverCity CC3 Bus Metro Bike Share Station
HOUSING & POPULATION	12,316 people 6,779 people per square mile 5,775 housing units (11% vacant) 10.2% of rental occupied housing units built in 2010 or later Median gross rent of $2,672 Median home value of $1,661,525
DEMOGRAPHICS	$143,980 median household income 60.3% White, 20.8% Asian, 9.5% Hispanic or Latino, 6.6% Two or more races, 1.6% Black
WALK SCORE	75 – Very Walkable
BIKE SCORE	78 – Very Bikeable

KEY DESTINATIONS	Overland Elementary School, Notre Dame Academy, Palms-Rancho Park Branch Library, Westwood Greenway, Palms Recreation Center, Palms Park
GENTRIFICATION RISK	Vulnerable to gentrification: No Gentrified from 1990 to 2000: No Gentrified from 2000 to 2018: No

General Zoning Map



LEGEND

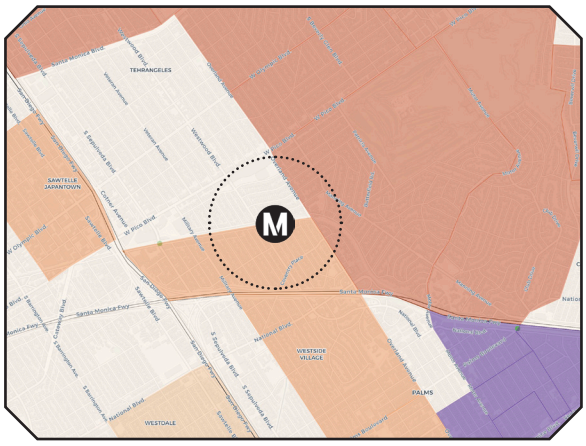
Residential
- Low Residential
- Low Medium Residential
- Medium Residential

Commerical
- General Commercial
- Neighborhood Commercial

Industrial
- Light Manufacturing

- Open Space
- Public Facilities

Gentrification Risk Map



LEGEND

Displacement Typology
- Susceptible to Displacement
- Ongoing Displacement
- At Risk of Gentrification
- Early/Ongoing Gentrification
- Advanced Gentrification
- Stable Moderate/Mixed Income
- At Risk of Becoming Exclusive
- Becoming Exclusive
- Stable/Advanced Exclusive
- High Student Population
- Unavailable or Unreliable Data

The Westwood/Rancho Park Station area had the highest increase in population of the 14 stations examined in this report. In 2010 the area reported roughly a population of 9,107; in 2022 this rose by 35%, resulting in a population of 12,316. This is a notable contrast to the more conservative 2.9% growth observed across the broader City of LA and the 5.6% average increase across all station areas.

The area predominantly consists of low and medium residential zoning with some community commercial along Pico Blvd. The Exposition Corridor Bike Path runs alongside the Expo line. The Westside Pavilion is located at the southeast corner of the Pico Blvd and Overland Ave intersection. The area includes the Overland Elementary School for Advanced Studies, a public library, Palms Park, and Palms Recreational Center. Much of the station area's residents are employed in professional services (27.8%), followed by educational or health services (22.6%) and finance and real estate services (8.1%). Compared to the City of LA and the overall station average, this area experienced a notable education level shift, with an increase in less than high school educated population (50.9%) and only a slight increase in residents with a bachelor's degree (11.7%). The average change in all station areas was -26.8% and 85.7% respectively.

An overwhelming majority of households have moved in relatively recently, with 85.5% of residents arriving in 2010 or later, specifically 39.7% arriving in 2018 or later. Over a similar time period, only 314 renter or owner-occupied units were built (6.1% of overall occupied housing stock). Even with this apparent mismatch in supply and demand, vacancy rates are reported at almost 11% in 2022, which may be a result of available units not meeting the needs of the rental population.

Despite the limited new construction, the area's experienced less significant affordability changes, with 22.3% of renters allocating more than 30% of their income toward rent and another 25.2% spending over 50%. The median gross rent increased by 54.1% from 2010 to 2022, less than the increase affecting the City of LA (66.3%) and all station areas (73.6%). However, this may be due to the lower percentage of renters in the area (44.7%) compared to residents who own their housing units (55.3%).

