

NORTH SAN FERNANDO VALLEY BUS RAPID TRANSIT CORRIDOR



Alternatives Analysis Report

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Prepared by:



Metro



Placeholder Page

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Executive Summary

The Los Angeles County Metropolitan Transportation Authority (Metro) has initiated an Alternatives Analysis (AA) to study a Bus Rapid Transit (BRT) project in the North San Fernando Valley (NSFV). The purpose of the Alternatives Analysis is to define, screen, and recommend Proposed Project alternatives to be studied as part of the environmental analysis phase in order to environmentally clear the project pursuant to California Environmental Quality Act (CEQA) guidelines.

Study Background

The NSFV BRT Project is identified and funded by Measure M, a half-cent transportation funding sales tax measure approved by LA County residents in November 2016. The Metro Board of Directors gave approval to initiate a technical study preceding environmental review for this project in March 2017. This technical study was completed in September 2017 with the publication of the NSFV BRT Improvements Environmental Framework Report. The Metro Board of Directors authorized the North San Fernando Valley Bus Rapid Transit Corridor Study in May 2018. Per Measure M, the project is expected to open between Fiscal Years 2023 and 2025.

The intent of the AA is to enable Metro and City stakeholders to evaluate a range of alternatives for a bus rapid transit service that can provide a new mode of travel in the project study area. The goal of the NSFV BRT project is to provide a high-capacity premium east-west transit service that will connect key activity centers and the regional transit system in the North San Fernando Valley. The Alternatives Analysis includes detailed planning, conceptual engineering, ridership forecasting, and consideration of community and stakeholder input, and opportunities to support Transit Oriented Communities and First/Last Mile improvements.

Study Area

The project study area is in the north San Fernando Valley and includes the City of Los Angeles neighborhoods of Chatsworth, Northridge, North Hills, Panorama City, Sun Valley, Pacoima, Sylmar, North Hollywood, and the City of San Fernando. The study area is approximately 18 miles in length and is bounded by Devonshire Street and Polk Street to the north, Strathern Street and Magnolia Boulevard to the south, Glenoaks Boulevard and Tujunga Ave to the east, and Canoga Avenue, Laurel Canyon Boulevard, and SR-170 to the west. Crossing the study area are several interregional freeways including the San Diego Freeway (I-405), the Golden State Freeway (I-5), and the Hollywood Freeway (SR-170).

There are three major transit corridors that serve regional trips in the study area: the Metro Orange Line (MOL), the Metro Red Line, the Metrolink Ventura County Line and Amtrak service, and the Metrolink Antelope Valley Line. Future major transit corridors that transverse and border the study area include the East San Fernando Valley Rail Transit Corridor (ESFVTC) and the Sepulveda Transit Corridor. The project study area is illustrated in Figure ES-1.

Figure ES-1: Project Study Area



Purpose and Need

The NSFV BRT project will provide a premium east-west transit service to link key activity centers and improve access to jobs, education, essential services and the regional transit system. The key challenge for the NSFV BRT is to design a premium transit service that offers outstanding trip experiences and improves regional connectivity while operating within existing right-of-way on local streets and roads.

Metro operates a large and varied transit network in the San Fernando Valley, and is advancing the planning and construction of an extensive transit network to provide high-quality mobility options to further enhance communities and lives. This project is part of Metro’s network expansion, and will close a significant gap in the frequent transit network in the San Fernando Valley (the Valley).

Projects including the East San Fernando Valley Rail Transit Corridor (ESFV light rail), Metro Orange Line Improvements, North Hollywood to Pasadena BRT, and the Sepulveda Transit Corridor projects, together with this project, will provide a world-class transportation system that meets Metro’s Vision 2028 goals. Metro’s Valley transit expansion plan is shown in Figure ES-2.

Frequent bus rapid transit service will enable people to spend less time traveling and will work to address equity goals by connecting Valley residents and visitors with education and employment. The project will provide an opportunity for local jurisdictions to partner with Metro to advance first/last mile planning, green/sustainable infrastructure, active transportation, and urban design along the corridor.



Metro Vision 2028 Goals

To identify project needs, the technical team performed an analysis of demographic, socioeconomic, and mobility data within the study area, and reviewed policy and planning documents from Metro and local jurisdictions. The needs highlighted in these assessments informed the development of four Project Objectives established to guide the planning process.

Objective 1: Improve transit accessibility and connectivity to major activity centers, employment sites, as well as the existing and planned regional transit system.

Objective 2: Design comfortable, convenient, and reliable rapid transit service that enables people to spend less time traveling.

Objective 3: Provide equitable access opportunities to benefit communities through urban design, transit-oriented communities, and green/sustainable infrastructure.

Objective 4: Design an improved transit service that complements Metro's network and improves accessibility and sustainability.

Definition of Project Alternatives

Preliminary BRT Concepts

In September 2017, the NSFV BRT Environmental Framework Report was completed, which established a study area and identified three preliminary BRT alignment concepts for the purpose of framing the approach to the Alternatives Analysis. These preliminary concepts are shown in Figure ES-3. The options all connect with Chatsworth on the west. One option goes north to Sylmar and the other two options connect to North Hollywood. The report characterized the existing community characteristics and transportation settings. Local streets and existing transit demand were reviewed to identify corridors for the potential implementation of dedicated bus lanes to improve regional connectivity in the North San Fernando Valley. The report advanced all three preliminary concepts to the Alternatives Analysis phase for initial discussion purposes as representative alignments.

AA Study Alternatives

The AA process began in July 2018 with early study activities focused on field reviews, planning assessments, stakeholder engagement, and operational study to reassess the three initial BRT concepts. Initial planning assessments were completed in September 2018 that resulted in development of three families of alignment options as shown in Figure ES-4. These three families of alignment options represent refined and improved versions of the three initial BRT concepts presented in the 2017 NSFV BRT Improvements Environmental Framework Report shown in Figure ES-3.

Figure ES-3: Environmental Framework Report BRT Concepts

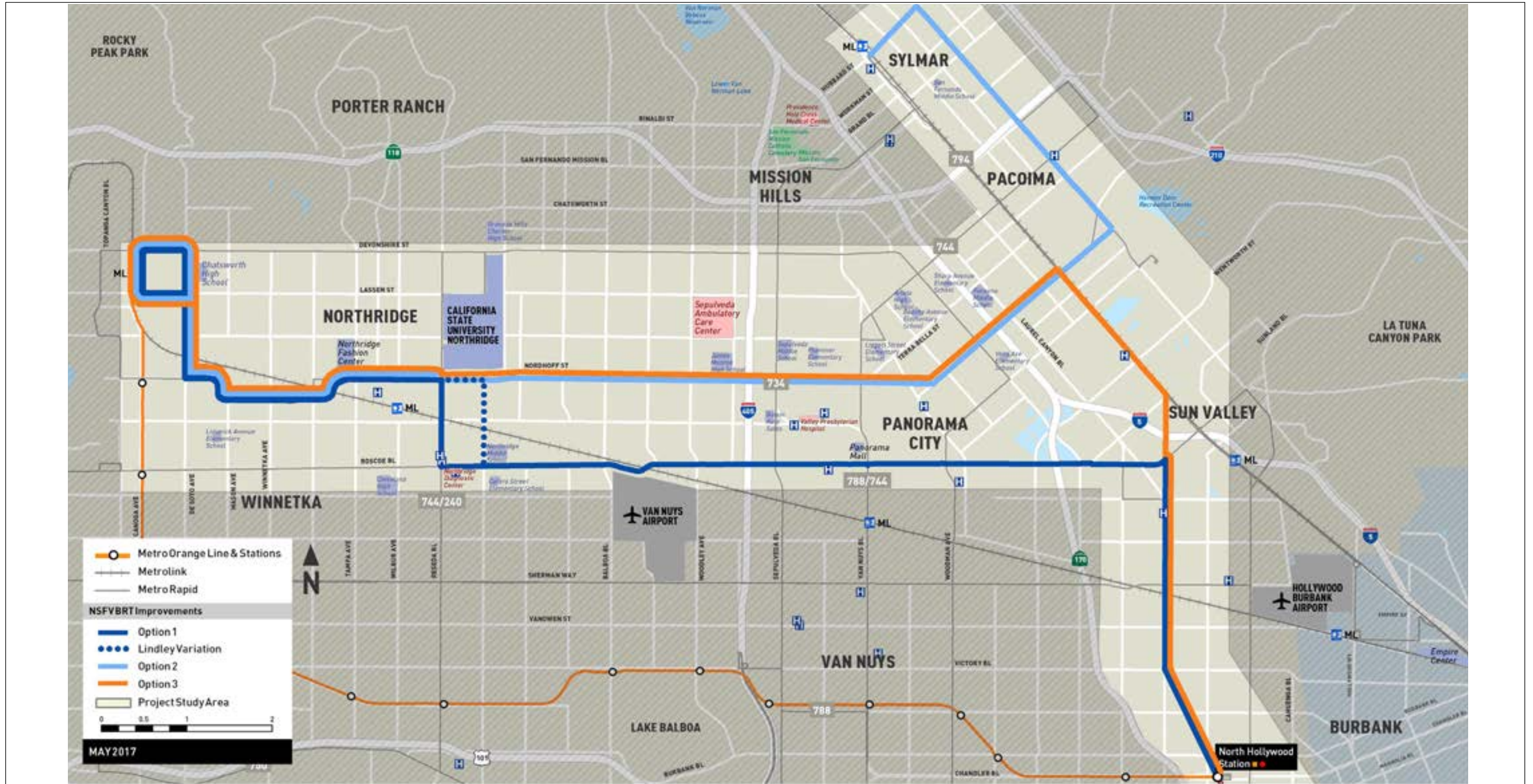
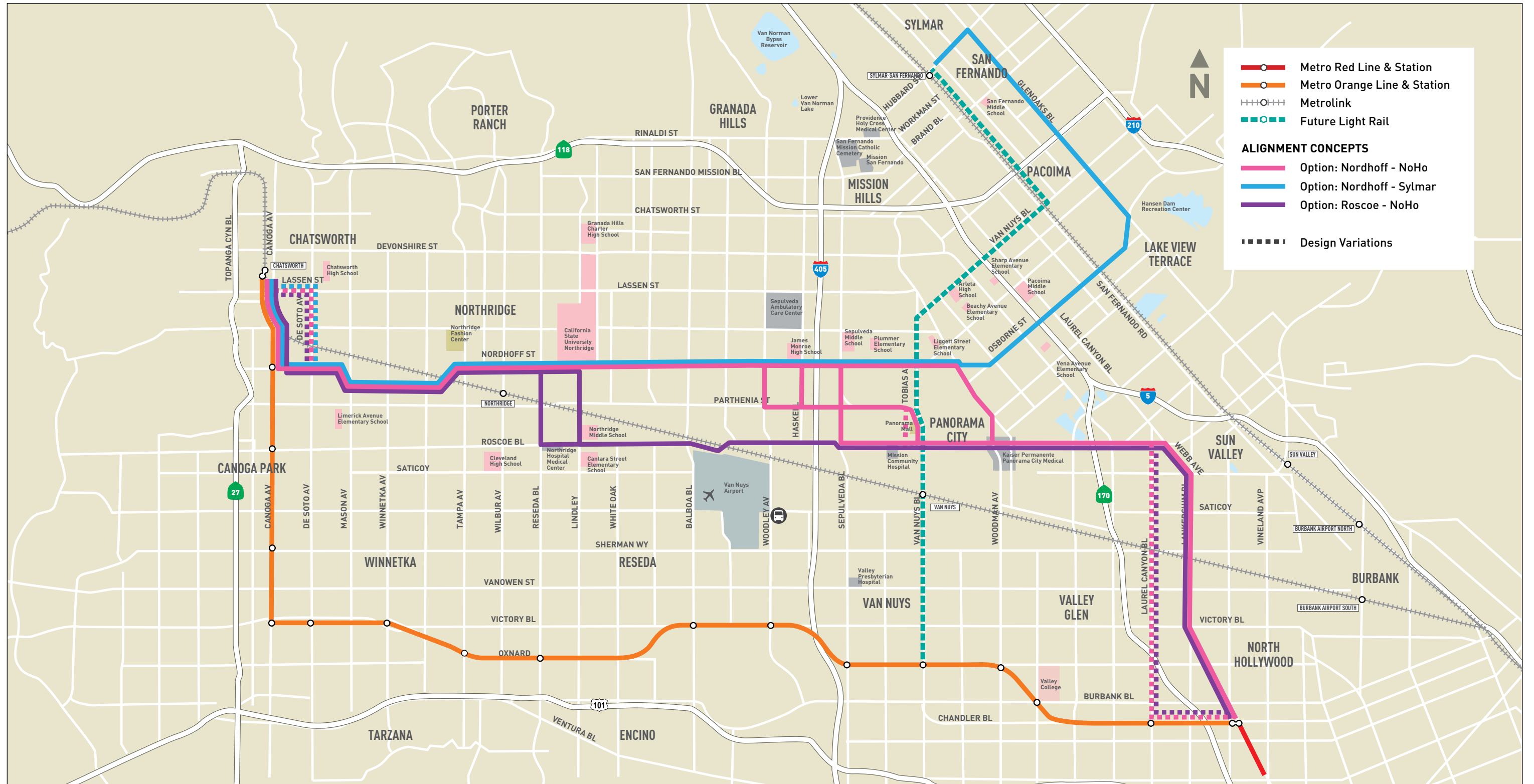


Figure ES-4: Refined Project Alternatives



From the three families of alignment options, the technical team was able to formulate seven distinct alignment options to test the relative performance of the alignments.

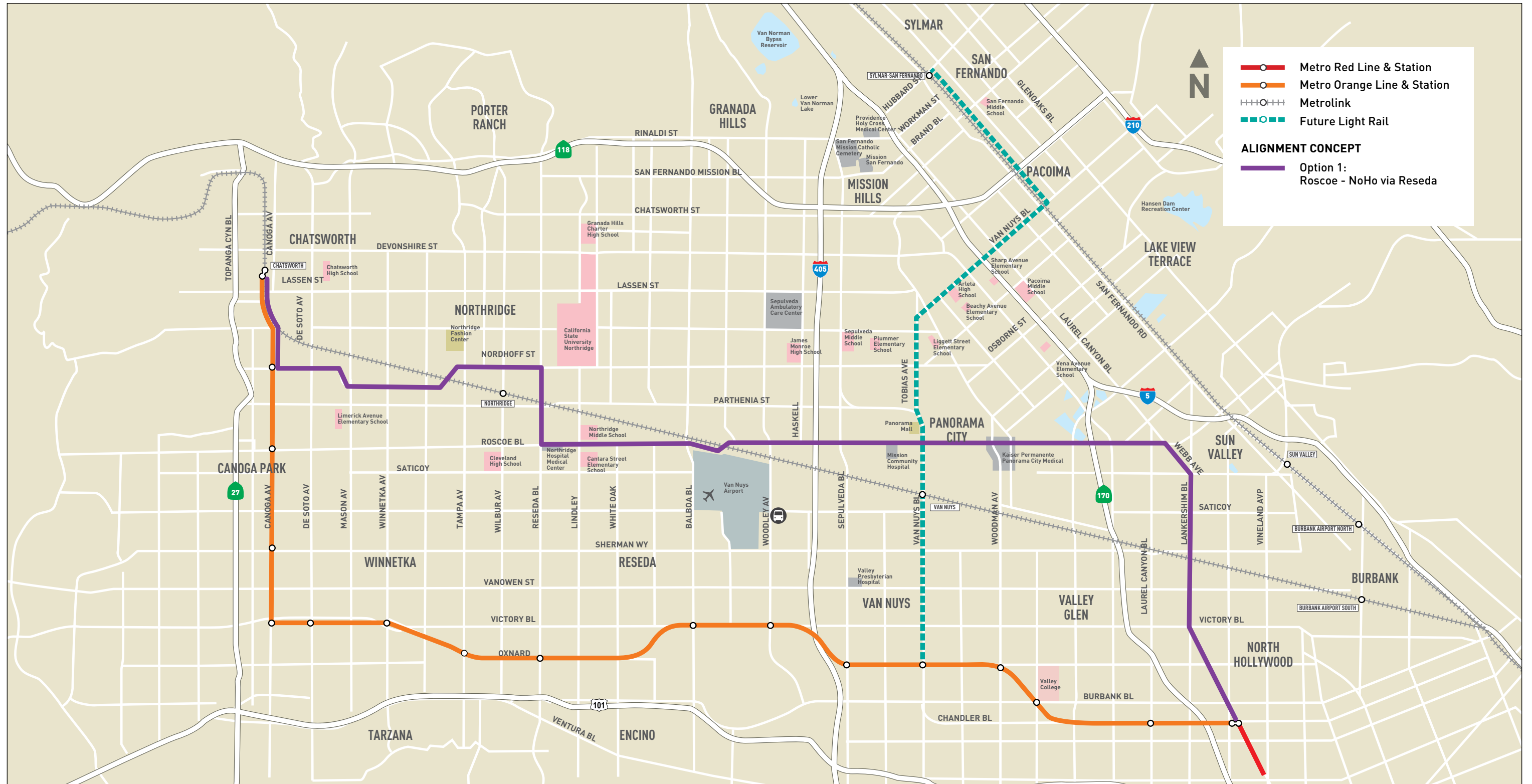
All of the alignment options begin on the west side of the study area at the Chatsworth Metro Orange Line/MetroLink station, and propose following the Metro Orange Line BRT guideway south before turning east onto Nordhoff Street. The first deviation begins as the alignments approach California State University, Northridge (CSUN), in the vicinity of Reseda Boulevard and Lindley Avenue.

Two of the alignment options travel south on either Reseda Boulevard or Lindley Avenue to Roscoe Boulevard, then follow Roscoe Boulevard and Lankershim Boulevard to the North Hollywood Station to connect with the Metro Red Line.

The five remaining alignment options continue along Nordhoff Street past CSUN. Option 3: Nordhoff-Sylmar/San Fernando, continues along Nordhoff Street past Van Nuys Boulevard, travels northeast along Osborne Street, northwest along Glenoaks Boulevard, and west along Hubbard Street, to connect to the Sylmar/San Fernando Metrolink station. The remaining Nordhoff-NoHo alignment options follow Nordhoff Street with different options to connect south to Roscoe Boulevard in the Panorama City neighborhood before continuing along Roscoe Boulevard to Lankershim Boulevard to the North Hollywood station and the Metro Red Line. The alignment options considered for screening are listed below and shown in Figures ES-5 through ES-11.

- Option 1: Roscoe-NoHo via Reseda
- Option 2: Roscoe-NoHo via Lindley
- Option 3: Nordhoff-Sylmar/San Fernando
- Option 4: Nordhoff-NoHo via Woodley
- Option 5: Nordhoff-NoHo via Haskell
- Option 6: Nordhoff-NoHo via Sepulveda
- Option 7: Nordhoff-NoHo via Woodman

Figure ES-5: Alignment Option 1: Roscoe - NoHo via Reseda



Legend

- Metro Red Line & Station
- Metro Orange Line & Station
- - - ○ - - - Metrolink
- - - ○ - - - Future Light Rail

