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Mejia, Edgar

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Matching L.A. Travel Patterns and Metro Bus Service

Project Lead: Edgar Mejia
Faculty Advisor: Michael Manville
Client: Los Angeles County Metropolitan Transportation Authority

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Matching L.A. Travel Patterns and Metro Bus Service



Photo taken by Edgar B. Mejía

A comprehensive project submitted in partial satisfaction of the requirements for the degree Master of Urban and Regional Planning.

By: Edgar B. Mejía

UCLA Luskin School of Public Affairs

June 2021

Adviser: Michael Manville

Client: Los Angeles County Metropolitan Transportation Authority

Disclaimer: This report was prepared in partial fulfillment of the requirements for the Master in Urban and Regional Planning degree in the Department of Urban Planning at the University of California, Los Angeles. It was prepared at the direction of the Department and of L.A. Metro as a planning client. The views expressed herein are those of the authors and not necessarily those of the Department, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the Client.

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Abstract

The Los Angeles County Metropolitan Transportation Authority (Metro) has allocated significant resources (time, money, political) to rework their bus network through the NextGen initiative, the first sweeping overhaul of the bus system in 25 years. Because such overhaul of a bus system requires extensive resources, the next major restructuring of Metro's bus routes will not occur for at least another decade or two. Thus, it is imperative that Metro aligns their bus service where people actually travel to, rather than merely supporting existing Metro routes. This project analyzes major travel patterns across L.A. County to spot any possible bus service recommendations explicitly *not* identified in NextGen. Major travel is assessed utilizing Metro's location-based service (LBS) cell-phone database, Metro's ridership data, and Census "OnTheMap" data. Though our analysis corroborates NextGen's study revealing most trips in LA County are under 5 miles, we found notable exceptions. For the exceptions, namely in the South Bay, Gateway Cities, and the San Fernando Valley, this project provides critical service opportunities to match Metro service to observed travel patterns. Finally, we suggest a pilot microtransit program, a low-cost investment, to test the actual demand strength of proposed service suggestions.

Introduction

Ridership is often touted as an important indicator of the health of a public transportation agency. A recent report from UCLA's Institute of Transportation Studies (ITS) unearths bleak findings regarding ridership trends for the Los Angeles County Metropolitan Transportation Authority's (Metro). Between 2007 and 2015, Metro has experienced a steady ridership decline, although this story is more complex than a simple across-the-board decline once data is analyzed in greater detail.

In early 2020, the global pandemic emerged in the United States. The coronavirus disease of 2019, or COVID-19, had a debilitating effect on the United

States' economic, business, entertainment, and public transportation sectors. According to national data from the National Transit Database, monthly transit ridership hit a low of 156.6 million rides in April 2020 — that's 81.3% lower than the 835.2 million rides taken in April 2019.¹

Of course, some agencies witnessed more drastic drops in ridership than others. Despite Los Angeles' infamy as an automobile-centric, car obsessed city, Los Angeles' Metro saw one of the smallest percentage changes in ridership in the nation.² This fact reveals perhaps two traits of Metro riders: 1) a large majority of Metro riders are considered "essential workers"³; and 2) a large majority of Metro riders rely predominantly (if not exclusively) on the transit system for their commutes. This

¹ USAFacts.org <https://usafacts.org/articles/covid-public-transit-decline/>

² Los Angeles Times. *Metro expects 'massive' budget hit from coronavirus as ridership, 2020.* [plummetshttps://www.latimes.com/california/story/2020-03-20/coronavirus-covid19-los-angeles-metro-public-transit-ridership-buses-trains](https://www.latimes.com/california/story/2020-03-20/coronavirus-covid19-los-angeles-metro-public-transit-ridership-buses-trains)

³ Essential workers definition as definition by the State of California <https://covid19.ca.gov/essential-workforce/#:~:text=Workers%20such%20as%20plumbers%2C%20electricians,any%20facility%20supporting%20COVID%2D19>

raises an interesting paradox: though Metro has steadily “hemorrhaged” riders over the last ten years, at the same time, it presently boasts one of the most consistent and reliable ridership bases in the nation.

Since 2017 (before COVID-19), Metro has aimed to recoup some of their lost riders. I believe that the 2020 ridership numbers (though still not ideal) do in fact raise hope for Metro to successfully recapture its lost ridership over the years. The most notable plan hails from a Metro board-approved NextGen initiative, which features a thorough landscape analysis. Extensive ridership needs assessment and subsequent potential bus improvements were all outlined in the NextGen Bus Plan.

Metro has allocated significant resources (time, money, political capital) to rework their bus network through the NextGen initiative, the first sweeping overhaul of the bus system in 25 years. Given the resource-intensive process to restructure the bus system, the next restructuring is not expected for at least another decade or two. As such, consideration of long-term travel patterns and contemporary circumstances (decline in ridership, COVID-19 induced transportation

changes) must be carefully balanced to produce a system that is reflective of bus transportation demand.

This project serves to supplement Metro’s NextGen Bus proposals with specific bus route suggestions. In order to understand how Metro’s entire network system can better serve its riders, I first analyze travel using the neighborhood⁴ as a unit of analysis. Specially, I analyze how far (in miles) to people travel; how much of travel is internal; and how much travel is external.

After understanding travel patterns, I then use this knowledge to compare it to LA Metro bus options as specified in the NextGen Plan. By comparing travel patterns observed and Metro bus options, I identify if there were any discrepancies between the two. If there are any discrepancies, this project attempts to find ways to match travel patterns and Metro bus service.

This analysis utilizes four data sets to answer the aforementioned questions. These data sources are:

- (1) Purchased third-party data of location-based service cell phone information.

⁴ While no universally agreed upon boundaries exist regarding Los Angeles County neighborhoods, for the purposes of this analysis, I use the L.A. Time’s map of Los Angeles County as boundary guides. <http://maps.latimes.com/neighborhoods/>.

(2) U.S. Census “OnTheMap” data.

(3) Metro TAP data

(4) Metro’s NextGen Bus Study findings and subsequent proposed bus service changes.

To match LA travel patterns and bus service, this project synthesizes our analyses to suggest data-driven bus route improvements not already specified in NextGen.

Lastly, this report discusses a few limitations of the study as well as provides possible future areas of investigation.

Literature Review

Metro Related Literature

In 2018, the Metro Board adopted Metro Vision 2028 as its strategic plan. The plan outlines five goals to guide the development of transportation in LA County:

- Goal 1.** Provide high-quality mobility options that enable people to spend less time traveling
- Goal 2.** Deliver outstanding trip experiences for all users of the transportation system
- Goal 3.** Enhance communities and lives through mobility and access to opportunity
- Goal 4.** Transform LA county through regional collaboration and national leadership
- Goal 5.** Provide responsive, accountable, and trustworthy governance within the Metro organization.

In 2018, Metro also launched its NextGen Bus Study aimed at understanding the needs of bus riders and to reflect those findings when restructuring their bus network. This was the first complete overhaul of Metro’s transit system in over a quarter of a century.⁵ In Metro’s own words, NextGen’s core goal is to “provide high-quality mobility options that enable people to spend less time traveling,” thereby making its bus network “relevant, reflective of, and attractive to the diverse customer needs within Los Angeles County.”⁶ As described in Metro’s 2020 Transit Service Policies & Standards, embedded in this goal are two subgoals:

Subgoal 1.1. Target infrastructure and service investments

Subgoal 1.2. Invest in a system that is reliable, convenient, safe, and attractive to more users for more trips.

To understand specific ways to achieve Metro’s goal, the NextGen Bus spent a considerable amount of resources understanding the status of their current

⁵ Metro NextGen Bus Study, 2020. *NextGen Facts Sheet*.

https://media.metro.net/projects_studies/nextgen/images/factsheet-nextgen-bus-plan.pdf

⁶ Metro, 2020. *Public Review of NextGen Transit First Service Plan*. Accessed November 2020. Retrieved from <https://boardagendas.metro.net/board-report/2019-0853/>

network through a series of complex engagement processes including surveys/questionnaires, workshops, and presentations. Though it is imperative to perform a thorough analysis of what Metro's customers are experiencing and understand what they would like to see from a bus reconfiguration, Metro is also interested in gauging the public's perception of what the role, purpose, and function public transportation plays in society.

A well-known transportation consultant, Jarret Walker, unearths the complexity of such a seemingly surface level question: what is the role of public transportation? Public transport exists for a wide range of purposes including environmental, economic and social.⁷ Walker asserts that the individual's worldview as it relates to public transportation's purpose is often reflective of their professional identity. This occurs as the individual tries to distill the role of public transit into a context that's familiar to them. For example, economists may view transit

in terms of profitability or productivity, whereas social service advocates may view it as a tool for meeting the needs of disadvantaged communities.

In contrast, architects and urban designers consider the visceral experience of riding transit and thus focus on aesthetics of both the transportation infrastructure and its vessels. Perhaps urban redevelopment advocates view public transportation as a source of economic development, as was the logic behind Californian Redevelopment Agencies' support for transit-oriented development.⁸

Though none of the above goals are inherently problematic, public transportation agencies must also address their own assumptions and dogmas as they relate to providing public transportation access and mobility. Still, what remains unclear despite the completion of the NextGen Bus Study is Metro's own views on public transportation. In other words, what does Metro view as their job in their role as a public transportation service provider and how do

⁷ Veeneman, W., 2002. Mind the gap: bridging theories and practice for the organisation of metropolitan public transport. TRAIL Thesis Series, TRAIL Research School, The Netherlands. ISBN: 90-407-2308-7

⁸ California Debt Advisory Committee, 2006. Recommended Practices for California Redevelopment Agencies/ <https://www.treasurer.ca.gov/cdiac/reports/practices.pdf>

those views affect the policy design and implementation of their bus network overhaul? Walker asserts that generally, two philosophies of public transit exist, the first of which is a numbers game - carry as many people as possible with the existing network and existing budget.⁹ The second philosophy is to serve all parts of the community.