On the transportation front, this station area experienced the highest increase in commuting via public transit (177.8%) compared to a -24.8% decrease in the City of LA and a -5.5% decrease across station areas. Biking and walking as a commute mode also increased significantly in this area, 57.1% and 60% respectively. A potential contributing factor is the diminished work from home population, meaning more residents in this area are traveling to work and relying on alternative modes of transportation.

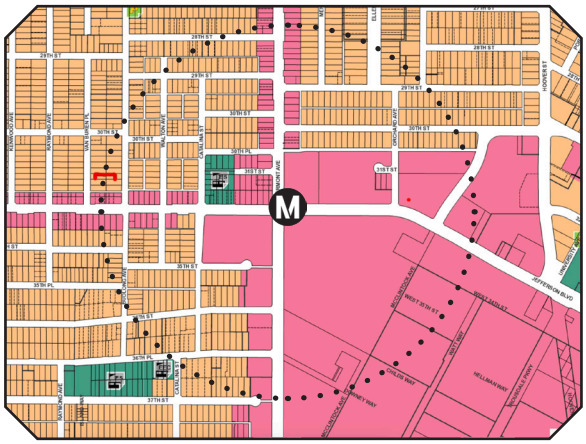
EXPO/VERMONT PARK STATION AREA

Aerial View of Station Area

PLANNING	South Los Angeles Community Plan recently updated in 2017
TRANSPORTATION	Expo Line Station – 2,200 boardings/weekday Metro 102, 204, 550, 754, F Bus Metro Bike Share Station
HOUSING & POPULATION	18,394 people 20,415 people per square mile 4,767 housing units (7.6% vacant) 8.3% of rental occupied housing units built in 2010 or later Median gross rent of $1,360 Median home value of $653,467
DEMOGRAPHICS	$40,273 median household income 49% Hispanic or Latino, 17% Asian, 16% Black, 13% White, 3.6% two or more races
WALK SCORE	88 – Very Walkable
BIKE SCORE	92 – Biker's Paradise

KEY DESTINATIONS	Jesse Brewer Jr. Park, Natural History Museum, California Science Center, Exposition Park Rose Garden, Los Angeles Memorial Coliseum, University of Southern California, Lenicia B. Weemes Elementary School, Exposition Park Montessori, St. John's Community Health Rolland Curtis Gardens Health Center
GENTRIFICATION RISK	Vulnerable to gentrification: Yes Gentrified from 1990 to 2000: No Gentrified from 2000 to 2018: Yes/No

General Zoning Map



LEGEND

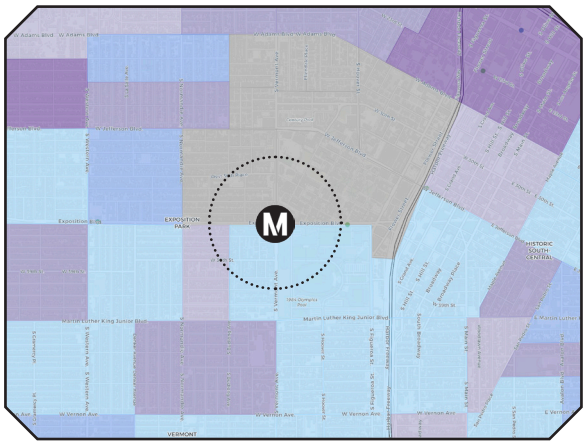
Residential
- Low Residential
- Low Medium Residential
- Medium Residential

Commerical
- General Commercial
- Neighborhood Commercial

Industrial
- Light Manufacturing

- Open Space
- Public Facilities

Gentrification Risk Map



LEGEND

Displacement Typology
- Susceptible to Displacement
- Ongoing Displacement
- At Risk of Gentrification
- Early/Ongoing Gentrification
- Advanced Gentrification
- Stable Moderate/Mixed Income
- At Risk of Becoming Exclusive
- Becoming Exclusive
- Stable/Advanced Exclusive
- High Student Population
- Unavailable or Unreliable Data

The Expo/Vermont Station area had the highest increase in median year of structures built of the 14 stations examined in this report. In 2010 the area reported roughly the median year to be 1944; in 2022 the this rose to 1976, or an increase of 1.6%. This is a notable contrast to the more conservative 0.2% growth observed across the broader City of LA and the 0.7% average increase across all station areas.