ALIGNMENT CONCEPT

- Option 1: Roscoe - NoHo via Reseda

Figure ES-6: Alignment Option 2: Roscoe - NoHo via Lindley

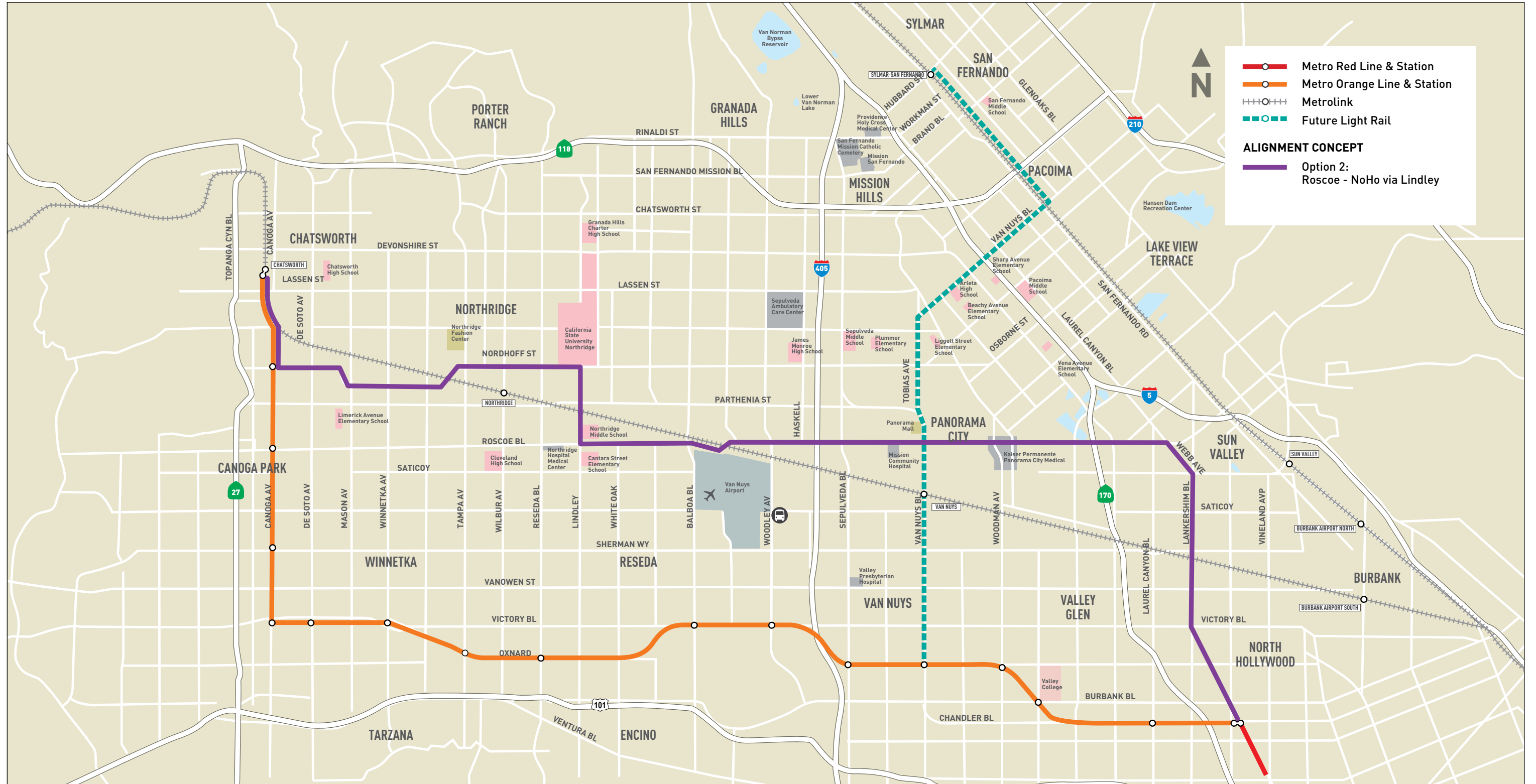


Figure ES-7: Alignment Option 3: Nordhoff - Sylmar/San Fernando

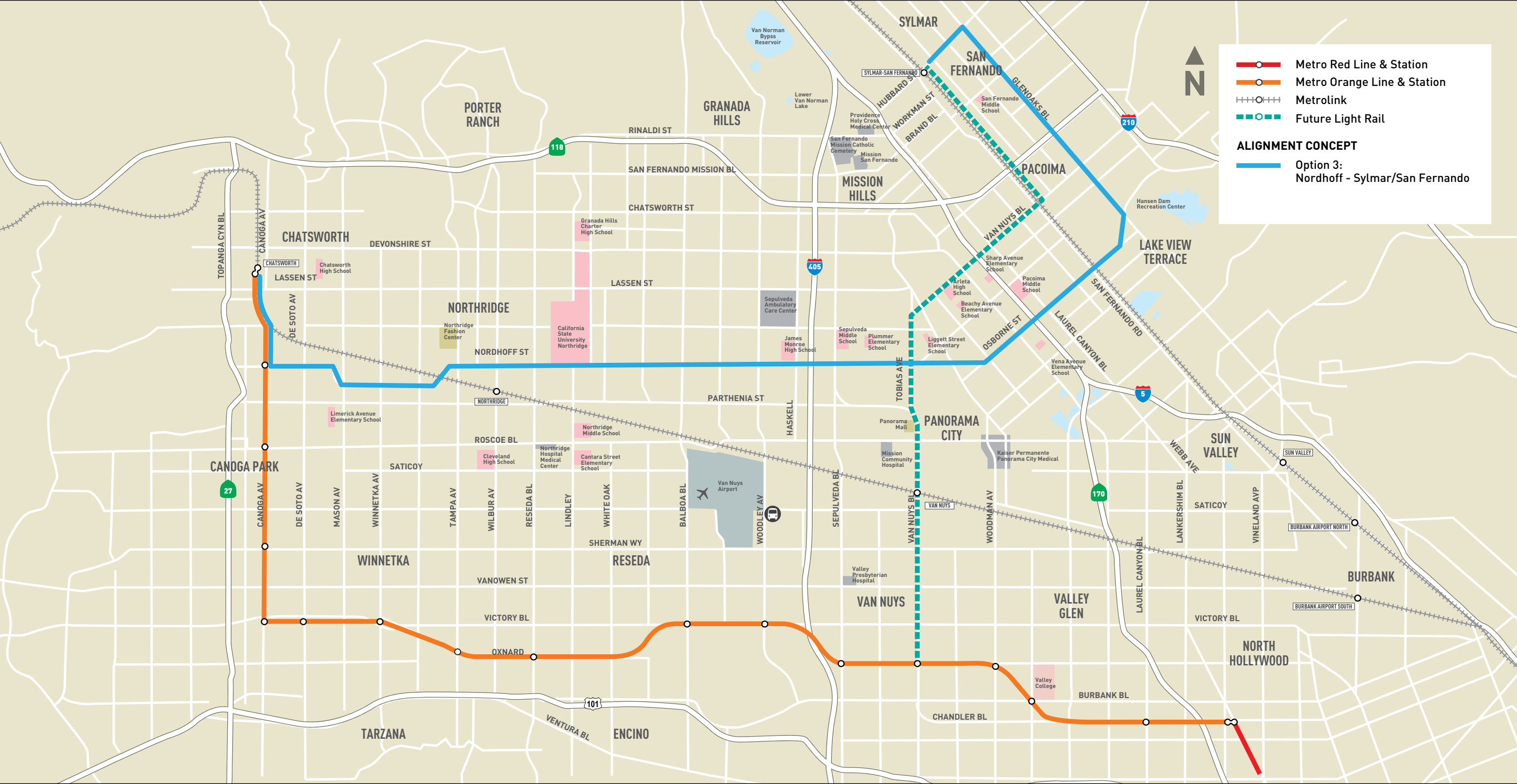


Figure ES-8: Alignment Option 4: Nordhoff - NoHo via Woodley

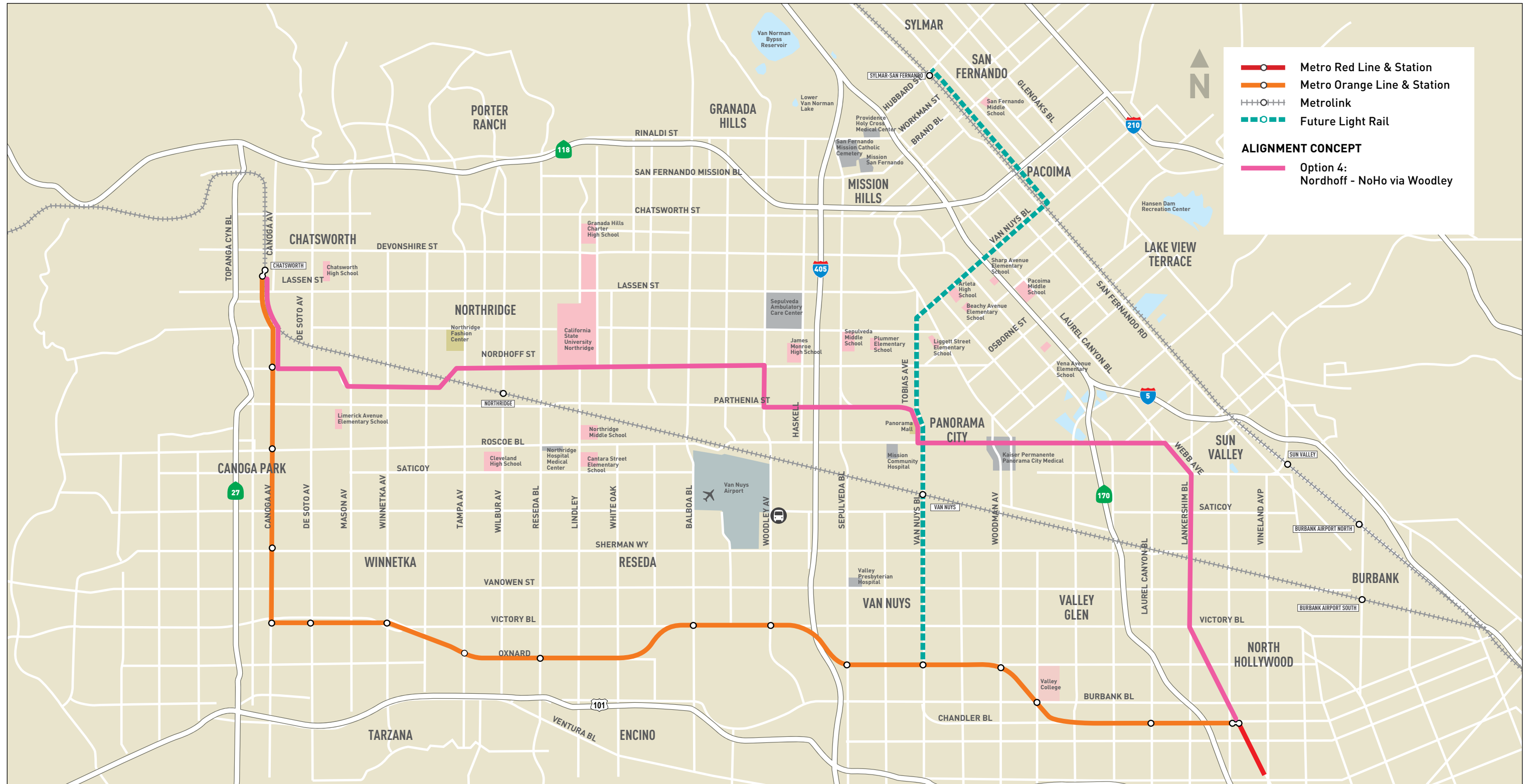


Figure ES-9: Alignment Option 5: Nordhoff - NoHo via Haskell

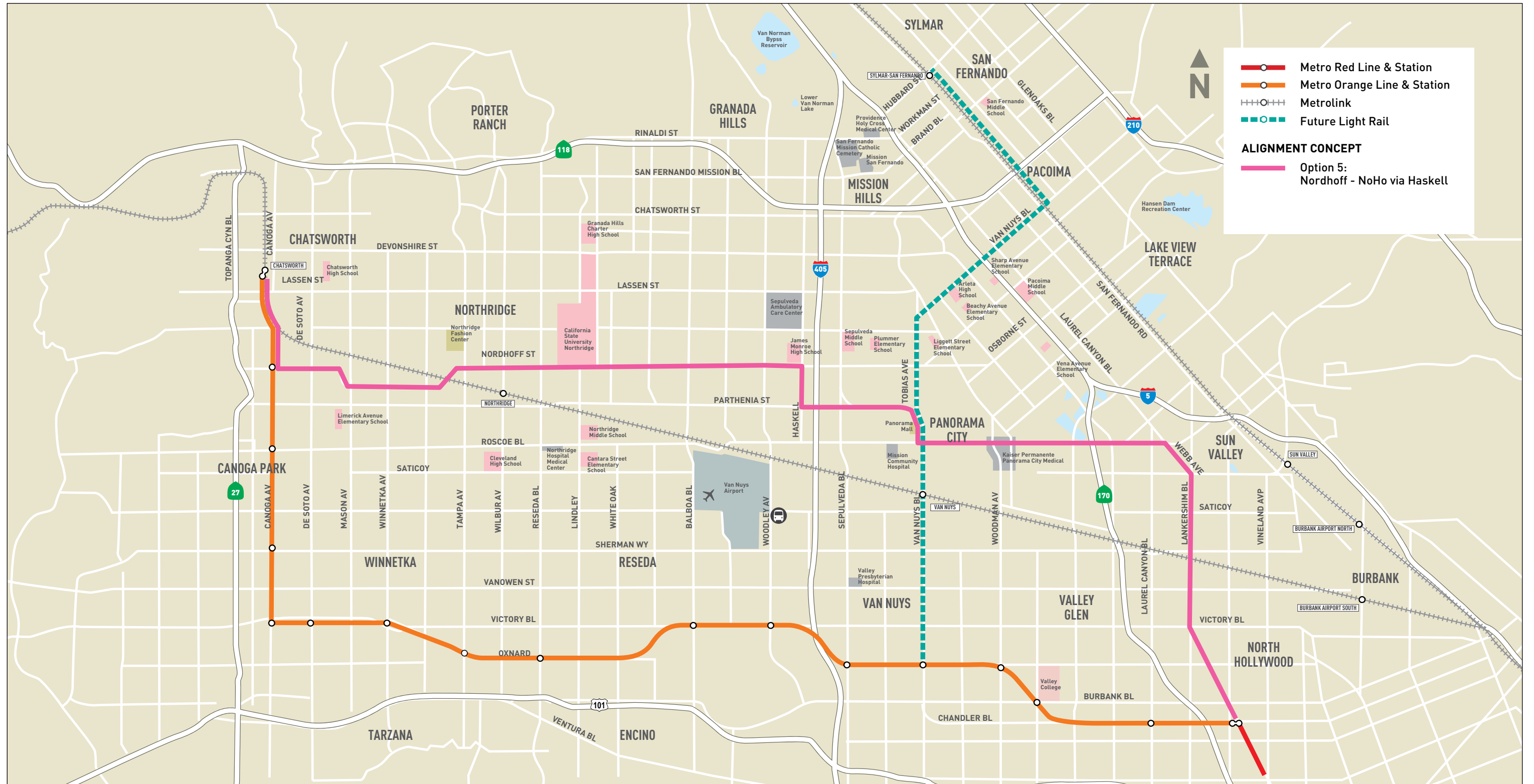


Figure ES-10: Alignment Option 6: Nordhoff - NoHo via Sepulveda

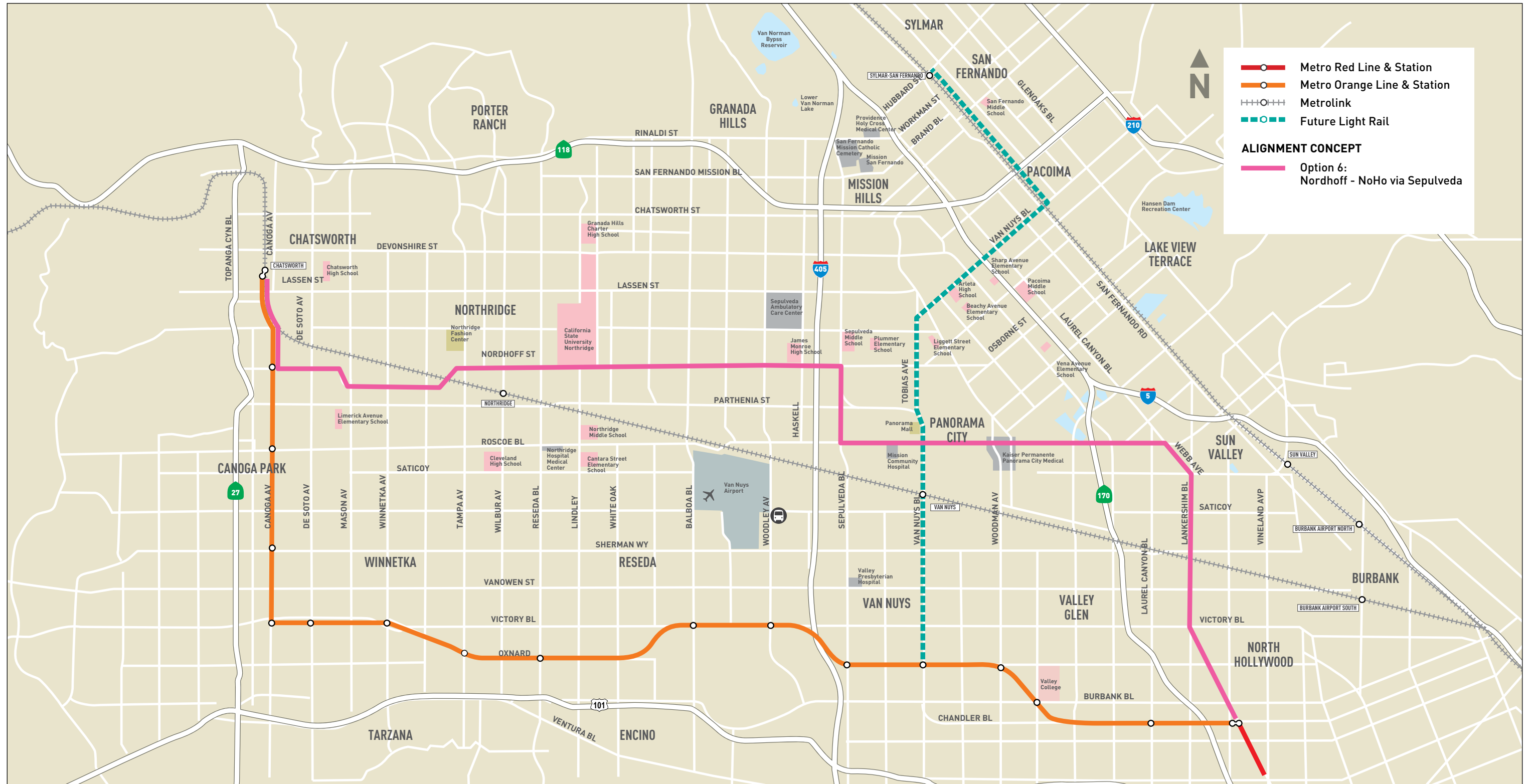
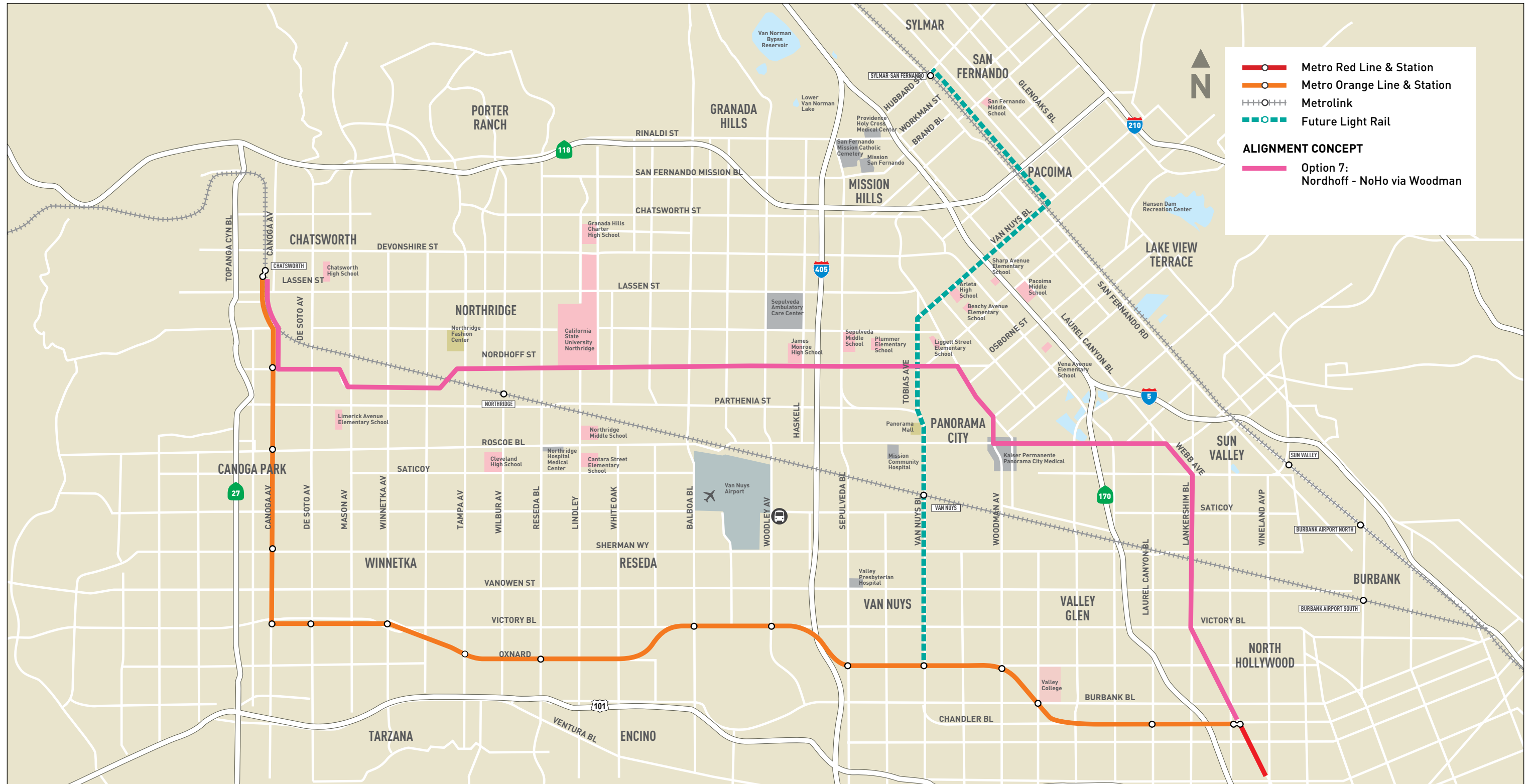


Figure ES-11: Alignment Option 7: Nordhoff - NoHo via Woodman



Public Outreach

Metro has initiated an outreach and public engagement strategy that is intended to engage and inform stakeholders through traditional and non-traditional outreach approaches that encourages them to provide input on the project. This process includes a wide range of opportunities for feedback that is designed to be transparent and inclusive. The outreach effort has also been guided by the Metro Equity Platform Framework adopted by the Metro Board in February 2018, ensuring outreach includes meaningful engagement with historically underserved communities. Since June 2018, the Metro team has met regularly with the local cities, key stakeholders, and the public within the project study area. By the conclusion of the pre-scoping meetings in November 2018, Metro held a total of 18 stakeholder meetings and five community meetings, with the goal of informing the public about the proposed project, gathering input, and hearing community issues, concerns and suggestions.



Northridge Community Meeting (September, 2018)

The following key takeaways were received from the public outreach process:

- **General Support for the Proposed Project:** Stakeholders and agencies generally agreed the project is needed to improve mobility in the North San Fernando Valley area and to enhance the regional transit network. There was near universal agreement that the Metro Orange Line is a great transit project. CSUN students and teachers reiterated a need for enhanced transit in north San Fernando Valley. Some attendees expressed a preference for light rail over buses and there was some opposition to bus-only lanes on the Lankershim Boulevard portion of the alternatives. The San Fernando Valley Council of Governments (SFV COG) unanimously passed an amendment to add the NSFV BRT Project to its 2019 Transportation Priorities list. CSUN is the largest stakeholder and travel generator in the study area, so the formal comment letter from CSUN President Diane Harrison expressing support for the project and the planning process was another demonstration of the greater San Fernando Valley community's support for the project.
- **Alignment Preferences:** More stakeholders supported the eastern terminus being the Metro North Hollywood Station rather than the Sylmar/San Fernando Metrolink Station. This was due to two reasons; (1) they liked the connection to the regional transit system and access to Downtown LA provided by the transfer opportunity to the Red Line, and (2) they felt that the ESFVTC provided a better connection to the Sylmar/San Fernando Metrolink station and a BRT alternative would be duplicative and competitive with the LRT route. The Parthenia option received support because it avoided the congested I-405 ramp intersections, is bordered by multi-family residential land uses, and has no existing

bus service. Several commenters suggested that a route further to the north be considered, citing Lassen, Plummer and Devonshire as potential alternatives. A number of commenters liked both the Roscoe and Nordhoff to North Hollywood alternatives.

- **Station Preferences:** There was a strong consensus that a station at CSUN should be located at Nordhoff and Lindley, in addition to a station at Nordhoff and Reseda, since it was closer to the center of campus. Other popular station locations included the Kaiser Permanente Medical Center on Roscoe, the Northridge Fashion Center, and the interface with the planned ESFVTC project on Van Nuys Boulevard.

Screening and Evaluation Summary

In order to determine which alternatives would be taken into environmental review, the technical team and Metro developed a three-step screening process that began with more qualitative information and became more quantitative through each step. Each step gradually applied more focused considerations to filter the alignment options down to the higher performing options and to identify the project corridor that is expected to perform at the highest levels according to the screening criteria. Figure ES-12 illustrates the way in which more quantitative and specific levels of analysis are applied during the screening process.

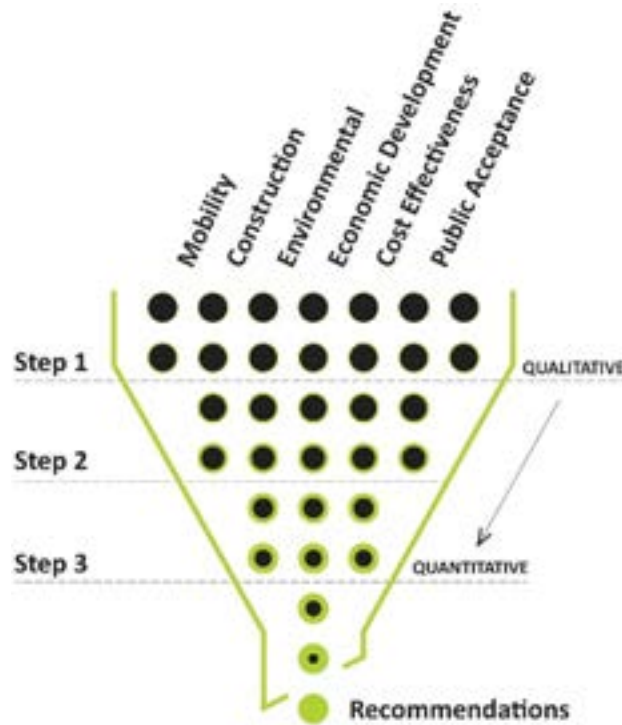


Figure ES-12: Screening Process

Quantification of performance is possible at this level of conceptual planning but it is important to note that the numbers are only for relative comparison purposes between the alternatives. At this high level, values such as ridership and costs lack precision which can only be generated as more detailed planning and engineering is performed.

Where appropriate, the report presents numbers but also uses a “high,” “medium,” and “low” rating system to help identify performance at each step. The use of a “high,” “medium,” and “low” rating system allows for a comparative analysis of the trade-offs between each alignment option’s ability to best meet the project purpose and need. Table ES.1 describes how the ratings were used.




Rating	Description
 HIGH	A high rating indicates the alternative highly supports and satisfies the criterion, or has a low potential for negative impacts.
 MEDIUM	A medium rating indicates the alternative moderately supports the criterion, or has a moderate potential for negative impacts.
 LOW	A low rating indicates that an alternative does not support or conflicts with the criterion, or has a high potential for negative impacts.

Table ES.1: Screening Rating Descriptions

There are six categories for evaluation, each having corresponding evaluation criteria that were developed to help screen the alternatives. The categories and evaluation criteria are reflective of the project objectives, and are listed below.



Mobility: This category evaluates how the alternative affects the ability of the BRT to move easily, reliably and quickly, as well as opportunities for bicycle and pedestrian connections, and potential changes to existing traffic.



Construction Impacts: This category primarily evaluates the extent of potential conflicts with existing infrastructure, right of way, and utilities.



Environmental Impacts: This category is a high level qualitative environmental assessment of the degree to which an alignment concept would introduce a potentially significant adverse environmental impact to the study area. The detailed environmental assessment will be addressed during the environmental analysis phase. This category also included CalEnviroScreen’s metric of environmental equity.



Economic Development Impacts: This category evaluates how the alternatives impact or benefit the economic well-being of the community, particularly as it relates to the overall connection to existing employment centers and key activity centers and the potential for transit oriented communities to thrive.



Cost Effectiveness: This category evaluates the costs associated with each alternative and comparison to other similar Metro transit projects.



Public Acceptance: This category considers the public and key stakeholder input as well as compatibility with local and regional plans.

Within these categories, high-level quantitative analysis in the categories of ridership modeling, operating scenarios, and cost estimates informed the screening process.

Ridership Modeling

Future NSFV BRT alignment concepts were modeled using the 2042 horizon year and the future-year baseline network that includes other corridor improvements within the regional transit network. The project team used the Metro Ridership Model to conduct the analysis presented in the AA Report and found that all of the BRT alignment options would increase overall transit ridership (as measured by total daily boardings), but Nordhoff-NoHo Options 4-7 performed the best in terms of ridership.

Potential Operating Plans and Service Characteristics

The potential operational characteristics for the alignment concepts were determined based on the passenger load patterns that were found in the ridership estimates. The conceptual BRT service plan assumed peak headways of:

- 5 minutes during the AM and PM peak
- 10 to 15 minutes during midday and early evening
- 20 minutes during the evening and night
- 30 minutes in the early morning on weekends

Operating hours were based on the Metro Red Line, with 21 hours per day (4 AM to 1 AM) Sunday through Thursday and longer hours (4 AM to 3 AM) on Fridays and Saturdays.

Regardless of alignment option, the peak hour load analysis consistently showed that by far the heaviest passenger loads occur between Reseda Boulevard and Van Nuys Boulevard. The next heaviest passenger loads are on Roscoe Boulevard in the segment east of Van Nuys Boulevard, followed by the Chatsworth to Reseda Blvd segment on Nordhoff Street. The alternatives generally demonstrated a similar peak hour passenger load profile.

Preliminary Operating and Maintenance Cost Estimates

The operating statistics and ridership estimates were used to help develop operating and maintenance (O&M) cost estimates for the NSFV BRT project. The O&M costs were developed using operating statistics which included annual revenue hours, annual revenue miles, peak vehicles, total vehicles, station platforms, directional lane miles, and maintenance facility needs. Using these statistics, O&M cost models were developed to estimate the annual cost to operate, maintain and administer the NSFV BRT. O&M costs for BRT service for all alignment options is estimated at \$22 to \$23 million annually.

Preliminary Capital Cost Estimates

The NSFV BRT project is in conceptual planning and important decisions on project features have not yet been finalized to develop fully refined cost estimates. At this early stage of design, the conceptual cost estimate takes a parametric approach, and incorporates additional unit cost details as available. The cost estimates produced during this phase are intended to inform initial decision-making and the alternatives screening process. Capital costs ranged from \$265 million to \$280 million in 2019\$, and \$396 million to \$418 million in year of expenditure dollars (YOES), with contingencies included to cover specific cost items that have yet to be fully developed.

The Nordhoff-NoHo and Roscoe-NoHo alignment options are similar in alignment length (17.7 to 18.0 miles) and potential station numbers (20 to 21 stations), therefore both have similar costs.

While similar in route length (17.6 miles) to the other options, the Nordhoff-Sylmar/San Fernando alignment option has the fewest number of station locations (17 stations) and therefore has the lowest projected capital cost.

The results of the Step 1 screening process are presented in Table ES.2. During the first step in the screening process, Option 3: Nordhoff-Sylmar/San Fernando was eliminated due to low scores in the mobility and economic development category, and a medium score in public acceptance.

Step 1 Screening Results

Evaluation Category	Rating						
	STEP 1 SCREENING						
Alignment Option	1	2	3	4	5	6	7
Mobility							
Environmental Impacts							
Economic Development Impacts							
Cost Effectiveness							
Public Acceptance							
Recommended for further evaluation	Y	Y	N	Y	Y	Y	Y

Table ES.2: Step 1 Screening Results Summary

The greatest difference between Option 3 and the other alignment options is its lower system connectivity due to a lack of connection to North Hollywood. The poor scores can also be attributed to low ridership potential, a duplication of service with the future ESFVTC, and a public preference for the North Hollywood terminus over the Sylmar/San Fernando terminus.

In the second screening step, Options 1 and 2 (those which operate primarily along Roscoe Boulevard) were eliminated for their low scores in mobility. They underperformed in this category because of lower ridership, slower bus speeds, increased travel time, and reduced travel time savings due to ramps at Interstate 405. Both Options 1 and 2 incurred an additional travel time penalty due to an at-grade railroad crossing on Roscoe Boulevard, and Option 2 would encounter an additional at-grade railroad crossing on Lindley Avenue. Option 1 in particular received a lower score in the public acceptance category because it would not directly service the CSUN campus. The results of the Step 2 screening are summarized in Table ES.3.

Step 2 Screening Results

Evaluation Category	Rating						
	1	2	3	4	5	6	7
STEP 2 SCREENING							
Alignment Option	1	2		4	5	6	7
Mobility							
Construction Impacts							
Environmental Impacts							
Economic Development Impacts							
Cost Effectiveness							
Public Acceptance							
Recommended for further evaluation	N	N		Y	Y	Y	Y

Table ES.3: Step 2 Screening Results Summary

Step 3 Screening Results

Evaluation Category	Rating				
	STEP 3 SCREENING				
Alignment Option					
		4	5	6	7
Mobility					
Construction Impacts					
Environmental Impacts					
Economic Development Impacts					
Cost Effectiveness					
Public Acceptance					
Recommended for further evaluation		Y	Y	Y	N

Table ES.4: Step 3 Screening Results Summary

In the third and final screening step, which is illustrated in Table ES.4, Option 7: Nordhoff-NoHo via Woodman was eliminated. All of the Nordhoff-NoHo alternatives ranked similarly in several categories such as construction impacts, environmental impacts, and cost effectiveness, but Option 7 received lower scores in the greatest number of categories.

Option 7 does not directly serve the more densely-developed areas of Panorama City as was indicated through the community outreach process. This option also has the potential to need more extensive physical infrastructure reconstruction on segments of Nordhoff Street and Woodman Avenue.

Proposed Project

Based on the three step screening process, Option 4: Nordhoff-NoHo via Woodley, Option 5: Nordhoff-NoHo via Haskell, and Option 6: Nordhoff- NoHo via Sepulveda are the three alignment options that best meet the project objectives and are recommended for advancement into environmental review.

The Nordhoff-NoHo via Woodley alignment (Option 4) has higher ridership projections, avoids potential peak hour congestion from freeway on/off ramps and railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area.

The Nordhoff-NoHo via Haskell alignment (Option 5) has higher ridership projections, avoids potential peak hour congestion from freeway on/off ramps and railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area.

The Nordhoff-NoHo via Sepulveda alignment (Option 6) also benefits from higher ridership projections, avoids railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area. While this option does cross the I-405 freeway ramps, the end-to-end travel times are reasonably comparable to the Nordhoff-NoHo via Woodley & Haskell options that avoid the freeway ramps.

High-level ridership and cost projections for these options are summarized in Table ES.5. Forecast boarding data refers to Year 2042 average weekday boardings for the NSFV BRT service.

ALIGNMENT OPTIONS	TOTAL DAILY BOARDINGS (2042)	NEW TRANSIT TRIPS (2042)	CAPITAL COSTS (\$YOE)	ANNUAL OPERATING COST
Option 4: Nordhoff-NoHo via Woodley	28,652	13,566	\$298M - \$413M	\$22M - \$23M
Option 5: Nordhoff-NoHo via Haskell	28,120	12,709	\$297M - \$413M	\$22M - \$23M
Option 6: Nordhoff-NoHo via Sepulveda	27,461	11,717	\$300M - \$417M	\$22M - \$23M

Table ES.5: Recommended Options Ridership and Cost Projections

It is important to note that further conceptual engineering will be developed during the environmental assessment. These efforts will result in refinements to the project alternatives that are carried forward. As such, the characteristics of the alternatives will evolve with respect to ridership potential, and cost estimates. Revised estimates will be provided in future technical materials as the engineering designs are advanced.

Design Variations

Following technical study and community input, several specific design variations were developed for further consideration and evaluation in the environmental analysis phase, as illustrated in Figure ES-13. The design variations are highlighted as potential route modifications that could be considered during the environmental phase of the project to improve bus operations or offer an alternative route to constrained corridors that might not easily accommodate some of the desired features of a BRT service. The design variations generally offer similar project benefits, but may allow reduced capital costs, operating costs, and/or environmental impacts. Studying the variations also preserves flexibility to respond to community feedback during the environmental phase or to overcome potential engineering constraints. The design variations considered were:

- **De Soto-Lassen:** This design variation is included should the project require an alternative to running on the Orange Line busway on the western end of the project study area adjacent to the Chatsworth Station. The variation would run east-west along Lassen Street and north-south along De Soto Avenue to reach Nordhoff Street.
- **Tobias Avenue:** This design variation is between Parthenia Street and Roscoe Boulevard and offers an alternative route to staying on Parthenia Street/Van Nuys Boulevard. The future ESFVTC will operate at-grade on Van Nuys Boulevard, limiting available right-of-way for dedicated BRT lanes and likely resulting in the need for mixed-flow BRT operations on this portion of the corridor. In addition, as Van Nuys Boulevard is a heavily traveled corridor, there could be potential operational constraints for the BRT. Therefore, Tobias Avenue (located approximately 870 feet west of Van Nuys Boulevard) is highlighted as a potential design variation to be considered during the environmental phase of work when detailed engineering and operational analysis take place. This variation would also give the project more direct access to new mixed-use development planned on Tobias Avenue.
- **Laurel Canyon-MOL/Chandler:** This design variation runs parallel to and west of Lankershim Boulevard from Roscoe Boulevard to Chandler Boulevard, where the BRT could then join the Metro Orange Line BRT guideway or a parallel local road to access the Metro North Hollywood Station. This potential design variation was identified as a viable alternative route to Lankershim Boulevard as it offers a similar roadway configuration and lane widths. Due to its length, a preliminary look at the Laurel Canyon corridor was conducted during the AA process. The analysis supported the recommendation of Laurel Canyon for further study during the environmental phase and can be found in the Supplemental Analysis Technical Memorandum.

Within each alignment option, additional variations with regard to horizontal configuration (center-running, side-running, combination center-/side-running, or mixed-flow), design variations to improve operations, and other design intricacies, will be studied further as the NSFV BRT project moves into environmental assessment.

Next Steps

Based on all the parameters examined in the Alternatives Analysis, the three highest-performing alignment options under consideration were combined into the Proposed Project map shown in Figure ES-13. The Proposed Project map illustrates the path of the project and each of the potential design variations traveling between the Chatsworth Metro Orange Line/Metrolink Station and the Metro North Hollywood Station. Potential station locations are also identified on the map to highlight locations under consideration for further analysis. These locations will be assessed in detail in the environmental analysis phase to test their performance and impact on accessibility, operations and costs.

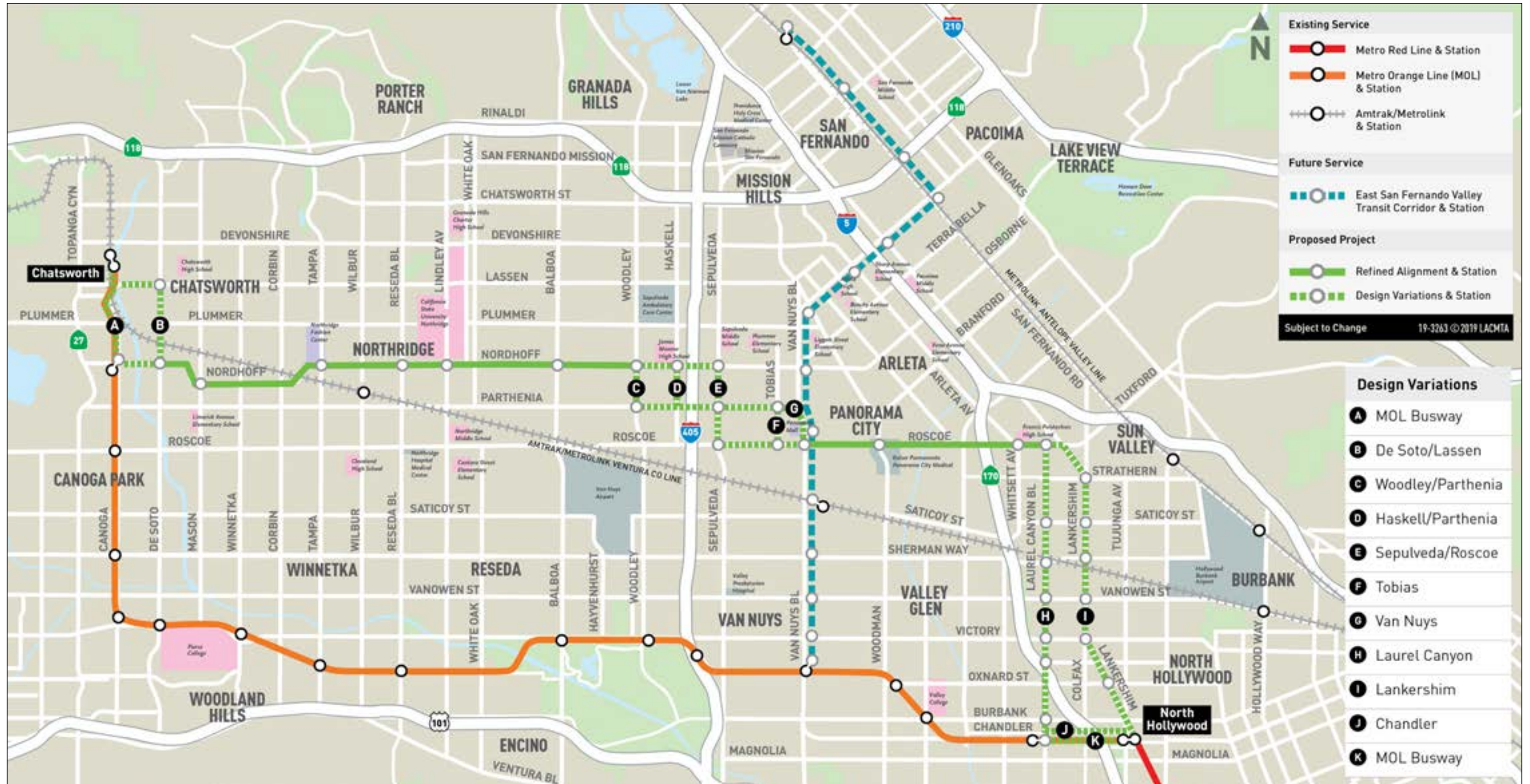
Design variations are labeled “A” through “K,” and include the Metro Orange Line Busway (adjacent to Chatsworth), De Soto/Lassen, Woodley/Parthenia, Haskell/Parthenia, Sepulveda/Roscoe, Tobias, Van Nuys, Laurel Canyon, Lankershim, Chandler, and the Metro Orange Line Busway (adjacent to North Hollywood). The design variations will be considered in further detail in subsequent phases to identify the strongest performers.

Following conclusion of the Alternatives Analysis phase, a Notice of Preparation (NOP) is issued signifying the start of the Public Scoping period for the CEQA environmental review process. The Environmental Analysis will examine the potential benefits and impacts associated with each route under consideration and identify the preferred BRT alignment for engineering design. Construction is currently planned to begin in 2022 to meet an opening date in 2025.



Project Timeline

Figure ES-13: North San Fernando Valley BRT Corridor Proposed Project



1 Introduction

1.1 Study Background

The North San Fernando Valley (NSFV) Bus Rapid Transit (BRT) Corridor Project is identified and funded by Measure M, a half-cent transportation funding sales tax measure approved by Los Angeles County residents in November 2016. The Metro Board of Directors gave approval to initiate a technical study preceding environmental review for this project in March 2017. This technical study was completed in September 2017 with the publication of the NSFV BRT Improvements Environmental Framework Report. The Metro Board of Directors authorized the North San Fernando Valley Bus Rapid Transit Corridor Project in May 2018. Per Measure M, the project is expected to open between Fiscal Years 2023 and 2025.

The intent of the Alternatives Analysis (AA) is to enable Metro and City stakeholders to evaluate a range of alternatives for a bus rapid transit service in the proposed project study area. The goal of the NSFV BRT project is to provide a high-capacity premium east-west transit service that will connect key activity centers and the regional transit system in the North San Fernando Valley. The AA study includes detailed planning, conceptual engineering, ridership forecasting, community and stakeholder input, and opportunities to support Transit Oriented Communities and First/Last Mile improvements.

1.2 Study Area

The project study area is in the North San Fernando Valley and includes the City of Los Angeles neighborhoods of Chatsworth, Northridge, North Hills, Panorama City, Sun Valley, Pacoima, Sylmar, North Hollywood, and the City of San Fernando. The study area is approximately 18 miles in length and is bounded by Devonshire Street and Polk Street to the north, Strathern Street and Magnolia Boulevard to the south, Glenoaks Boulevard and Tujunga Ave to the east, and Canoga Avenue, Laurel Canyon Boulevard, and SR-170 to the west. Several interregional freeways cross the study area including the San Diego Freeway (I-405), the Golden State Freeway (I-5), and the Hollywood Freeway (SR-170).

There are three major transit corridors that serve regional trips in the study area: the Metro Orange Line (MOL), the Metro Red Line, the Metrolink Ventura County Line and Amtrak service, and the Metrolink Antelope Valley Line. Future major transit corridors that transverse and border the study area include the East San Fernando Valley Rail Transit Corridor (ESFVTC), North Hollywood to Pasadena Bus Rapid Transit Corridor, and the Sepulveda Transit Corridor. The project study area is illustrated in Figure 1-1.

Figure 1-1: Project Study Area



1.3 Report Purpose and Structure

An Alternatives Analysis is the first step of a process that is required to complete the planning, environmental assessment, design and construction of a transit project. The AA Report begins with the Purpose and Need in Section 2. The Purpose and Need analyzes the existing transportation conditions and the travel markets within the Project Study Area and details a range of project objectives designed to address specific mobility problems. The Project Context is described in Section 3, including the key street network and existing demographic conditions. Section 4 defines the Alternatives Considered, and summarizes the key characteristics, including service plans, preliminary ridership estimates, and cost estimates. Section 5 discusses the public outreach and stakeholder briefings. Screening, a three-step process discussed in Section 6, examines the constraints of the alternatives and compares performance between alternatives. The purpose of the screening process is to narrow down the number of alternatives that are ultimately advanced to environmental review, the next phase in project development. Section 7 identifies the proposed project and describes which alternatives will be carried forward to be studied in detail based on the screening process.



