



NORTH HOLLYWOOD → TO PASADENA

BRT Corridor Planning and Environmental Study

Alternatives Analysis Executive Summary

Kimley»Horn

Prepared by:

Kimley-Horn
660 South Figueroa Street, Suite 2050
Los Angeles, CA 90017



Metro

Los Angeles County Metropolitan Transportation Authority

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Alternatives Development

Background

The North Hollywood to Pasadena Bus Rapid Transit (BRT) Corridor was identified by Metro's 2013 Countywide Bus Rapid Transit (BRT) and Street Design Improvement Study as one of the region's most heavily traveled corridors without a premium bus service. This project would provide a new high-quality BRT service between the San Fernando and San Gabriel Valleys, connecting the Metro Red and Orange Lines in North Hollywood to Pasadena City College in Pasadena. The North Hollywood to Pasadena BRT Corridor Project is funded with \$267 million in Measure M funds and is expected to open between Fiscal Years 2022 and 2024.

Initiated in June 2018, the North Hollywood to Pasadena BRT Corridor Planning and Environmental Study builds upon Metro's North Hollywood to Pasadena BRT Corridor Technical Study. The BRT Corridor Technical Study, completed in March 2017, explored the feasibility and performance of implementing BRT, including dedicated bus lanes, enhanced stations, all-door boarding, and transit signal priority. The BRT Corridor Technical Study identified two initial BRT concepts (Primary Street and Primary Freeway), including multiple route options, as the most promising alternatives to address the transportation challenges within this corridor. The purpose of the North Hollywood to Pasadena BRT Corridor Planning and Environmental Study is to further evaluate project alternatives and to develop recommendations regarding which alternatives should be advanced into environmental review.

Study Area

The North Hollywood to Pasadena corridor (**Figure 1**) is approximately 18 miles in length, extending from the North Hollywood Metro Red/Orange Line Station to Pasadena City College. The study corridor generally parallels the Ventura Freeway (State Route 134) between the San Fernando and San Gabriel Valleys. Existing high-capacity transit services in the study corridor include the Metro Red and Orange Lines in North Hollywood, the Metrolink Antelope Valley and Ventura Lines in Burbank, and the Metro Gold Line in Pasadena. The corridor traverses the communities of North Hollywood and Eagle Rock in the City of Los Angeles as well as the Cities of Burbank, Glendale, and Pasadena. The study area also includes many densely populated residential areas with cultural, entertainment, shopping, and employment areas distributed throughout, including:

- North Hollywood Metro Red/Orange Line Station
- North Hollywood Arts District
- Burbank Media District
- Downtown Burbank
- Burbank Metrolink Station
- Downtown Glendale
- Eagle Rock Community
- Old Pasadena
- Metro Gold Line
- Pasadena City College

NORTH HOLLYWOOD TO PASADENA

BRT Corridor Planning and Environmental Study

Figure 1 – North Hollywood to Pasadena BRT Corridor



Purpose and Need

Of the 700,000 daily trips entering the study area, the majority are destined to locations within the corridor; only one-third of the trips extend from one end of the study area to the other. By far, the largest existing mode share is single occupant auto trips. Transit currently accounts for just 2 percent of trips along the corridor, despite the presence of Metro Rail connections at both ends. The key challenge for the North Hollywood to Pasadena corridor will be to design a premium transit service that captures more of the travel market within the corridor by offering competitive travel times, better transit access, improved regional connectivity, and enhanced passenger comfort and convenience.

A premium bus transit service along the corridor would fill a significant gap in the transit network between the San Fernando and San Gabriel Valleys and provide a viable alternative to the use of single-occupancy automobiles along congested roadways, while further encouraging development of Transit Oriented Communities (TOC). Accessibility would be improved to both the Metro Red and Orange Lines to the west and to the Metro Gold Line to the east. A new high-quality bus option would also connect Metro's regional transit network to densely populated residential areas in Los Angeles, Burbank, Glendale, and Pasadena as well as to many key employment and activity centers throughout the corridor.