The area predominantly consists of low and low medium residential zoning with community commercial zoning along the main corridors of Exposition Blvd and Vermont Ave. The station is located adjacent to the University of Southern California (USC) campus and several major museums and sporting venues inside Exposition Park. This area will be a major hub for swimming and baseball during the 2028 Summer Olympics. A large portion of the residents in the vicinity of this station are students and as such, a significant amount of the housing stock is student housing. The area also includes Lenicia B. Weemes Elementary School. Much of the station area's residents are employed in educational or health services (31.7%), followed by entertainment, recreation, and food services (16.2%). Almost 50% of the area's population is not in the labor force – likely reflective of the high student population in the area.

The housing stock is further reflective of the area's student population with almost 90% of occupied housing units being renter occupied and 45.7% non-family households. Despite an almost 21% increase in undergraduate enrollment at USC since 2010, only 328 housing units were built over the same time period (8.3% of the overall housing stock in the area). However, student housing built by USC is predominantly located north of the Expo/Vermont station, more than ½ mile from the station itself.[13]

Despite the limited new construction, the area's experienced less significant affordability changes, with 28.1% of renters allocating more than 30% of their income toward rent and another 33.8% spending over 50%. With a median income in 2022 of $40,273 and a median gross rent of $1,360, the average resident in this area easily spends more than 30% of their income on rent. The lower income is likely attributed to the student population. The median gross rent increased by 65.3% from 2010 to 2022, notably less than the increase affecting the City of LA (66.3%) and all station areas (73.6%).

On the transportation front, this station area experienced an increase in commuting via driving alone (12.6%) and carpooling (10.1%), when the other station areas both experienced a decrease in these two commuting modes. Almost a quarter of housing units reported having no vehicles (24.5%) with another 37.5% reporting only one vehicle available.

[13] https://housing.usc.edu/index.php/publication/housing-map-pdf/

TAKEAWAYS

In summary, the results of this study reveal that:

1. Impact of Rail Stations on Demographics and Density

- **Racial Diversification:** The introduction of rail stations has contributed to increased racial diversity in surrounding areas, reflecting broader cultural shifts and possibly attracting a more diverse population due to improved accessibility.

- **Population Density:** Rail stations have significantly increased population density in their vicinities, indicating a trend towards denser urban living. The Expo/La Brea Station area, with a 122% rise in density, exemplifies this effect.

2. Educational and Economic Improvements

- **Higher Educational Levels:** Station areas have seen greater increases in educational attainment compared to the broader city, suggesting that these areas are becoming more attractive to educated individuals, possibly due to better access to resources and employment opportunities.

- **Income Growth:** Median household income has risen more sharply near stations than citywide, indicating economic growth and potential gentrification in these areas.

3. Changes in Commute and Transportation Patterns

- **Commute Times:** Both station areas and the city have experienced shifts towards longer commutes, possibly due to urban sprawl or changes in employment locations. Despite this, stations have seen more significant decreases in shorter commute times, reflecting improved local transit options.

- **Remote Work:** The rise in remote work, slightly higher in the city, highlights the lasting impact of the COVID-19 pandemic on work habits.

- **Transportation Means:** There is a notable decline in the use of various transportation modes, including public transit, indicating a shift in commuting patterns. This decline might reflect increased reliance on remote work or other factors affecting transit usage.

4. Housing and Urban Development

- **New Construction and Renewal:** Both station areas and the city show slight increases in the median year of structure built, indicating ongoing construction and urban renewal efforts. The Expo/Vermont Station area, with the highest increase in median year of structures built, highlights significant redevelopment.

- **Rising Rents and Property Values:** Substantial increases in median gross rent and home values near stations suggest high demand for housing in these areas. The higher rises near stations compared to citywide averages point to intensified gentrification and investment in these neighborhoods.

5. Case Study Insights

- **Expo/La Brea Station:** The area experienced the highest increase in population density and significant rent hikes, indicating rapid urbanization and possible affordability challenges.

- **Westwood/Rancho Park Station:** Notable for its unique demographic shifts and substantial increase in public transit use, suggesting a successful integration of transit options despite broader declines.

- **Expo/Vermont Station:** Significant changes in housing stock age and reliance on carpooling and driving alone, reflecting its unique position near USC and its student population.