Project Development Process

2 Purpose and Need

The purpose of the project is to provide a premium east-west transit service to link key activity centers and improve access to jobs, education, essential services and the regional transit system. This section details the project goal, purpose and need, and project objectives.

2.1 Project Goal

The key challenge for the NSFV BRT is to design a premium transit service that offers outstanding trip experiences and improves regional connectivity while operating within existing right-of-way on local streets and roads.

Metro operates a large and varied transit network in the San Fernando Valley, and is advancing the planning and construction of an extensive transit network to provide high-quality mobility options to further enhance communities and lives. The project study area shown in a regional context is provided in Figure 2-1. The NSFV BRT Project is part of Metro’s network expansion, and will close a significant gap in the frequent transit network in the San Fernando Valley (the Valley), which is shown in Figure 2-2.

Projects including the East San Fernando Valley Rail Transit Corridor (ESFV light rail), Metro Orange Line Improvements, North Hollywood to Pasadena BRT, and the Sepulveda Transit Corridor projects, together with this project, will provide a world-class transportation system that meets Metro’s Vision 2028 goals. Metro’s Valley transit expansion plan is shown in Figure 2-3.

Frequent bus rapid transit service will enable people to spend less time traveling and will work to address equity goals by connecting Valley residents and visitors with education and employment. The NSFV BRT Project will provide an opportunity for local jurisdictions to partner with Metro to advance first/last mile planning, green/sustainable infrastructure, active transportation, and urban design along the corridor.



Metro Vision 2028 Goals

Figure 2-1: Regional Context Map of Study Area and Regional Transit Network

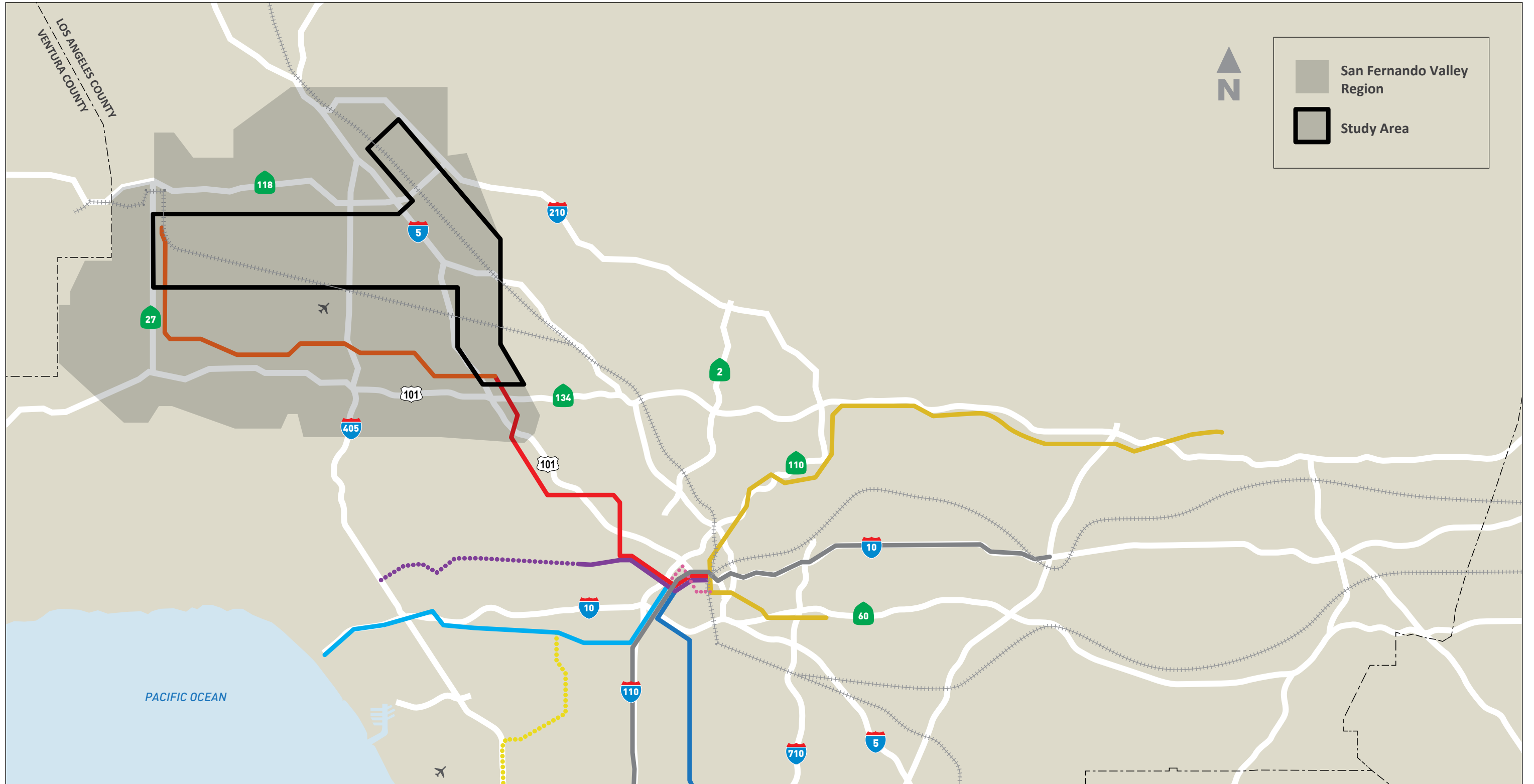
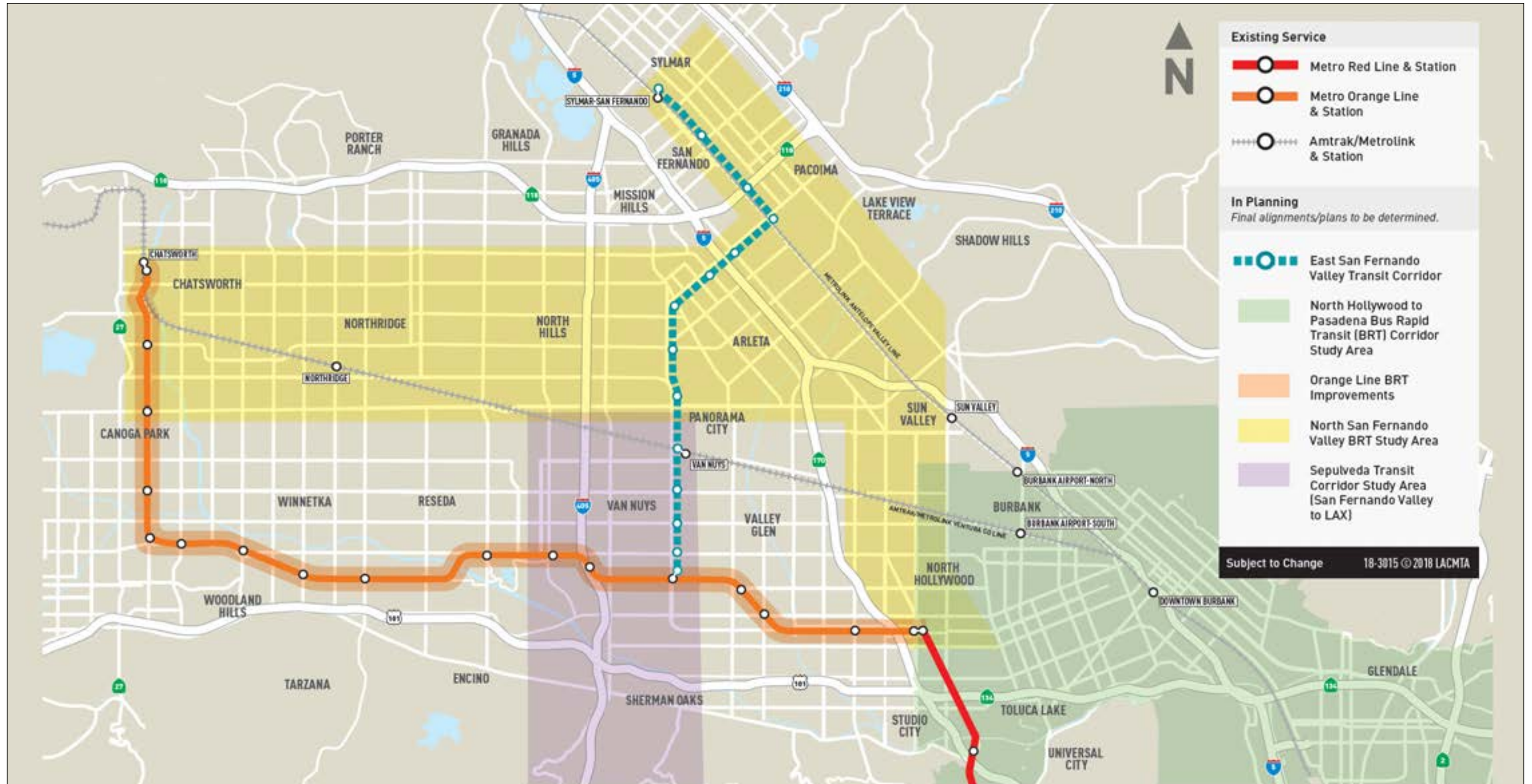


Figure 2-2: Frequent Transit Service Network



Figure 2-3: Measure M Transit Projects in the San Fernando Valley (source: Metro)



2.2 Purpose and Need

To identify project objectives, the technical team performed an analysis of demographic, socioeconomic, and mobility data within the study area, and reviewed policy and planning documents from Metro and local jurisdictions. These objectives were presented to the public in a round of community meetings and were reviewed by the Technical Working Group in December 2018. The project objectives are listed below, and related purpose and needs are explained in detail in the sections that follow.

1. Improve transit accessibility and connectivity to major activity centers, employment sites, as well as the existing and planned regional transit system.
2. Design comfortable, convenient, and reliable rapid transit service that enables people to spend less time traveling.
3. Provide equitable access opportunities to benefit communities through urban design, transit-oriented communities, and green/sustainable infrastructure.
4. Design an improved transit service that complements Metro's network and improves accessibility and sustainability.

2.3 Project Objectives Overview

Objective 1: Improve transit accessibility and connectivity to major activity centers, employment sites, as well as the existing and planned regional transit system.

Key activity centers within the North San Fernando Valley area include CSUN, the Northridge Fashion Center, Panorama Mall, Kaiser Permanente Panorama City Medical Center, Northridge Hospital Medical Center, Mission Community Hospital, Sepulveda VA Ambulatory Care Center, Chatsworth Orange Line/Metrolink Station, Sylmar/San Fernando Metrolink Station, and the Metro Red/Orange Line North Hollywood Station.

As highlighted in Figure 2-4, higher employment densities are found at the western end of the project study area in the large industrial, distribution, and manufacturing districts in Chatsworth, along Nordhoff Street between Wilbur Avenue and Lindley Avenue, centrally in the Panorama City neighborhood, and to the southeast in North Hollywood. Although the project area contains mostly single family residential neighborhoods, it is more densely populated in the Panorama City neighborhood, in the southeastern area along Lankershim Boulevard, and to the northeast along Van Nuys Boulevard as illustrated in Figure 2-5.

Future transit service expansion in the area includes the East San Fernando Valley Rail Transit Corridor, North Hollywood to Pasadena BRT, and the Sepulveda Transit Corridor. These projects are shown in the Measure M Projects Map in Figure 2-3. Connections to these projects would help expand Metro's regional transit system and overall transit reach.

Figure 2-4: Gross Employment Density (Jobs/Acre)

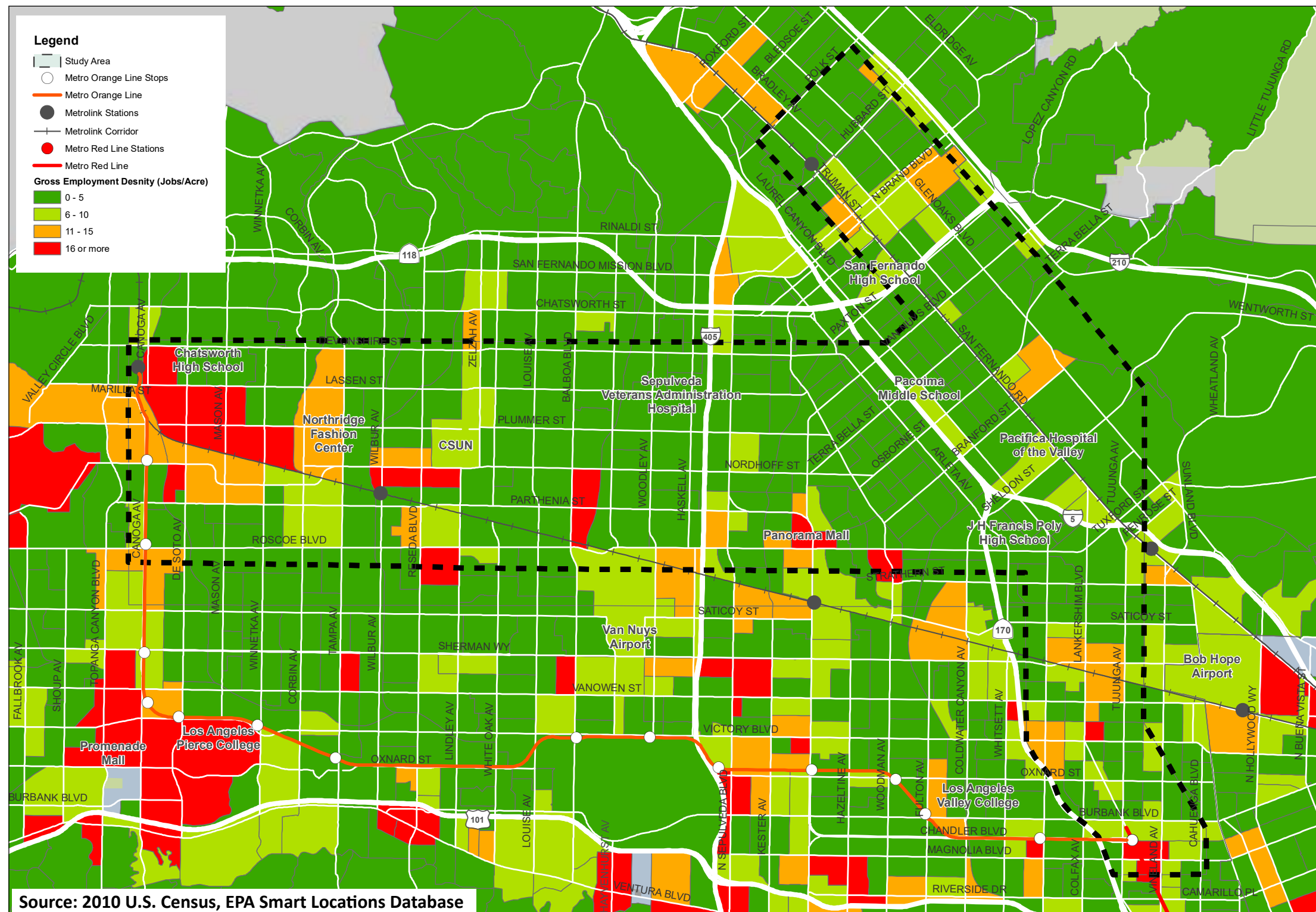
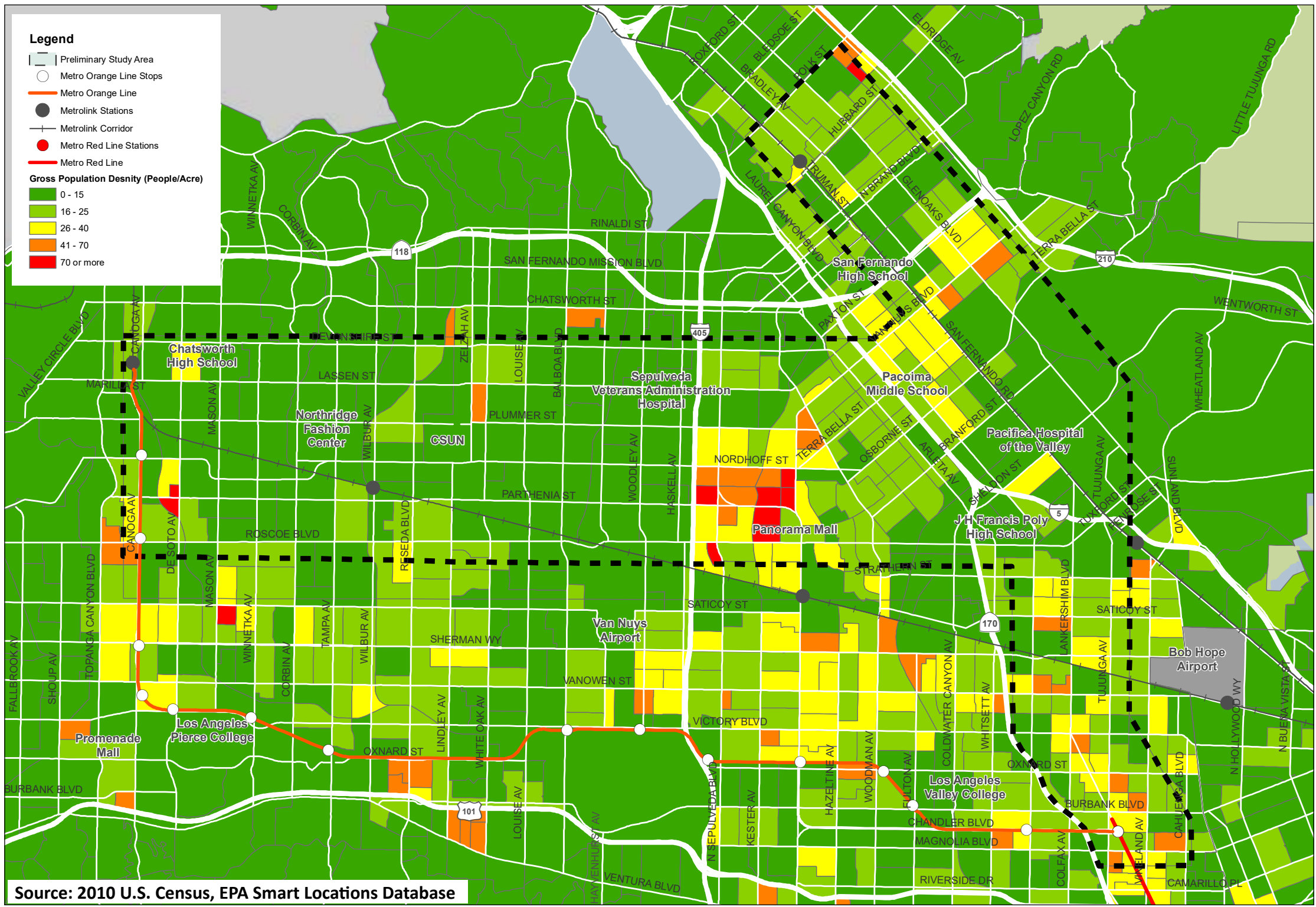


Figure 2-5: Gross Population Density (People/Acre)



Objective 2: Design comfortable, convenient, and reliable rapid transit service that enables people to spend less time traveling.

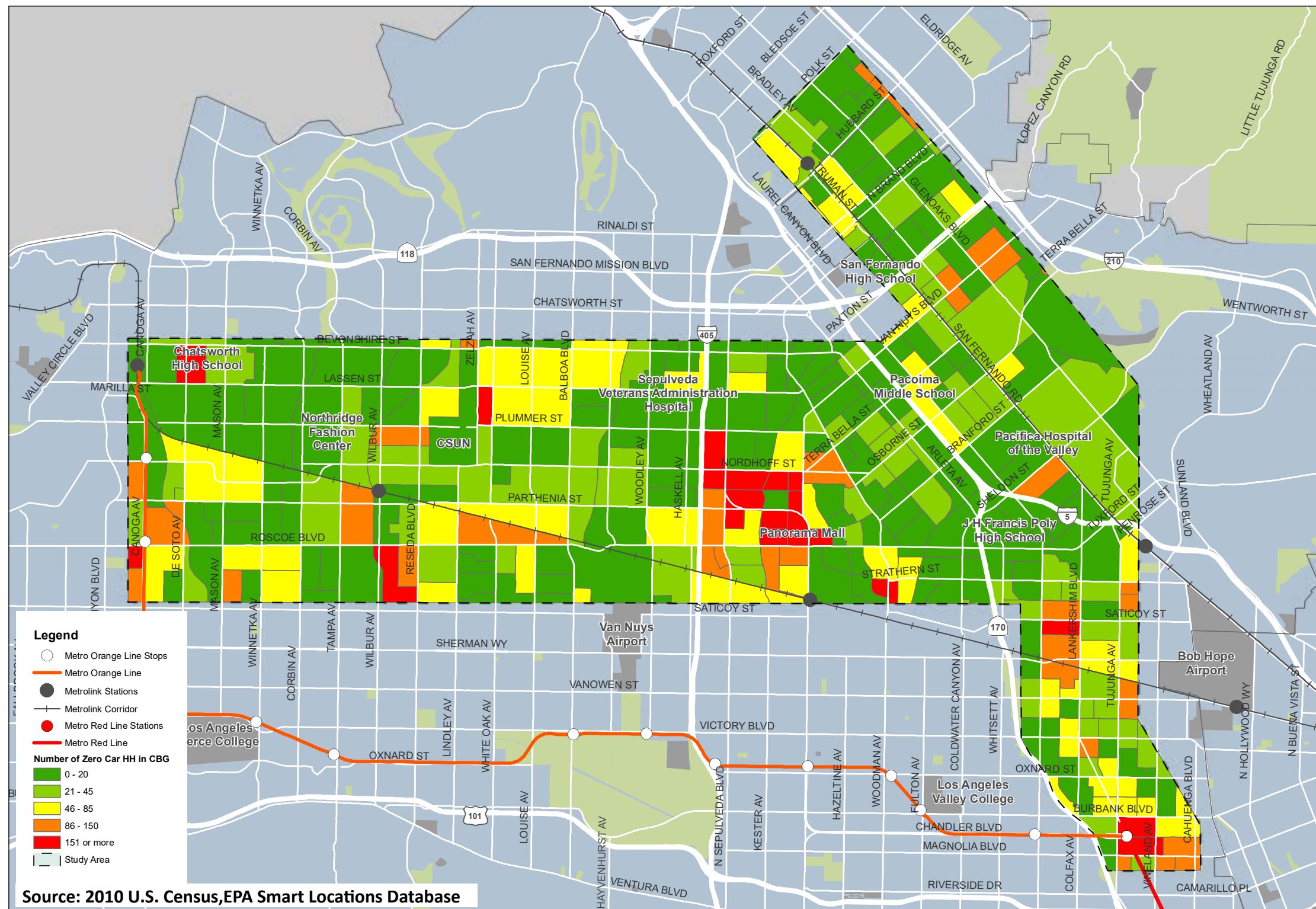
According to the 2010 U.S. Census, approximately 8% of households, or 15,519 households, within the study area do not own a private vehicle. In comparison, according to the U.S. Census American Fact Finder, in 2016, 9.5% of households in Los Angeles County do not own a private vehicle. These results indicate that although a significant number of households do not own a private vehicle, the majority of households within the study area have access to a car. Concentrations of zero car households in the study area are shown graphically in Figure 2-6.

Results from the 2017 NSFV BRT Environmental Framework Report found that the study area experiences high levels of traffic volumes. Per the Environmental Framework Report, approximately 700,000 daily trips end in the study area. Large trip generators in the area include CSUN, Kaiser Permanente, the VA Sepulveda Ambulatory Care Center, multiple large malls and other major retail outlets. Shifting travel behavior to alternative modes of transportation, such as transit, will help address the mobility needs of area residents and visitors by providing an alternative to single-occupancy vehicle trips.

Within the North San Fernando Valley, existing transit service is operated by Metro, LADOT, Antelope Valley Transit Authority, Santa Clarita Transit, Burbank Bus, and Metrolink. Metro operates several north-south running Rapid routes which operate with fewer stops for potentially faster transit service. However, the only transit routes running east-west are local bus lines, which operate at lower speeds and have more frequent stops. Existing transit service in the study area is illustrated in Figure 2-7.

As shown in Figure 2-2, only two frequent service transit routes (operating every 30 minutes or better 18 hours per day on weekdays and 12 hours per day on weekends) run through the project study area. In order to make transit a more competitive and viable option to driving, improvements to travel times, service reliability, and passenger comfort should be considered.

Figure 2-6: Number of Zero Car Households



Objective 3: Provide equitable access opportunities to benefit communities through urban design, transit-oriented communities, and green/sustainable infrastructure.

Transit Oriented Communities (TOCs) are places, such as corridors and neighborhoods that, by their design, allow people to drive less and access transit more. A TOC maximizes equitable access to a multi-modal transit network as a key organizing principle of land use and holistic community development. Because Metro is responsible for planning, constructing, and operating transit service, and local jurisdictions are responsible for land use policies and design and maintenance of the public realm, the TOC activities for the project are focused primarily on:

- Identifying the existing land uses and planned developments that will support sufficient ridership for the alignment of BRT and the placement of stations.
- Utilizing the expansion of BRT to support smart growth and placemaking opportunities at key points in pursuit of more sustainable, equitable, and multimodal communities.
- Increasing access to employment, educational, and leisure opportunities for Valley residents, while making it easier for visitors to access the area without a car.

In 2018, Metro adopted an Equity Platform, a four-pillar approach to addressing fundamental differences in access to opportunity. Two of these pillars in particular - 1. Define and Measure, and 2. Listen and Learn - are best accomplished at the project level. As the Equity Platform is further developed, the technical team will incorporate agency guidance on the topic into the project.

Figure 2-8 illustrates the number of households in poverty, and Figure 2-9 shows the CalEnviroScreen, a measure of environmental justice results. The Consideration of CalEnviroScreen is incorporated into TOC deliverables, and outreach and stakeholder meetings during the environmental clearance phase of the project will present opportunities to incorporate local knowledge received from community input.

Figure 2-8: Number of Households in Poverty

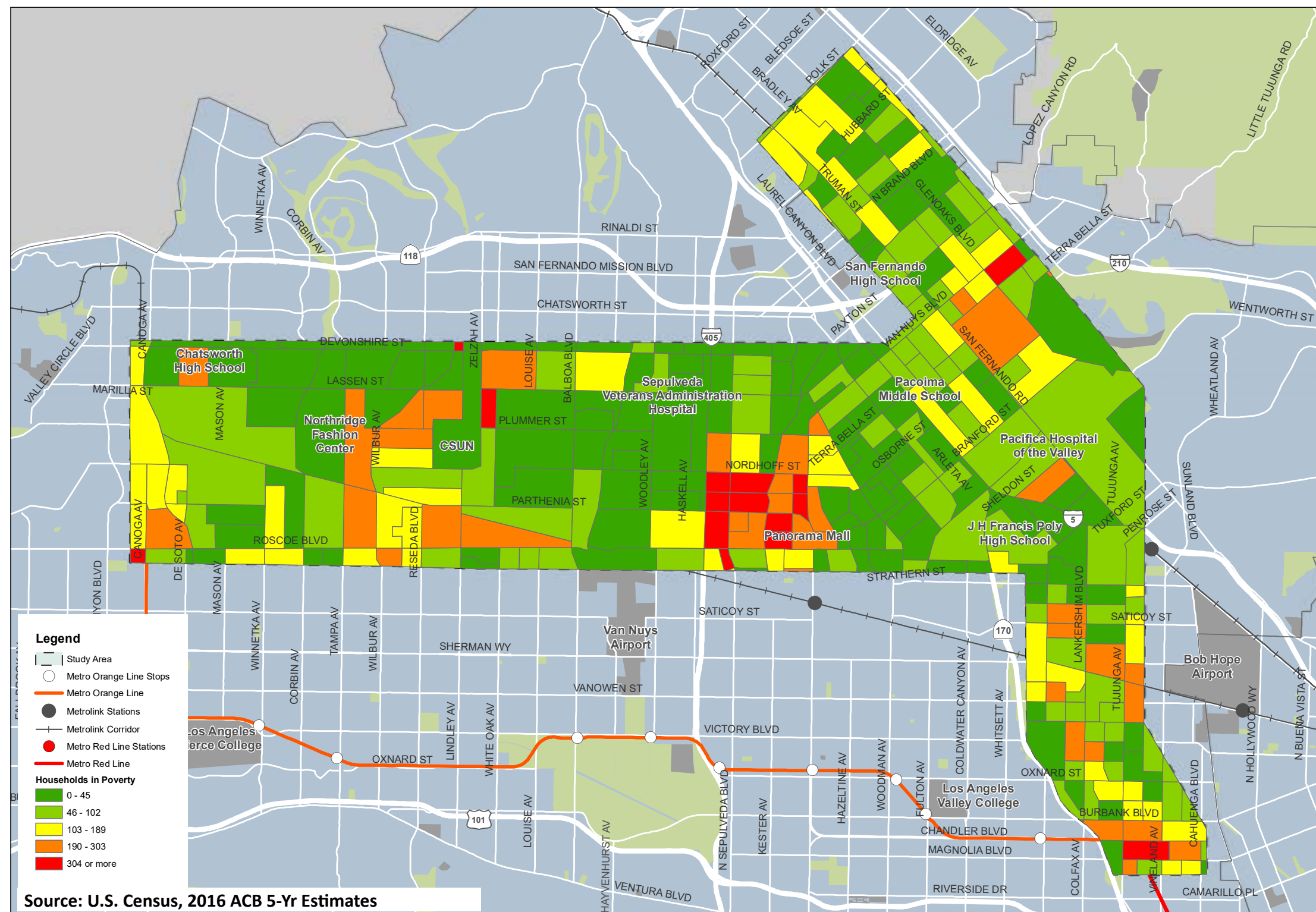
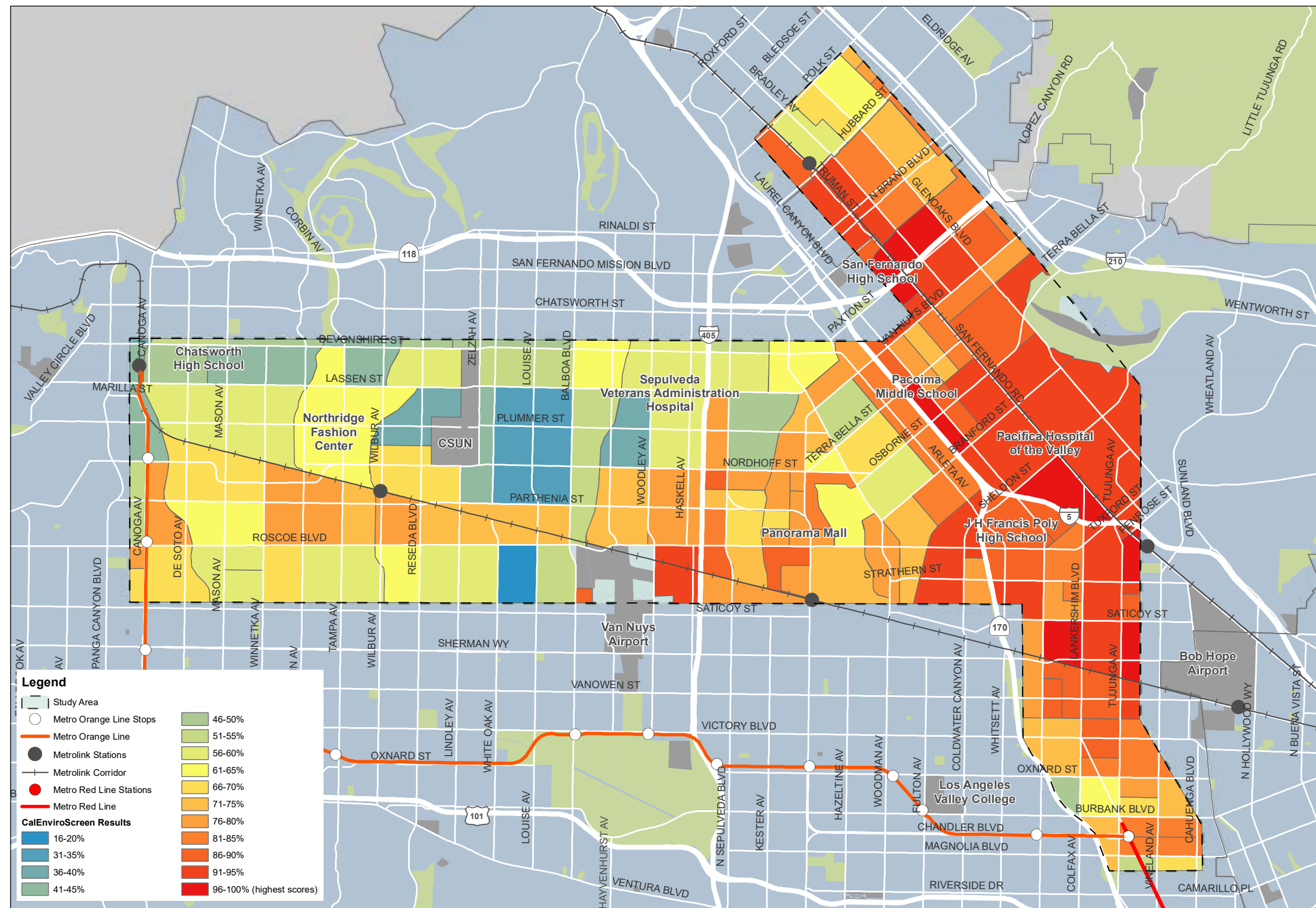


Figure 2-9: CalEnviroScreen Results



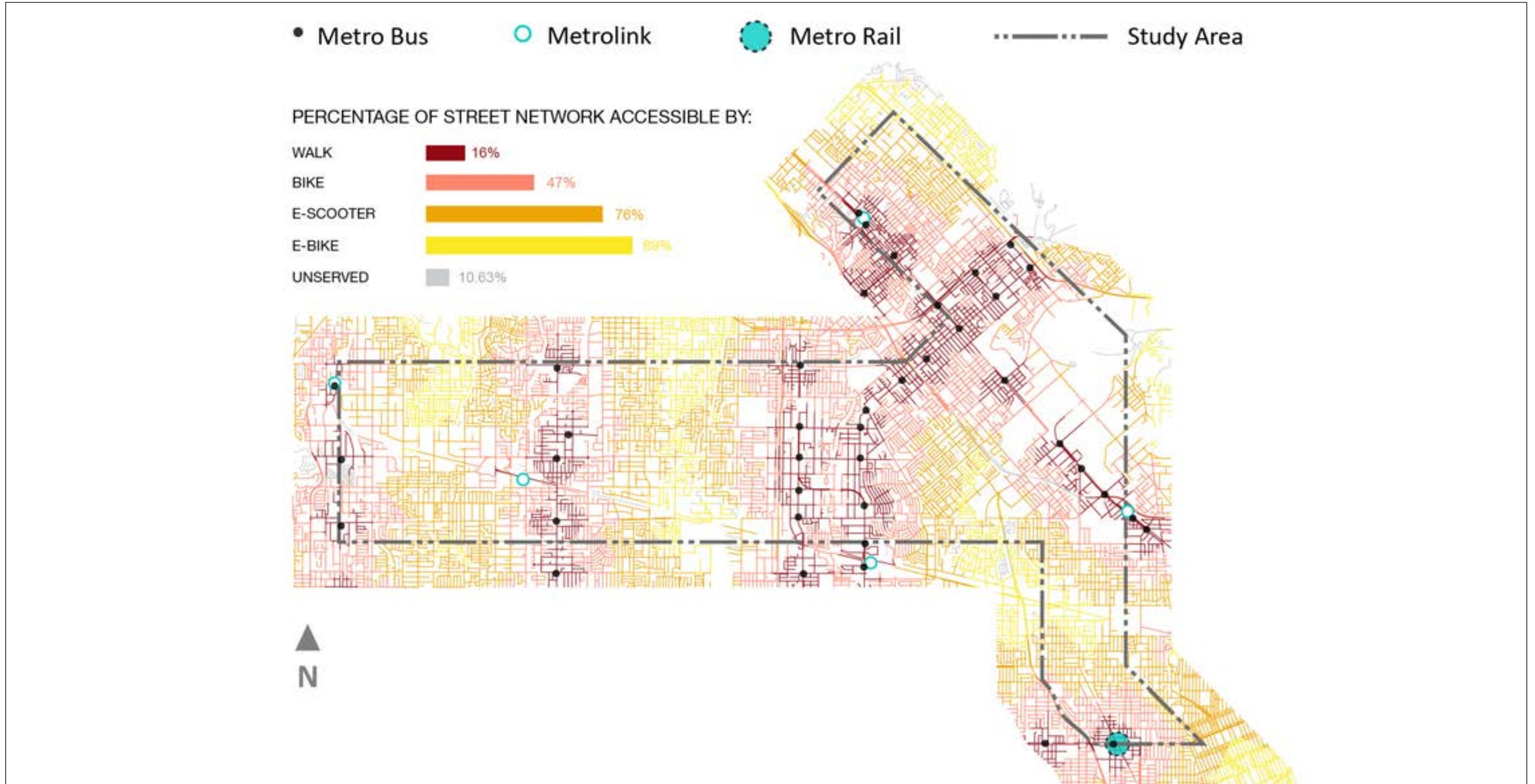
Objective 4: Design an improved transit service that complements Metro’s network and improves accessibility and sustainability.