These two philosophies, while not inherently in direct competition with one another, can be simplified to a more fundamental question: what are agencies trying to achieve, maximum ridership or maximum coverage? It is clear from the NextGen proposed policies such as consolidating stops, consolidating bus routes and segments (or eliminating poor performing routes/segments), and refunnelling service hours to high ridership corridors that Metro NextGen is leaning more heavily towards achieving maximum ridership. This decision is likely mostly attributed to a combination of the responses received from their NextGen Bus Study, bus service performance analysis, and financial efficiency analysis.

Ridership Theory

Ridership theory is indispensable to better understand the different approaches a transportation agency may employ to achieve a deserved ridership outcome.

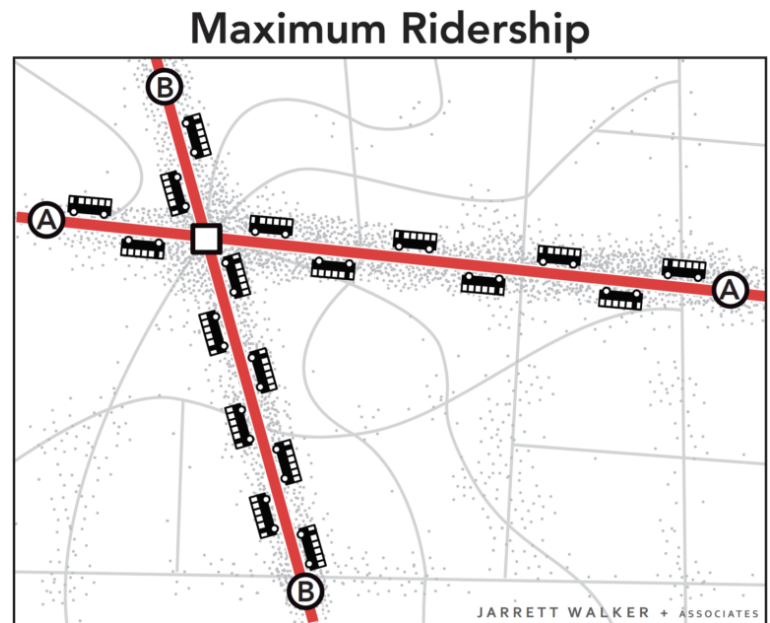


Figure 1: Walker's illustration of the Maximize Ridership Goal showcasing strategic bus routes along major streets.

The figure above is an illustration that showcases how a Maximum Ridership goal would translate to concentrated bus stops and bus routes along only the busiest (both in residential and commercial density) corridors. By concentrating service along a select few streets, frequency is high but access to bus stops is compromised. In this example, those in less populated areas have a longer walk to bus stops. While

⁹ Walker, Jarrett. 2012. Human transit: how clearer thinking about public transit can enrich our communities and our lives. Washington, DC: Island Press.

frequency and ridership are both high, some places have no service.

However, while transportation agencies generally lean towards either the Ridership Goal or the Coverage Goal, in reality, most do not adopt policies that are solely one or the other, but rather a combination of both. Agencies adopt a “service allocation policy” that forms a percentage split of resources between the different goals. For example, an agency may decide to allocate 80 percent of its service towards the Ridership goal and 20 percent of its service towards the Coverage goal. Walker argues that agencies should often consider travel patterns, and urban form to balance the Coverage and Ridership goals.¹⁰

¹⁰ Walker, Jarrett. 2012. Human transit: how clearer thinking about public transit can enrich our communities and our lives. Washington, DC: Island Press.

Data

Location-based Service (LBS) Cell Phone Data

Location-based service (LBS) is a general term denoting software services which utilize geographic data and information to provide services or information to users. In our context, LBS cell phone data specifically uses a smartphone's GPS technology to track a person's location, if that person has opted in to allow it. After a smartphone user opts in, the service can identify their location down to a street address without the need for manual data entry. Metro purchased LBS data for the month of October 2017 from a third-party vendor. This data does not come directly from national cell phone service providers, but rather from a third-party vendor which aggregates LBS data from all national cell phone service providers.

Metro's TAP data

Metro's fare payment infrastructure, whereby a passenger loads fare onto a TAP card, allows passengers to seamlessly ride public transit across the county. A TAP card is a durable plastic card with a smart chip designed to make your transit experience

simple and secure. Using this technology, Metro has millions of TAP records. While "tapping" is required to board a bus or rail, it is not required to alight. Therefore, while TAP data provides precise boarding information (including transfers), destinations are trickier to ascertain. However, by reviewing repeated TAP patterns, we can (to the best of our abilities) ascertain round-trip travel patterns.

While TAP provides accurate boarding data, alighting data on buses is captured via automatic passenger counter sensors at bus doors. This complete data set provides insight into noticeably high boarding and alighting locations, particularly those arising in non-terminal locations and non-popular destination locations.

U.S. Census "OnTheMap"

Our project utilized OnTheMap's 2018 U.S. Census data to understand commute travel patterns on a zip-code basis. It directly links where people live to where people work, which is valuable for assessing whether bus service aligns with such commute patterns. To check out data for your zip code, visit the following website: <https://onthemap.ces.census.gov/>.

Metro's NextGen Bus Study

Metro's NextGen Bus Study (the study) is the result of Metro's first major overhaul of their bus system in over 25 years. Under the study, the NextGen Bus Plan (the plan) emerged. This plan proposed bus service revisions, LA county residents would experience much more frequent bus service along most routes, shorter waits for buses, and ultimately more reliable service. Over the last two years as part of its NextGen Bus Study, L.A. Metro has been conducting market research and analyzing local travel data. According to L.A. Metro, it has also held 260 stakeholder and community meetings, conducted on-board surveys of bus riders and held 20 interactive public workshops.

The plan is reflective of the study's results, which demonstrated that:

- The public wants more frequent service to reduce often long and unpredictable wait times at bus stops.
- There is significant unmet demand for short rides of one to five miles from midday through the evening hours and on weekends.
- Bus routes on the 44 busiest corridors in L.A. County carry over

80 percent of the L.A. Metro bus system's riders.

Data Limitations

A few limitations to the data and methodologies used in this report should be noted. Both the LBS and US Census "OnTheMap" data sources are from 2018. This means that travel patterns may not be reflective of more recent travel behaviors. In the context of COVID-19, travel patterns may be significantly different than expressed in 2018 data.

Methods

This section serves as a guide through the methodology employed in this project. The research objective was mutually identified by Metro's Senior Director of Service Performance and Analysis and myself after investigation of Metro's NextGen proposed bus service changes. From there, we defined objectives and relevant research questions to address the status of bus service in Los Angeles County.

To reiterate our purpose, Metro is investing considerable resources to restructure their bus network system, known as NextGen. Given this resource intensive process, we do not expect Metro to engage in this process for at least another decade or two. As such, it is important to match bus service to observed travel patterns.

We analyzed four data sources to help us determine travel patterns and the bus service network under NextGen. These data sources are: location-based service cell phone data; U.S. Census "OnTheMap" data; Metro TAP data, and Metro's NextGen Bus Study findings and subsequent proposed bus service changes.

First, utilizing the location-based service cell phone data, we reviewed travel

patterns on a neighborhood-by-neighborhood basis. Important to note, this data contained travel pattern information of all observed travel (not just commute). This data was projected spatially to more easily observe broad patterns of travel destinations, both within and outside the respective neighborhood. This data also included averaged distance trips to better understand whether a majority of trips were <5, 5, 10, or 10+ miles.

In tandem, we undertook a similar process to evaluate travel patterns using data from the U.S. Census Bureau's "OnTheMap" for all zip codes found in Los Angeles County. OnTheMap contains detailed commute travel patterns by zip code. This data revealed granular zip code to zip code travel and their respective percentages.

Once we reviewed and synthesized data from the location-based service cell phone data and the OnTheMap data, we began comparing discrepancies in the travel patterns observed with Metro's existing bus system. For any discrepancy, I checked major destinations (mall/university/etc.) via GoogleMaps and determined whether more analysis is needed based on the following criteria:

1. Is this the beginning or end to a bus route?

2. Are there any significant destinations present in a particular area such as a job hub, BRT, light-rail, heavy-rail, or university?
3. Are there adjacent bus routes available?
4. Are there any large barriers such as a freeway or mountain side present?

Based on the above answers, if we determined more analysis was necessary, I reviewed Metro's TAP data for boarding and alighting trends (getting on and off the bus, respectively). This data allowed us to ascertain whether a high proportion of boarding or alighting (>50%) was occurring at a particular bus stop. A high percentage of boarding or alighting at a bus stop would signal that perhaps forced-transferring occurred at that stop. Further analysis would be needed to draw more concrete conclusions.

Finally, if it was determined that a discrepancy between travel pattern and bus service existed, as well as high levels of boarding or alighting at certain stops, I began to note which areas did not have any or low-service of bus service. From there, I began to systematically determine how to a) provide bus service in these areas from rerouting, b) determine if other infrastructure was needed to provide bus service (i.e., sidewalks), and c) review any relevant

proposed Metro NextGen bus service changes.

In sum, our process took a laborious, trial and error approach whereby systematic review of each data source was necessary to understand any discrepancies between travel patterns and Metro bus service.