The North Hollywood to Pasadena BRT Corridor Project objectives can be summarized as follows:

- Advance a premium transit service that is more competitive with auto travel to attract discretionary riders;
- Improve accessibility for disadvantaged communities;
- Improve transit access to major local and regional activity and employment centers;
- Enhance connectivity to Metro and other regional transit services;
- Provide improved passenger comfort and convenience; and
- Support community plans and transit-oriented community goals.



Initial BRT Concepts

Development of project alternatives began with the North Hollywood to Pasadena BRT Corridor Technical Study completed in March 2017, which identified both a “Primary Street” and a “Primary Freeway” BRT concept along with various route options (**Figure 2** and **Figure 3**, respectively).

Beginning in August 2018, the project team launched an extensive public outreach effort to update the public on the project and to solicit feedback on the initial BRT concepts identified in the BRT Corridor Technical Study.

This outreach effort included five community meetings in addition to approximately 40 individual project briefings given to the affected cities’ elected officials and other community, business, and neighborhood groups. To broaden the outreach efforts to reach historically underserved communities, the project team also attended several neighborhood events such as street fairs, farmers markets, and music festivals, and shared project information at the North Hollywood Metro Red/Orange Line Station.

The public could also access project updates and/or provide comments through the project website or the special email address and telephone number established for the project.



Figure 2 – Primary Street Concept with Route Options from 2017 BRT Corridor Technical Study



Figure 3 – Primary Freeway Concept with Route Option from 2017 BRT Corridor Technical Study



Screening of Initial BRT Concepts

Field reviews were conducted to evaluate all the potential routings as well as land use opportunities and constraints. Concurrently, a comprehensive database of street cross sections, existing transit service characteristics, and other data to inform the screening and evaluation of alternatives was assembled.

An initial screening of the concepts was then performed using the criteria shown below in **Table 1**. Combined with the feedback received from the various communities, several of the initial routing options were eliminated from further consideration—three from the Primary Street Concept and two from the Primary Freeway Concept.

Table 1 – Initial Screening Evaluation

	Physical Constraints	Land Use Compatibility	Misses Several Key Destination(s)
Primary Street Route Options			
Chandler Boulevard (North Hollywood to Downtown Burbank)	X	X	
Magnolia Boulevard (North Hollywood to Downtown Burbank)	X	X	
Brand Boulevard (Glendale)	X		
Primary Freeway Route Options			
Burbank Boulevard – Hollywood Way – Burbank Airport – Interstate 5 (North Hollywood & Burbank)	X	X	X
Fair Oaks Avenue/Raymond Avenue Couplet (Pasadena)			X

Eliminated Primary Street Route Options

- **Chandler Boulevard (North Hollywood/Burbank):**

Although Metro owns right-of-way along Chandler Boulevard, the median area is presently occupied by a Class 1 bikeway. The road is narrow and shifts from a single two-lane roadway in Los Angeles to a two-way couplet in Burbank. Within Burbank, the median is heavily landscaped, and the land use is relatively low-density residential. Metro received



community input that a dedicated BRT lane along Chandler Boulevard in the City of Burbank would be incompatible with the residential neighborhood. Burbank residents also expressed strong concern over the potential loss of the bikeway. Moreover, this route option was anticipated to have low ridership potential based on its low-density characteristics.

- **Magnolia Boulevard (North Hollywood/Burbank):** Although Magnolia Boulevard would provide the shortest route between North Hollywood and Downtown Burbank, the roadway narrows to a single eastbound travel lane west of North Clybourn Avenue. The narrow roadway, and presence of numerous small businesses that are dependent upon a limited on-street parking supply, would make this route challenging to support BRT lanes. This option also was not supported by the Burbank community and City elected officials.
- **Brand Boulevard (Glendale):** This alignment was removed due to physical constraints; routing via Central Avenue in Downtown Glendale was preferred. Bulb-outs and diagonal parking on Brand Boulevard would need to be removed to accommodate dedicated BRT lanes. Without dedicated lanes, service reliability would suffer, particularly during peak times. BRT stations located along Central Avenue (900 feet to the west) at similar cross streets could provide access to the commercial uses along Brand Boulevard.