BRT will provide an improved east-west service in the project study area that addresses the lack of frequent service. It will also provide an opportunity to connect with and leverage Metro investments in planned projects such as the East San Fernando Valley Rail Transit Corridor, Orange Line upgrades, Sepulveda Transit Corridor, and the North Hollywood to Pasadena BRT. Improved connections to existing rail service will further enhance the network of complementary high-quality lines and create greater accessibility. Frequent and reliable service can also improve fiscal sustainability for the agency by retaining existing riders and attracting new riders.

The multi-modal sheds analysis illustrated in Figure 2-10 highlights areas with a robust network of first/last mile connections, and where pedestrian, bicycle and other multi-modal improvements may enhance the Project. Providing walkable connections between the NSFV BRT Project and existing transit lines and activity centers will help meet this objective.

The Project also offers an opportunity to address Metro’s environmental sustainability goals by studying and making recommendations for the planned deployment of zero-emission buses and related infrastructure. In addition to having no tailpipe emissions, electric buses are quieter and can offer improved rider comfort over their compressed natural gas (CNG) counterparts.

Figure 2-10: Existing Multimodal Travel Shed



3 Project Context

The NSFV BRT corridor is characterized by data from its demographic context, land use patterns, major activity centers, roadways, and existing and planned transit service. This section provides a summary of this information for the project study area.

3.1 Key Street Network

The preliminary alignment options run primarily along major San Fernando Valley arterials and boulevards described in this section.

Nordhoff Street is one of two primary east-west arterials considered for the Project, and is classified as Boulevard II in the City of Los Angeles Department of City Planning Mobility Plan 2035. The street is characterized by a mixture of industrial, office parks, and single family residential along the western end of the project study area from the Orange Line Busway to Reseda Boulevard and the campus of CSU Northridge. East of the CSUN campus, the street is fronted primarily by single family residential until reaching Interstate 405 (I-405). From I-405 east to Woodman Avenue, Nordhoff Street features a mixture of commercial retail, multi-family residential, and some single-family residential. East of Van Nuys Boulevard, Nordhoff Street becomes Osborne Street, described below.

Roscoe Boulevard is the second of two primary east-west arterials considered for the project, and is classified as Boulevard II in Mobility Plan 2035. From Reseda Boulevard to Balboa Boulevard, the street is fronted primarily by single family residential and occasionally multi-family residential. From Balboa Boulevard to I-405, the street is fronted by the Van Nuys airport and related businesses, as well as large industrial, distribution, and logistics facilities. East of I-405 to Lankershim Boulevard, Roscoe Boulevard features a mixture of car dealerships, commercial retail, multi-family residential, and single family residential.

Osborne Street is an additional east-west arterial, classified as Avenue I in Mobility Plan 2035. The street generally has two travel lanes in each direction and is fronted by single-family residential, some commercial retail at major intersections, and the Whiteman Airport and some municipal facilities.

Parthenia Street is classified as Avenue II in Mobility Plan 2035, and could be used to ease the connection between Nordhoff and Roscoe by traveling under I-405 where no on/off-ramps would impact service. Parthenia Street has two travel lanes in each direction and a center two-way left turn lane, generally with on-street parking permitted. There are no existing or planned bike lanes on Parthenia Street, and it features a mixture of single- and multi-family residential and commercial land uses.

Chandler Boulevard is classified as a Boulevard II in Mobility Plan 2035. The street generally has two travel lanes and a bicycle lane in each direction running on either side of the Metro Orange Line Busway, and a reconfiguration of the bicycle and automobile travel lanes is currently in progress. On-street parking is generally permitted. It features a mixture of single- and multi-family residential, and commercial retail and office land uses.

Reseda Boulevard is a north-south arterial classified as Boulevard II in the City of Los Angeles Mobility Plan 2035. Commercial land uses line both sides of the street through the alignment

area. A portion of the street recently received protected bike lanes as part of the City of Los Angeles's Great Streets Initiative.

Lindley Avenue is a north-south residential street with two travel lanes in each direction and on-street parking on both sides of the street.

Lankershim Boulevard is a north-south arterial classified as Boulevard II in Mobility Plan 2035. The street generally has two travel lanes in each direction, with on-street parking and Class II bike lanes striped in both directions. The street is characterized primarily by light industrial, commercial, automotive, and multi-family residential land uses. Higher density development with some mixed-use, mid-rise residential and ground floor retail, is occurring in the North Hollywood area at the southern end of the project study area.

Glenoaks Boulevard is a north-south arterial classified as Boulevard II in Mobility Plan 2035. The street generally has two travel lanes with on-street parking in each direction with a center two-way turn lane. It is striped with Class II bike lanes in both directions from Osborne Street to Arroyo Street, and is generally fronted by single and multi-family residential, with a portion of light industrial and automotive uses adjacent to the San Fernando Swap Meet site.

3.2 Demographic Context

An assessment of demographic, population, and employment trends were conducted to understand the existing transit market and demand for transit services. The densely populated areas are found in the Panorama City area just east of I-405 and further east within the study area, particularly surrounding Lankershim Boulevard toward North Hollywood. Figure 2-4 shows the employment density within the study area, where the greatest employment is shown on the western half of the study area near Chatsworth, within Panorama City, and along Roscoe Boulevard toward North Hollywood. Data from the U.S. Census 2016 American Communities Survey and Environmental Protection Agency (EPA) were used to assess the study area market demographics.

The study area consists primarily of low density development with population density of approximately 25 people per acre or less. Higher levels of population density can be found within the preliminary study area along Lankershim Boulevard, as shown in Figure 2-5. There are low levels of employment density within the preliminary study area, with five jobs per acre or less reported. Approximately 18% of households within the preliminary study area reported incomes below the poverty threshold, which is higher than the approximately 16% for Los Angeles County as a whole. Approximately 45% of census block groups within the study area reported median household incomes at or below the City of Los Angeles' average of \$51,538 in 2016.

Approximately 146,518 people within the preliminary study area were under 18 or older than 65 years of age, representing approximately 22% of the preliminary study area population. Approximately 8% of households do not own a private vehicle. See Figure 2-6 for a map of zero car households. Younger people without a driver's license or access to a car and aging populations who may become unable to drive themselves could benefit from a high-quality transit option that connects to schools and medical centers and that does not limit higher frequency service only to peak commute hours.

3.3 Land Use Patterns

Data from the Southern California Association of Governments (SCAG) and the City of Los Angeles was used to assess land use patterns and evaluate where premium transit has the potential to benefit the community. Existing land uses are shown in Figure 3-1.

The study area is primarily composed of low density single-family residential, with some multi-family residential and commercial land uses. Within the study area, single-family residential land use represents approximately 49% of the total area.

3.4 Major Activity Centers

An assessment of major activity centers was conducted to understand travel behavior patterns. Data from Metro's 2016 Active Transportation Strategic Plan was used to identify locations of major activity centers. These destinations include a variety of employment centers, 48 public elementary schools, ten public middle schools, five public high schools, four colleges and universities, thirteen hospitals and medical centers, and thirteen shopping centers.

Key activity centers that would benefit from premium east-west transit service include the Chatsworth Orange Line/Metrolink Station, Northridge Fashion Center, California State University Northridge (CSUN), Panorama Mall/Panorama City area.

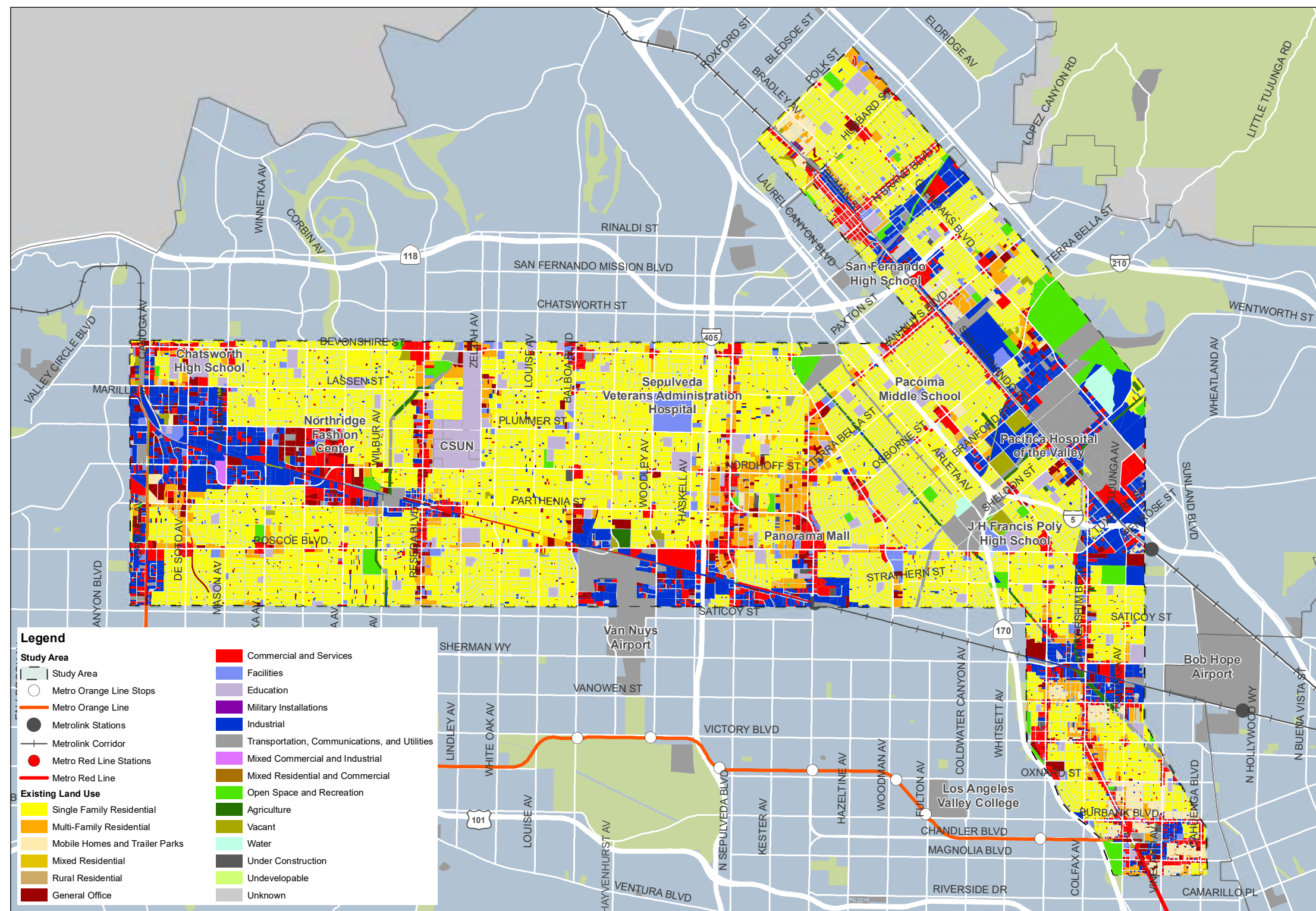
Additional key activity centers that could be served by one or more of the preliminary alignments include the Dignity Health Northridge Hospital Medical Center, Kaiser Permanente Panorama City Medical Center, Mission Community Hospital, James Monroe High School, Sylmar/San Fernando Transit Station, Metro Red/Orange Line North Hollywood Station, and the future North Hollywood to Pasadena BRT line.

3.5 Existing Transit Services

In addition to the primary service by Metro, other transit service is provided by Los Angeles Department of Transportation (LADOT), Burbank Bus, Antelope Valley Transportation Authority (AVTA), and Santa Clarita Transit. Metrolink provides regional rail service, and Amtrak provides intercity service with a station within the study area.

Figure 2-7 illustrates the transit routes serving the study area. It is also worth noting that Metro is in the process of completing the NextGen Bus Study, which will include recommendations for modifying bus service in the study area.

Figure 3-1: Existing Land Use



4 Definition of Alternatives

The purpose of this section is to introduce and define the alternatives considered, and to summarize the key characteristics, including preliminary ridership estimates, operating plans and service characteristics, and cost estimates of the alternatives evaluated.

4.1 Preliminary BRT Concepts

In September 2017, the North San Fernando Valley (NSFV) Bus Rapid Transit (BRT) Environmental Framework Report was completed, which established a study area and identified three preliminary BRT concepts for the purpose of framing the approach to the Alternatives Analysis. These preliminary concepts are shown in Figure 4-1. These options all connect with Chatsworth on the west. One option goes north to Sylmar and the other two options connect to North Hollywood. The report characterized the existing community characteristics and transportation settings. Local streets and existing transit demand were reviewed to identify corridors for the potential implementation of dedicated bus lanes to improve regional connectivity in the north San Fernando Valley. The report advanced all three preliminary concepts to the Alternatives Analysis phase for initial discussion purposes as representative alignments.

4.2 AA Study Alternatives

The AA process began in July 2018 with early study activities focused on field reviews, planning assessments, stakeholder engagement, and operational study to reassess the three initial BRT concepts. Initial planning assessments were completed in September 2018 that resulted in the development of three families of alignment options as shown in Figure 4-2. These three families of alignment options represented refined and improved versions of the three initial BRT concepts presented in the 2017 NSFV BRT Improvements Environmental Framework Report shown in Figure 4-1.

Figure 4-1: Environmental Framework Report BRT Concepts

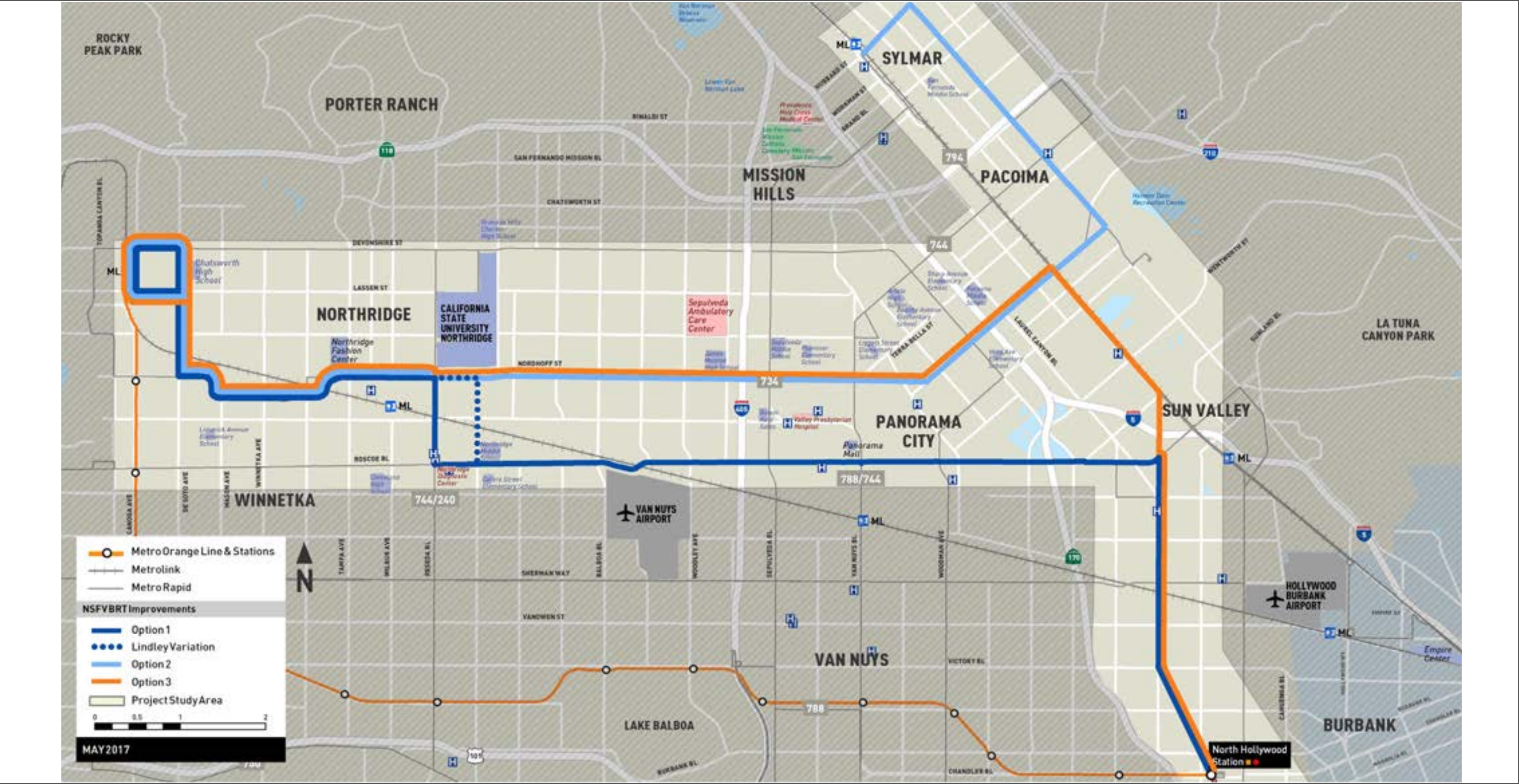
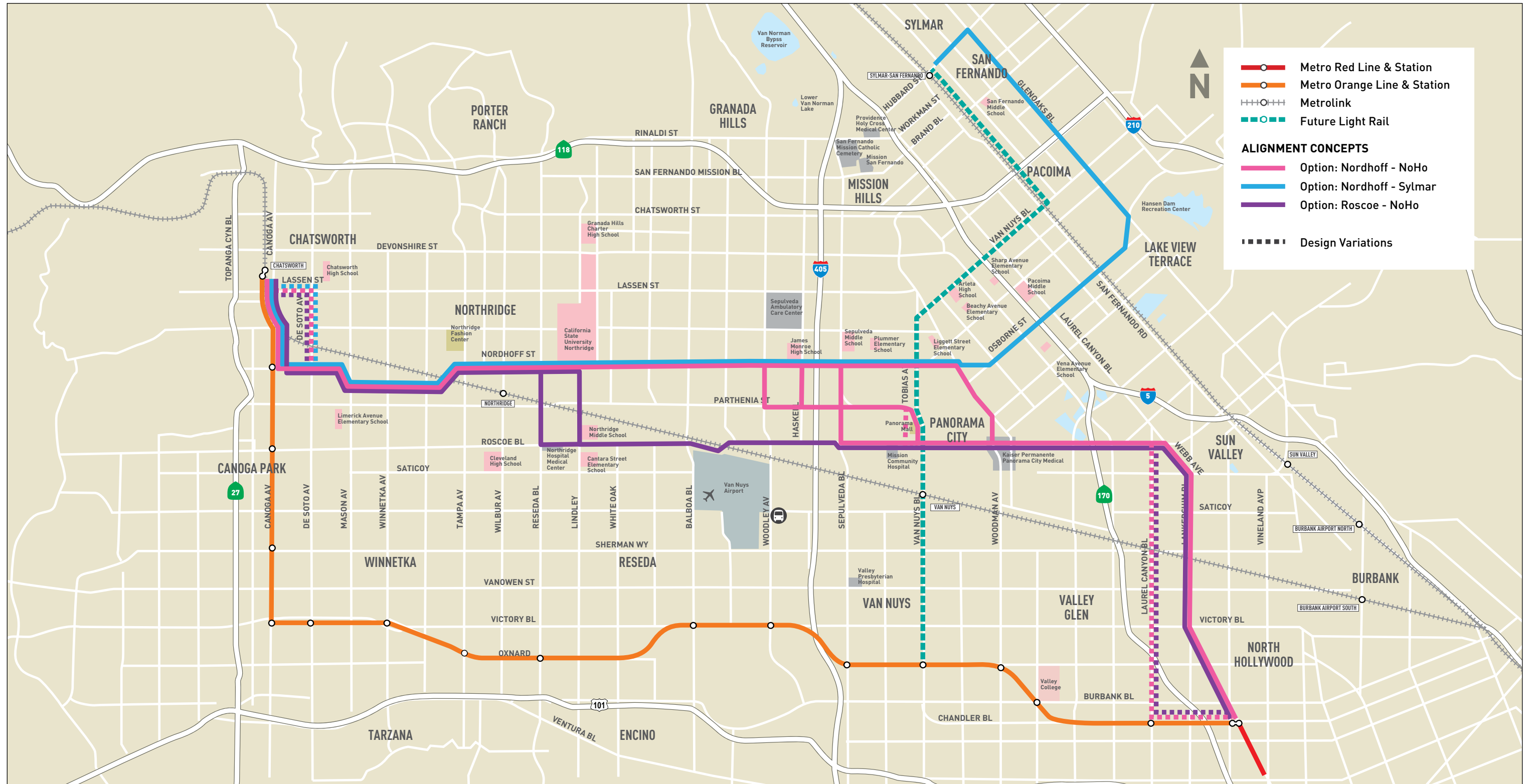


Figure 4-2: Refined Project Alternatives



From the three families of alignment options, the technical team was able to formulate seven distinct alignment options to test the relative performance of the alignments. The seven alignment options considered for screening are:

- Option 1: Roscoe-NoHo via Reseda
- Option 2: Roscoe-NoHo via Lindley
- Option 3: Nordhoff-Sylmar/San Fernando
- Option 4: Nordhoff-NoHo via Woodley
- Option 5: Nordhoff-NoHo via Haskell
- Option 6: Nordhoff-NoHo via Sepulveda
- Option 7: Nordhoff-NoHo via Woodman

All of the alignment options begin on the west end of the study area at the Chatsworth Metro Orange Line/Metrolink station, and propose to travel on the Metro Orange Line BRT guideway to Nordhoff Street. Option 3: Nordhoff-Sylmar/San Fernando continues east on Nordhoff Street to Osborne Street, Glenoaks Boulevard and Hubbard Street to the Sylmar/San Fernando Station. The other six alignment options travel on Nordhoff Street and Roscoe Boulevard to Lankershim Boulevard and terminate on the east end at the North Hollywood Station. These six options vary in the streets utilized to transition from Nordhoff Street to Roscoe Boulevard.

4.3 Roscoe-North Hollywood Alignment Options

The Roscoe-North Hollywood alignment options are similar to the preliminary alignments in the NSFV BRT Environmental Framework Report.

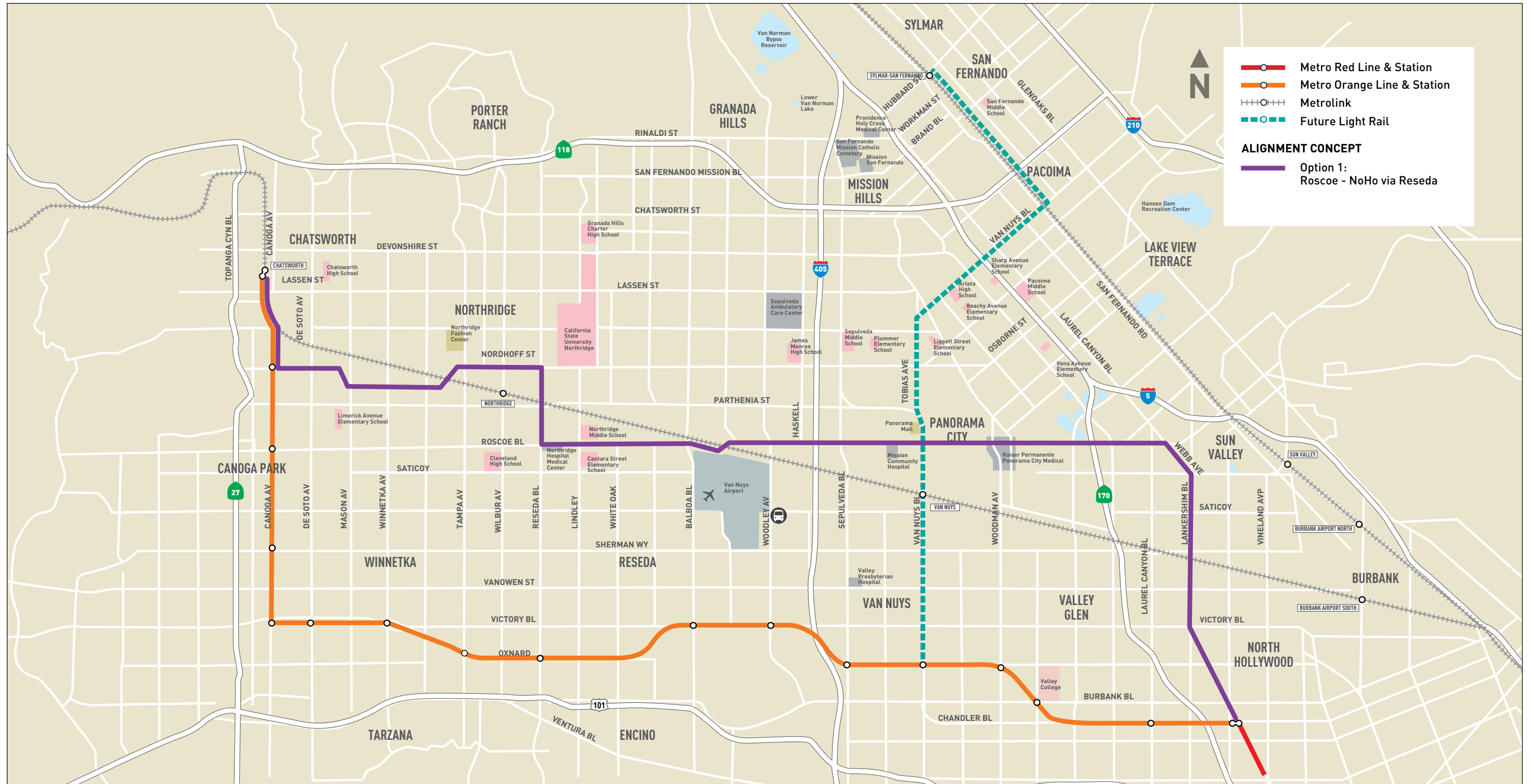
Option 1: Roscoe-NoHo via Reseda

The alignment for Option 1 begins at the Chatsworth Station, then uses the Metro Orange Line BRT guideway to travel south before turning east on Nordhoff Street. Option 1 turns south on Reseda Boulevard, east on Roscoe Boulevard, and south on Lankershim Boulevard to the Metro North Hollywood Station. The total length of Option 1 is approximately 18.1 miles, including the 1.2 miles of Orange Line Busway between Chatsworth Station and Nordhoff Street. Option 1 is shown in Figure 4-3.

Reseda Boulevard is a north-south arterial classified as Boulevard II in Mobility Plan 2035 memo. It has two travel lanes in each direction and a center two-way left-turn lane. On-street parking is available on one or both sides of the street between Bryant Street and Roscoe Boulevard. There are Class IV (buffered) bike lanes on Reseda Boulevard between Nordhoff Street and Bryant Street, and Class II (striped) bike lanes between Bryant Street and Roscoe Boulevard.

Option 1 serves commercial uses on Reseda Boulevard and Dignity Health–Northridge Hospital, but it does not touch the California State University, Northridge (CSUN) campus. Option 1 includes one at-grade rail crossing on Roscoe Boulevard between Balboa Boulevard and Woodley Avenue, north of Van Nuys Airport.

Figure 4-3: Alignment Option 1: Roscoe - NoHo via Reseda



ALIGNMENT CONCEPT

- Metro Red Line & Station
- Metro Orange Line & Station
- +--+ Metrolink
- Future Light Rail
- Option 1: Roscoe - NoHo via Reseda

Option 2: Roscoe-NoHo via Lindley

Option 2 is similar to Option 1, but it continues on Nordhoff Street past Reseda Boulevard to Lindley Avenue, and travels on Lindley Avenue to Roscoe Boulevard. The total length of Option 2 is approximately 18.1 miles. Option 2 is shown in Figure 4-4.

Lindley Avenue is a north-south residential street with two travel lanes in each direction and on-street parking along both sides of the street. Most of the residential properties along the corridor are served by rear alleys, and do not have conflicting driveways on Lindley Avenue. A center two-way left turn lane is provided in the limited segments where there are private driveways on Lindley Avenue. The curb-to-curb width varies from 62 feet to 66 feet.

Option 2 includes two at-grade rail crossings. One rail crossing is on Lindley Avenue, south of Parthenia Street. The second crossing is on Roscoe Boulevard between Balboa Boulevard and Woodley Avenue, north of Van Nuys Airport.

Option 2 would include stations on Nordhoff Street at Reseda Boulevard and Lindley Avenue, with the Lindley Avenue station serving CSUN.

4.4 Nordhoff-Sylmar/San Fernando Alignment Option

The Nordhoff-Sylmar/San Fernando alignment (Option 3), begins at Chatsworth Metro Orange Line/Metrolink Station, travels south along the Metro Orange Line BRT guideway, then east along Nordhoff Street, northeast along Osborne Street, northwest along Glenoaks Boulevard, and southwest along Hubbard Street to the Sylmar/San Fernando Metrolink Station. The total length of the Nordhoff-Sylmar alignment option is approximately 16.7 miles, including the 1.2 miles of Orange Line Busway between Chatsworth Station and Nordhoff Street. Figure 4-5 shows the alignment for Option 3: Nordhoff-Sylmar/San Fernando.