Results

Location-Based Service

Analysis

Utilizing location-based service (LBS) cell data provided by Metro, origin and destination analyses were conducted within Metro's four (4) major Service Areas:

- (1) South Bay - Gateway Cities
- (2) San Gabriel Valley
- (3) San Fernando Valley
- (4) Westside / Central Los Angeles

Within each Service Area, subarea analysis was conducted to review the respective region's travel length patterns, as well as travel time patterns. As previously mentioned, this data represents travel recorded during the month of October in 2018. In detail analysis is provided below, but generally, a few trends emerged across all Service Areas.

Consistent with previous research, our data revealed that most LBS trips are between 1-5 miles. There were a few exceptions though. Generally, about 20% of trips originating in the neighborhoods in West San Fernando Valley (Chatsworth neighborhood) and East San Fernando Valley engaged in LBS trips longer than 10 miles. (Figure x, Figure y).

West San Fernando Valley

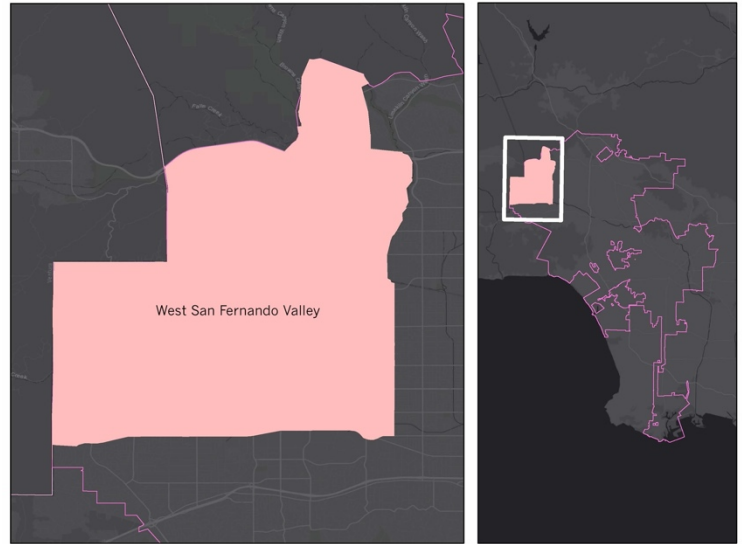


Figure 2: West San Fernando Valley Analysis Zone

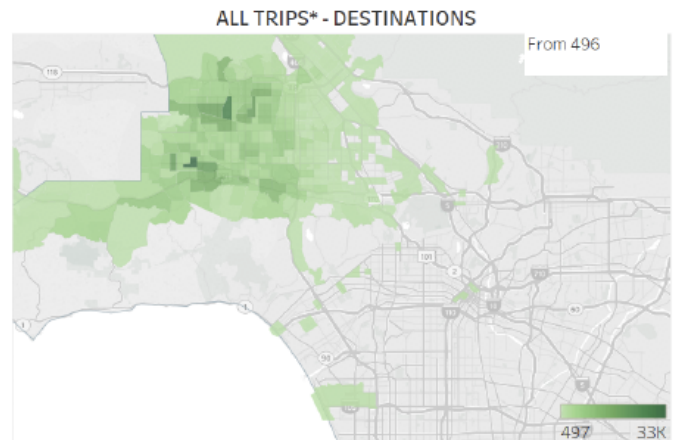


Figure 3: West San Fernando LBS Travel Data Analysis

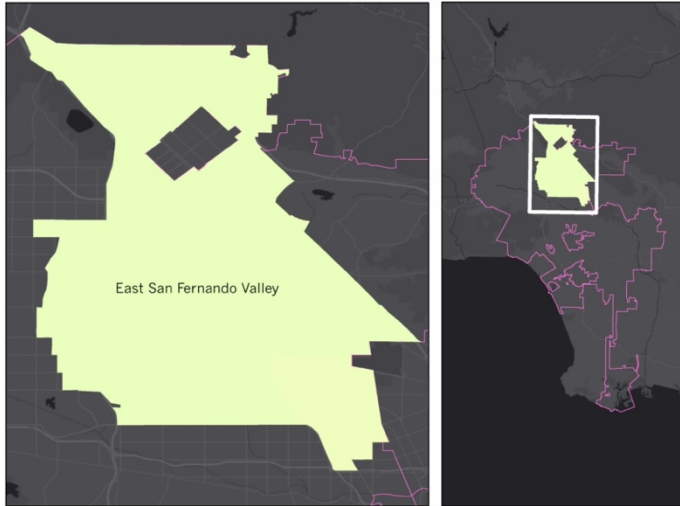


Figure 4: East San Fernando Valley Analysis Zone

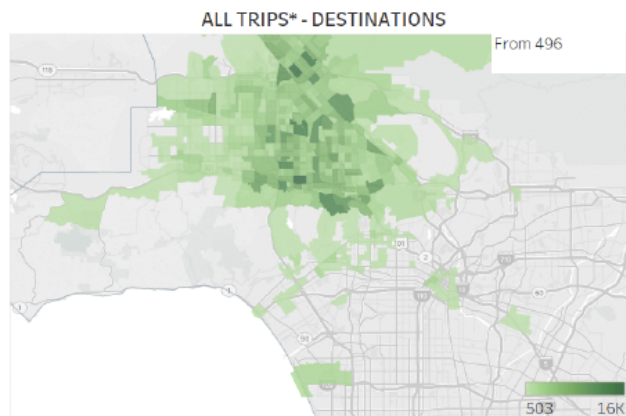


Figure 5: East San Fernando Valley LBS Travel Data Analysis

South Bay and Gateway Service Area

Gardena / Hawthorne

We conducted an LBS analysis of the Gardena and Hawthorne area. The analysis zone investigated stretched from Hawthorne Blvd. on the west to Vermont Ave. to the east, and 120th St. to the north and Artesia Blvd. to the south. Analysis revealed that 14.5% of LBS trips were longer than 10 miles. Further analysis also showed that 42.5%

of all trips were internal to the analysis zone. Travel outside of the analysis zone was concentrated along Vermont Blvd. into the Torrance neighborhood as well as Westside communities such as Inglewood and Playa Del Ray.

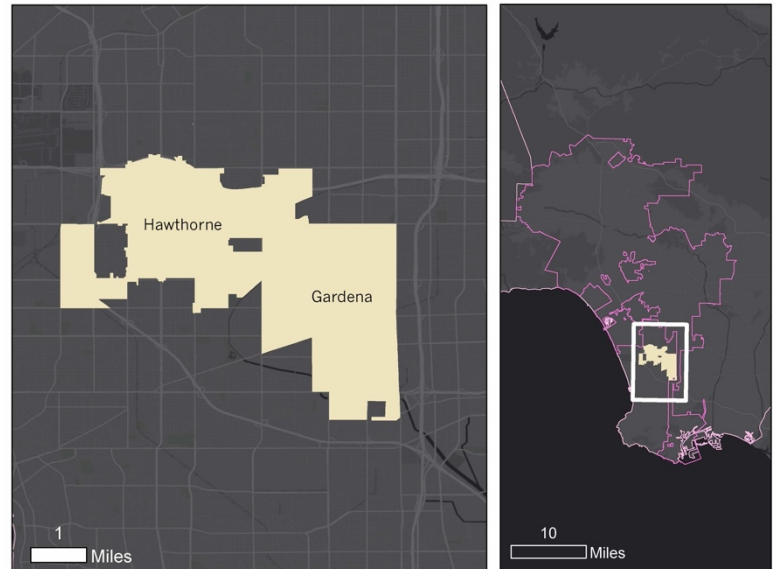


Figure 6: Gardena/Hawthorne Analysis Zone

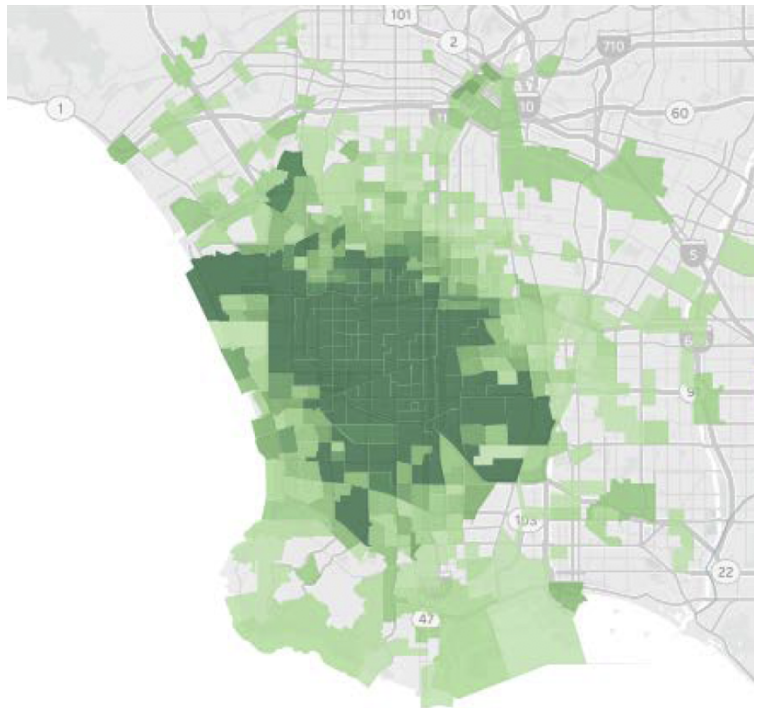


Figure 7: Gardena/Hawthorne LBS Travel Data Analysis

San Gabriel Valley; East Los Angeles Service Area

Glassell Park-Cypress Park

We also conducted an LBS analysis of the Northeast Los Angeles neighborhood of Glassell Park and Cypress Park. The analysis zone we determined for this region was the area between the 5 freeway, the 110 freeway, and 2 freeway and El Paso Drive. (See Figure X). We found that about a third of all trips were internal to the analysis zone and 66% of LBS trips were less than 5 miles. Outside of the analysis zone, our analysis revealed that about another 30% of trips headed north and northeast towards Eagle Rock, Glendale, and Pasadena.