Eliminated Primary Freeway Route Options

- **Burbank Boulevard – Hollywood Way – Burbank Airport – Interstate 5:** This alignment has several deficiencies. Although this route would serve the Hollywood Burbank Airport, Burbank Boulevard in Los Angeles is too narrow to support dedicated BRT lanes. In addition, the Los Angeles segment has industrial and commercial land uses such as auto body shops that are not anticipated to attract significant ridership. Furthermore, this route is indirect with out-of-direction travel to the north, would miss the Burbank Media District, and passes through Downtown Burbank along Interstate 5, which does not provide good service to the downtown area. Access to the Airport could be provided by enhancing other existing transit routes.
- **Fair Oaks Avenue/Raymond Avenue Couplet (Pasadena):** This couplet, which would utilize the Fair Oaks interchange along the Ventura Freeway, was included in the Freeway Concept in the BRT Corridor Technical Study. Although a northbound station could be provided immediately adjacent to the Del Mar Metro Gold Line station, this option would not serve the heart of Pasadena, the South Lake Avenue District, or Pasadena City College. Input from stakeholders and City staff confirmed a preference for routing along Colorado Boulevard or a Green Street/Union Street couplet to Pasadena City College at Hill Street.



Refined Alternatives Studied

The results of the initial screening analysis were synthesized into three distinctive refined alternatives to further study as part of the Alternatives Analysis—a Street-Running, a Freeway-Running, and a Hybrid Street/Freeway-Running alternative. Each of these three alternatives would extend from the Metro Red/Orange Line terminus on Lankershim Boulevard at Chandler Boulevard in North Hollywood and would serve the North Hollywood Arts District. Similarly, each alternative would terminate at Pasadena City College on Colorado Boulevard at Hill Avenue in Pasadena, serving Old Pasadena and connecting to the Metro Gold Line. Key route characteristics of each alternative are noted in this section.

This section contains maps of each of the refined alternatives that indicate “candidate” station locations; the siting of each station is subject to refinement during the environmental phase. Additionally, because there are sections where stations are located closer to each other than the typically-desirable 1-mile average station spacing for BRT, stations may be consolidated or eliminated based upon further evaluation of ridership potential and operational factors.

Street-Running Alternative

This alternative (**Figure 4**), which closely resembles the Primary Street Concept originally identified in the 2017 BRT Corridor Technical Study, incorporates the most promising segments. This alternative has the greatest number of stations, maximizing ridership potential, connectivity to other local bus and regional rail services, and access to land uses along the corridor. Except for a short stretch of freeway between Eagle Rock and Pasadena, it operates entirely on-street, and therefore would have a longer end-to-end running time than the other alternatives.

Key route characteristics of the Street-Running alternative include:

- Serves the Burbank Media District and provides access to Downtown Burbank
- Provides connection to Burbank-Downtown Metrolink station
- Serves the heart of Downtown Glendale with multiple stations
- Operates along Colorado Boulevard serving the Eagle Rock community
- Operates along Colorado Boulevard in Pasadena

Figure 4 – Street-Running Alternative



Freeway-Running Alternative

This alternative (**Figure 5**) was largely based upon the Primary Freeway Concept identified in the 2017 North Hollywood to Pasadena BRT Corridor Technical Study. It operates along the Ventura Freeway (State Route 134) between Burbank and Pasadena with a short on-street section through the Burbank Media District. With the least amount of on-street operation and with fewer stations, it would have the fastest end-to-end travel time; however, this alternative would also be expected to attract fewer riders because it would serve fewer destinations.

Key route characteristics of the Freeway-Running alternative include:

- Serves the Burbank Media District but does not provide access to Downtown Burbank
- Serves Downtown Glendale but with only one station
- Does not serve the Eagle Rock community
- Operates along the Green Street/Union Street one-way couplet in Pasadena



