SANDAG | Caltrans

CONCEPTUAL PLANNING FOR NEXT GEN *RAPID*
ROUTES 41, 471, AND 625

STUDY ALTERNATIVES REPORT

FINAL
OCTOBER 2023

Prepared by

HNTB

Table of Contents

Tables

Figures

Attachments

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ADA	Americans with Disabilities Act
AT	Active Transportation
BAT	Business Access and Transit
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
DT	Downtown
ETC	Escondido Transit Center
FV	Fashion Valley
GHG	greenhouse gas emissions
GIS	geographic information system
MTS	San Diego Metropolitan Transit System
NB	Northbound
O&M	Operations and Maintenance
PDT	Project Development Team
SANDAG	San Diego Association of Governments
SB	Southbound
SDSU	San Diego State University
SEFP	Social Equity Focus Population
SR	State Route
SSTAC	Social Services Transportation Advisory Council
STPG	Caltrans Sustainable Transportation Planning Grant
TC	Transit Center
TOD	transit-oriented development
TSP	transit signal prioritization
UC	University City
UCSD	University of California San Diego
UTC	University Town Center
VMT	vehicle miles traveled

1.0 Introduction

1.1 SANDAG Regional Plan and Next Gen *Rapid*

With the adoption of the 2021 Regional Plan[1], San Diego Association of Governments (SANDAG) is set to implement Next Gen *Rapid*: a system of faster, more reliable bus service that will reshape how travelers move throughout San Diego County. Though the 2021 Regional Plan identifies approximate route alignments and stop locations, additional analysis is needed to define service characteristics and identify transit-supportive improvements along Next Gen *Rapid* corridors. Doing so will position SANDAG, San Diego Metropolitan Transit System (MTS), and North County Transit District to secure the funding needed to provide quality, reliable transit; maximize ridership by ensuring travel times that are competitive with automobiles; eliminate first- and last-mile barriers; serve basic needs, opportunities, and major destinations; and improve transit service while maximizing corridor passenger throughput.

1.2 Project Description

The Conceptual Planning for Next Gen *Rapid* Routes 41, 471, and 625 study (Study) will identify concepts and a path to implementing bus rapid transit (BRT) service along *Rapid* Routes 41, 471, and 625, providing reliable, high-capacity transit service to diverse communities in San Diego, National City, Chula Vista, and Escondido.

Advanced planning of *Rapid* routes is a critical first step in providing the region's residents and visitors with more mobility options, better connectivity, and greater access to resources across the region. This study is the first step in conducting advanced planning for *Rapid* Routes 41, 471, and 625.

1.3 Purpose of this Report

This report summarizes Study goals and objectives, evaluation criteria, performance measures, and development of corridor concepts, and evaluation of each against Study performance measures. This report also summarizes key findings of the corridor assessment and outlines next steps for project development. The findings of this report will inform the implementation recommendations for each corridor that will be included in the Study Report (Task 7 Report).

1.4 Study Area Overview

The project evaluates potential BRT strategies in three separate study areas within the cities of San Diego, National City, Chula Vista, Escondido, and San Marcos. Each study area is described in the following sections and shown in Figure 1-1, Figure 1-2, and Figure 1-3 .

1.4.1 *Rapid 41*

Rapid 41 is a planned overlay of *Rapid* service along the existing local Route 41 service. Local 41 currently runs from University City (UC) to Mission Valley, primarily via Genesee Avenue, connecting low-income communities in Clairemont Mesa and Linda Vista to the Veterans Administration Medical Center, University Town Center (UTC) mall, University of California San Diego (UCSD), and Fashion Valley (FV) mall. The route is also adjacent to San Diego Mesa College. *Rapid* 41 will have higher frequencies,

[1] SANDAG (San Diego Association of Governments). 2021. 2021 Regional Plan. December 2021. Available at: https://www.sandag.org/regional-plan/2021-regional-plan/-/media/8D0F181A086844E3A84C3D44576BED6B.ashx.

longer service spans, faster travel times, and more amenities than local Route 41. It will connect to the Green Line trolley at FV and the Blue Line trolley at UCSD and UTC.

One of the corridor concepts includes an extension of *Rapid* 41 service to Hillcrest via Bachman Place. This extension would serve the transit-supportive land use in Hillcrest and provide a high-quality direct transit service between UCSD's La Jolla Campus and Hillcrest Medical Center Campus.

1.4.2 *Rapid 471*

Rapid 471 is a planned rapid service that will connect eastern Escondido, Escondido Transit Center (ETC), Palomar Medical Center Escondido, and in some options, Nordahl Marketplace in San Marcos, providing the vulnerable communities along the route — seniors, low-income, and minorities — with an essential regional multimodal option to and from the SPRINTER light rail and other *Rapid* and local bus routes at ETC. It will connect the medical center, a major employment center, to high-frequency transit for the first time. The City of Escondido is planning significant transit-oriented development (TOD) in the corridor, which will include affordable housing options. Providing a connection to ETC links current and future residents to more transportation options to access destinations around the region.