LIMITATIONS AND NEXT STEPS

It is important to address certain limitations of this study. The findings and results from the data analysis are limited to the transit-oriented communities around the Expo Line and cannot be generalized to other light and heavy rail lines in Los Angeles. The study's aim is to focus on stations built between 2010 and 2020 which limits the data collection to these 14 stations.

Further research could be conducted on the remaining LA Metro stations to determine if similar changes were experienced in other areas of the rail network. It would also be interesting to narrow the research by determining which non-transit adjacent census tracts have similar demographics to transit-adjacent census tracts to understand if the resulting changes from 2010 to 2022 are similar.

RECOMMENDATIONS

LA's Existing Policies and Programming around Transit-Oriented Developments

Transit Oriented Communities (TOC) Program

The TOC Program is a key component of LA's strategy to promote high-density, mixed-use developments near transit stations. It was established following the approval of Measure JJJ in 2016, which aimed to increase affordable housing and improve job conditions in the city. The program incentivizes developers to build affordable housing near high-quality transit by offering increased density, reduced parking requirements, and additional floor area ratio (FAR) allowances. Key aspects include:

- *Affordable Housing Requirements:* Developers must include a certain percentage of affordable units to qualify for the incentives.
- *Tier System:* Incentives are structured in tiers based on the proximity to transit stations and the type of transit service (e.g., light rail, bus rapid transit). The closer and higher the quality of transit, the greater the incentives.
- *Reduced Parking Requirements:* The program significantly reduces parking requirements for new developments, encouraging the use of public transit.

Funding Priorities in High-Quality Transit Areas (HQTA)

Los Angeles prioritizes funding and resources in areas designated as High-Quality Transit Areas (HQTA), which are defined as areas within half a mile of a major transit stop that offers high-frequency service. Funding priorities and initiatives include:

- *Affordable Housing Development:* LA targets HQTAs for affordable housing developments to ensure low- and moderate-income residents have access to reliable transit.
- *Infrastructure Improvements:* Investments in pedestrian and bicycle infrastructure are prioritized in HQTAs to improve accessibility and safety for transit users.
- *Sustainable Communities:* The city integrates land use and transportation planning to promote sustainable communities, reducing greenhouse gas emissions and promoting public health.

Policy Recommendations

Building off Los Angeles's existing TOD policies and considering the findings from this report, the following recommendations are given.

Encourage diverse types of housing types near transit stations
The case study research in this report shows the lack of zoning diversity surrounding a few of the transit stations along the Expo line, with the predominant zoning being low or medium residential. Promoting mixed-use zoning along high quality transit corridors can further enhance the amenities available for residents and visitors in the area, building off the existing time and resource investment made by LA Metro and the city in economic development near transit.

Beyond encouraging diverse zoning types, diverse types of multi-family homes can provide a moderate increase in density without significant construction and disruption of the existing urban area. The expansion of accessory dwelling unit laws can also contribute to increased density. The city should prioritize innovative housing programs to diversify housing types and enhance affordability options. By embracing models like community land trusts, co-living arrangements, and modular housing, the city can address various housing needs and provide more affordable options for residents.

Implement robust anti-displacement measures
The analysis shows that areas near transit stations are at risk of gentrification, with rising property values and rents potentially displacing low-income residents. To mitigate these effects, the city should adopt policies that protect existing residents. LA's tiered TOC Program currently offers developers robust density bonuses and other benefits if they build affordable housing close to transit. However, developers sometimes forgo these bonuses because of the high costs associated with construction. Instead, the city could make it a requirement for market-rate projects to include a higher percentage of inclusionary units and allow current residents preference during the application process. For example, San Francisco's Inclusionary Housing Program, in place since 2002, requires new residential projects with 10 or more units to either pay an Affordable Housing Fee or fulfill the inclusionary requirement by designating a percentage of the units as "below market rate" units. This would help create housing options for moderate-income residents, in addition to low and very low-income individuals.

This could also constitute introducing stronger rent control measures and tenant protection ordinances in areas targeted for TOD. Current LA rent control measures include the rent stabilization ordinance and statewide rent control (AB 1482). Additionally, the Just Cause For Eviction Ordinance covers most residential properties in LA that are not regulated by the city's Rent Stabilization Ordinance.