Figure 5 – Freeway-Running Alternative



Hybrid Street/Freeway-Running Alternative

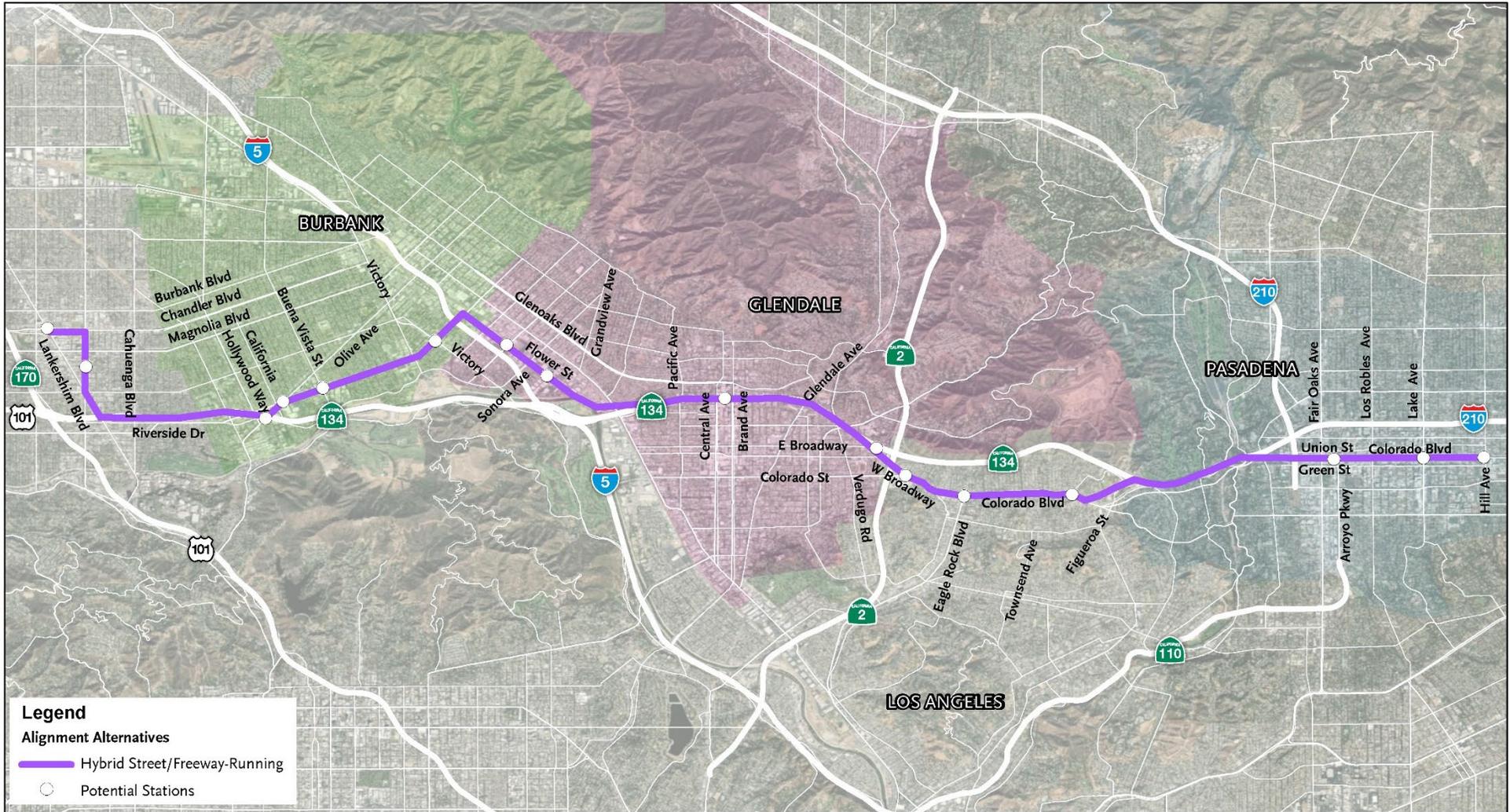
A third alternative (**Figure 6**) was developed for evaluating alternate route options, station locations, and testing a blend of on-street and freeway operations. This alternative, termed the Hybrid Street/Freeway-Running alternative, incorporates various route options including routing from the North Hollywood Metro Red/Orange Line station via Chandler Boulevard to Vineland Avenue where there is adequate width to provide a center-running busway. The Hybrid Street/Freeway-Running alternative connects Burbank and Glendale along Alameda Avenue and Flower Street, then runs along the Ventura Freeway through the northern edge of Downtown Glendale to the Glendale city limits, just outside the community of Eagle Rock in Los Angeles. It has fewer stations than the Street-Running alternative but more than the Freeway-Running alternative. The end-to-end travel time would be faster than the Street-Running alternative but slower than the Freeway-Running alternative.