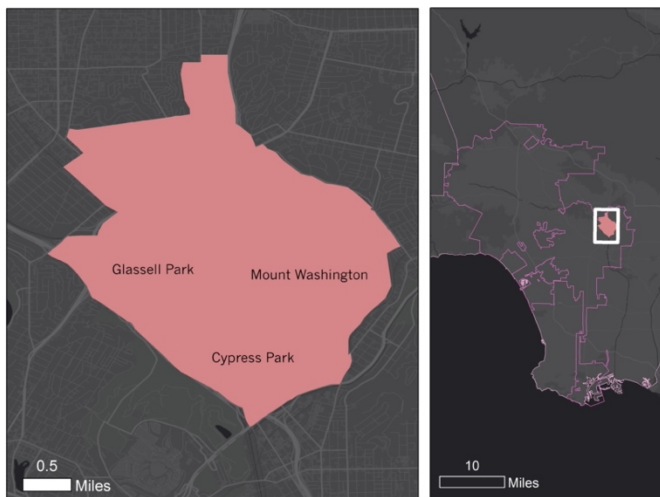


Figure 8: Cypress Park and surrounding community analysis zone.

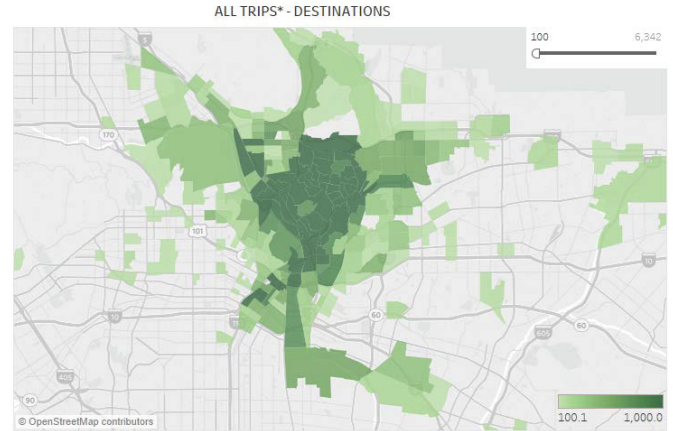


Figure 9: Cypress Park and surrounding communities LBS travel analysis.

San Fernando Valley

Burbank

We also analyzed LBS in Burbank, a city in Los Angeles County, California, in the southeastern end of the San Fernando Valley. We used Burbank city limits as our analysis zone.

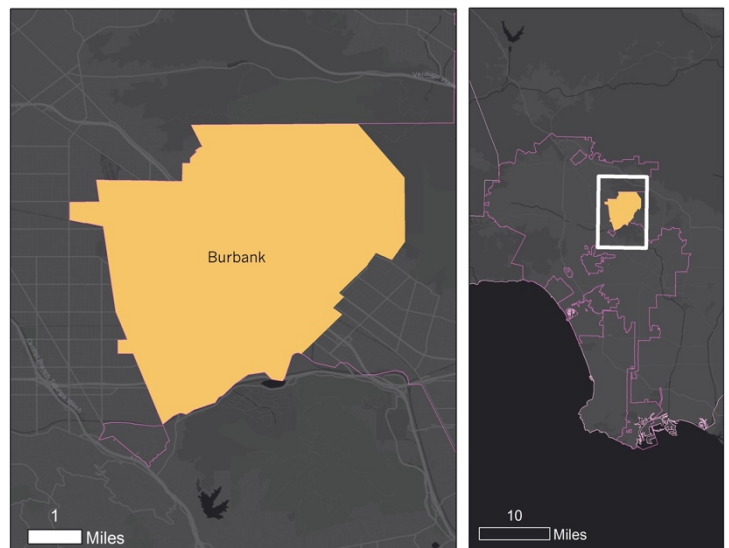


Figure 10: Burbank Analysis Zone

Our analysis found that about 40% of all travel was internal to the zone, followed by the southeast region of the San Fernando Valley, east of the I-405. Other notable travel destinations were the Westside (Westwood/Century City), the city of Glendale, west of I-405 of the San Fernando Valley, Sylmar, and finally DTLA (8%, 6%, 3%, 2%, and 1%, respectively.)

or shorter. Despite the short distance, 80% of trips ended outside of the neighborhood.

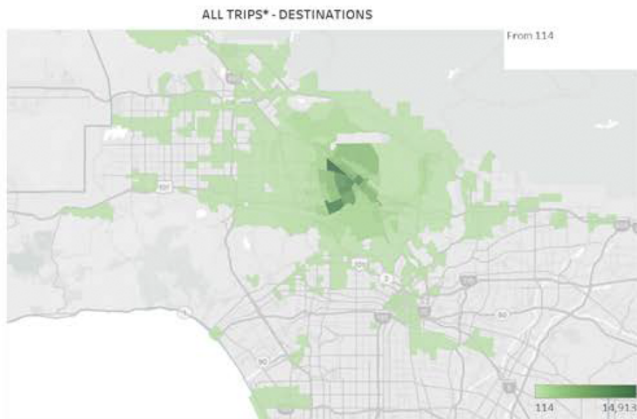


Figure 11: Burbank LBS travel analysis.

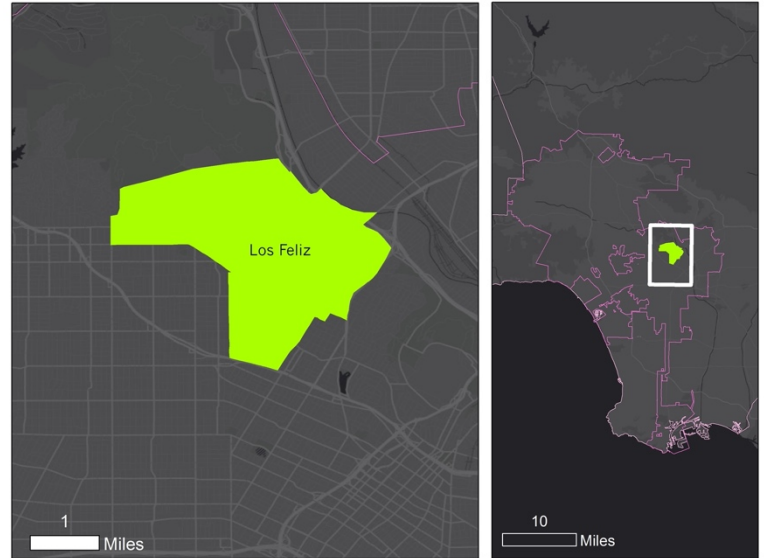


Figure 12: Los Feliz analysis zone.

Central Los Angeles

Los Feliz-Vermont, Sunset

The analysis zone for the neighborhood of Los Feliz resembled the shape of a diamond with Loz Feliz Blvd., Hollywood Blvd., Sunset Blvd., Hyperion Ave, and Riverside Dr. as the perimeters. Generally, all neighborhoods analyzed on the Westside and Central Los Angeles had at least more than half of their trip distances as 5 miles or shorter. The Los Feliz neighborhood was no exception with over 70% of all LBS trips as 5 miles

ALL TRIPS* - DESTINATIONS

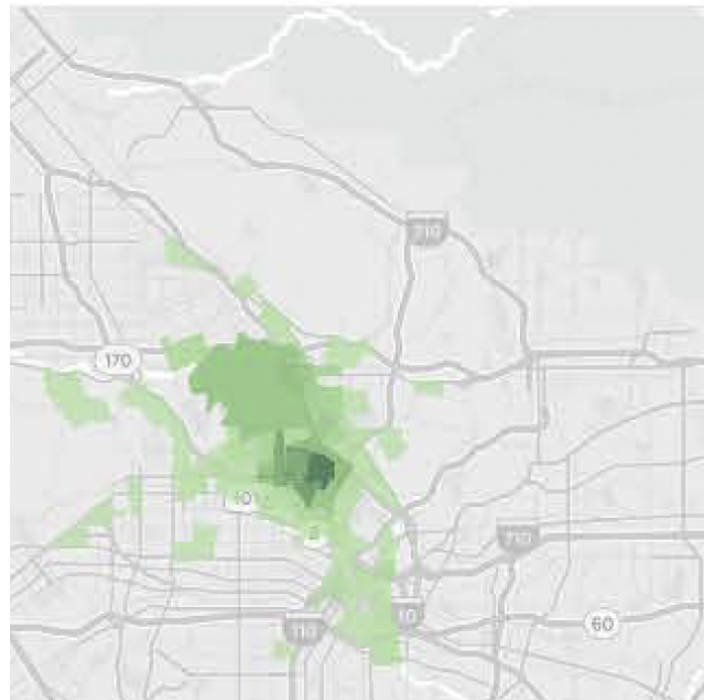


Figure 13: Los Feliz LBS travel data

Our analysis revealed that a sizable destination of trips beginning within Los Feliz included Downtown Glendale and the Burbank area, possibly due to its Media District.