There are some segments of Nordhoff Street between Van Nuys Boulevard and Woodman Avenue where the street was not built out to full width, and the curb-to-curb width is as narrow as 54 feet. While the BRT may be able to travel in mixed flow through some of these areas, Option 3 includes areas where physical improvements such as roadway widening and sidewalk construction would be required to provide a premium BRT service with robust first/last mile pedestrian connections.

Option 3 also includes an at-grade rail crossing on Osborne Street, just east of San Fernando Road.

Figure 4-4: Alignment Option 2: Roscoe - NoHo via Lindley

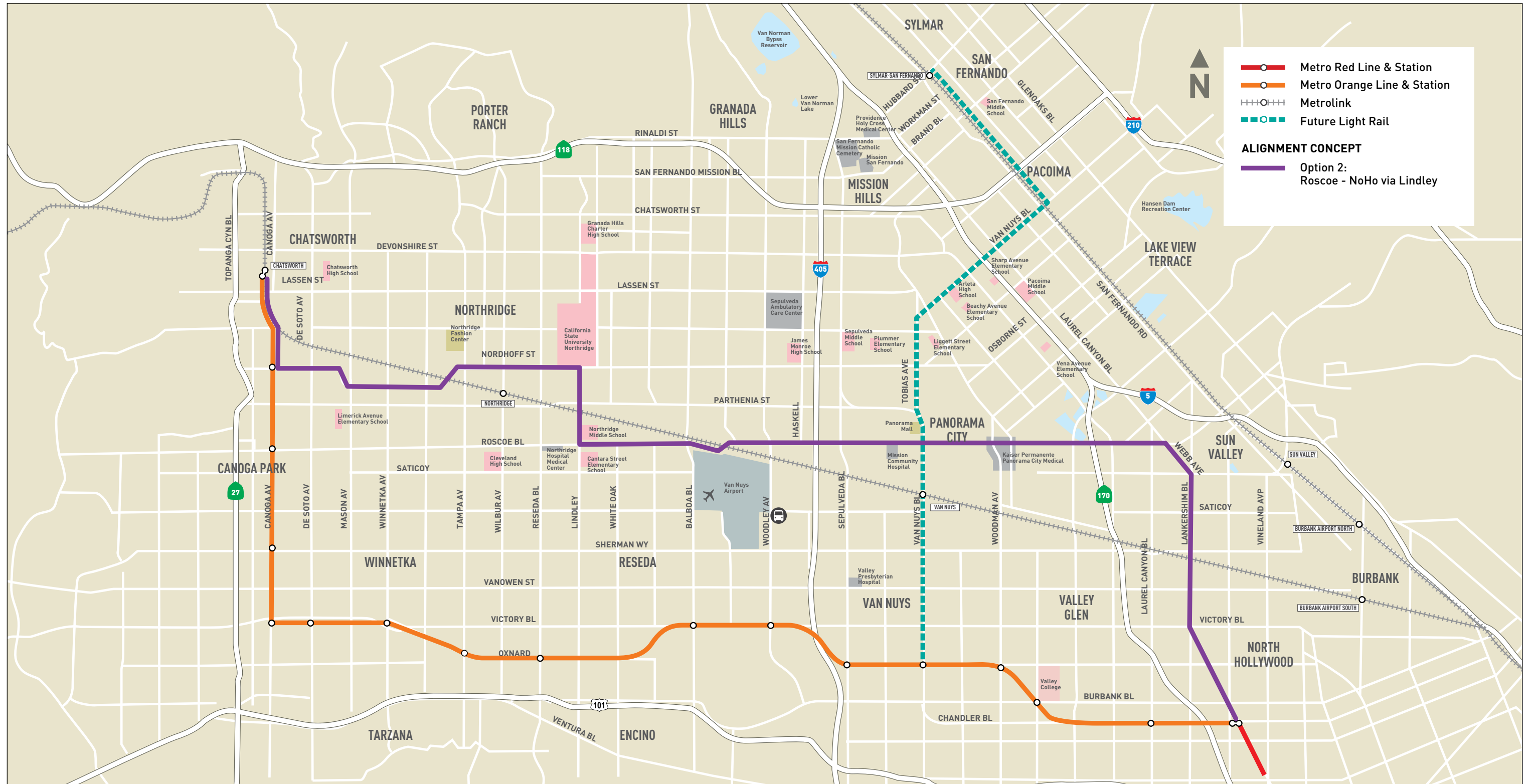
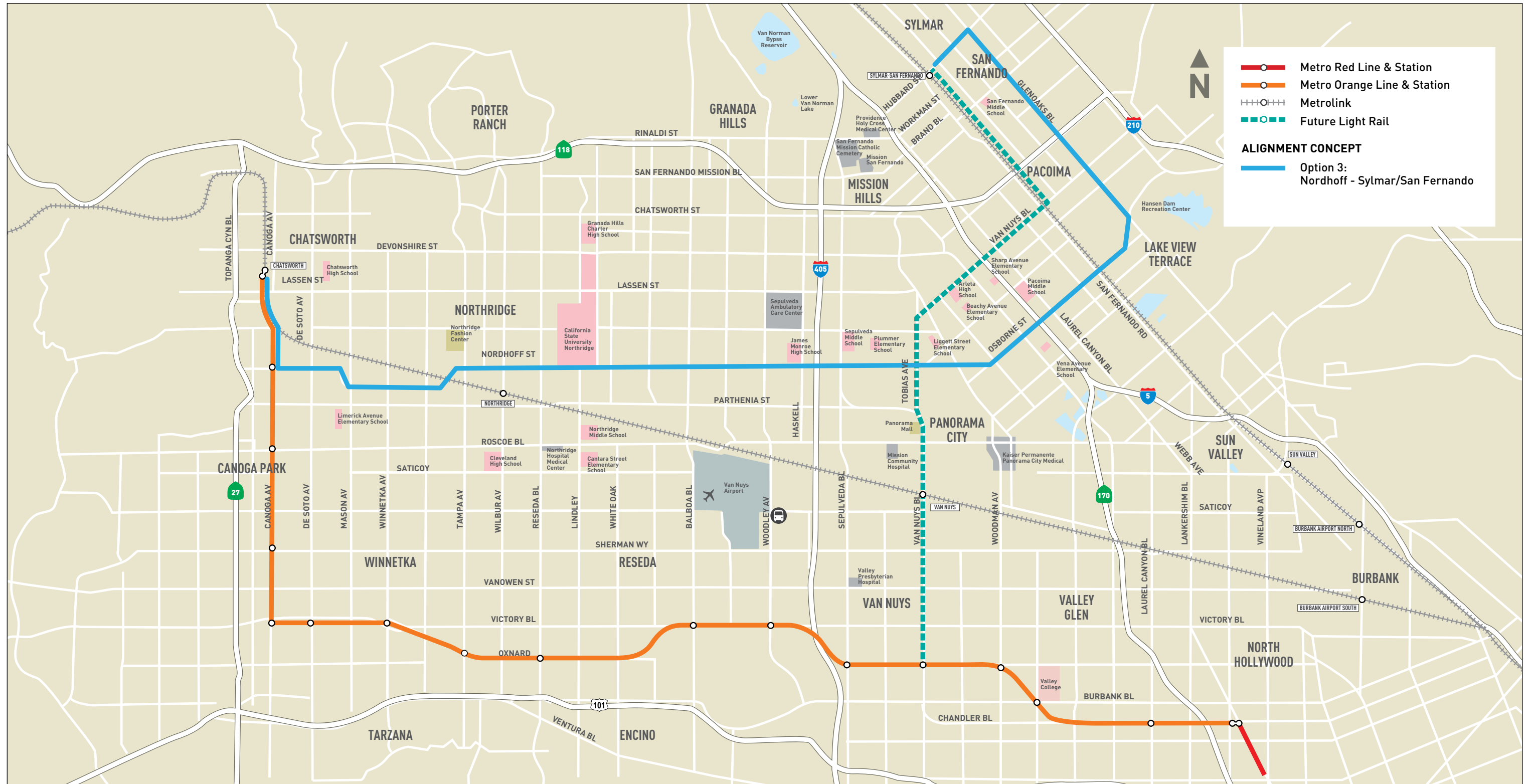


Figure 4-5: Alignment Option 3: Nordhoff - Sylmar/San Fernando



4.5 Nordhoff-North Hollywood Alignment Options

The Nordhoff-North Hollywood alignment options evolved from the alignment included in the 2017 NSFV BRT Environmental Framework Report to shorten the travel distance to North Hollywood Station, and serve activity centers and areas with higher residential density in Panorama City.

The Interstate 405 (I-405) ramp intersections on Nordhoff Street are a known constriction point along the alignment. The capacity of the ramp intersections is constrained by the undercrossing bridge structure, which would be prohibitively expensive to widen. While technological advancements and the use of directional bus only lanes may be able to reduce travel time delays through the ramp intersections, two of the alignment options (Option 4 and Option 5) bypass the ramp intersections by moving off of Nordhoff Street west of the I-405 and crossing the freeway on Parthenia Street.

Option 4: Nordhoff-NoHo via Woodley

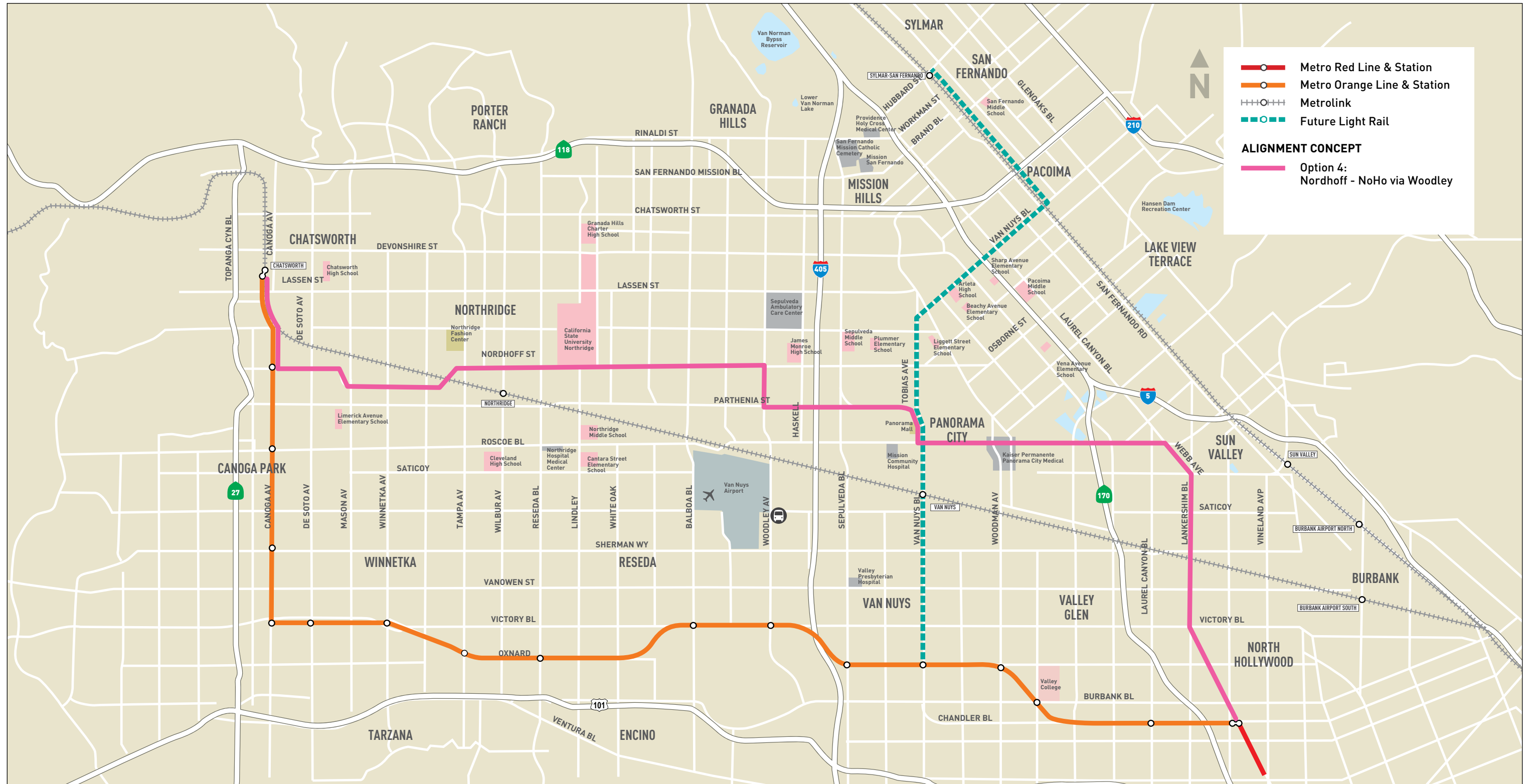
Option 4 begins at the west end of the study area at the Chatsworth Station, travels south on the Metro Orange Line BRT guideway to Nordhoff Street, then east on Nordhoff Street. At Woodley Avenue, Option 4 turns south onto Woodley Avenue, east onto Parthenia Street, south onto Van Nuys Boulevard, east onto Roscoe Boulevard, and south on Lankershim Boulevard to North Hollywood Station. The total length of the Option 4 alignment is approximately 18.0 miles, including the 1.2 miles of Orange Line Busway between Chatsworth Station and Nordhoff Street. Option 4 is shown in Figure 4-6.

Woodley Avenue is a north-south residential street with two travel lanes in each direction and a center two-way left-turn lane, with on-street parking and Class II bike lanes striped in both directions. The curb-to-curb width varies from 74 to 80 feet. The residential properties along the corridor are served by rear alleys, so buses traveling on Woodley Avenue would not be subject to residential driveway conflicts.

At the intersection of Woodley Avenue and Parthenia Street, there are small commercial centers on the northwest, northeast and southeast corners, and a commercial center anchored by a supermarket on the southwest corner. A BRT station is anticipated at this intersection in Option 4.

Option 4 avoids the I-405 freeway ramp intersections on Nordhoff Street, and provides new east-west transit service for the residential land uses along Parthenia Street. It also travels through high density residential and low income areas that are currently underserved by transit.

Figure 4-6: Alignment Option 4: Nordhoff - NoHo via Woodley



Option 5: Nordhoff-NoHo via Haskell

Option 5 is similar to Option 4, but it continues on Nordhoff Street past Woodley Avenue, and turns south onto Haskell Avenue. From Haskell Avenue, Option 5 turns east onto Parthenia Street, south onto Van Nuys Boulevard, east onto Roscoe Boulevard, and south on Lankershim Boulevard to North Hollywood Station. The total length of the Option 5 alignment is approximately 18.0 miles. Option 5 is shown in Figure 4-7.

Haskell Avenue is a north-south residential street with two travel lanes in each direction and a center two-way left-turn lane, with on-street parking permitted along both sides of the street. The curb-to-curb width is 66 feet. There are no existing or planned bike lanes on Haskell Avenue, so buses traveling on Haskell Avenue would not be subject to bike lane conflicts.

James Monroe High School is located on the northwest corner of Nordhoff Street and Haskell Avenue. This activity center is served by Option 5, but not by Option 4. At the intersection of Haskell Avenue and Parthenia Street, there is a church on the southwest corner, a preschool on the northeast corner, and residential uses on the northwest and southeast corners. These land uses do not generate enough ridership demand to warrant a station at this intersection.

Similar to Option 4, Option 5 avoids the I-405 freeway ramp intersections on Nordhoff Street, and provides service to high density residential and low income areas that are currently underserved by transit.

Option 6: Nordhoff-NoHo via Sepulveda

Option 6 begins at the west end of the study area at the Chatsworth Station, travels south on the Metro Orange Line BRT guideway to Nordhoff Street, then east on Nordhoff Street. Option 6 turns south onto Sepulveda Street, east onto Roscoe Boulevard, and south on Lankershim Boulevard to North Hollywood Station. The total length of the Option 6 alignment is approximately 18.0 miles. Option 6 is shown in Figure 4-8.

Sepulveda Boulevard is a north-south arterial with three travel lanes in each direction, a center raised median, and on-street parking permitted along both sides of the street. It is classified as Boulevard II in Mobility Plan 2035, and has a curb-to-curb width of 125 feet. Sepulveda Boulevard is lined with commercial uses, and has high potential for transfer activity.

Option 6 travels through the I-405 freeway ramp intersections on Nordhoff Street, and travel time for the BRT will be dependent on the level of congestion and delays at these intersections.

Figure 4-7: Alignment Option 5: Nordhoff - NoHo via Haskell

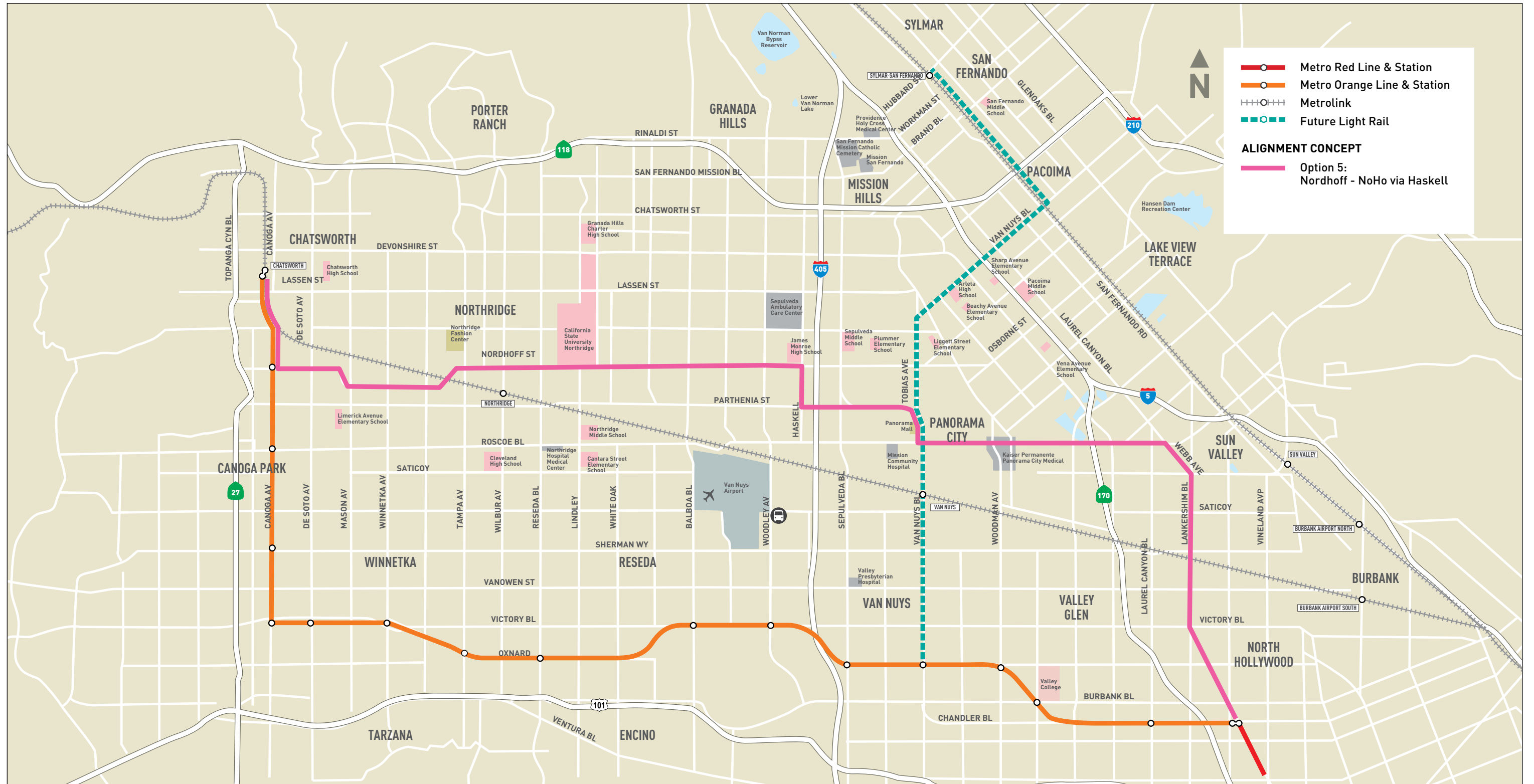
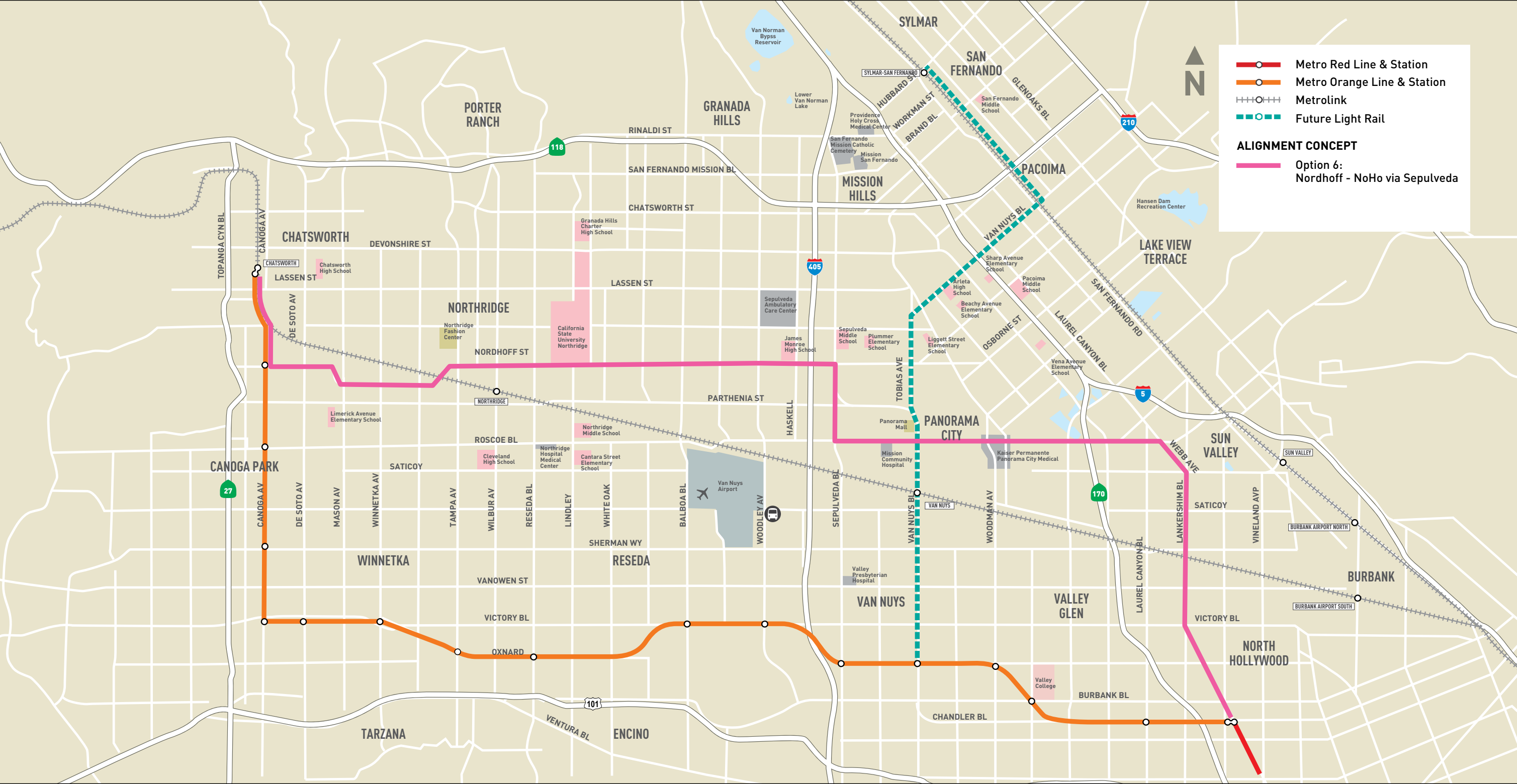


Figure 4-8: Alignment Option 6: Nordhoff - NoHo via Sepulveda



Option 7: Nordhoff-NoHo via Woodman

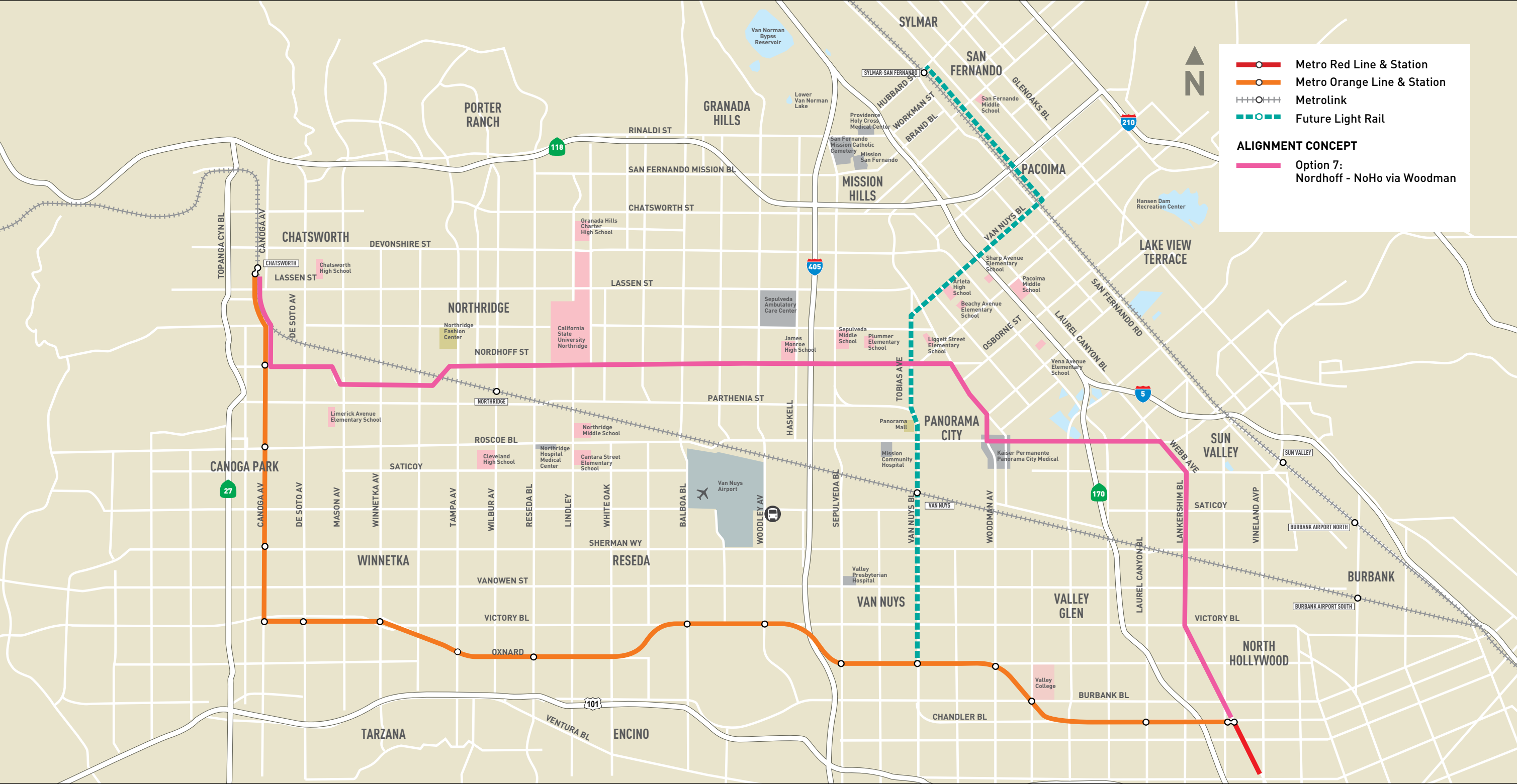
Option 7 begins at the west end of the study area at the Chatsworth Station, travels south on the Metro Orange Line BRT guideway to Nordhoff Street, then east on Nordhoff Street to Woodman Avenue. At Woodman Avenue, Option 7 turns south onto Woodman Avenue, then turns east onto Roscoe Boulevard, and south on Lankershim Boulevard to North Hollywood Station. The total length of the Option 7 alignment is approximately 17.8 miles. Option 7 is shown in Figure 4-9.

Woodman Avenue is a north-south arterial that is classified as Avenue I in Mobility Plan 2035. It has two lanes in each direction, a center two-way left-turn lane, Class II bike lanes, and on-street parking. The curb-to-curb width in this segment is 74 feet. Between Nordhoff Street and Branford Street, Woodman Avenue is fronted by commercial uses. Between Branford Street and Roscoe Boulevard, there are sound walls separating residential properties from the street, and there are missing sidewalks in some sections of the corridor.

There are some segments of Nordhoff Street between Van Nuys Boulevard and Woodman Avenue where the street was not built out to full width, and the curb-to-curb width is as narrow as 54 feet. While the BRT may be able to travel in mixed flow through some of these areas, Option 7 includes a number of areas where physical improvements such as roadway widening and sidewalk construction would be required to provide a premium BRT service with a robust first/last mile network.

Similar to Option 6, Option 7 travels through the I-405 freeway ramp intersections on Nordhoff Street, and travel time for the BRT will be dependent on the level of congestion and delays at these intersections.

Figure 4-9: Alignment Option 7: Nordhoff - NoHo via Woodman



4.6 Ridership Modeling

Metro's regional travel demand model, Corridors Based Model 18 (CBM 18), was used to estimate travel demand and performance statistics. The seven alignment options were coded into the model and evaluated through a series of performance measures that inform decision-making for BRT alignments in the study area. These performance measures are reported for the model region, which includes the six counties in Southern California (Los Angeles County, Imperial County, Orange County, Riverside County, San Bernardino County, and Ventura County) as well as the study area. The metrics include:

Ridership Forecasts

- **Transit Trips** are average weekday transit trips for the region. Transit trips can include transfers and represent person trips from the origin to the destination. Higher transit trips indicate that the travelers are choosing to ride transit more often because the transit service alignment provides better service.
- **Mode Share** is the average total weekday regional transit trips divided by the average total weekday regional person trips. Higher transit mode shares indicate that the travelers are choosing transit more often because the transit service alignment provides better service.
- **Boardings** are average weekday boardings for the region and by station for the NSFV BRT service. Boardings are from station-to-station so, for example, a transit trip that includes one transfer represents two boardings. Boardings per station are also reported to assess the new transit services on a per station basis.
- **Transfer Rate** is the total boardings divided by the total transit trips. Travelers prefer fewer transfers so lower transfer rates indicate better transit service.
- **Peak Load** includes an assessment of the number of transit riders on a particular route segment and direction during the peak hour. This allows a comparison of the peak load to the capacity of the transit services provided.

Market Analysis

- **Transit Trips by Market** segment transit trips within the study area, with one end in the Study area and outside the study area.
- **Transit Trips by Direction** segment transit trips to/from north of the study area, to/from south of the study area, to/from the east of the study area and to/from the west of the study area.
- **Low-Income Work Transit Trips** segment trips by market segment and identifies the percent of new transit trips that are low-income work trips.

Traffic Forecasts

- **Vehicle Miles Traveled (VMT)** is the average weekday auto vehicle trips times the miles traveled. This measure indicates how much the alignment is reducing auto travel.

The model reflects all transit services that are expected to be operating in Year 2042 along with the expected future land use (population and employment). Table 4.1 presents transit trips and boardings forecasted for each of the alternatives in the year 2042. The boarding and trip forecast data presented in Table 4.1 is based on assumptions regarding the number and locations of stations, walking distance from stations to transit and activity centers, alignment lengths and travel times. As these parameters are refined in future stages of the project, forecast ridership data is subject to change.

Each transit trip represents one entire trip from origin to destination, including transfers. Boardings are tallied for each entry or exit from a transit vehicle –boardings are greater than transit trips due to transfers. Total new transit trips are forecast to increase by approximately 12,000 to 13,500 new daily transit riders for the alignment options that run on Nordhoff-NoHo, the highest performing corridor. The Nordhoff-NoHo alignment options also have the highest number of estimated total daily boardings, and the Nordhoff-Sylmar/San Fernando alignment (Option 3) performed the lowest.

ALIGNMENT OPTIONS	STATIONS	TOTAL DAILY BOARDINGS (2042)	NEW TRANSIT RIDERS (2042)
Option 1: Roscoe-NoHo via Reseda	20	26,328	10,570
Option 2: Roscoe-NoHo via Lindley	20	26,516	10,900
Option 3: Nordhoff-Sylmar/San Fernando	17	20,846	9,603
Option 4: Nordhoff-NoHo via Woodley	21	28,652	13,566
Option 5: Nordhoff-NoHo via Haskell	21	28,120	12,709
Option 6: Nordhoff-NoHo via Sepulveda	21	27,461	11,717
Option 7: Nordhoff-NoHo via Woodman	21	27,393	11,985

Table 4.1 2042 Transit Trips and Boardings Summary

Critical Boarding Locations

The project team reviewed the boardings per station and by district. The station boardings are concentrated around a few critical areas:

- At Van Nuys Boulevard (and Nordhoff Street or Roscoe Boulevard depending on the alignment option) to connect to the future East San Fernando Valley light rail. For all options, more than 25% of the total boardings occur at Van Nuys Boulevard.
- On Nordhoff Street at Reseda Boulevard and Lindley Avenue, serving California State University at Northridge (CSUN). Except for Option 1, which doesn’t connect to Lindley Avenue at Nordhoff Street, between 17% and 23% of boardings occur at these two stations. For Option 1, 14% of the total boardings occur at Reseda Boulevard and Nordhoff Street.