Key route characteristics of the Hybrid Street/Freeway-Running alternative include:

- Serves the Burbank Media District but does not provide access to Downtown Burbank
- Serves media production centers located along Flower Street
- Serves Downtown Glendale but with only one station
- Operates along Colorado Boulevard serving the Eagle Rock community
- Operates along Colorado Boulevard in Pasadena with a station at Arroyo Parkway, providing a closer connection to the Memorial Park Metro Gold Line station



Figure 6 – Hybrid Street/Freeway-Running Alternative



Evaluation Criteria

Next, the three refined study alternatives were evaluated for mobility improvements, cost-effectiveness, economic development, land use, and environmental benefits in accordance with Metro policies, industry Best Practices, and Federal Transit Authority (FTA) guidelines as presented in the Fixing America’s Surface Transportation (FAST) Act. Equity and public support categories have also been included as important considerations. Specific measures, calculations, sources, and ranking breakpoints have been selected to provide a meaningful comparison of alternatives, as well as of individual segments within each alternative. **Table 2** shows the criteria and related measures.

Table 2 – Evaluation Criteria and Measures

 MOBILITY IMPROVEMENTS	 COSTS	 ECONOMIC DEVELOPMENT	 LAND USE	 EQUITY	 ENVIRONMENTAL BENEFITS	 PUBLIC SUPPORT
M1 Ridership on new BRT alternative / segment	C1 Capital costs	ED1 TOC opportunities	L1 Population and employment	EQ1 Low income or disadvantaged communities ¹	EB1 Measurement of VMT	PS1 Public support
M2 Travel time comparison	C2 Operating costs	ED2 Potential parking impacts	L2 Population and employment density			
M3 Reliability improvement	C3 Cost efficiency		L3 Connections to major activity centers			
M4 Transit network connectivity						
M5 Transit hub connectivity						
M6 Improvement potential for other buses						

Notes:

1. "Disadvantaged" as identified by the California Environmental Protection Agency as the top 25% most impacted census tracts using CalEnviroScreen 3.0; "Low-income Communities" – census tracts that are either at or below 80 percent of the statewide median income, or at or below the threshold designated as low-income by the California Department of Housing and Community Development's (HCD) 2016 State Income Limits.

Evaluation Summary

For each evaluation criterion, the three refined study alternatives were assigned a comparative ranking ranging from very high to very low, with a corresponding score as follows.

- Very High = 5 points
- High = 4 points
- Moderate = 3 points
- Low = 2 points
- Very Low = 1 point

The scores were totaled for each evaluation criteria to determine an overall score for the three refined study alternatives. **Table 3** presents the evaluation results.

The Street-Running alternative has the highest overall score; although the travel time is the slowest and the capital and operating costs are the highest, this alternative has the highest ridership potential and provides the best access to regional activity centers, aligning with the purpose and need for the project. It also delivers the highest vehicle miles of travel (VMT) reduction, which supports Metro's priorities of sustainability, and provides the most service to disadvantaged communities.

Both the Freeway-Running and Hybrid Street/Freeway-Running alternatives leverage the Ventura Freeway, where no mainline improvements were considered (i.e., buses would operate in mixed-flow or in the existing High Occupancy Vehicle [HOV] lane), to achieve time and cost savings relative to the Street-Running alternative. These time and cost savings, however, are achieved by sacrificing some accessibility to the system and connectivity to activity centers.

Although the Hybrid Street/Freeway-Running alternative would cost less to implement than the Street-Running alternative, this alternative did not attract many more riders than the Freeway-Running alternative and it scored significantly lower on the mobility criteria when compared to the Street-Running alternative. This analysis indicated that shifting portions of the alignment to the freeway would not improve the project.

High-level observations in the various evaluation categories are as follows:

- **Mobility Improvements:** The Street-Running alternative attracts nearly 28 percent more net new transit riders than the Freeway-Running alternative and 14 percent more than the Hybrid Street/Freeway-Running alternative. It also outperforms the other two alternatives on all mobility criteria except travel time. (It should be noted, however, that the ridership patterns indicate fewer riders would be traveling the entire length from one end of the study area to the other.)
- **Costs:** Both the Hybrid Street/Freeway-Running and the Freeway-Running alternatives have higher cost efficiency (calculated as the annualized capital costs over 20 years divided by the annual new riders). Although the Street-Running alternative attracts the greatest ridership, it is not as cost efficient because the capital costs are higher.