OnTheMap Data

As a cross-checking measure, we decided to also review and analyze data from the U.S. Census Bureau. OnTheMap is a data-spatial tool that leverages U.S. Census data to report various travel patterns including commute patterns. In general, we found that most travel patterns in Los Angeles were less than 5 miles.¹¹ We reviewed the following neighborhoods to complement our LBS data.

Chatsworth

Reviewing Chatsworth OnTheMap data revealed that while a decent size of commute travel is internal (10.9%), a sizable commute travel also occurs further than 5 miles.

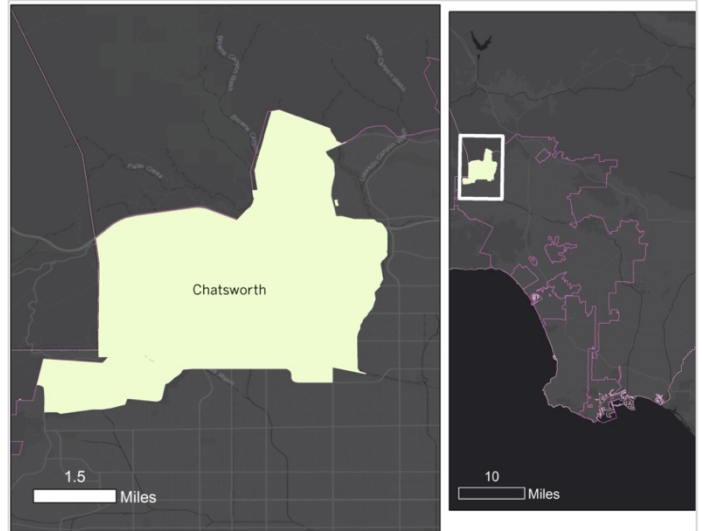


Figure 14: Chatsworth travel analysis zone

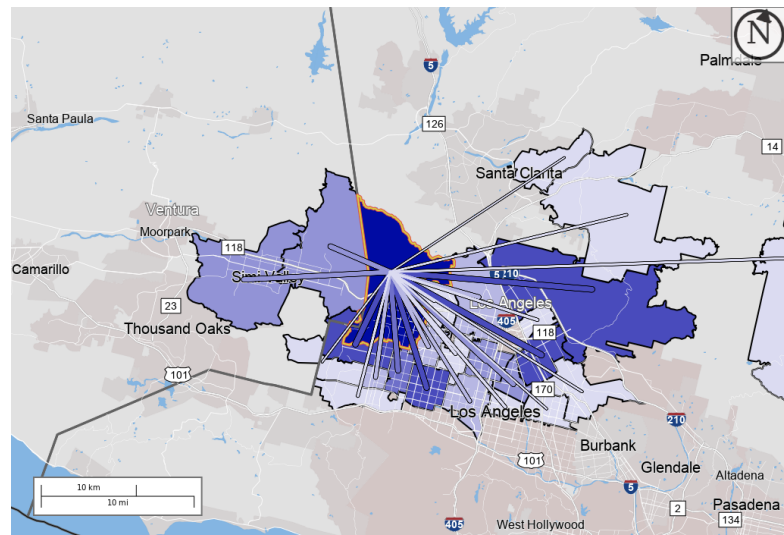


Figure 15: Chatsworth LBS travel analysis

For example, 10.6% of observed commute travel from Chatsworth ended in Simi Valley, a community about 15 miles west. Travel to the east San Fernando Valley is also strong. A combined

¹¹ U.S. Census Bureau. *OnTheMap* (2018). <https://onthemap.ces.census.gov/>

percentage of travel to the east SFV communities is up to at least 20%, including Panorama City, Granada Hills, and Northridge. A map is provided below as a demonstration.

Table 1: OnTheMap Average Daily Chatsworth Travel Pattern (October 2018)						
Origin	Simi Valley	Chatsworth (internal)	Porter Ranch	Northridge	Granada Hills	Panorama City
Chatsworth (total travel 30,370)	1815	1859	513	1069	696	852
	10.6%	10.9%	3.0%	6.1%	4.1%	5.0%

San Pedro

Another community that showed a strong travel pattern to communities further than 5 miles away was San Pedro. San Pedro is a port community at the southernmost end of the Los Angeles City Boundary.

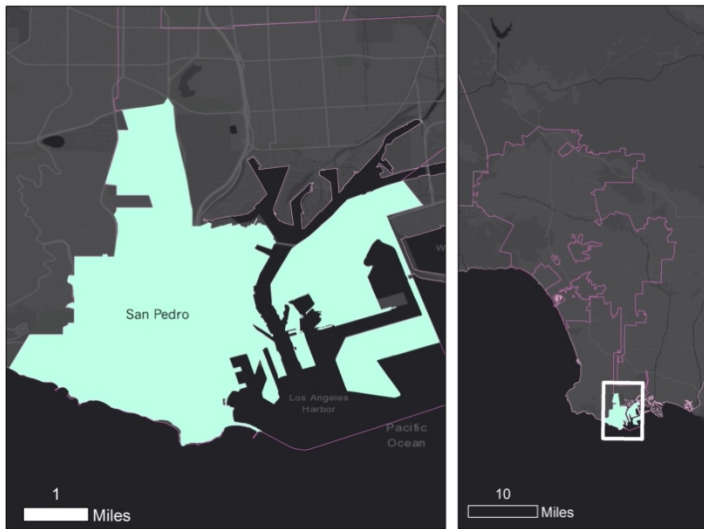


Figure 15: Chatsworth travel analysis zone

As shown in the chart below, most travel is contained within the San Pedro area and adjacent communities of Wilmington and Long Beach (34%). However, the next strongest concentration of travel is shown to be contained northwards towards the Carson and Torrance cities, 9.4% and 7.6% respectively. See the chart below on exact travel breakdown including absolute daily travel.

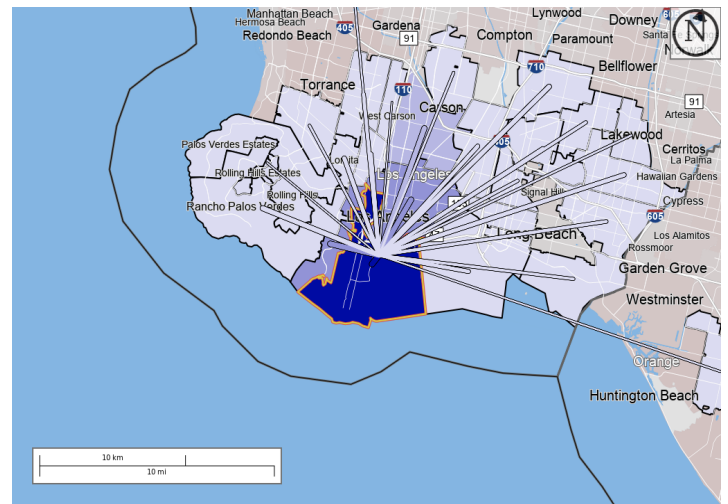


Figure 16: San Pedro LBS travel analysis.

Table 2: OnTheMap Average Daily San Pedro Travel Pattern (October 2018)						
Origin	San Pedro	Long Beach	Wilmington	Carson / Harbor City	Torrance/ Redondo Beach	Palos Verdes Peninsula
San Pedro (total travel 12,572)	4,675	2,141	2,079	1185	959	820
	37.2%	17.0%	16.5%	9.4%	7.6%	6.5%

Vernon / Huntington Park

The City of Vernon is an industrial city of 5.2 square miles near the Gateway Cities within Los Angeles County.¹² Since Vernon has no residential zoning,¹³ all destination travel originating in Vernon can be assumed to be to ones' residence.

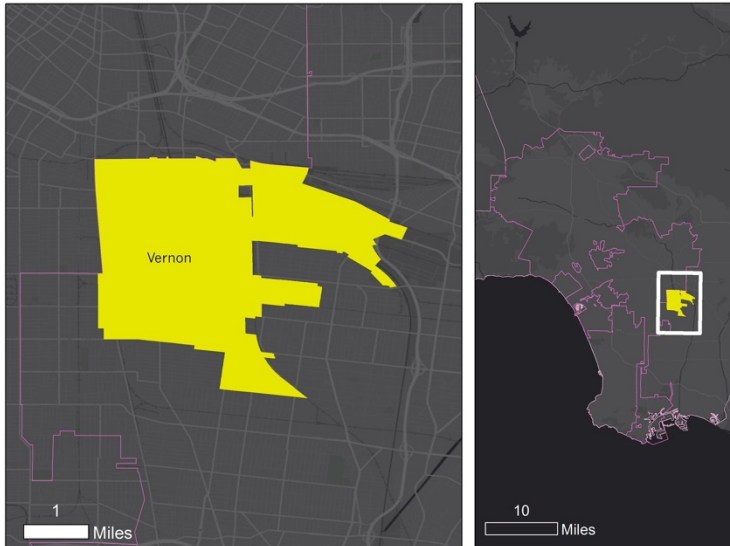


Figure 17: City of Vernon boundary

As shown below, over a quarter of all travel departing Vernon terminated within the communities

of Huntington Park, South Gate, Lynwood and Maywood

Table 3: OnTheMap Average Daily Vernon Travel Pattern (October 2018)				
Origin	Huntington Park	South Gate	Maywood	Lynwood
Vernon (total travel 16,033)	1,651	1,260	672	668
	10.3%	7.9%	4.2%	4.2%

¹² City of Vernon. <http://www.cityofvernon.org/>

¹³ City of Vernon. Zoning Ordinance.

http://www.cityofvernon.org/good_governance_reforms/ZoningOrdinanceDiscussionPowerPoint_BDC.pdf

Norwalk

We conducted an OntheMap analysis of the city of Norwalk. Encompassing an area of about 9.7 square miles and a population of about 105,000 (2020), Norwalk is the 14th most populated city in LA County. Moreover, Norwalk is home to one of Metro's C Line (Green) terminus points. We found that the largest travel to occur between Norwalk and Compton, Bellflower and Paramount (23.3%, 19.9%, and 18%, respectively). Moreover, we found a majority forward flow towards Norwalk (61.1%), signaling most travel originated from Compton, Bellflower, and Paramount into Norwalk.