- At Chandler Blvd and Lankershim Blvd to connect to the North Hollywood Station. Except for Option 3, which does not connect to North Hollywood, approximately 12% of boardings occur at North Hollywood Station.

Low Income Work Trips

Low-income work trips are segmented by income, so these trips provide an opportunity to review market patterns based on income. Table 4.2 presents the new transit trips market patterns for low-income work trips. The alignments that serve the highest numbers of low-income work trips are Option 4 (Nordhoff-NoHo via Woodley) and Option 5 (Nordhoff-NoHo via Haskell). Option 3 (Nordhoff-Sylmar/San Fernando) serves the lowest number of low-income work trips.

BLENDED ALIGNMENT	MARKET ASSESSMENT FOR NEW TRANSIT TRIPS				
	WITHIN STUDY AREA	WITH ONE ENDPOINT IN STUDY AREA	OUTSIDE OF STUDY AREA	LOW-INCOME WORK	PERCENTAGE LOW-INCOME WORK
Option 1: Roscoe-NoHo via Reseda	316	910	475	1,700	16.1%
Option 2: Roscoe-NoHo via Lindley	302	871	474	1,648	15.1%
Option 3: Nordhoff-Sylmar/San Fernando	330	592	149	1,071	11.1%
Option 4: Nordhoff-NoHo via Woodley	382	1,221	720	2,323	17.1%
Option 5: Nordhoff-NoHo via Haskell	364	1,048	656	2,069	16.3%
Option 6: Nordhoff-NoHo via Sepulveda	343	969	481	1,793	15.3%
Option 7: Nordhoff-NoHo via Woodman	357	978	463	1,797	15.0%

Table 4.2: New Transit Trips Market Patterns for Low-Income Work Trips

VMT Reduction

The CBM18 model calculates VMT as the product of auto vehicle trips and miles traveled. In the model, miles traveled are fixed across alignments and changes in VMT are a direct result of changes in auto vehicle trips. A reduction of VMT is expected for the BRT alignments, since some new transit trips will have diverted from auto modes to take transit.

The 2042 VMT analysis results are summarized in Table 4.3. As expected, each of the proposed alignments results in lower VMT than the No-Build scenario. The VMT reduction overall and per capita is not significantly different among the seven NSFV BRT alignments at the regional scale but may be more important at the local scale. Local traffic analysis would be required to evaluate these impacts at the local scale. Total population is 23,499,823 for the per capita calculation.

Blended Alignment	VMT (2042)	VMT per Capita	Change in VMT	Percent Change in VMT
No-Build	511,926,864	21.8		
Option 1: Roscoe-NoHo via Reseda	511,862,477	21.8	-67,190	-0.013%
Option 2: Roscoe-NoHo via Lindley	511,861,059	21.8	-44,573	-0.009%
Option 3: Nordhoff-Sylmar/San Fernando	511,882,291	21.8	-79,366	-0.016%
Option 4: Nordhoff-NoHo via Woodley	511,834,159	21.8	-92,705	-0.018%
Option 5: Nordhoff-NoHo via Haskell	511,847,498	21.8	-72,372	-0.014%
Option 6: Nordhoff-NoHo via Sepulveda	511,859,674	21.8	-90,810	-0.018%
Option 7: Nordhoff-NoHo via Woodman	511,854,492	21.8	-75,712	-0.015%

Table 4.3: 2042 VMT Analysis

Further analysis of the VMT by market shows that more than half of the VMT reduction is for trips with one end of the trip in the study area (a range of 55% to 87% of the reduction, depending on the alignment). A much smaller portion of the VMT reduction (a range of 14% to 27%, depending on the alignment) is within the study area. This indicates that the service is reducing VMT outside the study area as well as inside the study area.

New Transit Trips

The seven alternatives have similar transit trip markets. There are approximately 52% to 63% of new transit trips within the study area, 40 to 46 percent of new transit trips with one endpoint in the study area and -2% to 3% of new transit trips outside the study area. The North San Fernando Valley BRT route serves residents in the study area primarily, and secondarily to travelers going to or returning from the study area.

The new transit trips can also be evaluated spatially to better understand where riders are coming from and going to. Figure 4-10 shows the origin and destination of new transit riders for Option 2, which is similar for Option 1 (Roscoe-NoHo via Reseda) and Option 2 (Roscoe-NoHo via Lindley). Figure 4-11 shows the origin and destination of new transit riders for Option 3 (Nordhoff-Sylmar/San Fernando). Figure 4-12 shows the origin and destination of new transit riders for Option 5 (Nordhoff-NoHo via Haskell), which is similar to Options 4 (Nordhoff-NoHo via Woodley) and 6 (Nordhoff-NoHo via Sepulveda). Figure 4-13 shows the origin and destination of new transit riders for Option 7 (Nordhoff-NoHo via Woodman).

Generally, all seven alignments show a similar pattern of servicing trips primarily in the study area and around the key activity nodes of Northridge Fashion Center, CSUN, Panorama City, and North Hollywood. There is a noticeable difference and decrease in level of activity in Figure 4-11, going up to Sylmar/San Fernando. This is explained by the presence of the ESFVTC as a higher performing mode that attracts riders away from NSFV BRT in this particular option that has the two services competing with each other to go north.

Figure 4-10: New Transit Riders - Option 2: Roscoe - NoHo via Lindley

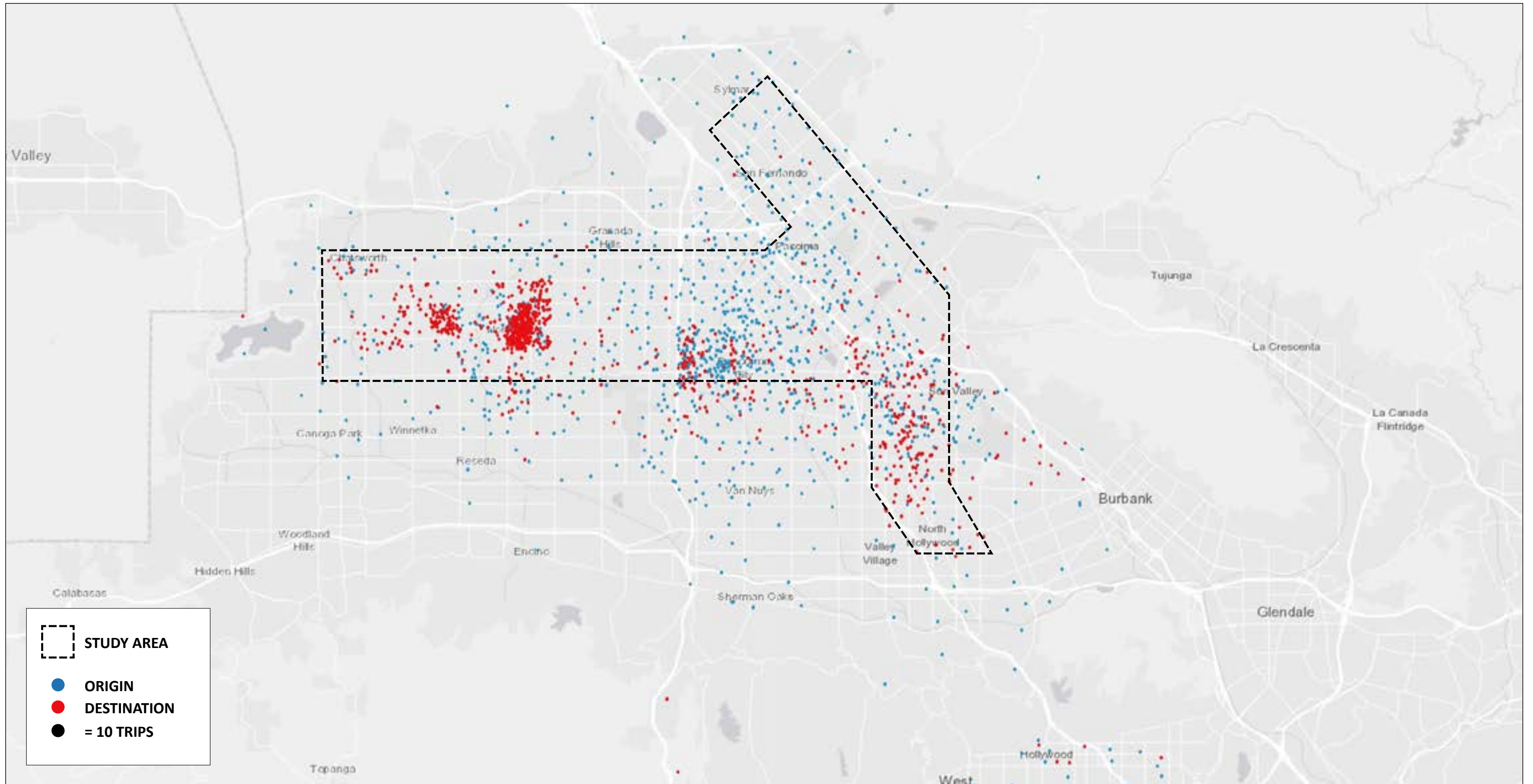


Figure 4-11: New Transit Riders - Option 3: Nordhoff - Sylmar/San Fernando

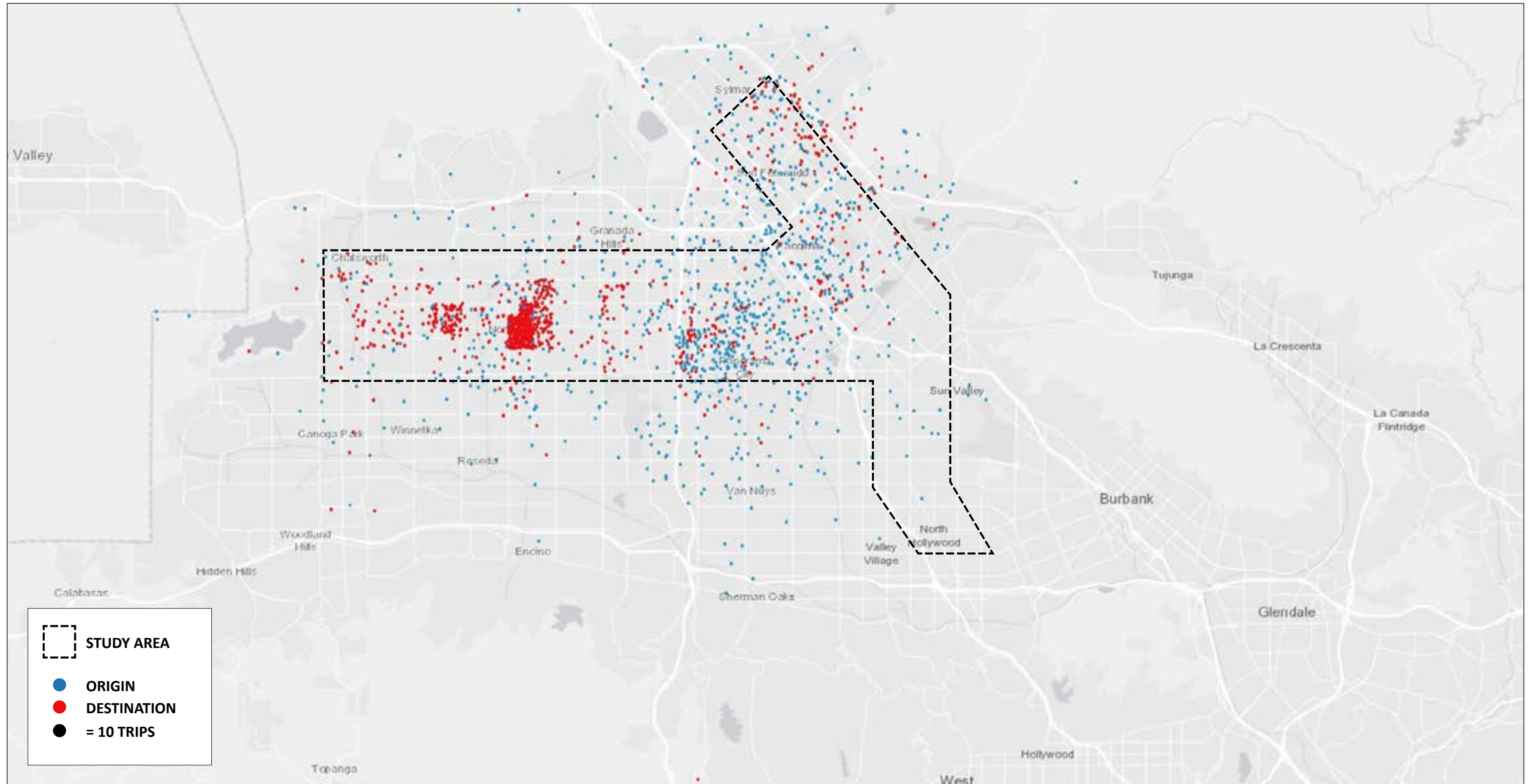


Figure 4-12: New Transit Riders - Option 5: Nordhoff - NoHo via Haskell

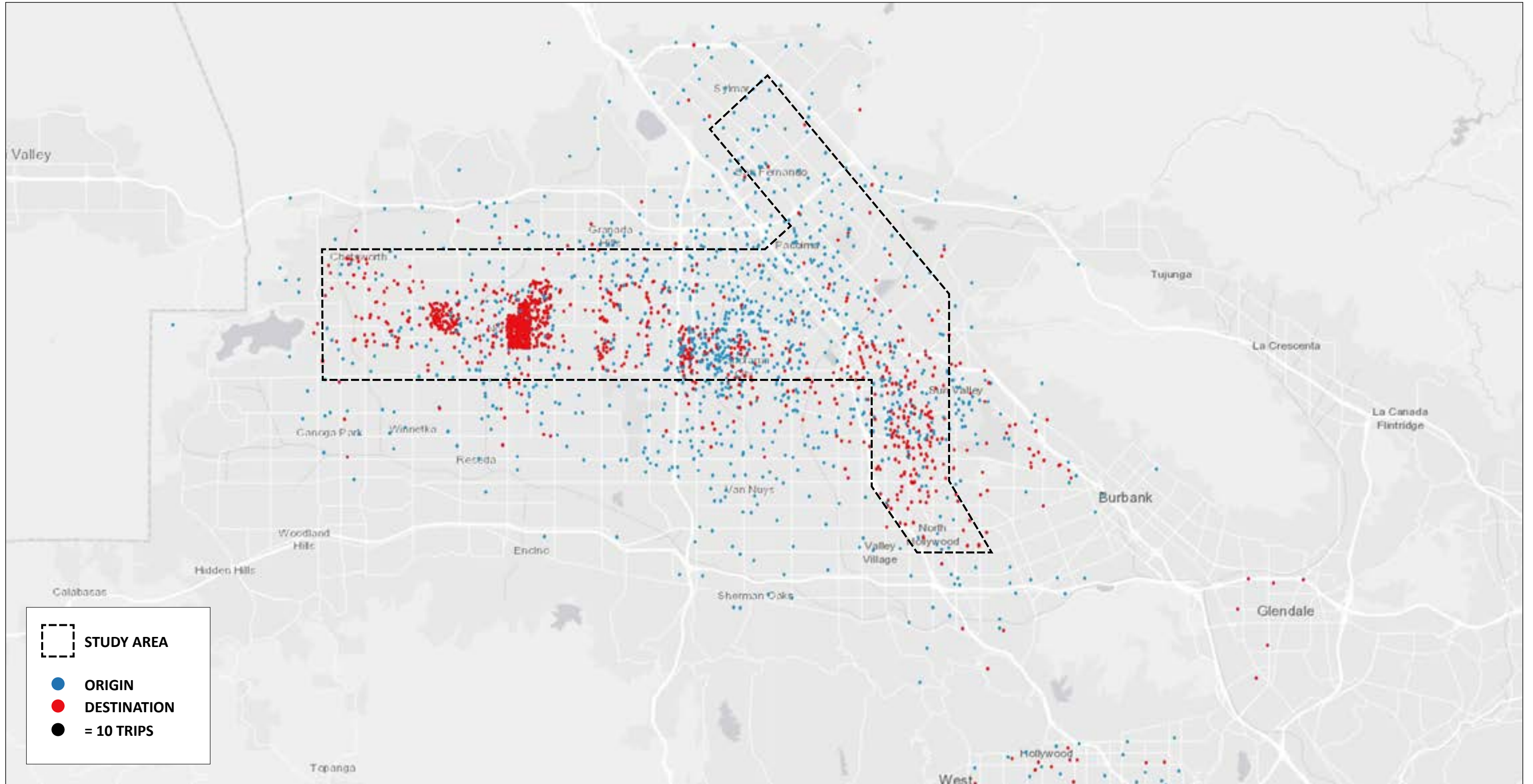
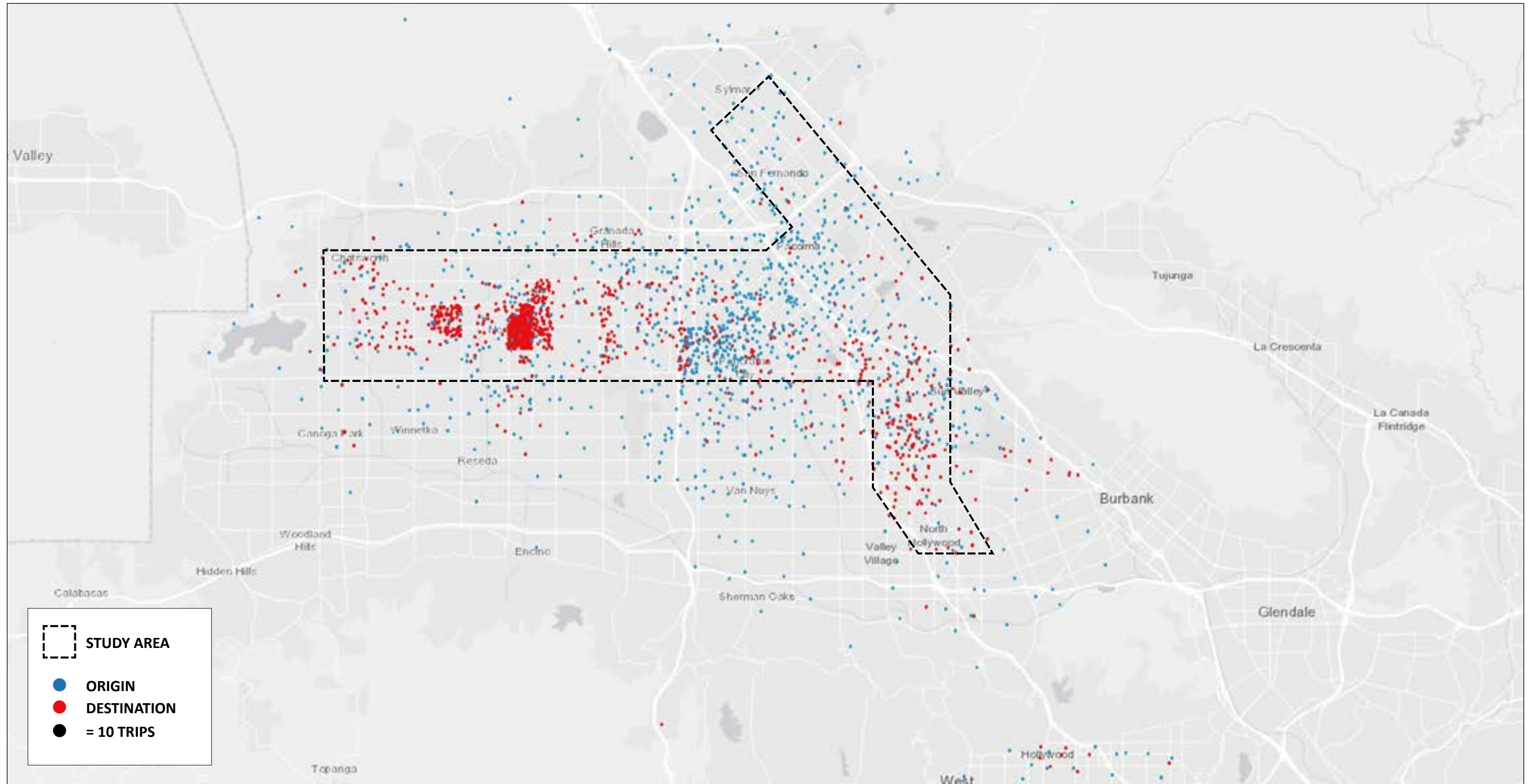


Figure 4-13: New Transit Riders - Option 7: Nordhoff - NoHo via Woodman



4.7 Operating Plans and Service Characteristics

This section defines the possible operational characteristics of the configuration options under study. For all BRT alignment options under consideration, the proposed service span and frequency for the BRT service is assumed to be identical. Proposed span and frequencies are subject to refinement based on the results of further analysis and definition of the proposed project during subsequent phases of project development.

Conceptual BRT Operating Characteristics

The NSFV BRT is anticipated to operate primarily in dedicated lanes with dedicated stops. BRT lanes would either be median-running or side-running, with potential mixed flow segments. Conceptual examples of side running and median running BRT configurations are illustrated in Figure 4-14.

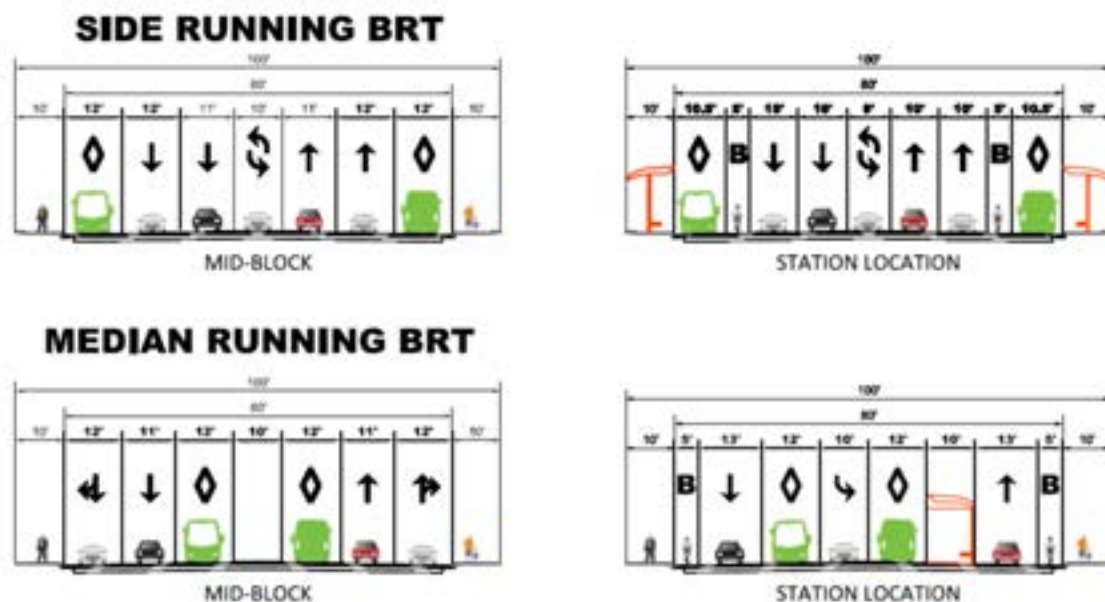


Figure 4-14: Example Cross Sections for Side and Median Running BRT

Median-running BRT provides the least amount of interference with local buses since local buses would continue to stop in the curb lane. If BRT is side-running (in a dedicated curbside lane), then local buses could potentially also use this lane, causing challenges given more frequent stops on local buses. The BRT buses would likely need to occasionally move into mixed flow traffic lanes to pass up local buses making interim stops, slowing BRT operations while causing impacts to mixed flow traffic despite having a dedicated BRT lane. While BRT can share stops with local buses, it is anticipated that BRT will have dedicated stations and a separate loading area, even if serving the same intersection. This separation is less likely to cause queuing of buses and allows BRT stations to retain distinctive branding.

As the project progresses, the lane configuration and additional specifics will be confirmed for a narrowed set of alternatives, including the extent of expected Transit Signal Priority and queue jumps. This refinement would allow the detailed calculation of travel time estimates based on specific operating environment (median-running, side-running or mixed flow), degree of transit

signal priority, etc., which in turn allows the calculation of service statistics, fleet requirements, and annual operating and maintenance (O&M) costs.

Conceptual BRT Service Characteristics

The service span is based on the Metro Red Line, with 21 hours per day Sunday through Thursday and longer hours on Fridays and Saturdays. Weekday BRT service is assumed to operate at 5-minute service frequencies during the peak period and 10-minute service frequencies in the midday, with tapering service levels on evenings. Weekend service is assumed to be 10 minutes all day, tapering in the evenings. Future stages of project development would consider refinement to potentially reflect tapering service at one or both ends of the route. Proposed BRT service span and service frequencies are summarized in Table 4.4 and Table 4.5.

	EARLY	AM PEAK	MIDDAY	PM PEAK	EARLY EVENING	EVENING	NIGHT
Monday-Thursday	4-6a	6-9a	9a-3p	3-7p	7-9p	9p-12a	12-1a
Friday	4-6a	6-9a	9a-3p	3-7p	7-9p	9p-12a	12-3a
Saturday	4-6a	6-9a	9a-3p	3-7p	7-9p	9p-12a	12-3a
Sunday/Holiday	4-6a	6-9a	9a-3p	3-7p	7-9p	9p-12a	12-1a

Table 4.4: Proposed BRT Service Span

	EARLY	AM PEAK	MIDDAY	PM PEAK	EARLY EVENING	EVENING	NIGHT
Monday-Thursday	15 min	5 min	10 min	5 min	15 min	20 min	20 min
Friday	15 min	5 min	10 min	5 min	10 min	20 min	20 min
Saturday	30 min	10 min	10 min	10 min	10 min	20 min	20 min
Sunday/Holiday	30 min	10 min	10 min	10 min	10 min	20 min	20 min

Table 4.5: Proposed BRT Service Frequency

Peak Load Analysis

In order to confirm whether the proposed BRT service levels are appropriate based on expected passenger loads, a peak hour load analysis was performed. Based on the natural breaks that were found in the ridership estimates and operational assessment of the corridors, analysis was performed for three main segments: Chatsworth Station to Reseda Boulevard, Reseda Boulevard to Van Nuys Boulevard, and Van Nuys Boulevard to Eastern Terminus (North Hollywood Station or Sylmar Metrolink Station).

The peak hour load analysis estimates the maximum number of riders on the bus during the single busiest hour of the day in the busiest direction, based on boardings and alightings along

the route. The number of riders is then compared to the capacity per vehicle (80 passengers per articulated bus during the peak period, per Metro’s defined transit standards). The number of required buses per hour is calculated, then translated to a required minimum peak service frequency range.

Regardless of alternative, the peak hour load analysis consistently showed that by far the heaviest loads occur in the Reseda Boulevard to Van Nuys Boulevard segment. The next heaviest loads are in the segment east of Van Nuys Boulevard, followed by the Chatsworth to Reseda Boulevard segment.

A summary of the segment-level minimum required peak period headways for the three alignment options and their variations is shown in Table 4.6. This peak hour load analysis confirms that 5-minute peak period service frequencies and 10-minute midday service frequencies are expected for the most part to address peak demand.

ALIGNMENT OPTIONS	CHATSWORTH-RESEDA	RESEDA-VAN NUYS	VAN NUYS-NOHO	VAN NUYS-SYLMAR
Option 1: Roscoe-NoHo via Reseda	15-20 min	4-5 min	10-15 min	-
Option 2: Roscoe-NoHo via Lindley	15-20 min	4-5 min	10-15 min	-
Option 3: Nordhoff-Sylmar/San Fernando	13-18 min	4-5 min	-	10-20 min
Option 4: Nordhoff-NoHo via Woodley	13-18 min	4-5 min	10-15 min	-
Option 5: Nordhoff-NoHo via Haskell	13-18 min	4-5 min	10-15 min	-
Option 6: Nordhoff-NoHo via Sepulveda	13-18 min	4-5 min	10-15 min	-
Option 7: Nordhoff-NoHo via Woodman	13-18 min	4-5 min	10-15 min	-

Table 4.6: Summary of Minimum Required Peak Period Headways

4.8 Operating and Maintenance Cost Estimates

Operating and maintenance (O&M) cost estimates were developed using operating statistics which included annual revenue hours, annual revenue miles, peak vehicles, total vehicles, station platforms, directional lane miles, and maintenance facility needs. Using these statistics, O&M cost models were developed to estimate the annual cost to operate, maintain and administer the NSFV BRT. The estimated annual O&M costs for BRT service for all options range from about \$22 to \$23 million annually as shown in Table 4.7. The differences are due to the number of stations and miles of dedicated bus lane variations between the options.

ALIGNMENT OPTIONS	ANNUAL O&M COST
Option 1: Roscoe-NoHo via Reseda	\$23,188,000
Option 2: Roscoe-NoHo via Lindley	\$23,188,000
Option 3: Nordhoff-Sylmar/San Fernando	\$22,364,000
Option 4: Nordhoff-NoHo via Woodley	\$22,644,000
Option 5: Nordhoff-NoHo via Haskell	\$22,644,000
Option 6: Nordhoff-NoHo via Sepulveda	\$23,222,000
Option 7: Nordhoff-NoHo via Woodman	\$23,058,000

Table 4.7: Metro Annual O&M Cost Estimates (2018 Dollars)

4.9 Capital Cost Estimates

Capital cost estimates were developed for each of the seven alternatives. The cost estimates were developed using the Federal Transit Administration (FTA) Standard Cost Category (SCC) format, which allows for useful comparisons with other BRT projects nationwide. The estimate utilizes parametric models based on key inputs. A precise capital cost estimate is not yet available for the project as a number of elements are still under study and the project will continue to be refined through the environmental and project development process. It is expected that this will result in a change in the project cost estimate. However, it is useful to provide a rough order of magnitude cost to allow for comparisons between alignment options. The conceptual cost estimates for each alternative have wide ranges, which is indicative of each alternative’s route length and potential number of stations. Subsequent cost estimates will provide greater precision as scope elements such as alignment, number and style of stations, required systems, and required roadway and utility improvements are better defined. Some assumed elements, such as the ability to make use of existing Metro Orange Line facilities on either end of the route, maintenance storage and support facility requirements are subject to further analysis to confirm feasibility.

Table 4.8 shows high-level capital cost ranges for the alignment options. The costs also include placeholder costs for elements such as support facilities, right-of-way and vehicle purchases, which are to be defined in the environmental and conceptual engineering phases. Currently, the estimates use a contingency represented in the low and high range of accuracy to account for these unknowns in the table. The low and high end of the cost estimate range for each of the three corridors for the expected year of expenditure are shown below. The Roscoe-NoHo and Nordhoff-NoHo options are similar in terms of alignment lengths (16.8-17.1 miles) and potential station numbers (20 stations), therefore both have similar costs. Although the Nordhoff-Sylmar/San Fernando option is similar in route length (16.7 miles) to the other options, it has the least number of station locations (16 stations) and therefore has the lowest capital costs.

UNIT COST/ ASSUMPTION		OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5	OPTION 6	OPTION 7
Project Distance (route-mi)		17.1	17.1	16.7	17.1	17.1	17.1	16.8
Estimated Number Stations/Platform Pairs:		20	20	16	20	20	20	20
Expected Year of Expenditure Total (Million YOES)		\$334.1	\$334.0	\$316.5	\$330.6	\$330.6	\$333.3	\$328.5
Low Range of Accuracy	-10%	\$300.7	\$300.6	\$284.9	\$297.5	\$297.5	\$300.0	\$295.7
High Range of Accuracy	25%	\$417.7	\$417.5	\$395.7	\$413.2	\$413.2	\$416.6	\$410.7
Notes:								
1. Dollar values are given in Year of Expenditure (YOES). The estimate was prepared with a 2019 base year and escalated using 4.5% annual inflation.								
2. Percentages for Range of Accuracy given here are for use in comparing to similar Metro BRT projects. Per AACE Class 4, with low level of design, range of accuracy would be -30% to +50%.								
3. Project Distances do not include Metro Orange Line from Nordhoff to Chatsworth Depot, and Number of Stations does not include Chatsworth Depot.								

Table 4.8: Preliminary Alternatives Capital Cost Estimates

4.10 Transit Oriented Communities (TOC) Corridor Overview

Transit Oriented Communities are places (such as corridors and neighborhoods) that, by their design, allow people to drive less and access transit more. A TOC maximizes equitable access to a multi-modal transit network as a key organizing principle of land use and holistic community development. Because Metro is responsible for planning, constructing, and operating transit service, and local jurisdictions are responsible for land use policies and design and maintenance of the public realm, the TOC analysis emphasizes the following core considerations:

- Identifying the existing land uses and planned developments that will support sufficient ridership for the alignment of BRT and the placement of stations.
- Utilizing the expansion of BRT to support smart growth and placemaking opportunities at key points in pursuit of more sustainable, equitable, and multimodal communities.
- Increasing access to employment, educational, and leisure opportunities for Valley residents, while making it easier for visitors to access the area without a car.