- **Economic Development:** The Street-Running alternative is most supportive of Metro’s TOC policies. But, this alternative also has the highest potential for impacting traffic and on-street parking, so developing mitigation measures should be a focus during the design refinement and environmental phase of project development.
- **Land Use:** The Street-Running alternative scored the highest on two of the three metrics. It has a lower “density” score; however, this is somewhat misleading as the score is an average of the densities at all stations. The three alternatives serve many of the same high-density centers, but the Street-Running alternative also serves additional stations in less dense areas.
- **Equity:** The Street-Running alternative provides a higher level of access to low income and disadvantaged communities, as defined by the California Environmental Protection Agency (CalEPA). Low income and disadvantaged populations within 1/4-mile buffers of each alternative alignment (except the portion of the route alignments on freeways) and within 1/2-mile buffers of potential station locations were considered.
- **Environmental Benefits:** The Street-Running alternative would result in the greatest reduction in VMT, substantially better than the Freeway-Running alternative and slightly better than the Hybrid Street/Freeway-Running alternative.
- **Public Support:** Although this criterion is somewhat subjective, the Street-Running alternative was judged to be the highest scoring. Based on input from the public and from multiple stakeholders during community outreach efforts, there was a strong consensus that the Freeway-Running alternative was the least desirable.



Source: Trammell Crow Company’s NoHo District Transit Oriented Development Project

Table 3 – Evaluation Results

	Alternative 1: Street-Running	Alternative 2: Freeway-Running	Alternative 3: Hybrid Street/ Freeway-Running	
Mobility Improvements				
Daily Ridership	● 29,570	● 23,136	○ 25,963	
End-to-End Travel Time	● 65 mins	● 43 mins	○ 56 mins	
Travel Time Reliability	●	●	○	
Transit Network Connectivity	●	●	◐	
Transit Hub Connectivity	◐	◐	◐	
Other Bus Line Benefit	●	●	○	
Costs				
Capital Cost (Year of Expenditure)	● \$271-429M	● \$137-201M	◐ \$156-230M	
Annual Operating Cost	● \$19.6M	● \$12.9M	○ \$16.9M	
Cost Efficiency (1)	●	●	●	
Economic Development				
TOC Opportunities	●	●	◐	
Potential Parking Impacts	●	●	●	
Land Use				
Population and Employment (2)	● 364,072	● 199,774	○ 267,355	
Population and Employment Density (3)	● 40	● 47	● 40	
Connections to Major Activity Centers	●	◐	◐	
Equity				
Disadvantaged Communities (4)	●	●	◐	
Environmental Benefits				
VMT Reduction (5)	●	●	◐	
Public Support				
Public Support	○ Moderate	● Very Low	◐ Low	
SUMMARY	● Very High (5 points)	9	6	2
	◐ High (4 points)	1	1	3
	○ Moderate (3 points)	1	0	6
	◐ Low (2 points)	0	1	5
	● Very Low (1 points)	6	9	1
Total Score	● 58	● 45	○ 51	

Notes:

1. Cost efficiency is measured as the annualized capital costs over 20 years divided by the annual new riders
2. Total existing population and employment within a 1/2-mile radius of potential stations
3. Total existing population and employment density per acre within a 1/2-mile radius of potential stations
4. Low income or disadvantaged population, as defined by CalEPA, within 1/4-mile buffers of each alternative alignment and within 1/2-mile buffers of potential station locations
5. Daily decrease in vehicle miles traveled

Refined Project Alternative

Based on the evaluation conducted on the three alternatives, it was determined that the Street-Running alternative best meets the purpose and need for the project and achieves the highest number of overall benefits, including ridership potential, connectivity, TOC opportunities, equity, and environmental benefits. However, high-performing segments from the other two alternatives are recommended to be carried forward resulting in a Refined Street-Running Alternative with Route Options as described below.