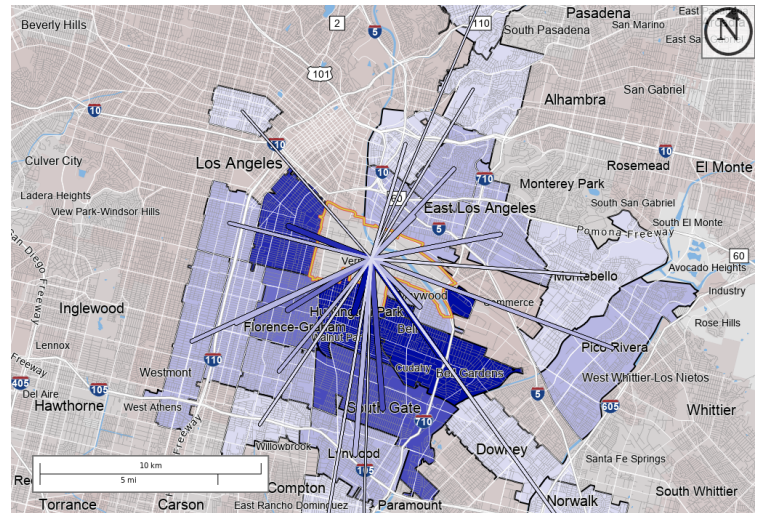


Figure 19: Norwalk OntheMap travel analysis.

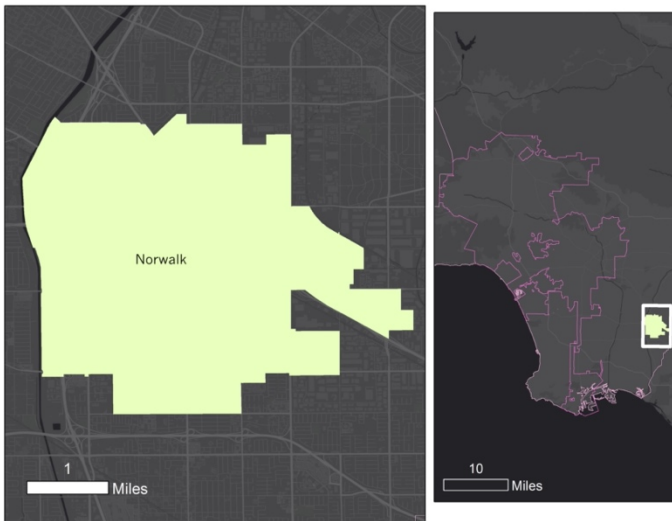


Figure 18: City of Norwalk boundary.

Data Limitations

A few limitations to the data and methodologies used in this report should be noted. Both the LBS and US Census “OnTheMap” data sources are from 2018. This means that travel patterns may not be

reflective of more recent travel behaviors. In the context of COVID-19, travel patterns may be significantly different than expressed in 2018 data.

Discussion and Preliminary Recommendations

Before NextGen in 2017, the last restructuring of Metro’s bus service was in 1995 -- over 25 years prior. Given the long lifespan of bus service routes, it is imperative that bus service today is restructured to match travel patterns across LA County. We know that the lifeline of Metro are bus riders, and we must tailor our service to their needs. With the NextGen study, along with travel data provided by Metro, we can meet bus riders’ accessibility needs.

A thorough review of our data sources reveal general consistency with results from the NextGen Bus service. The location-based service data and the US Census “OnTheMap” data revealed most trips were local with the majority of trips being 5 miles or less. However, a few notable exceptions arose in our analysis which are discussed below.

San Fernando Service Area

For example, many trips originating in the Chatsworth / West San Fernando Valley had a destination of over 10 miles away. Though around 10% of trips ended at Simi Valley, west of Chatsworth, about 20% of trips ended towards the Eastern portion of San Fernando. By examining the transportation network, perhaps most of this travel could be attributed to the adjacent California State Route (SR) 118.

To address this travel trend, we recommend providing an express service along SR 118. Originating from the G (Orange) Line’s Chatsworth Station, we propose services running from Chatsworth Station and CSUN to Sylmar/San Fernando Metrolink Station via SR118.

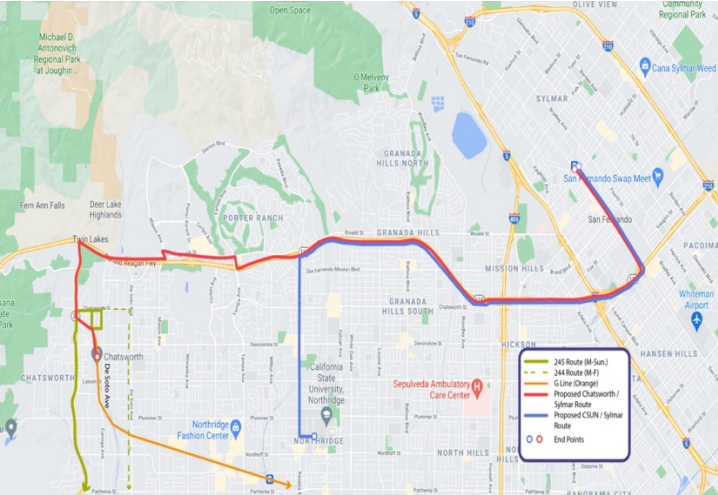


Figure 20: Proposed link between G Line’s Chatsworth Station and Sylmar San Fernando Station via SR 118. Larger version provided in Tables and Figures Section.

South Bay

Similar to Chatsworth, our analysis revealed long travel miles for travel originating in San Pedro. We found a notable link between San Pedro and the Torrance and Carson neighborhoods. Currently, direct transit lines exist between San Pedro to Carson (Metro) as well as between San Pedro and Rancho Palos Verdes (PVPTA). However, no direct lines exist between San Pedro and Torrance. While establishing a direct transit link does not need to begin with a standard bus route, our travel analysis shows a sizeable travel pattern between San Pedro and Torrance. As such, establishing a direct link could entail starting as Metro Micro or a Municipal line extension.

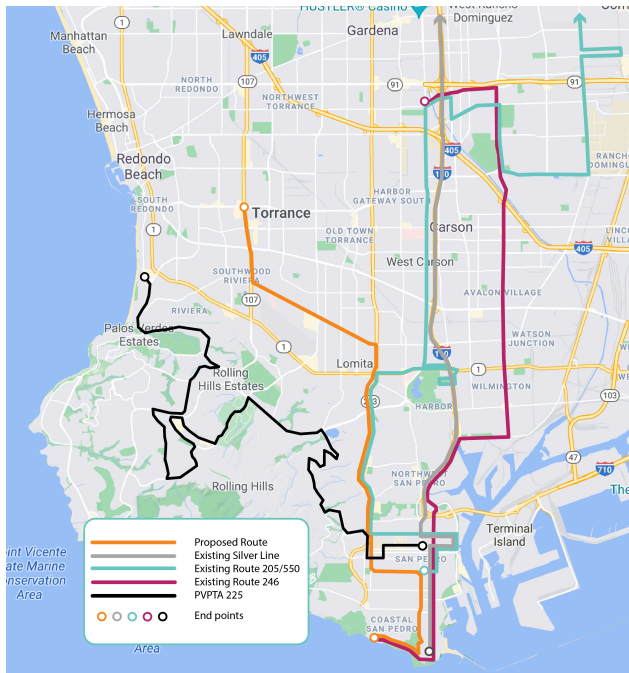


Figure 21: Proposed route in orange connecting the communities' of San Pedro and Torrance.

Gateway Cities

Lynwood/Huntington Park

Currently the Vernon bus (105) has an eastern terminus at the edge of the City of Vernon on Santa Fe Ave. and Vernon Ave. Analysis of travel patterns from Vernon show that travel originating in Vernon have destinations in southern communities such as Huntington Park, South Gate, and possibly Lynwood. Given such a high percentage of southern travel we recommend that the 105 bus continues into at least the main streets of Huntington Park and South Gate, if not terminating at Lynwood.

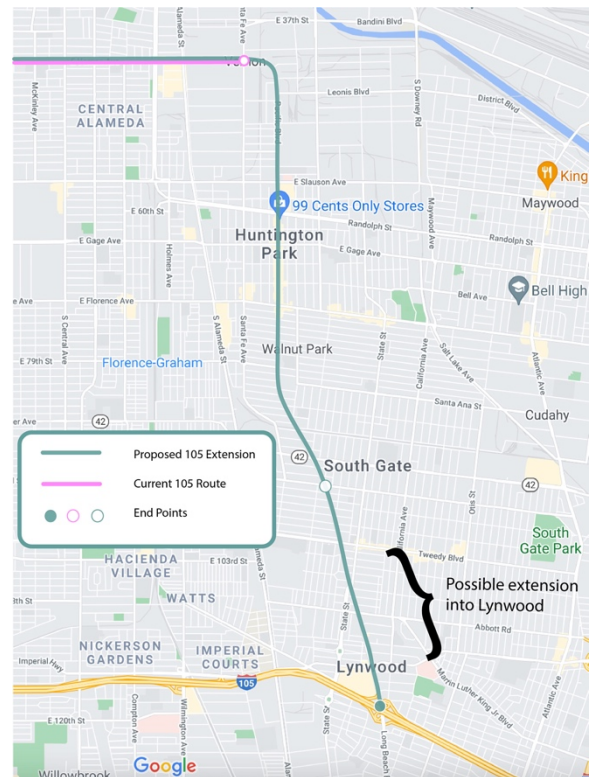


Figure 22: Proposed Vernon bus route 105 extension into Huntington Park and South Gate, possibly Lynwood.