To improve rent control coverage, it's essential to broaden the applicability of current regulations. This can be achieved by extending rent control to newer buildings by adjusting the cut-off date for applicable properties or reducing the exemption period for new constructions. Additionally, advocating for changes at the state level to expand the scope of AB 1482 to include more types of rental properties will ensure broader protection for tenants. Addressing rent increases is also crucial; implementing stricter

caps on allowable rent increases, especially during high-inflation periods, will help keep rent affordable. Furthermore, limiting the pass-through of renovation costs to tenants or providing financial incentives for landlords to undertake necessary improvements without shifting the financial burden onto renters can prevent unjustified rent hikes.

Promote economic development and job access near transit stations
Existing LA Metro programs have a two-pronged approach: 1) 'Markets at Metro' aims to active station areas, creating community spaces with amenities for transit riders and residents while activating the commercial space available systemwide; and 2) the Pilot Investment Fund that will make loans available to support small business preservation and sustainability over the course of a two-year pilot program.

While these programs have the potential to support the creation of sustainable local small businesses, the residents from the surrounding communities could significantly benefit from local hire policies. By prioritizing the employment of local workers, these policies can reduce unemployment, increase local incomes, and foster economic stability in neighborhoods directly impacted by new infrastructure developments. Additionally, local hire initiatives can help build stronger community ties and support long-term, sustainable economic growth by investing in the local workforce and enhancing their skills through targeted training programs.

Expanded monitoring and research of existing and new TOD areas
Understanding the process by which households decide where to live and form their preferences for different types of residential and travel environments is crucial to creating successful transit-oriented communities. Additional research could build on existing studies such as this one, focusing on before-and-after evaluations of the impact of changes of VMT and other aspects of travel behavior. Existing research is often contradictory on the impact of TOD, with critics citing potential displacement of affordable housing and limited influence on overall transportation patterns. A stronger assessment of the potential for compact development to reduce VMT and more studies on the relationship that precede the land-use travel behavior relationship. A particular look at Tier 3 and Tier 4 areas (per LA Metro's TOC Program designation) could help provide insight for expanding upon transit rich areas in LA. The city could incorporate monitoring requirements for developments that benefit from TOC program incentives, allowing policymakers insight into how residents are interacting with the high-quality transit area around them. Overall, this insight could reveal how alterable living and commuting decisions and preferences are and what interventions might increase demand for compact development.

CONCLUSION

The introduction of rail stations marks a pivotal moment in urban development, transforming neighborhoods and shifting transportation modes. As hubs of connectivity and accessibility, rail stations drive economic revitalization, demographic changes, and new commuting behaviors. They attract diverse populations, spur commercial and residential development, and promote sustainable mobility solutions, reducing car dependency and its negative impacts on urban environments. As highlighted in this report's analysis, the introduction of a new light rail station can significantly alter an LA neighborhood's demographic, housing, and economic makeup.

Navigating the complexities of introducing a new rail station into an existing neighborhood requires a balanced approach that prioritizes community engagement, equitable development practices, and proactive measures to mitigate displacement risks. Solutions must be sensitive to the diverse needs and aspirations of residents, ensuring that growth enhances, rather than disrupts, the fabric of existing neighborhoods. In essence, the journey towards a more sustainable and equitable transportation system in Los Angeles is multifaceted, requiring coordinated efforts across various sectors. It is not merely about expanding transit infrastructure, but reimagining the built environment in a way that fosters inclusive, resilient communities. By embracing innovative planning strategies and prioritizing equity and sustainability, Los Angeles can chart a path towards a future where mobility is accessible to all, and neighborhoods thrive in harmony with public transit.

WORKS CITED

Cervero, R., & Duncan, M. (2004). Neighbourhood Composition and Residential Land Prices: Does Exclusion Raise or Lower Values? Urban Studies, 41(2), 299–315.

Chapple, Karen. 2009. Mapping Susceptibility to Gentrification: The Early Warn- ing Toolkit. Berkeley: University of California at Berkeley Center for Community Innovation.

Chatman, D. G. (2013). Does TOD Need the T? On the Importance of Factors Other Than Rail Access. Journal of the American Planning Association, 79(1).

Coleman, Erin. 2012. “Evaluating Relationships between Rail Development and Neighborhood Change: Heavy Rail in Los Angeles.” Applied Planning Re- search Project. University of California, Los Angeles.