Refined Street-Running Alternative with Route Options

The Recommended Project Alternative to be advanced for environmental review is shown in **Figure 7**. This alternative is a refinement of the Street-Running alternative with several route options. Specific refinements include:

- Addition of a route option from the North Hollywood Metro Red/Orange Line station via Chandler Boulevard to Vineland Avenue to Lankershim Boulevard
- Routing via the Ventura Freeway between Lankershim Boulevard and the Burbank Media District to provide a faster operating speed compared to Riverside Drive
- Addition of two route options in Glendale – an alternative street-running segment using Colorado Street in lieu of Broadway as well as an alternative freeway-running segment using the Ventura Freeway between Brand Boulevard and Harvey Drive
- Addition of a route option in Pasadena via the Green Street/Union Street couplet, as an alternative to operating along Colorado Boulevard
- Consolidation of stations in Pasadena with a single station at Arroyo Parkway in lieu of separate stations at Fair Oaks Avenue and Marengo Avenue, to provide a more convenient connection to the Metro Gold Line in Pasadena

The Refined Street-Running Alternative with Route Options, which is the Recommended Project Alternative, connects to the Metro Red and Orange Lines and the future North San Fernando Valley BRT at the North Hollywood Metro Red/Orange Line station and extends to Pasadena City College in Pasadena. Key route characteristics of the Recommended Project Alternative include:

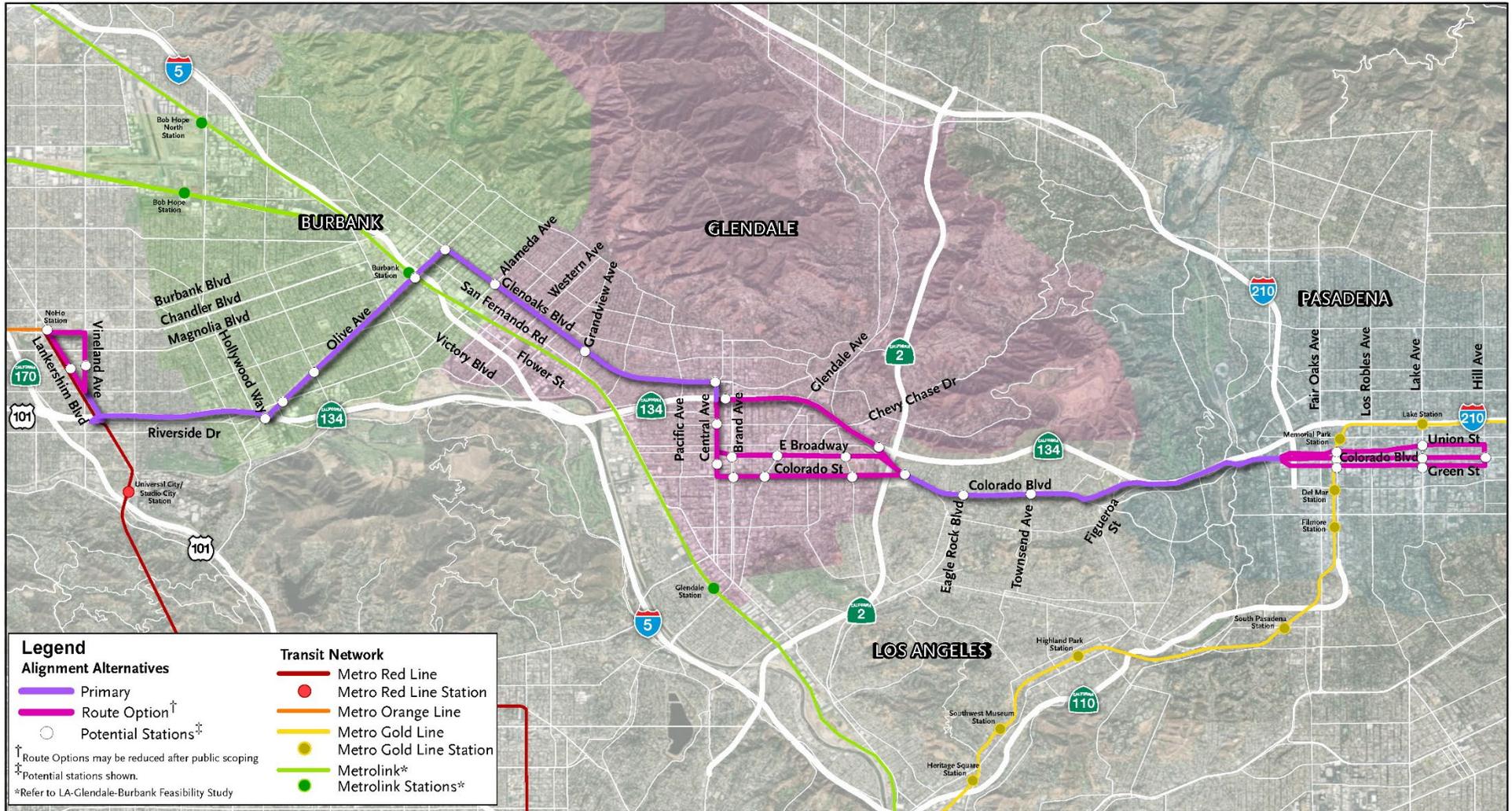
- Serves the North Hollywood Arts District
- Serves the Burbank Media District and Downtown Burbank, including the Burbank-Downtown Metrolink Station
- Connects to Downtown Glendale with options serving the heart of Downtown Glendale with multiple stations, or alternatively with one station adjacent to the Ventura Freeway
- Operates along Colorado Boulevard through the community of Eagle Rock
- Provides access to Old Pasadena, the Metro Gold Line, South Lake Avenue District, and Pasadena City College in Pasadena