Norwalk

Norwalk's most prominent Metro infrastructure is the C Line (Green)'s Norwalk Station. The C Line Norwalk Station provides invaluable connection service to the A Line (Blue) as well as public transit access throughout the Interstate 105 (I-105) communities. As previously described, the majority of traffic coming into Norwalk originates from the I-105 communities. However, the C Line's Norwalk Station is located within a relatively low-density area and outside walking distance to major job-rich areas of Norwalk and popular destinations. Moreover, many bus routes such as Metro's 125 bus also terminate at the Norwalk Station. Accordingly, service improvements within the community of Norwalk should be considered - especially via relatively easy bus route modifications.

We recommend expanding Metro's 125 bus service into Norwalk. One option could be to expand service eastwards towards Norwalk/Santa Fe Springs Metrolink Station on Imperial Highway (Imperial). The Norwalk/Santa Fe Springs Metrolink Station services both Orange County, and a separate route in the Riverside/Inland Empire Counties. This

option equips riders with invaluable access to employment hubs, shopping centers, schools, and recreational parks.

A second option to reach the Norwalk/Santa Fe Springs Metrolink Station could be to have the 125 bus leave the Norwalk C Line (Green) Station and head south via Studebaker Road until reaching Rosecrans Ave. Afterwards, the bus route should return northwards via San Antonio Dr, reaching Imperial until reaching the Norwalk/Santa Fe Springs Metrolink Station. Similar to option one, this route provides direct access to employment, shopping, and recreational opportunities available on Rosecrans within Norwalk.

Similar reconfiguration arguments can be made for modifying Metro lines 127, 115, and 111 and the C (Green) Line rail service to penetrate directly into the key destinations in Norwalk.

It is important to recognize the external factors outside to improve transit service in Norwalk. In particular, the situation is complicated by existing municipal service. The need for Metro to coordinate with the municipal operator in Norwalk (Norwalk Transit) is paramount to avoid unnecessary duplication.

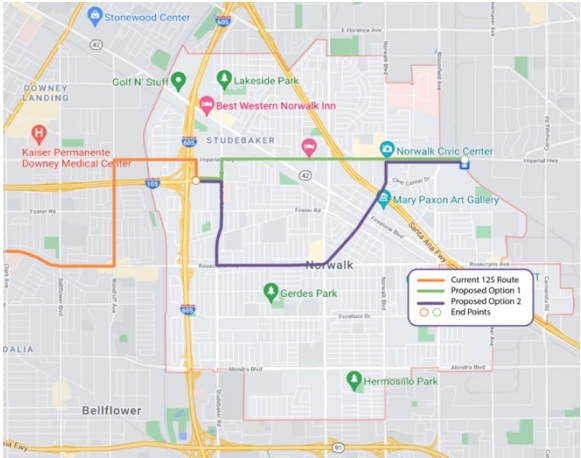


Figure 23: Metro bus route 125 extension through Norwalk core.

Implementation

Though implementation of these routes would not entail an exorbitant price tag, there would be costs associated nonetheless. Understanding that LA Metro might want to first test the strength of demand for any of the recommended routes, launching a pilot program might be a reasonable solution. For example, a pilot Metro Micro shuttle would allow Metro to test the strength of observed demand without having to use funds to purchase bus stop signs, shelters, or high operating expenses.

Future Research

While a thorough analysis of travel patterns was conducted based on the data provided, this research would greatly benefit from the inclusion of recent travel trends. It is undeniable that the COVID-19 pandemic has affected travel patterns ranging from the local level to the international scale. In particular, commute travel patterns, especially for white-collar workers who are more easily able to perform their work remotely, may be particularly skewed. Nevertheless, the majority of Metro's bus riders are low-income and are less likely to have the ability to work remotely. Furthermore, while public transportation use

has plummeted across the nation, Los Angeles has seen the smallest percent decrease in their ridership. Therefore, it would be incorrect to assume that travel patterns considerations before COVID-19 are moot.