In order to evaluate the proposed alignments based on the philosophy of TOCs, the technical team performed a quantitative analysis of the proposed alignment options utilizing a parametric design algorithm that aligns with the TOC Vision, Methodologies, and Screening Criteria developed for this project. This data-driven approach analyzed hundreds of intersections along the alignment options and ranked the options based on their fit for social, physical, supportive, and connective planning factors. It identified top-performing intersections for TOC potential, and analyzed multimodal travel sheds to help visualize which alignment options would most increase accessibility based on a user’s combination of transit and active transportation (walking, bike, e-scooter, and e-bike).

Unlike a light rail line or a BRT system such as the Metro Orange Line that operate on their own dedicated right of way, the NSFV BRT project will not acquire significant amounts of land for its operations. TOC efforts for the project are therefore focused on the alignment design and community engagement processes, and the TOC opportunities assessment can be used to help inform the station location process. TOC activities that occur at greater distances from the BRT route or that require more intensive land acquisition would require additional policy or financial support from local jurisdictions or other agencies.

Alignment Option Rankings

Based on a pure output of results from the parametric algorithm, the TOC Scorecard ranked the alignment options as noted in Table 4.9.

ALIGNMENT OPTION	RANK (PARAMETRIC)
Option 6: Nordhoff – NoHo via Sepulveda	1
Option 1: Roscoe – NoHo via Reseda	2
Option 5: Nordhoff – NoHo via Haskell	3
Option 2: Roscoe – NoHo via Lindley	4
Option 4: Nordhoff – NoHo via Woodley	5
Option 7: Nordhoff – NoHo via Woodman	6
Option 3: Nordhoff – Sylmar	7

Table 4.9: Parametric Ranking of Alignment Options

In order to provide a more holistic approach, the technical team incorporated additional consideration of the top performing intersections, multi-modal sheds analysis, and qualitative evaluations of existing conditions, land uses, and barriers into the alignment rankings. The refined alignment option rankings are presented in Table 4.10. Although the Roscoe-NoHo (Options 1-2) and Nordhoff-NoHo (Options 4-7) alignments received TOC scores that were quantitatively similar, the unique conditions and concentration of jobs along Roscoe Boulevard between the Van Nuys Airport and Interstate 405 skewed the quantitative evaluation of Options 1 and 2.

The large industrial/distribution land uses in this area are powerful barriers to the short-term development of TOCs. Zoning changes and/or coordinated redevelopment efforts could unlock future TOC potential for these options, but these significant changes would likely extend far past the project delivery window. The Roscoe-NoHo options also directly served fewer top performing intersections, and as a result, the technical team moved both Options 1 and 2 down in the rankings.

Option 3: Nordhoff-Sylmar/San Fernando scored the lowest on all aspects of the parametric analysis. It received the lowest score in the TOC scorecard, had the fewest top performing intersections, and did not significantly increase multi-modal accessibility because it is duplicative of both existing (Metro Rapid) and future (East San Fernando Valley LRT) high-quality transit service. No adjustment to its ranking was necessary.

Options 4 through 6 received the highest ratings because they connect to the most key activity centers and to regional transit, scored highly in the initial parametric ranking, provide the greatest number of connections to top performing intersections, and increase multi-modal accessibility throughout the project study area.

ALIGNMENT OPTION	ADJUSTED RANK	ORIGINAL RANK
Option 6: Nordhoff – NoHo via Sepulveda	1	1
Option 5: Nordhoff – NoHo via Haskell	2	3
Option 4: Nordhoff – NoHo via Woodley	3	5
Option 7: Nordhoff – NoHo via Woodman	4	6
Option 1: Roscoe – NoHo via Reseda	5	2
Option 2: Roscoe – NoHo via Lindley	6	4
Option 3: Nordhoff via Sylmar	7	7

Table 4.10: Refined Alignment Option Rankings

Top-Performing Intersections

The concentration of top performing TOC intersections in two areas highlights the importance of the project traveling through Panorama City (preferably along Parthenia Street), and terminating at the Metro North Hollywood Station. The high level of development activity, existing density, and connections to high-quality transit at these sites are high drivers of TOC potential. These areas best support the Project Objectives and Metro TOC goals, and the following intersections should be considered during the station placement process.

1. Tujunga Avenue and Chandler Boulevard

All Roscoe – NoHo (Options 1 and 2) and Nordhoff – NoHo (Options 4-7) alignment options connect to the major Metro Joint Development project at the North Hollywood Station adjacent to the intersection of Tujunga Avenue and Chandler Boulevard. The high density development taking place in this area, along with connections to multiple high-quality lines in the regional transit network, make it a top priority for TOC treatments.

2. Van Nuys Boulevard and Roscoe Boulevard

Except for Option 7: Nordhoff-NoHo via Woodman, all of the North Hollywood-terminating alignment options highlight the intersection of Van Nuys Boulevard and Roscoe Boulevard as one of the most important TOC opportunities in the project area. The planned ICON at Panorama City development nearby combined with greatly expanded regional transit connectivity at this potential transfer point between NSFV BRT and the East San Fernando Valley Rail Transit Corridor make this a critical juncture.

3. Van Nuys Boulevard and Chase Street

In the same area, Van Nuys Boulevard intersects with Chase Street and Parthenia Street to suggest additional TOC potential, and the clustering of high-ranking points in the Panorama City area indicates that a corridor-length TOC approach should be considered. Chase Street provides connections to the regional bike network, with striped lanes running east-west to adjacent neighborhoods, while striped lanes run along Van Nuys Boulevard north of Parthenia Street. Parthenia Street provides access to additional key activity centers like the Sepulveda Recreation Center and North Hills Community Park, and a walkable connection through one of the most densely-populated neighborhoods in the study area.

4. Lankershim Boulevard and Burbank Boulevard

A quarter-mile north of the North Hollywood Station, the area adjacent to the intersection of Lankershim Boulevard and Burbank Boulevard is experiencing additional infill development, with the development of a new Holiday Inn Express hotel and the Aura apartment complex at 11430 Burbank Boulevard. Existing bike lanes along Burbank Boulevard increase multimodal connectivity, and additional protection for cyclists could help support multimodal travel.

5. Sepulveda Boulevard and Rayen Street

The intersection of Sepulveda Boulevard and Rayen Street performs highly due to a planned four building apartment complex with 364 units—including 44 affordable housing units—the most significant recent residential construction along a largely

commercial corridor. In addition to the NSFV BRT, residents will be able to access high-quality north-south transit at the Metro Rapid 734 bus route's stops at both Nordhoff Street and Roscoe Boulevard. The Sepulveda corridor is also one of the most dangerous in Los Angeles and is slated for prioritization in the City's Vision Zero initiative covered in Section 4.

Wherever possible, development of the NSFV BRT should be coordinated with Vision Zero efforts and other programs by local jurisdictions to create safer streets for bicyclists, pedestrians, and other non-automotive travel. Along the proposed alignment options, the intersections of Sepulveda Boulevard and Parthenia Street, and Lankershim Boulevard and Oxnard Street are located in the top quintile of the Los Angeles Health and Equity Index areas, and are therefore eligible for prioritization in the Los Angeles Department of Transportation's streetscape improvements program.

Given limited resources, TOC applications should focus on the Vision Zero High Priority Intersections and Corridors adjacent to the chosen alignment where additional local funding can be prioritized to augment Metro's own project budget. Options 4 and 5 provide the greatest number of intersection opportunities for this holistic planning effort, and Option 6 runs along Sepulveda Boulevard, a Vision Zero Priority Corridor.

Local jurisdictions should also direct resources to adding sidewalks where there are none and improving sidewalks that are not ADA compliant in order to address First/Last Mile gaps and make transit easier to use. Curb extensions at sidewalks and improved crosswalks in particular are agreed upon by Metro and City of Los Angeles policies as important street treatments. Given the high temperatures experienced in the San Fernando Valley, station treatments should focus on providing shade and protection from the elements. Once a preferred alignment is chosen and the station selection process is begun, community outreach activities (such as walk audits) and consultation with key stakeholders should be used to leverage local knowledge in order to identify the TOC-supportive treatments that are most needed by residents.

5 Public and Agency Outreach

5.1 Public Outreach Program

The public engagement program for this project was intended to provide Metro and the consultant technical team with broad-based public input from potential transit riders and representatives of land uses that would be served by transit as to the preferred alignment, station locations and service parameters.

Metro conducted an outreach and public engagement strategy that was intended to engage and inform stakeholders through traditional and non-traditional outreach approaches and encourage them to provide input on the project. This process included a wide range of opportunities for feedback that was designed to be transparent and inclusive. The outreach effort has also been guided by the Metro Equity Platform Framework adopted by the Metro Board in February 2018, ensuring outreach includes meaningful engagement with historically underserved communities. Since June 2018, the Metro team has met regularly with the local cities, key stakeholders, and the public within the project area. By the conclusion of the pre-scoping meetings in November 2018, Metro had held a total of 18 stakeholder meetings and five community meetings, with the goal of informing the public about the proposed project, gathering input, and hearing community issues, concerns and suggestions.

The Metro team developed a stakeholder database of over 2,000 contacts in the San Fernando Valley to initiate and coordinate communication with the communities in and around the project area. The database for the project consisted of community leaders and key stakeholders in and around the project area, including agencies, elected officials, neighborhood and community groups, civic associations, business groups, and Chambers of Commerce religious institutions, and the media. Outreach efforts included a project website, email address and telephone line all of which accepted comments from the public. Facebook was used to promote the community meetings by posting meeting information and sending reminder notices to followers.



Northridge Community Meeting (Photo: Metro)

In addition to formal community outreach meetings, the Metro team conducted several outreach efforts at events in the study area. These “pop up” outreach events included street fairs, farmers markets and other type of events. The events attended were selected in part to broaden the outreach team’s efforts to reach historically underserved communities. On each such occasion Spanish-speaking team members had a booth with bilingual project information (Fact Sheets, comment cards) to hand out and boards and/or maps showing the project.

5.2 Stakeholder Feedback

Throughout the duration of the pre-scoping period, a total of 208 comments were collected via email, social media, the project website, letters, public comments, sticky notes, flip charts, comment cards, and through the phone line.

A breakdown of the number of comments collected via each method are included below:

- 16 comments via email
- 27 comments via social media
- 8 comments via a comment form on the project website (Wufoo)
- 0 comments via written letters
- 0 calls via the information phone line;
- 31 written and public comments at the community meetings
- 98 comments via sticky notes on aerial maps at the community meetings
- 28 comments via sticky notes at the other “pop up” events



CSUN Community Meeting (Photo: Metro)

A small percentage of the comments expressed a preference for a specific alternative. They more often included comments on station location preferences or asked questions about the alignment alternatives.

The following key takeaways were received from the public outreach process:

- **General Support for the Proposed Project:** Stakeholders and agencies generally agreed the project is needed to improve mobility in the North San Fernando Valley area and to enhance the regional transit network. There was near universal agreement that the Metro Orange Line is a great transit project. CSUN students and teachers reiterated a need for enhanced transit in North San Fernando Valley. Some attendees expressed a preference for light rail over buses and there was some opposition to bus-only lanes on the Lankershim Boulevard portion of the alternatives. The San Fernando Valley Council of Governments (SFV COG) unanimously passed an amendment to add the NSFV BRT project to its 2019 Transportation Priorities list. CSUN is the largest stakeholder and travel generator in the study area, so the formal comment letter from CSUN President Diane Harrison expressing support for the project and the planning process was another demonstration of the greater San Fernando Valley community’s support for the project.
- **Alternatives Preference:** More stakeholders supported the eastern terminus being the North Hollywood Station rather than the Sylmar/San Fernando Metrolink Station. This was due to two reasons; (1) they liked the connection to the regional transit system and access to Downtown LA provided by the transfer opportunity to the Red Line, and (2) they felt that the ESFV light rail provided a connection to the Sylmar/San Fernando Metrolink station and a BRT alternative would be duplicative and competitive with the LRT route.

The Parthenia option received support because it avoided the congested I-405 ramp intersections, has a lot of apartments and no existing bus service. Several commenters suggested that a route further to the north be considered, citing Lassen, Plummer and Devonshire as potential alternatives. A number of commenters liked both the Roscoe and Nordhoff to North Hollywood alternatives.

- **Station Preferences:** There was a strong consensus that a station at CSUN should be located at Nordhoff and Lindley, in addition to a station at Nordhoff and Reseda, since it was closer to the center of Campus. Other popular station locations included the Kaiser Permanente Medical Center on Roscoe, the Northridge Fashion Center, James Monroe High School on Nordhoff, and the interface with the planned ESFV light rail project on Van Nuys Boulevard.
- **Environmental Impact Concerns:**
 - **Traffic:** Stakeholders are concerned that traffic is already congested on both Nordhoff and Roscoe, particularly near the I-405 freeway, near CSUN and at the intersections on Van Nuys Boulevard where the light rail line will be implemented. Several expressed concerns about removing existing travel lanes.
 - **Noise:** Residents who live adjacent to the potential alignments are concerned about potential noise impacts.
 - **Property Impacts:** Stakeholders expressed concerns that the NSFV BRT project would require acquisition of property through eminent domain. Stakeholders also expressed concerns about the project restricting access to fronting properties, in particular, median bus lanes could preclude left turns to/from driveways.
 - **Safety/Security:** Stakeholders expressed concerns about safety issues related to waiting for buses at stations and walking to stations. They were also concerned about existing homeless persons on the buses. The cleanliness of buses was also an expressed concern.
 - **Bicycle Access:** Several meeting attendees wanted to make sure that the buses would have adequate capacity to carry bicycles and that the bus lanes would not displace bicycle lanes. Allowing bicyclists to ride in the bus lanes was supported.

5.3 Next Steps

During the next phase of environmental review, Metro will coordinate closely with the community along the corridor to design BRT elements that complement and enhance the unique community character. Metro will also be conducting a series of public scoping meetings to solicit community input and help further shape the project. Community outreach efforts will continue to include innovative and comprehensive approaches that engage historically underserved communities with the intention of producing outcomes that promote and sustain opportunities and avoid increasing disparity.

6 Screening of Alternatives

6.1 Evaluation Screening Process Development

In order to determine which alternatives would be taken into environmental review, the alternatives were evaluated with a three-step quantitative and qualitative screening process. Each step gradually filters down to the higher performing alternatives to ultimately identify the project corridor that is expected to perform at the highest levels and meet the project objectives based on the screening criteria. The screening process is divided into three steps.

Step 1

Step 1 in the screening process is a high-level assessment of the potential alignment concepts based on mostly qualitative factors to determine how well the concepts could fulfill the project objectives. Evaluation criteria considered in this step includes forecast ridership and boarding data, and potential for economic development. As the result of this initial screening, a selection of the potential alignment concepts was recommended to move forward to the next step in the screening process.

Step 2

Step 2 in the screening process still contains the qualitative assessment from Step 1 but considers additional measures such as land uses served, feedback from public outreach, and constraints such as at-grade rail crossings. This second level screening process provides insights into potential project benefits and impacts for the remaining alternatives.

Step 3

Step 3 in the screening process is to identify the Preferred Alternatives to move forward into Environmental Analysis. This screening includes the same qualitative and quantitative measures of effectiveness identified under the Step 2 screening process, but places a more focused lens on each of the previous criteria.

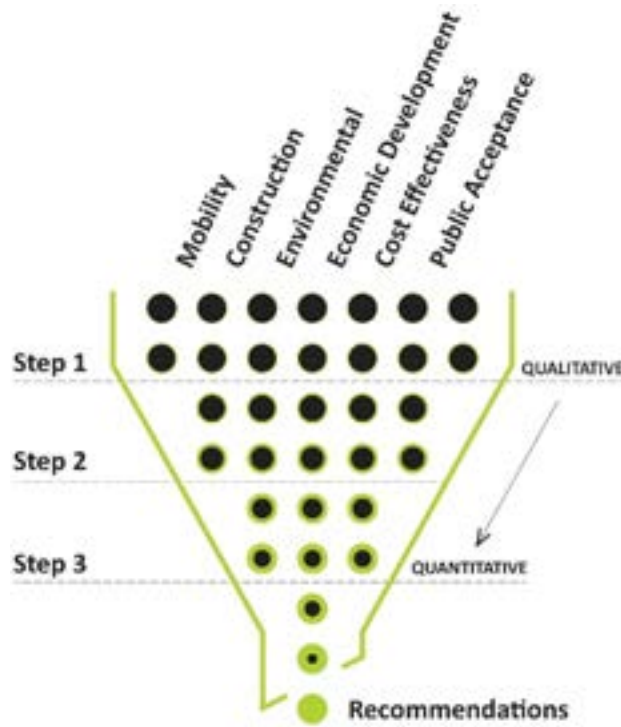


Figure 6-1: Screening Process

Quantification of performance is possible at this level of conceptual planning but it is important to note that the numbers are only for relative comparison purposes between the alternatives. At this high level, values such as ridership and costs lack precision which can only be generated as more detailed planning and engineering is performed.

A “high”, “medium”, or “low” rating system is used to identify performance at each step. The use of a “high”, “medium”, or “low” rating system allows for a comparative analysis of the trade-offs between the alternatives and each alignment’s ability to best meet the project objectives. Table 6.1 describes the high, medium, and low ratings.




Rating	Description
 HIGH	A high rating indicates the alternative highly supports and satisfies the criterion, or has a low potential for negative impacts.
 MEDIUM	A medium rating indicates the alternative moderately supports the criterion, or has a moderate potential for negative impacts.
 LOW	A low rating indicates that an alternative does not support or conflicts with the criterion, or has a high potential for negative impacts.

Table 6.1: Screening Rating Descriptions

6.2 Evaluation Criteria

Six categories for evaluation were developed to help screen the alternatives. Criteria were developed for each evaluation category that are reflective of the project objectives that were discussed in Chapter 2. The categories are as follows:



Mobility: This category evaluates how the alternative affects the ability of the BRT to move easily, reliably and quickly, as well as opportunities for bicycle and pedestrian connections, and potential changes to existing traffic.



Construction Impacts: This category primarily evaluates the extent of potential conflicts with existing infrastructure, right of way, and utilities.



Environmental Impacts: This category is a high level qualitative environmental assessment of the degree to which an alignment concept would introduce a potentially significant adverse environmental impact to the study area. The detailed assessment for many of the environmental criteria will be addressed during the environmental analysis phase. This category also included CalEnviroScreen's metric of environmental equity.



Economic Development Impacts: This category evaluates how the alternatives impact or benefit the economic well-being of the community, particularly as it relates to the overall connection to existing employment centers and key activity centers and the potential for transit oriented communities to thrive.



Cost Effectiveness: This category evaluates the costs associated with each alternative and comparison to other similar Metro transit projects.



Public Acceptance: This category considers the public and key stakeholder input as well as compatibility with local and regional plans.

Table 6.2 summarizes the evaluation criteria that were used as part of the evaluation screening of project alternatives.





CATEGORY	EVALUATION CRITERIA	APPROACH
Mobility	Parking Impacts	Examine on-street parking conditions and estimate parking lost due to BRT lanes via Google and field observations.
	Existing Traffic	Assess the potential existing congestion levels along each alignment concept using transportation model numbers and high-level intersection review (at select critical intersections), number of intersection closures or potential turning restrictions.
	Travel Time Savings	Model transit operating speeds and compare by concept and as a percentage of modeled auto travel speeds along each alignment alternative.
	Reliability	Using ridership model data, observe areas where reliability would be at risk due to corridor constraints or congestion.
	Ridership	Model each alignment concept to determine ridership estimates to evaluate relative differences between the alignments and whether they are adding new trips to the regional transit network.
	Improvements to System Connectivity	Assess number of transfer opportunities with existing bus routes (local, Rapid and other BRT) and rail for each concept.
	First/Last Mile Connections	Qualitative assessment of the potential to add First/Last Mile improvements for each concept, and whether the alignment is compatible with pedestrian and bicycle infrastructure projects or plans.
Construction Impacts	Physical Fit and Ease of Construction	Evaluate extent of potential conflicts with existing infrastructure, ROW, and utilities.
Environmental Impacts	Visual and Aesthetics	Identify potential visual impacts experienced by nearby residents and businesses.
	Social (Equity)	Map existing disadvantaged communities utilizing CalEnviroScreen and other transit dependent socioeconomics.
	Displacement of Existing Uses	Identify households and other infrastructure affected by possible BRT along each alignment alternative.

CATEGORY	EVALUATION CRITERIA	APPROACH
	Land Use	Map existing and proposed land uses along each alignment alternative and assess compatibility of each alignment with existing land use patterns, including accessibility to and from properties.
Economic Development Impacts	Access to/from Employment Centers	Qualitative assessment and mapping of employment centers along each concept.
	Access to/from Key Activity Centers	Qualitative assessment and mapping of major commercial, educational, recreational or institutional activity centers along each concept.
	Transit Oriented Communities (TOC)	
Cost Effectiveness	Overall Project Costs	Develop order of magnitude capital costs for each concept.
	Cost Effectiveness	Examine unit costs from prior Metro BRT projects. (Unit cost measures; cost per rider, etc.)
Public Acceptance	Input from the public and key stakeholders	Utilize input received from community meetings, stakeholder briefings, project website, emails, hotline and social media campaigns, and pop-up outreach activities.
	Compatibility with Local and Regional Plans	Examine local and regional plans (Metro and non-Metro plans) to determine the degree to which the alignment concepts are compatible.

Table 6.2: Screening Evaluation Criteria

6.3 Step 1 Screening Results

Tables 6.3 through 6.9 summarize how each alternative satisfied the Step 1 evaluation criteria supplemented by the high, medium, low rating system, and whether the alternative is recommended for further analysis or eliminated from further consideration.

OPTION 1: ROSCOE-NOHO VIA RESEDA	
<p>Mobility</p> 	<p>The option has estimated daily boardings of approximately 26,328 and an increase in system-wide linked transit trips of 10,570.</p> <p>This option provides multiple transfer opportunities with connections to Chatsworth Orange Line/Metrolink Station, future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, Woodley Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard. The route would also share the roadway with existing Class IV protected bikes lanes along Reseda Boulevard.</p>
<p>Environmental Impacts</p> 	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this route, particularly east of I-405.</p>
<p>Economic Development Impacts</p> 	<p>The option provides access to multiple employment and key activity centers in the study area including Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, Panorama Mall, and Mission Community Hospital. Reseda Boulevard is a commercial corridor and would connect to land uses along Reseda Boulevard and to Dignity Health – Northridge Hospital, but this option does not provide direct access to California State University, Northridge (CSUN).</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$301M-\$418M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are \$23,188,000, similar to all other alternatives.</p>
<p>Public Acceptance</p>	<p>This option is compatible with local and regional plans.</p> <p>The community input showed more preference for the NoHo terminus than the Sylmar line. There were station preferences for Northridge Fashion Center, CSUN, Kaiser</p>





	<p>Permanente Medical Center and to interface with the planned ESFV light rail on Van Nuys Boulevard. There was a strong consensus that a station at CSUN should be located at Nordhoff and Lindley, as opposed to Nordhoff and Reseda, because Reseda Boulevard is about a half of a mile west of the central CSUN campus.</p>
RECOMMENDATION: ADVANCE TO STEP 2	
<p>This option is recommended for further evaluation because it performs well in most categories receiving a high score in all but Public Acceptance, which it receives an average rating because of a preference for the Lindley connection to CSUN, and Mobility, which it receives an average rating because the ridership is not as high as other alternatives under this screening level.</p>	

Table 6.3: Step 1 Screening Results – Roscoe-NoHo via Reseda

OPTION 2: ROSCOE-NOHO VIA LINDLEY	
<p>Mobility</p> <p style="text-align: center;"></p>	<p>The option has estimated daily boardings of approximately 26,516 and an increase in system-wide linked transit trips of 10,900 both which are slightly higher than its counterpart alternative that uses Reseda Boulevard to access Roscoe Boulevard.</p> <p>This option also provides multiple transfer opportunities with connections to Chatsworth Orange Line/Metrolink Station, future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Woodley Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Roscoe-NoHo and Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard.</p>
<p>Environmental Impacts</p> <p style="text-align: center;"></p>	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this corridor, particularly east of I-405.</p>
<p>Economic Development Impacts</p> <p style="text-align: center;"></p>	<p>The option provides access to multiple employment and key activity centers in the study area including Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, Panorama Mall, and Mission Community Hospital. Lindley Avenue is primarily a residential street but does offer direct access to CSUN; however, it misses the commercial land uses along Reseda Boulevard and does not provide direct access to Dignity Health – Northridge Hospital.</p>





<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$301M-\$418M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are similar to all other alternatives at \$23,188,000.</p>
<p>Public Acceptance</p> 	<p>The option is compatible with local and regional plans.</p> <p>The community input showed more preference for the NoHo terminus than the Sylmar. There were preferences for stations at Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center and interface with the planned LRT on Van Nuys Boulevard. There was a strong consensus that a station at CSUN should be located at Nordhoff and Lindley, as opposed to Nordhoff and Reseda, because Reseda Boulevard is about a quarter of a mile west of the CSUN campus.</p>
<p>RECOMMENDATION: ADVANCE TO STEP 2</p>	
<p>This option is recommended for further evaluation because it receives a high or average rating in all categories similar to the Roscoe-NoHo via Reseda option.</p>	

Table 6.4: Step 1 Screening Results – Roscoe-NoHo via Lindley

<p>OPTION 3: NORDHOFF-SYLMAR/SAN FERNANDO</p>	
<p>Mobility</p> 	<p>The option has estimated daily boardings of approximately 20,846 and an increase in system-wide linked transit trips of 9,603; the lowest daily corridor boardings and linked transit trips out of all the alternatives.</p> <p>This option provides transfer opportunities with connections to Chatsworth Orange Line/MetroLink Station, future East San Fernando Valley Light Rail, and Sylmar/San Fernando MetroLink Transit Station in addition to transfer opportunities with Metro Rapids and local buses. However, it is missing the additional rail and BRT transfer opportunities that the North Hollywood Station offers with the Metro Red and Orange Lines.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, Woodley Avenue, and Van Nuys Boulevard. Existing Class II bike lanes share the roadway along a portion of Glenoaks Boulevard and intersect the potential alignment at Van Nuys Boulevard.</p>
<p>Environmental Impacts</p> 	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this corridor, particularly east of I-405 on Nordhoff Street and in the City of San Fernando.</p>







<p>Economic Development Impacts</p> 	<p>The option provides access to Northridge Fashion Center and CSUN. However, the alignment on portions of Nordhoff Street, Osborne Street and Glenoaks Boulevard do not offer access to any key destinations or major employment centers as it is heavily dominated by single family residential and low-density uses.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$285M-\$396M (YOES). The estimates assumed a route length of 16.7 miles and 16 stations. At \$22,364,000, the O&M cost estimates are similar to all other alternatives. This option is less than the other alternatives but is reflective of the lesser number of station locations proposed.</p>
<p>Public Acceptance</p> 	<p>The option is compatible with local and regional plans.</p> <p>The community input showed more preference for the NoHo terminus than the Sylmar. There were station preferences for Northridge Fashion Center, CSUN, and to interface with the planned ESFV light rail on Van Nuys Boulevard.</p>
<p>RECOMMENDATION: ELIMINATE</p>	
<p>This option is not recommended for further evaluation because it does not perform well in the Mobility category as this alignment has the lowest ridership compared to all other options considered in this screening step. Additionally, it did not score as well in Public Acceptance category, because of a preference for the NoHo terminus and that once the East San Fernando Valley LRT is complete this option will provide redundant service to Sylmar. And while this option does provide access to several major employers and key destinations, the alignment on Osborne Street and Glenoaks Boulevard do not offer access to any key destinations or major employment centers that are found on Roscoe Boulevard and Lankershim Boulevard.</p>	

Table 6.5: Step 1 Screening Results – Nordhoff-Sylmar/San Fernando

OPTION 4: NORDHOFF-NOHO VIA WOODLEY	
<p>Mobility</p> 	<p>The option has estimated daily boardings of approximately 28,652 and an increase in system-wide linked transit trips of 13,566; among the highest daily corridor boardings and linked transit trips of all the alternatives.</p> <p>This option provides multiple transfer opportunities with connections to Chatsworth Orange Line/MetroLink Station, the future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Roscoe-NoHo and Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard.</p>
<p>Environmental Impacts</p> 	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this alignment, particularly east of I-405 on Nordhoff Street. This alignment also provides direct connections within the communities of Panorama City and North Hollywood, both of which have higher numbers of transit dependent populations.</p>
<p>Economic Development Impacts</p> 	<p>The option provides access to employment and key activity centers such as Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, James Monroe High School, and Panorama Mall.</p> <p>Under the TOC analysis, this option shares with all other options potential opportunities adjacent to the Metro Orange Line Busway and Chatsworth Orange Line/MetroLink station area.</p> <p>It shares potential TOC opportunities with the Nordhoff-NoHo alignments in the corridor along Lankershim Boulevard between Burbank Boulevard and Chandler Boulevard in the area adjacent to the Metro North Hollywood Station.</p> <p>It shares potential TOC opportunities with the Nordhoff-NoHo via Haskell, Nordhoff-NoHo via Sepulveda, and both Roscoe options in the highest potential corridor along Parthenia Street east of Sepulveda Boulevard, and area around the Panorama Mall and the adjacent intersections of Roscoe and Tobias and Roscoe and Van Nuys.</p>





<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$298M-\$413M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. Similar to all other alternatives, the O&M cost estimates are \$22,644,000.</p>
<p>Public Acceptance</p> 	<p>The option is compatible with local and regional plans.</p> <p>The community input showed preference for a connection to the NoHo Station. There were station preferences for Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center and interface with the planned East San Fernando Valley LRT on Van Nuys Boulevard.</p>
<p>RECOMMENDATION: ADVANCE TO STEP 2</p>	
<p>This option is recommended for further evaluation because it performs well receiving a high rating in every category.</p>	

Table 6.6: Step 1 Screening Results – Nordhoff-NoHo via Woodley

<p>OPTION 5: NORDHOFF-NOHO VIA HASKELL</p>	
<p>Mobility</p> 	<p>The option has estimated daily boardings of approximately 28,120 and an increase in system-wide linked transit trips of 12,709; among the highest daily corridor boardings and linked transit trips of all the alternatives.</p> <p>This option provides multiple transfer opportunities with connections to Chatsworth Orange Line/MetroLink Station, the future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, Woodley Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Roscoe-NoHo and Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard.</p>
<p>Environmental Impacts</p> 	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this route, particularly east of I-405 on Nordhoff Street. This alignment takes advantage of providing a direct connection within the communities of Panorama City and North Hollywood, both of which have higher numbers of transit dependent populations.</p>





<p>Economic Development Impacts</p> 	<p>The option provides access to employment and key activity centers such as Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, James Monroe High School, and Panorama Mall.</p> <p>Under the TOC analysis, this option shares with all other options potential opportunities adjacent to the Metro Orange Line Busway and Chatsworth Orange Line/Metrolink station area.</p> <p>It shares potential TOC opportunities with the Nordhoff-NoHo alignments in the corridor along Lankershim Boulevard between Burbank Boulevard and Chandler Boulevard in the area adjacent to the Metro North Hollywood Station.</p> <p>It shares potential TOC opportunities with the Nordhoff-NoHo-Woodley, Nordhoff-NoHo-Sepulveda, and both Roscoe options in the highest potential corridor along Parthenia Street east of Sepulveda Boulevard, and area around the Panorama Mall and the adjacent intersections of Roscoe and Tobias and Roscoe and Van Nuys.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$298M-\$413M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are \$22,644,000 similar to all other alternatives.</p>
<p>Public Acceptance</p> 	<p>The alignment is compatible to the local and regional plans.</p> <p>The community input showed preference for a connection to the NoHo Transit Station. There was station preferences for Northridge Fashion Center, CSUN, James Monroe High School, Kaiser Permanente Medical Center and interface with the planned East San Fernando Valley LRT on Van Nuys Boulevard.</p>
<p>RECOMMENDATION: ADVANCE TO STEP 2</p>	
<p>This option is recommended for further evaluation because it performs well receiving a high rating in every category.</p>	

Table 6.7: Step 1 Screening Results – Nordhoff-NoHo via Haskell

<p>OPTION 6: NORDHOFF-NOHO VIA SEPULVEDA</p>	
<p>Mobility</p> 	<p>The option has an estimated daily boardings of approximately 27,461 and an increase in system-wide linked transit trips of 11,717.</p> <p>This option provides multiple transfer opportunities with connections to Chatsworth Orange Line/Metrolink Station, future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p>










	This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, Woodley Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Roscoe-NoHo and Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard.
<p>Environmental Impacts</p> 	<p>All alignments are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the environmental analysis phase.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit along this route, particularly east of I-405 on Nordhoff Street. This option also provides direct connections within the communities of Panorama City and North Hollywood, both of which have higher numbers of transit dependent populations.</p>
<p>Economic Development Impacts</p> 	The option provides access to employment and key activity centers such as Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, James Monroe High School, and Panorama Mall.
<p>Cost Effectiveness</p> 	Capital costs are estimated at \$300M-\$417M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. Similar to all other options, the O&M cost estimates are \$23,222,000.
<p>Public Acceptance</p> 	The option is compatible with local and regional plans. The community input showed preference for a connection to the NoHo Transit Station. There were station preferences for Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center and interface with the planned East San Fernando Valley LRT on Van Nuys Boulevard.
RECOMMENDATION: ADVANCE TO STEP 2	
This option is recommended for further evaluation because it performs well receiving a high rating in every category.	