The primary segments (shown in purple on Figure 7) and route options (shown in pink on Figure 7) from west to east are described below.

- From North Hollywood, utilizes either Lankershim Boulevard directly to the Ventura Freeway or utilizes a Chandler Boulevard-Vineland Avenue-Lankershim Boulevard routing with dedicated lanes along Vineland Avenue and along Lankershim Boulevard south of Vineland Avenue
- Operates in mixed traffic along the Ventura Freeway between Lankershim Boulevard and Pass Avenue, with stations both south and north of the freeway in the Burbank Media District
- Extends northeast in dedicated lanes along Olive Avenue to Glenoaks Boulevard in Downtown Burbank
- Continues southeast in dedicated lanes along Glenoaks Boulevard between Burbank and Downtown Glendale
- Operates on-street through Downtown Glendale via Central Avenue to Broadway or Colorado Street, or utilizes the Ventura Freeway between Brand Boulevard and Harvey Drive east of downtown
- Operates along Colorado Boulevard in dedicated lanes through the community of Eagle Rock in the City of Los Angeles
- Uses the freeway ramps located east of Linda Rosa Avenue in Eagle Rock to access the Ventura Freeway, continuing along the freeway to Colorado Boulevard in Pasadena
- Continues along Colorado Boulevard in dedicated lanes to Pasadena City College at Colorado Boulevard and Hill Avenue, or operates along the Green Street/Union Street couplet; an Arroyo Parkway station would provide convenient transfer to the Metro Gold Line

The alternative includes 18 to 21 potential stations (depending upon whether the freeway is used in Glendale); however, all station locations are preliminary at this point in the planning process. More specific determinations regarding station locations are dependent upon further design development and evaluation.

Figure 7 – Refined Street-Running Alternative with Route Options



Project Timeline/Next Steps

The North Hollywood to Pasadena BRT Corridor Planning and Environmental Study is currently in the Alternatives Analysis phase. Approval of the Alternatives Analysis will trigger initiation of the formal Environmental Analysis with issuance of a Notice of Preparation (NOP) in Spring 2019 followed by Public Scoping meetings. The Draft Environmental Impact Report (DEIR) will be available in early 2020 and it is expected that the Final EIR will be certified in late 2020. The overall project schedule anticipates design and construction commencing by mid-2022 with an opening date by mid-2024.

The Refined Street-Running Alternative with Route Options as described in this Alternatives Analysis is recommended for further evaluation in the DEIR. The DEIR will identify a Proposed Project and assess route options as part of the Proposed Project or as alternatives to lessen potentially significant impacts. The content of the DEIR will be informed by additional input from Public Scoping Meetings and the ongoing community engagement process.