Dominie, Will. 2012. “Is Just Growth Smarter Growth?” Applied Planning Research Project. University of California, Los Angeles.

Driscoll, R. A., Lehmann, K. R., Polzin, S., & Godfrey, J. (2018). The Effect of Demographic Changes on Transit Ridership Trends. Transportation Research Record, 2672(8), 870–878. https://doi.org/10.1177/0361198118777605

Ewing, R., & Cervero, R. (2001). Travel and the Built Environment: A Synthesis. Transportation Research Record: Journal of the Transportation Research Board, 1780, 87–114.

Kolko, J. (2011). Making the Most of Transit: Density, Employment Growth, and Ridership Around New Stations. Public Policy Institute of California.

Lin, J. (2002). Gentrification and transit in Northwest Chicago. Journal of the Transportation Research Forum, 56(4).

Loo, B., Chen, C., & Chan E. (2010). Rail-based transit- oriented development: Lessons

from New York City and Hong Kong. Landscape and Urban Planning, 97(3), 202–212.

Lund, H. M., Cervero, R., & Wilson, R. W. (2004). Travel Characteristics of Transit-Oriented Development in California.

Ratner, K., & Goetz, A. (2013). The reshaping of land use and urban form in Denver through transit-oriented development. Cities, 30, 31–46.

Schuetz, J., Giuliano, G., & Shin, E. J. (2018). Can a Car-Centric City Become Transit Oriented? Evidence From Los Angeles. Cityscape, 20(1), 167–190.

Stephens, Pamela. 2012. “Evaluating Relationships between Rail Development and Neighborhood Change: Light Rail in the City of Los Angeles.” Applied Planning Research Project. University of California, Los Angeles.

Zhang, M. (2010). Can Transit-Oriented Development Reduce Peak-Hour Congestion? Transportation Research Record: Journal of the Transportation Research Board, 2174, 148–155.

APPENDIX

A. Station Average vs City of LA Average by ACS Data Category

Category	Station Average	City of LA Average
Demographic		
Population Density (Per Sq. Mile)	39.6%	2.5%
Race		
White Alone	3.9%	-16.3%
Black or African American Alone	-3.1%	-9.6%
American Indian and Alaska Native Alone	740.2%	114.4%
Asian Alone	23.5%	7.1%
Native Hawaiian and Other Pacific Islander Alone	14.1%	-26.1%
Some Other Race Alone	-4.3%	2.3%
Two or More Races	476.1%	346.3%
Educational Attainment for Population 25 Years and Over		
Less than High School	-26.8%	-9.8%
High School Graduate or More	19.1%	18.8%
Some College or More	40.7%	24.3%
Bachelor's Degree or More	85.7%	35.1%
Master's Degree or More	90.4%	39.8%
Professional School Degree or More	92.0%	29.9%
Doctorate Degree	213.4%	35.8%
Median Household Income (In 2022 Inflation Adjusted Dollars)	63.4%	55.2%
Housing		
Median Year Structure Built	0.7%	0.2%

Median Gross Rent	73.6%	66.3%
Median House Value for All Owner-Occupied Housing Units	75.9%	48.5%
Mode Choice		
Travel Time to Work for Workers 16 Years and Over		
Did Not Work At Home	-10.6%	-2.3%
Less Than 10 Minutes	-37.0%	-22.2%
10 to 19 Minutes	-20.3%	-11.4%
20 to 29 Minutes	-10.7%	-6.5%
30 to 39 Minutes	-3.2%	1.3%
40 to 59 Minutes	27.2%	11.6%
60 to 89 Minutes	-3.2%	15.1%
90 or More Minutes	5.4%	13.7%
Worked At Home	207.9%	218.7%
Means of Transportation to Work for Workers 16 Years and Over		
Car, Truck, or Van	-8.0%	0.5%
Drove Alone	-7.7%	2.4%
Carpooled	-4.5%	-11.0%
Public Transportation	-5.5%	-24.8%
Motorcycle	-19.2%	2.3%
Bicycle	11.8%	-12.5%
Walked	14.7%	-2.6%
Other Means	95.3%	33.7%
Worked At Home	207.9%	218.7%

B. FY2023 Metro Rail Ridership