Table 6.8: Step 1 Screening Results – Nordhoff-NoHo via Sepulveda

OPTION 7: NORDHOFF-NOHO VIA WOODMAN	
<p>Mobility</p> 	<p>The option has estimated daily boardings of approximately 27,393 and an increase in system-wide linked transit trips of 11,985.</p> <p>This option provides multiple transfer opportunities with connections to Chatsworth Orange Line/Metrolink Station, the future East San Fernando Valley Light Rail, Metro North Hollywood Station, and future North Hollywood to Pasadena BRT in addition to transfer opportunities with Metro Rapids and local buses.</p> <p>This option shares existing First/Last Mile connectivity with all other options via perpendicular Class II bike lanes on Winnetka Avenue, Wilbur Avenue, Woodley Avenue, and Van Nuys Boulevard. It shares existing First/Last Mile connectivity with all Roscoe-NoHo and Nordhoff-NoHo options via perpendicular Class II bike lanes on Sherman Way, Burbank Boulevard, and Chandler Boulevard.</p>
<p>Environmental Impacts</p> 	<p>All options are currently proposed to be within the street right-of-way; therefore, minimal to no property displacements are expected. The visual impacts related to stations will be further reviewed during the DEIR.</p> <p>A visual and qualitative review of the corridor shows that there are social equity and land use benefits to providing enhanced transit on this route, particularly east of I-405 on Nordhoff Street. The option provides direct connections within the communities of Panorama City and North Hollywood, both of which have higher numbers of transit dependent populations.</p>
<p>Economic Development Impacts</p> 	<p>The option provides access to employment and key activity centers such as Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center, James Monroe High School, and Panorama Mall.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$296M-\$411M (YOES). The estimates assumed a route length of 16.8 miles and 20 stations. The O&M cost estimates are \$23,058,000, which are similar to all other options.</p>
<p>Public Acceptance</p> 	<p>The option is compatible with local and regional plans.</p> <p>The community input showed preference for a connection to the NoHo Transit Station. There were station preferences for Northridge Fashion Center, CSUN, Kaiser Permanente Medical Center and interface with the planned East San Fernando Valley LRT on Van Nuys Boulevard.</p>
RECOMMENDATION: ADVANCE TO STEP 2	

This option is recommended for further evaluation because it received a high or average rating in every category.

Table 6.9: Step 1 Screening Results – Nordhoff-NoHo via Woodman

The Step 1 Screening Results are summarized in Table 6.10. During the first step in the screening process, Option 3: Nordhoff-Sylmar/San Fernando was eliminated due to low scores in the mobility and economic development category, and a medium score in public acceptance.

The greatest difference between Option 3 and the other alignment options is its lower system connectivity due to a lack of connection to North Hollywood. The poor scores can also be attributed to low ridership potential, a duplication of service with the future ESFVTC, and a public preference for the North Hollywood terminus over the Sylmar/San Fernando terminus.




































Evaluation Category	Rating						
	1	2	3	4	5	6	7
STEP 1 SCREENING							
Alignment Option	1	2	3	4	5	6	7
Mobility							
Environmental Impacts							
Economic Development Impacts							
Cost Effectiveness							
Public Acceptance							
Recommended for further evaluation	Y	Y	N	Y	Y	Y	Y

Table 6.10: Step 1 Screening Results Summary

6.4 Step 2 Screening Results

Based on the high, medium and low rating system, one alignment option (Nordhoff-Sylmar/San Fernando) was screened out during the Step 1 screening process leaving six options to be screened during Step 2. The six alignment options recommended to continue to the Step 2 screening were the Roscoe-NoHo and Nordhoff-NoHo concepts. The high, medium and low ratings assigned in this step are based on the performance of the alternative relative to the remaining alignment option, which is why an option may receive a high or medium rating in Step 1 and a low rating in Step 2, or vice versa. Step 2 also considers a level of detail beyond the Step 1 screening. In a similar fashion to the initial screening, the Step 2 Screening process is presented in Tables 6.11 through 6.16. The tables below only present new information related to the Step 2 screening for the remaining six options. For categories where there are no additional evaluation criteria added to the Step 2 screening process, the Step 1 screening evaluation remains applicable.



OPTION 1: ROSCOE-NOHO VIA RESEDA	
<p>Mobility</p> 	<p>The length of this option is 18.1 miles, including the portion that will run on the Orange Line Busway between Nordhoff Street and Canoga at the west end. The at-grade railroad crossing along Roscoe Boulevard would require the BRT to make additional stops and introduce potential travel time disruptions for bus service. The Interstate 405 (I-405) freeway ramps at Roscoe Boulevard are a source of constriction that could impede on travel time reliability for bus service. Ridership modeling data shows the average speed at 18.5mph and the end-to-end travel time as 58.3 minutes.</p> <p>The ridership modeling also showed an estimated 26,328 daily corridor boardings and an increase in system-wide linked transit trips of 10,570. When compared to the other five remaining options is this the lowest in terms of boardings and linked trips.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alignment option is contained within the existing right-of-way. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
RECOMMENDATION: ELIMINATE	
<p>This option is not recommended for further evaluation because it does not perform well in the Mobility category due to several instances where travel time and service reliability could be impacted based on at-grade rail crossings and multiple existing traffic impacts as well as the lowest in ridership estimates for daily boardings and linked trips.</p>	

Table 6.11: Step 2 Screening Results – Roscoe-NoHo via Reseda

OPTION 2: ROSCOE-NOHO VIA LINDLEY	
<p>Mobility</p>	<p>The length of this option is 18.1 miles, including the portion that will run on the Orange Line Busway between Nordhoff Street and Canoga at the west end. The at-grade railroad crossing along Roscoe Boulevard and the second railroad crossing on Lindley</p>



	<p>Avenue would incur additional stops and potential travel time disruptions for bus service. Similar to the Roscoe-NoHo via Reseda option, this alternative would also have travel time impacts due to the I-405 ramps which are a source of constriction on Roscoe Boulevard during peak hours. Ridership modeling data shows the average speed at 18.5mph and the end-to-end travel time as 58.3 minutes.</p> <p>The ridership modeling also showed an estimated 26,516 daily corridor boardings and an increase in system-wide linked transit trips of 10,900. When compared to the other five remaining options, this is the second lowest in terms of boardings and linked trips.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alternative is contained within the right-of-way. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
<p>RECOMMENDATION: ELIMINATE</p>	
<p>This option is not recommended for further evaluation because it does not perform well in the Mobility category due to several instances where travel time and service reliability could be impacted based on two at-grade rail crossings and multiple existing traffic impacts as well as the second lowest in ridership estimates for daily boardings and linked trips.</p>	

Table 6.12: Step 2 Screening Results – Roscoe-NoHo via Lindley



OPTION 4: NORDHOFF-NOHO VIA WOODLEY	
<p>Mobility</p> 	<p>The length of this option is 18.0 miles, including the portion that would run on the Orange Line Busway between Nordhoff Street and Canoga Avenue at the west end. There are no at-grade crossings along the alignment. The I-405 freeway off-ramps at Nordhoff Street are a source of constriction near the ramps that could impede on travel time reliability for bus service. This option uses Parthenia Street to avoid these potential travel time delays. Ridership modeling data shows the average speed at 19.2mph and the end-to-end travel time as 56.3 minutes.</p> <p>The ridership modeling also showed an estimated 28,652 daily corridor boardings and an increase in system-wide linked transit trips of 13,566, which are among the highest ridership estimates when compared to the other five remaining options.</p> <p>While Woodley Avenue has large stretches of single family homes, access to these homes are primarily via an access road relieving some potential driveway friction with the BRT lane.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alternative is contained within the right-of-way. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
RECOMMENDATION: ADVANCE TO STEP 3	
<p>This option is recommended for further evaluation because it receives a high score in all criteria.</p>	

Table 6.13: Step 2 Screening Results – Nordhoff-NoHo via Woodley



OPTION 5: NORDHOFF-NOHO VIA HASKELL	
<p>Mobility</p> 	<p>The length of this alignment is 18.0 miles, including the portion that would run on the Orange Line Busway between Nordhoff Street and Canoga Avenue at the west end. There are no at-grade crossings along the alignment. This option also uses Parthenia Street to avoid the source of constriction at the I-405 ramps on Nordhoff Street. Ridership modeling data shows the average speed at 19.2mph and the end-to-end travel time as 56.3 minutes.</p> <p>The ridership modeling also showed an estimated 28,120 daily corridor boardings and an increase in system-wide linked transit trips of 12,709; among the highest ridership estimates when compared to the other five remaining alternatives.</p> <p>The segment of Haskell Avenue that would be used by the BRT has multiple driveways serving single family residential driveways resulting in continual side friction for the BRT lane.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alternative is contained within the right-of-way. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
RECOMMENDATION: ADVANCE TO STEP 3	
<p>This option is recommended for further evaluation because it receives a high score in all criteria.</p>	

Table 6.14: Step 2 Screening Results – Nordhoff-NoHo via Haskell



OPTION 6: NORDHOFF-NOHO VIA SEPULVEDA	
<p>Mobility</p> 	<p>The length of this option is 18.0 miles, including the portion that would run on the Orange Line Busway between Nordhoff Street and Canoga Avenue at the west end. There are no at-grade crossings along the alignment, but the alignment does cross the I-405 ramps, which are a source of constriction. Ridership modeling data shows the average speed at 18.5mph and the end-to-end travel time as 58.3 minutes.</p> <p>The ridership modeling also showed an estimated 27,461 daily corridor boardings and an increase in system-wide linked transit trips of 11,717, which is similar to all the Nordhoff-NoHo options having the best ridership potential compared to the Roscoe-NoHo options.</p> <p>The segment of Sepulveda Boulevard that would be used by the BRT has multiple driveways serving commercial shopping centers resulting in continual side friction for the BRT.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alternative is contained within the right-of-way; however, there are future bike lanes planned for Sepulveda Boulevard which current do not exist that could make accommodating a dedicated bus lane difficult. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
RECOMMENDATION: ADVANCE TO STEP 3	
<p>This option is recommended for further evaluation because it performs well receiving a high rating in Construction Impacts and an average rating in Mobility due to the potential travel time impacts caused by the I-405.</p>	

Table 6.15: Step 2 Screening Results – Nordhoff-NoHo via Sepulveda



OPTION 7: NORDHOFF-NOHO VIA WOODMAN	
<p>Mobility</p> 	<p>The length of this option is 17.8 miles, including the portion that would run on the Orange Line Busway between Nordhoff Street and Canoga at the west end. There are no at-grade crossings along the alignment, but the alignment does cross the I-405 ramps, which is a source of constriction. Ridership modeling data shows the average speed at 18.7mph and the end-to-end travel time as 56.8 minutes.</p> <p>Woodman Avenue has multiple driveways serving commercial shopping centers resulting in side friction for the BRT; however, south of Brandford Street there are no driveways until just north of Roscoe Boulevard. This alignment also includes segments on Nordhoff Street where the street is not built out to full right-of-way, and curb-to-curb width as narrow as 54 feet.</p>
<p>Construction Impacts</p> 	<p>The physical fit for this alternative is contained within the right-of-way. There are existing Class II bike lanes on Woodman Street, so maintaining the bike lanes could potentially result in constrained right-of-way in some segments. Similar construction methods are planned for all options and thus the ease of construction is similar for all alternatives.</p>
RECOMMENDATION: ADVANCE TO STEP 3	
<p>This option is recommended for further evaluation because it performs well receiving a high rating in Construction Impacts and an average rating in Mobility due to the potential travel time impacts caused by the I-405. However, the travel time from end-to-end is fairly similar to the two alternatives that do not cross the I-405 ramps.</p>	

Table 6.16: Step 2 Screening Results – Nordhoff-NoHo via Woodman







The results of the Step 2 screening analysis are summarized in Table 6.17. In the second screening step, Options 1 and 2 (those which operate primarily along Roscoe Boulevard) were eliminated for their low scores in mobility. They underperformed in this category because of lower ridership, slower bus speeds, increased travel time, and reduced travel time savings due to ramps at Interstate 405. Both Options 1 and 2 incurred an additional travel time penalty due to an at-grade railroad crossing on Roscoe Boulevard, and Option 2 would encounter an additional at-grade railroad crossing on Lindley Avenue. Option 1 in particular received a lower score in the public acceptance category because it would not directly service the CSUN campus.

Evaluation Category	Rating						
	1	2	3	4	5	6	7
STEP 2 SCREENING							
Alignment Option	1	2		4	5	6	7
Mobility							
Construction Impacts							
Environmental Impacts							
Economic Development Impacts							
Cost Effectiveness							
Public Acceptance							
Recommended for further evaluation	N	N		Y	Y	Y	Y

Table 6.17: Step 2 Screening Results Summary






6.5 Step 3 Screening Results

Based on the results of the Step 2 Screening process, the four highest scoring alignment options (Nordhoff-NoHo) were advanced for a final level of screening. This third step in the screening process rates the four remaining alternatives against each other for each category to assess the project trade-offs and identify the Preferred Alternative. The Step 3 Screening process is documented in Tables 6.18 through 6.21.

OPTION 4: NORDHOFF-NOHO VIA WOODLEY	
<p>Mobility</p> 	<p>This option is among the highest projected ridership and linked system wide trips compared to any of the other alternatives.</p> <p>Woodley Avenue has fewer driveways causing side friction for the BRT lane compared to Haskell Avenue.</p>
<p>Construction Impacts</p> 	<p>The physical fit for the option is contained within the right-of-way. There is more curb to curb width available on Woodley Avenue at 74' to 80' compared to Haskell Avenue.</p>
<p>Environmental Impacts</p> 	<p>There are no adverse environmental impacts determined at this stage of conceptual planning.</p>
<p>Economic Development Impacts</p> 	<p>The option provides access to generally the same TOC, FLM, employment centers, and key destinations as the other three remaining Nordhoff-NoHo options that provide access to the Panorama City area.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$298M-\$413M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are \$22,644,000 similar to all other alternatives.</p>
<p>Public Acceptance</p> 	<p>The option is compatible with the local and regional plans.</p>

RECOMMENDATION: ADVANCE TO ENVIRONMENTAL	
<p>This option is recommended to advance to environmental because it performs well in every category. This alignment has higher projected ridership, avoids the congestion at the I-405 ramps, Woodley has a wider right-of-way than Haskell Avenue, and provides exemplary access to key destinations and employment centers.</p>	

Table 6.18: Step 3 Screening Results – Nordhoff-NoHo via Woodley

OPTION 5: NORDHOFF-NOHO VIA HASKELL	
<p>Mobility</p> 	<p>This option is among the highest projected ridership and linked system wide trips compared to the other two Nordhoff-NoHo options.</p> <p>Haskell Avenue has more residential driveways than Woodley Avenue, potentially causing side friction for the BRT lane; however, the configuration for the BRT lane has not been determined. This impact could be avoided with center running or mixed-flow lanes on Haskell Avenue.</p>
<p>Construction Impacts</p> 	<p>The physical fit for the option is contained within the right-of-way. At 66 feet curb to curb, there is less width available on Haskell Avenue than on Woodley Avenue. However, there are no existing bike lanes on Haskell Avenue, and class II bike lanes are present on Woodley Avenue. Similar construction methods are planned for all options and the horizontal configuration of the BRT operations on this segment have not been determined. Thus it is assumed that the ease of construction is similar for this option is similar to Woodley.</p>
<p>Environmental Impacts</p> 	<p>There are no adverse environmental impacts determined at this stage of conceptual planning.</p>
<p>Economic Development Impacts</p> 	<p>The option provides access to generally the same TOC, FLM, employment centers, and key destinations as the other Nordhoff-NoHo options that provide access to the Panorama City area.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$298M-\$413M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are \$22,644,000 similar to all other alternatives.</p>





<p>Public Acceptance</p> 	<p>The option is compatible with local and regional plans.</p> <p>This option is similar to the others in regards to public support.</p>
<p>RECOMMENDATION: ADVANCE TO ENVIRONMENTAL</p>	
<p>This option is recommended for environmental. It has similar ridership estimates to Woodley and also avoids the congestion at the I-405 ramps. While Haskell Avenue does not have existing bus service, it does have a constrained right-of-way compared to Woodley Avenue, and has multiple residential driveway conflicts; the BRT operations on this segment have not been determined and therefore may not be proven to be a challenge for this option. For these reasons, this alignment is recommended to advance to the environmental review stage.</p>	

Table 6.19: Step 3 Screening – Nordhoff-NoHo via Haskell

<p>OPTION 6: NORDHOFF-NOHO VIA SEPULVEDA</p>	
<p>Mobility</p> 	<p>This option is among the highest projected ridership and linked system wide trips. It also provides an alternative to traveling on Parthenia Street to connect to Roscoe Boulevard. The future East San Fernando Light Rail will travel on Van Nuys Boulevard, and reduce the number of general travel lanes adjacent to the Panorama Mall. The future configuration of Tobias Avenue is also subject to change if significant occurs on that street.</p>
<p>Construction Impacts</p> 	<p>The physical fit for the option is contained within the right-of-way. North of Rayen Street, Sepulveda Boulevard has a total right-of-way width of about 140 feet and a landscaped median that is up to 40 feet wide. South of Rayen Street, Sepulveda Boulevard loses the raised median and narrows to a curb-to curb width that varies from 88 to 96 feet. There will be a need for spot grading/widening in certain sections along Sepulveda which could require a reconfiguration of the street and median as well as accommodation for future bicycle lanes that are planned. This option could require more extensive reconstruction than the other options.</p>
<p>Environmental Impacts</p> 	<p>There are no adverse environmental impacts determined at this stage of conceptual planning.</p>
<p>Economic Development Impacts</p>	<p>The option provides access to generally the same TOC, FLM, employment centers, and key destinations as the other three remaining Nordhoff-NoHo options that provide access to the Panorama City area.</p>







	
	Cost Effectiveness Capital costs are estimated at \$300M-\$417M (YOES). The estimates assumed a route length of 17.1 miles and 20 stations. The O&M cost estimates are \$23,222,000 similar to all other alternatives
	Public Acceptance The option is compatible with local and regional plans. The option is similar to the others in regards to public support.
RECOMMENDATION: ADVANCE TO ENVIRONMENTAL	
This option is recommended for environmental analysis as an alternative to traveling on Parthenia Street via Van Nuys Boulevard or Tobias Avenue to connect to Roscoe Boulevard.	

Table 6.20: Step 3 Screening – Nordhoff-NoHo via Sepulveda

OPTION 7: NORDHOFF-NOHO VIA WOODMAN	
	Mobility This option ranks similarly in terms of ridership and linked system wide trips compared to the other two Nordhoff-NoHo options. Woodman Avenue also has multiple commercial driveways potentially causing side friction for the BRT lane.
	Construction Impacts The physical fit for the option is contained within the right-of-way. There is more curb to curb width available on Woodman Avenue at 74' to 95'; however portions of Nordhoff Street between Sylmar Avenue and Costello Avenue are not developed to full width (54' curb-to-curb) which would require additional street construction in this area potentially increasing construction costs and impacts, as well as potential community acceptability. In addition, portions of Woodman from Branford Street to Community Street are missing sidewalks. Due to adjacent slopes, retaining walls may be necessary to add sidewalks in these areas. This is considered to be more extensive reconstruction than is expected for the other options.
	Environmental Impacts There are no adverse environmental impacts determined at this stage of conceptual planning.




<p>Economic Development Impacts</p> 	<p>The option provides access to generally the same TOC, FLM, employment centers, and key destinations as the other three remaining Nordhoff-NoHo options; however, it does not provide access to the central areas of Panorama City. Additionally, Woodman does not serve the Roscoe/Van Nuys intersection which is a key location in the Panorama City area supported by dense population and employment.</p>
<p>Cost Effectiveness</p> 	<p>Capital costs are estimated at \$296M-\$411M (YOES). The estimates assumed a route length of 16.8 miles and 20 stations. The O&M cost estimates are \$23,058,000 similar to all other alternatives</p>
<p>Public Acceptance</p> 	<p>The option is compatible to the local and regional plans. This option compares the same as the other three in regards to public support; however, it does not provide access to the central areas of Panorama City, which was supported by the community.</p>
<p>RECOMMENDATION: ELIMINATE</p>	
<p>This option is not recommended to advance to environmental as it lacks some of the key attributes that the other three alternatives meet in terms of economic development impacts and meeting the project's purpose and need to serve key destinations and employment centers in the Panorama City area..</p>	

Table 6.21: Step 3 Screening Results – Nordhoff-NoHo via Woodman

The results of the Step 3 screening analysis are summarized in Table 6.22. In the third and final screening step, which is illustrated in Table 4, Option 7: Nordhoff-NoHo via Woodman was eliminated. All of the Nordhoff-NoHo alternatives ranked similarly in several categories such as construction impacts, environmental impacts, and cost effectiveness, but Option 7 received lower scores in the greatest number of categories.

Option 7 does not directly serve the more densely-developed areas of Panorama City as was indicated through the community outreach process. This option also has the potential to need more extensive physical infrastructure reconstruction on segments of Nordhoff Street and Woodman Avenue.

Evaluation Category	Rating			
STEP 3 SCREENING				
Alignment Option	4 5 6 7			
Mobility	● ● ◐ ◐			
Construction Impacts	◐ ◐ ◐ ◐			
Environmental Impacts	● ● ● ●			
Economic Development Impacts	● ● ● ◐			
Cost Effectiveness	● ● ● ●			
Public Acceptance	◐ ● ● ◐			
Recommended for further evaluation	Y Y Y N			

Table 6.22: Step 3 Screening Results Summary

6.6 Screening Results and Alternatives Eliminated from Further Analysis

Option 1: Roscoe-NoHo via Reseda, Option 2: Roscoe-NoHo via Lindley, Option 3: Nordhoff-Sylmar/San Fernando, and Option 7: Nordhoff-NoHo via Woodman were eliminated from further analysis through the three step screening process. Option 4: Nordhoff-NoHo via Woodley, Option 5: Nordhoff-NoHo via Haskell, and Option 6: Nordhoff-NoHo via Sepulveda were assessed to be the best options, and will be brought into the conceptual engineering and environmental phase to be further evaluated.

Option 3 was eliminated in the Step 1 screening due to low scores in the mobility and public acceptance category, and a medium score in economic development. The poor scores can be attributed to low ridership, lower system connectivity because it lacks connections at North Hollywood, duplication of service with the future East San Fernando LRT, and a public preference for the NoHo terminus over the Sylmar terminus.

In the Step 2 screening, Option 2 (those which operate primarily along Roscoe Boulevard) were eliminated for their low scores in mobility. They underperformed in this category because of lower ridership, and slower bus speeds, increased travel time, and reduced travel time savings due to ramps at Interstate 405 and at-grade railroad crossings on Roscoe Boulevard and Lindley Avenue.

In the final Step 3 screening, Option 7 was eliminated for its average rating in multiple categories compared to the other three options. Although all of the Nordhoff-NoHo alternatives ranked similarly in several categories, it eventually came down to the more granular details at this level of screening and the pros and cons for each alternative were revealed in the mobility, constructability, economic development impacts, and public acceptance categories. Option 7 had similar deficiencies in terms of mobility and constructability impacts compared to Option 6 but there were additional considerations due to the significant land use changes occurring in the central Panorama City area which is not served directly by Option 7. Serving the Panorama City area was also supported by the community which is why Option 7 received a lower score in this category.

7 Identification of Proposed Project

7.1 Proposed Project Alternatives

Based on the results of the three-step screening process, the Nordhoff to North Hollywood alignment options performed highest, and the following three options are recommended to be carried into the next stage of environmental review.

- Option 4: Nordhoff-NoHo via Woodley
- Option 5: Nordhoff-NoHo via Haskell
- Option 6: Nordhoff-NoHo via Sepulveda

The recommended alignment alternatives, Nordhoff-NoHo via Woodley, Nordhoff-NoHo via Haskell, and Nordhoff-NoHo via Sepulveda, all serve key destinations and appropriate land uses and provide meaningful transit connections. They were proven to be the preferred alternatives with respect to mobility, construction, environmental, economic development, cost effectiveness, and public acceptance. All alignment options are poised to achieve the project objectives by providing an accessible, reliable, rapid, equitable, sustainable, connected transit system that offers enhanced mobility options for the North San Fernando Valley.

The Option 4: Nordhoff-NoHo via Woodley alignment has higher ridership projections, avoids potential peak hour congestion from freeway on/off ramps and railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area.

The Option 5: Nordhoff-NoHo via Haskell alignment has higher ridership projections, avoids potential peak hour congestion from freeway on/off ramps and railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area.

The Option 6: Nordhoff-NoHo via Sepulveda alignment also benefits from higher ridership projections, avoids railroad crossings, provides multiple regional rail and BRT transfer opportunities, and serves multiple employment and key activity centers within the study area. While this option does cross the I-405 freeway ramps, the end-to-end travel times are reasonably comparable to the Nordhoff-NoHo via Woodley & Haskell options that avoid the freeway ramps.

7.2 Design Variations

Following technical study and community input, several specific design variations were developed for further consideration and evaluation in the environmental analysis phase. The design variations are highlighted as potential route modifications to improve bus operations or offer an alternative route to constrained corridors where accommodating some of the desired features of a BRT service may be a challenge. The design variations generally offer similar project benefits, but may allow reduced capital costs, operating costs, and/or environmental impacts. Studying the variations also preserves flexibility to respond to community feedback during the environmental phase or to overcome potential engineering constraints.

The design variations considered are:

- **De Soto-Lassen:** This design variation is included should the project require an alternative to running on the Orange Line busway on the western end of the project study area adjacent to the Chatsworth Station. The variation would run east-west along Lassen Street and north-south along De Soto Avenue to reach Nordhoff Street.
- **Tobias Avenue:** This design variation is between Parthenia Street and Roscoe Boulevard and offers an alternative route to staying on Parthenia Street/Van Nuys Boulevard. The future East San Fernando Valley LRT will operate at-grade on Van Nuys Boulevard, limiting available right-of-way for dedicated BRT lanes and likely resulting in the need for mixed-flow BRT operations on this portion of the corridor. In addition, as Van Nuys Boulevard is a heavily traveled corridor, there could be potential operational constraints for the BRT. Therefore, Tobias Avenue (located approximately 870 feet west of Van Nuys Boulevard) is highlighted as a potential design variation to be considered during the environmental phase of work when detailed engineering and operational analysis take place. This variation would also give the project more direct access to new mixed-use development planned on Tobias Avenue.
- **Laurel Canyon-MOL/Chandler:** This design variation runs parallel to and west of Lankershim Boulevard from Roscoe Boulevard to Chandler Boulevard, where the BRT could then join the Metro Orange Line BRT guideway or a parallel local road to access the Metro North Hollywood Station. This potential design variation was identified as a viable alternative route to Lankershim Boulevard as it offers a similar roadway configuration and lane widths. Due to its length, a preliminary look at the Laurel Canyon corridor was conducted during the AA process. The analysis supported the recommendation of Laurel Canyon for further study during the environmental phase and is included in a Supplemental Analysis Technical Memorandum.

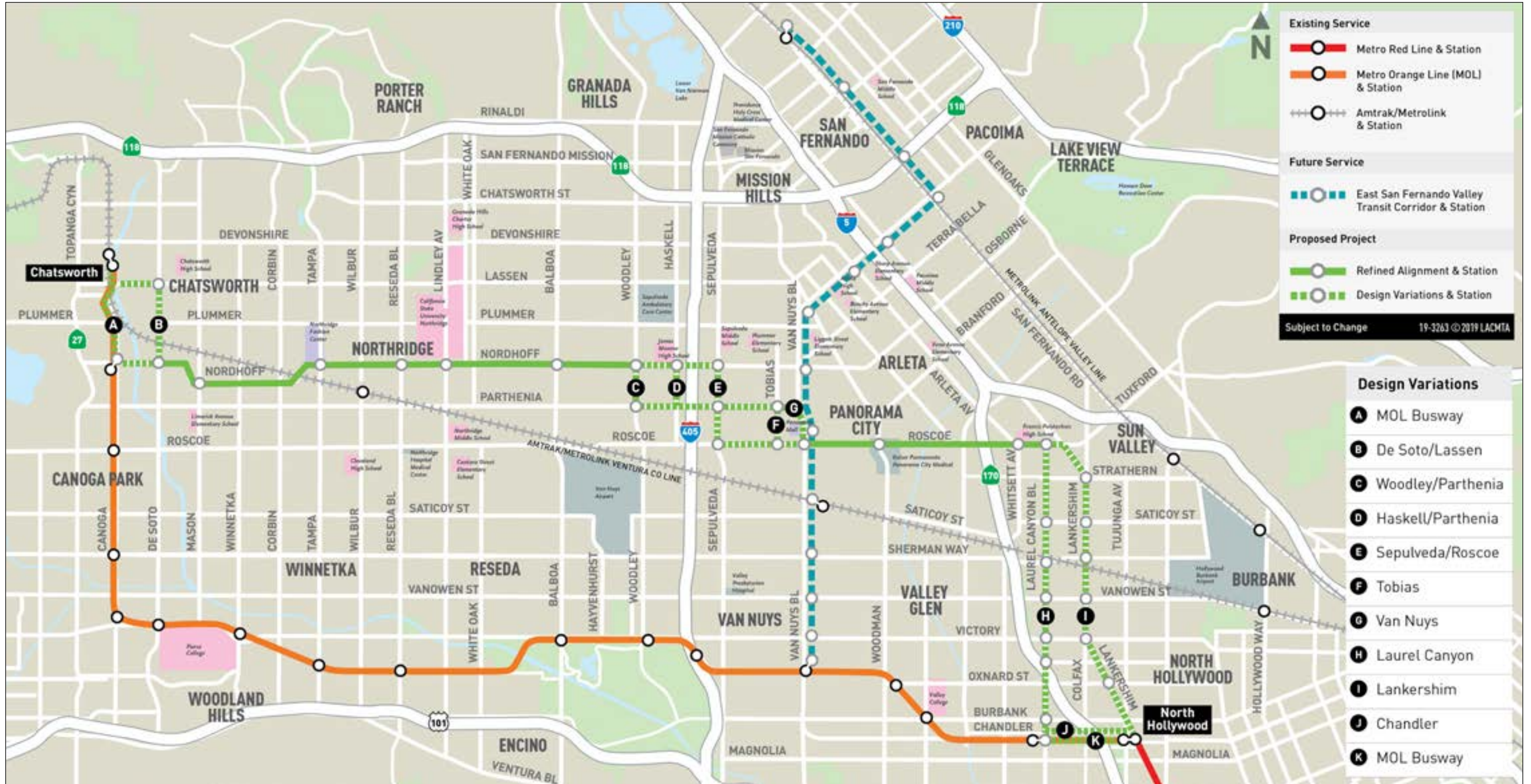
In addition to the options above, a No Build Alternative is also considered as part of this project. The No Build Alternative represents anticipated background conditions for 2042 – including projects in the Long Range Transportation Plan (LRTP) and the Regional Transportation Plan (RTP) – without the BRT project. It will establish the baseline for comparison for the alternatives in terms of benefits and costs and will be analyzed during the environmental review process.

7.3 Next Steps

Based on all the parameters examined in the Alternatives Analysis, the three highest-performing alignment options under consideration were combined into the Proposed Project map. The Proposed Project map, shown in Figure 7-1, illustrates the path of the project traveling between the Chatsworth Metro Orange Line/Metrolink Station and the Metro North Hollywood Station, along with each of the design variations under consideration. Potential station locations are also identified on the map to highlight locations under consideration for further analysis. These locations will be assessed in detail in the environmental analysis phase to test their performance and impact on accessibility, operations and costs.

Design variations are labeled “A” through “K,” and include the Metro Orange Line Busway (adjacent to Chatsworth), De Soto/Lassen, Woodley/Parthenia, Haskell/Parthenia, Sepulveda/Roscoe, Tobias, Van Nuys, Laurel Canyon, Lankershim, Chandler, and the Metro Orange Line Busway (adjacent to North Hollywood).

Figure 7-1: North San Fernando Valley BRT Corridor Proposed Project



It is important to note that further conceptual engineering will be developed during the environmental assessment. These efforts will result in refinements to the project alternatives that are carried forward. As such, the characteristics of the alternatives will evolve with respect to ridership potential, and cost estimates. Revised estimates will be provided in future technical materials as the engineering designs are advanced.

Following conclusion of the Alternatives Analysis phase, a Notice of Preparation (NOP) is issued signifying the start of the Public Scoping period for the CEQA environmental review process. The Environmental Analysis will examine the potential benefits and impacts associated with each route under consideration and identify the preferred BRT alignment for engineering design. Construction is currently planned to begin in 2022 to meet an opening date in 2025.



Project Timeline