Select Tables and Figures

Tables

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Figures

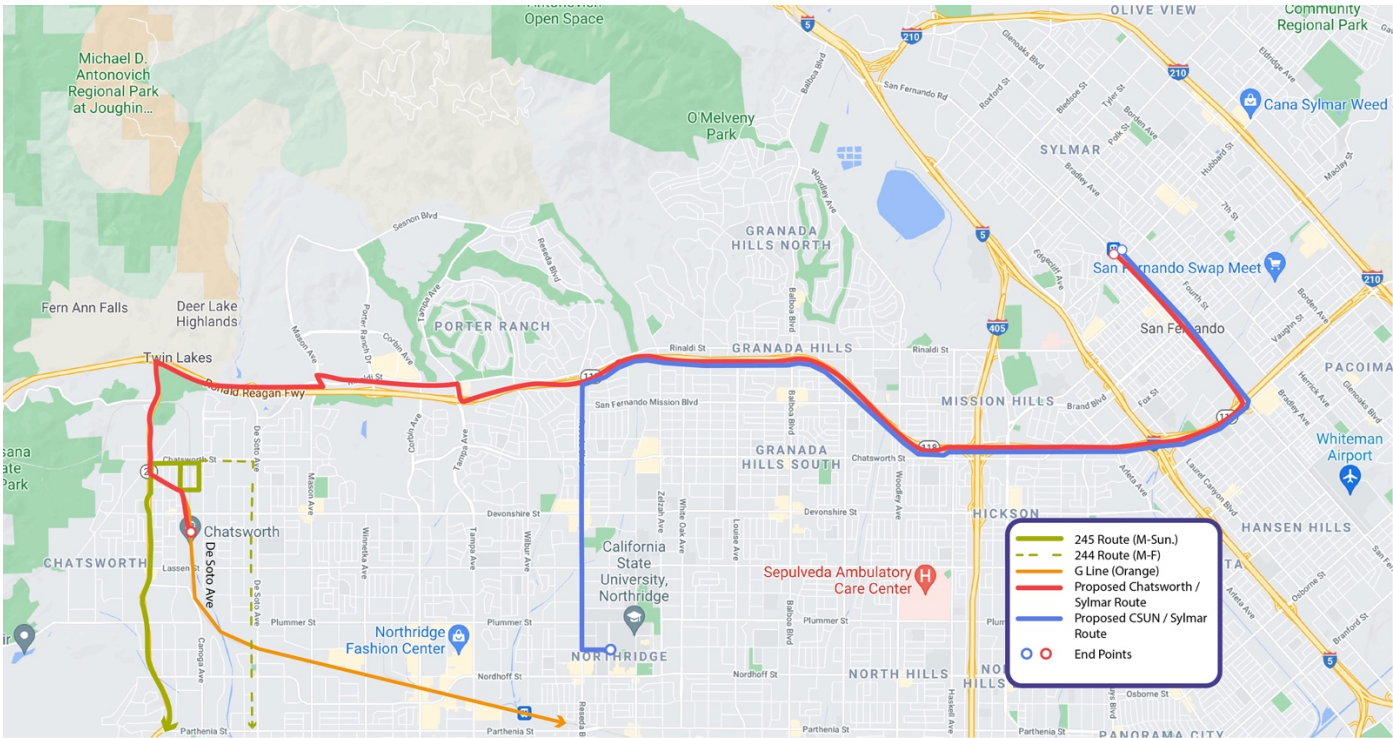


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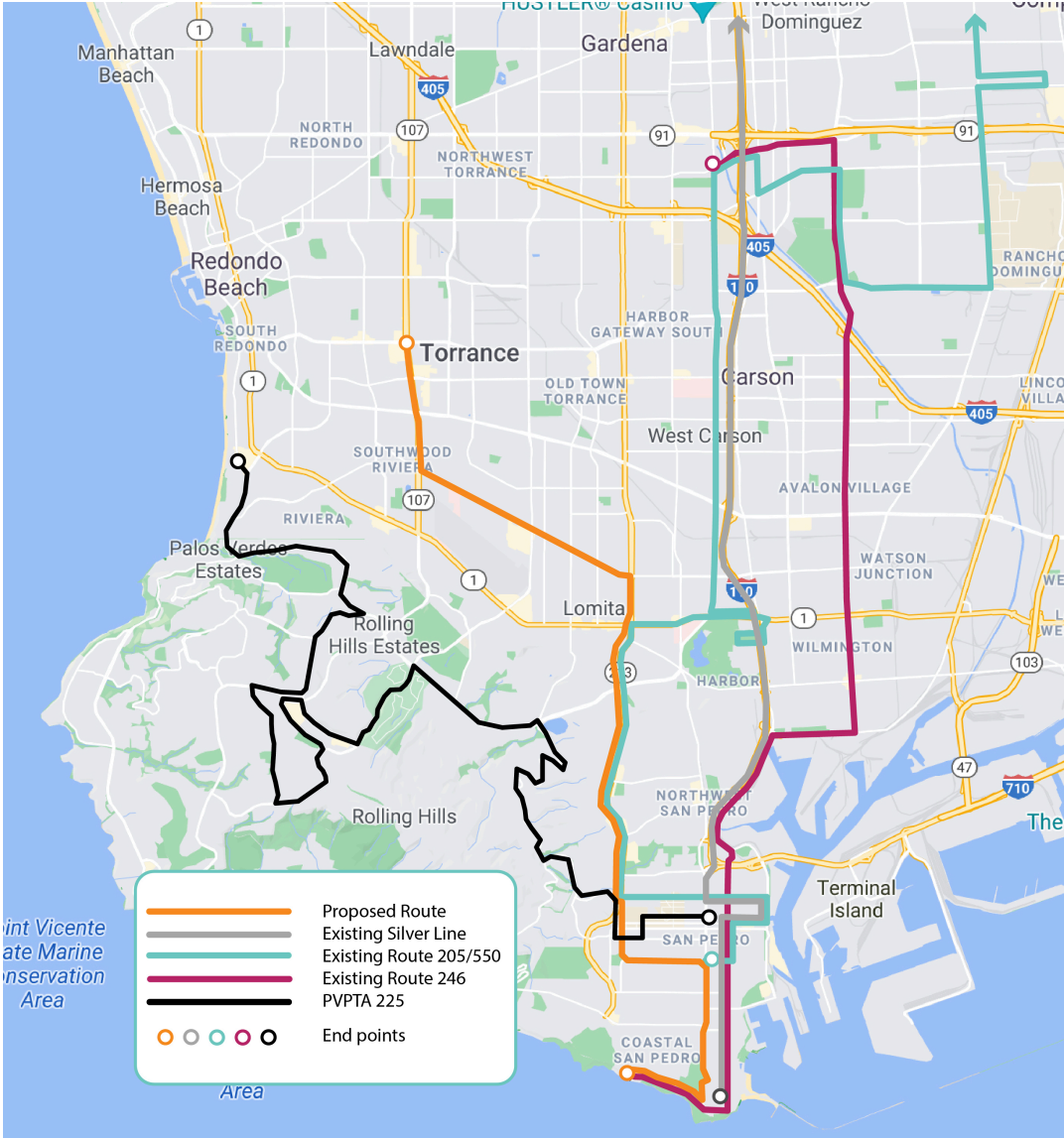


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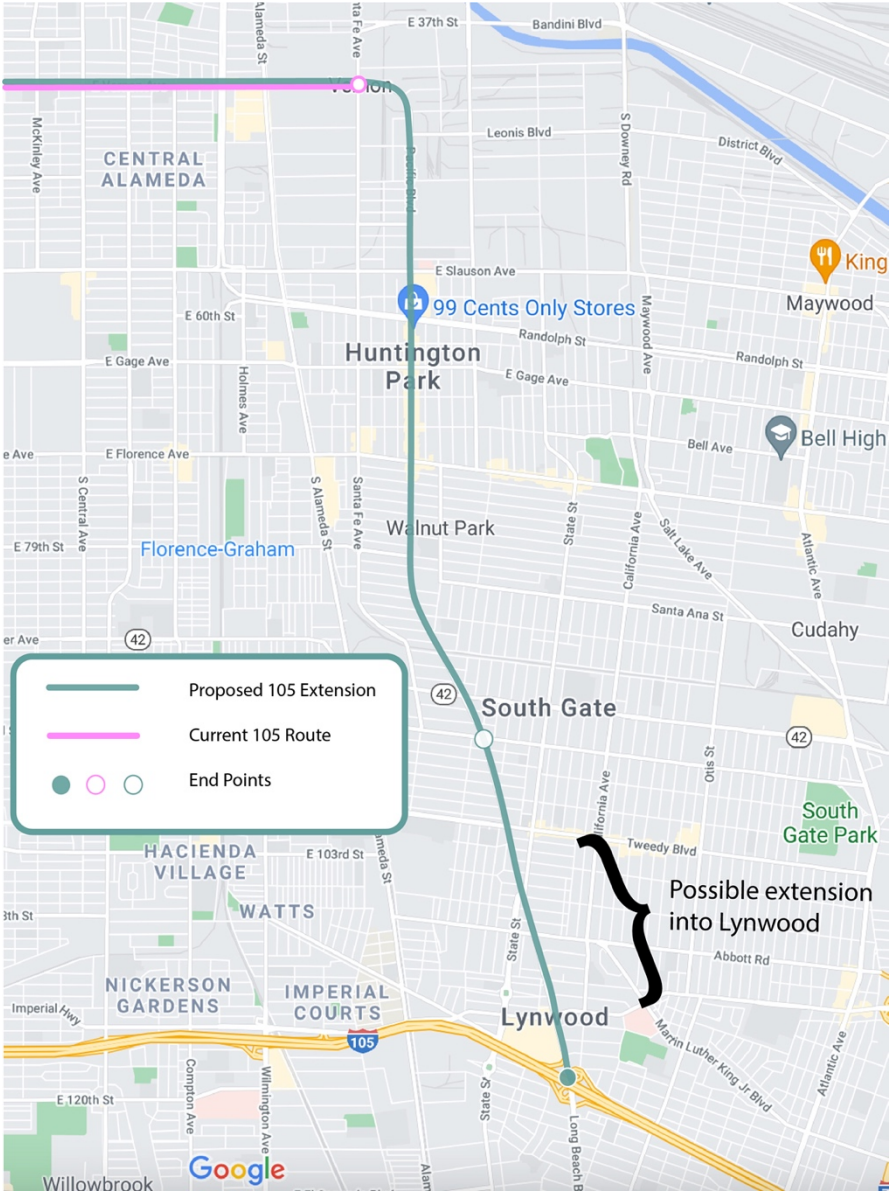


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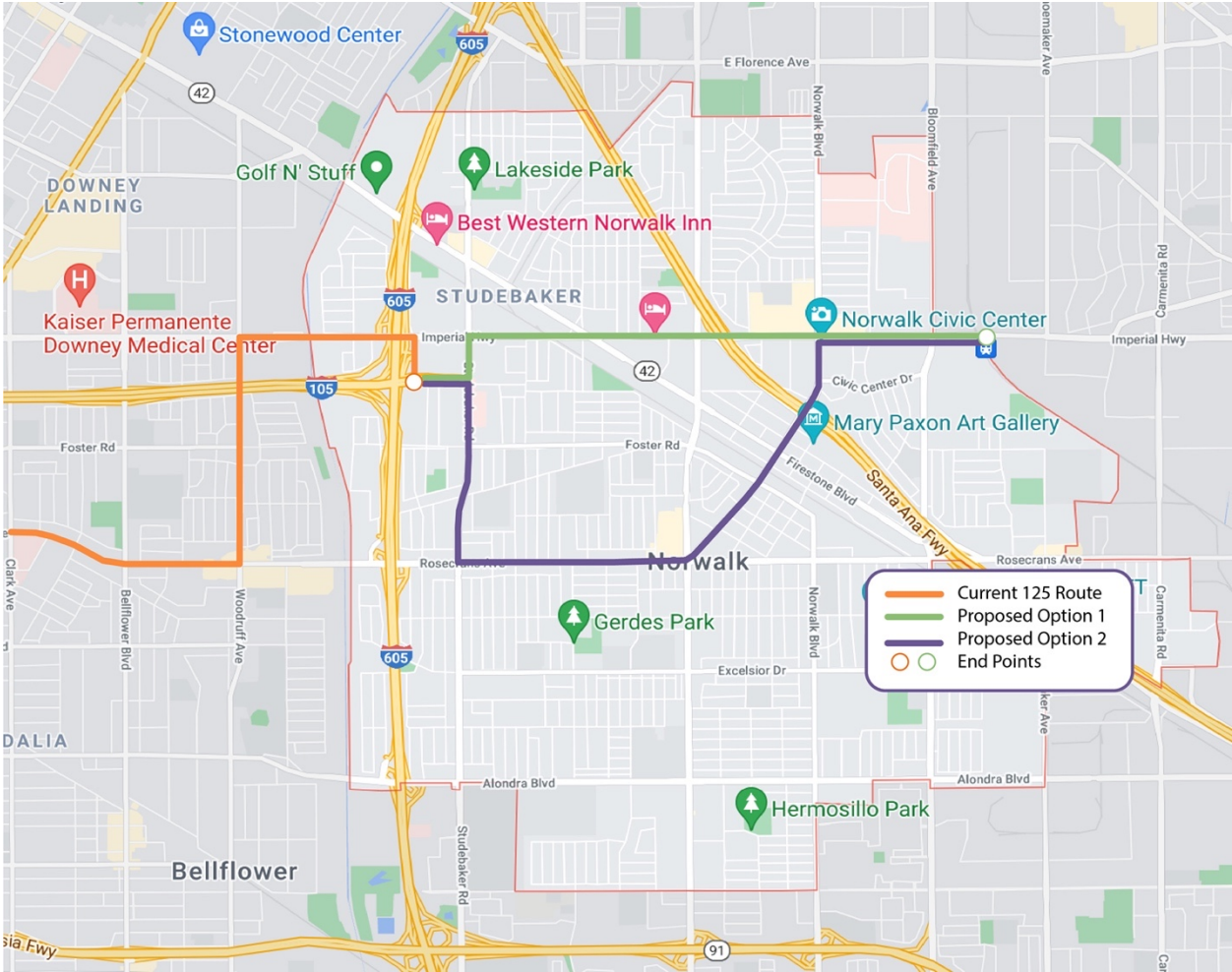


Figure 23: Metro bus route 125 extension through Norwalk core.

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