1.4.3 *Rapid 625*

Rapid 625 is a planned rapid service that will serve the San Diego State University (SDSU) community, City Heights, National City, Chula Vista, and communities in between. It connects these communities to key destinations, including the Green Line trolley at SDSU TC, the Orange Line trolley in Southeast San Diego, and the Blue Line trolley in Chula Vista. The route will serve disadvantaged communities within the top 25 and top 50 percent CalEnviroScreen thresholds and connect these communities to quality-of-life spaces, such as higher education facilities, job centers, and medical campuses within the region.

Figure 1-1. *Rapid 41* Corridor – Study Area

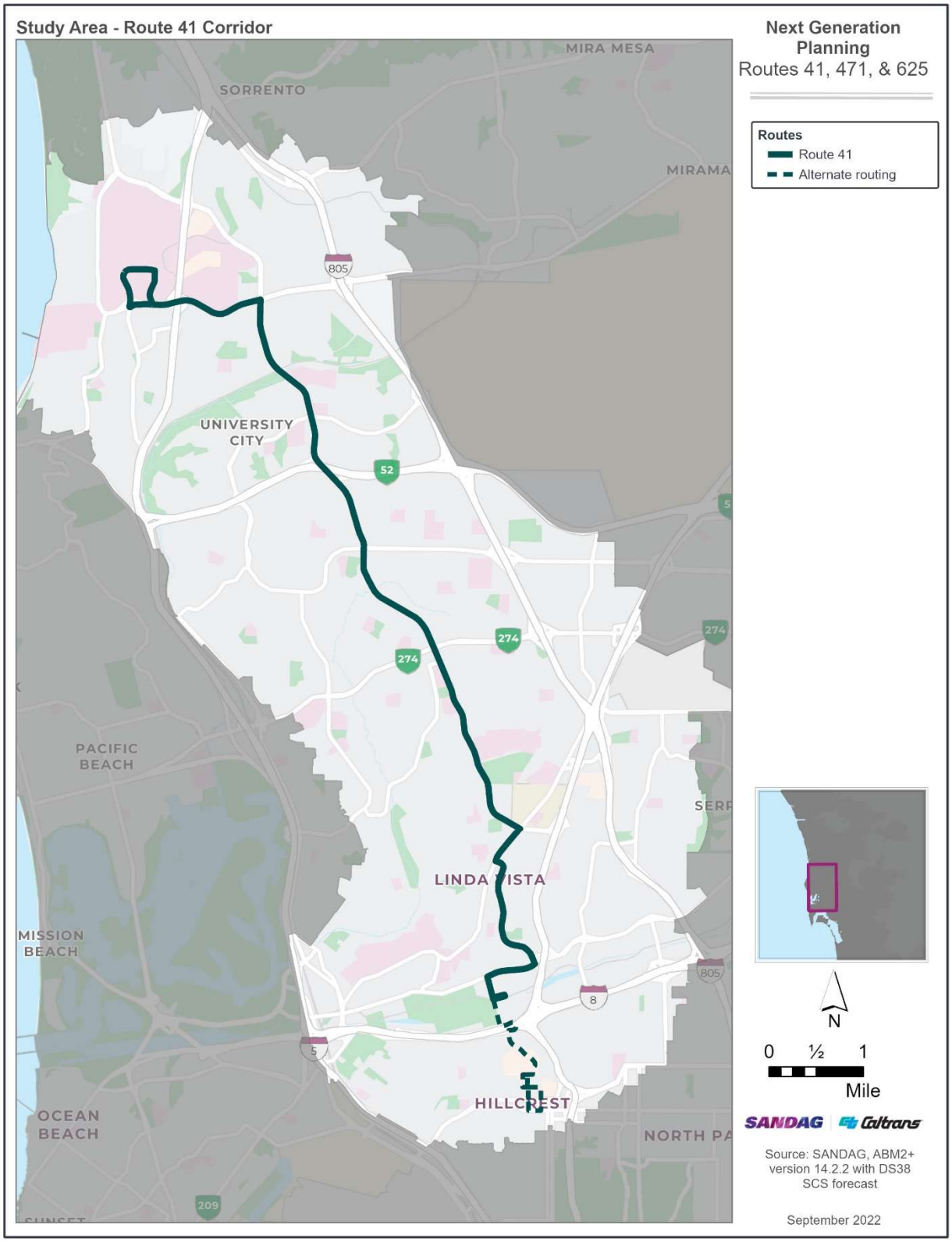


Figure 1-2. *Rapid 471* Corridor– Study Area

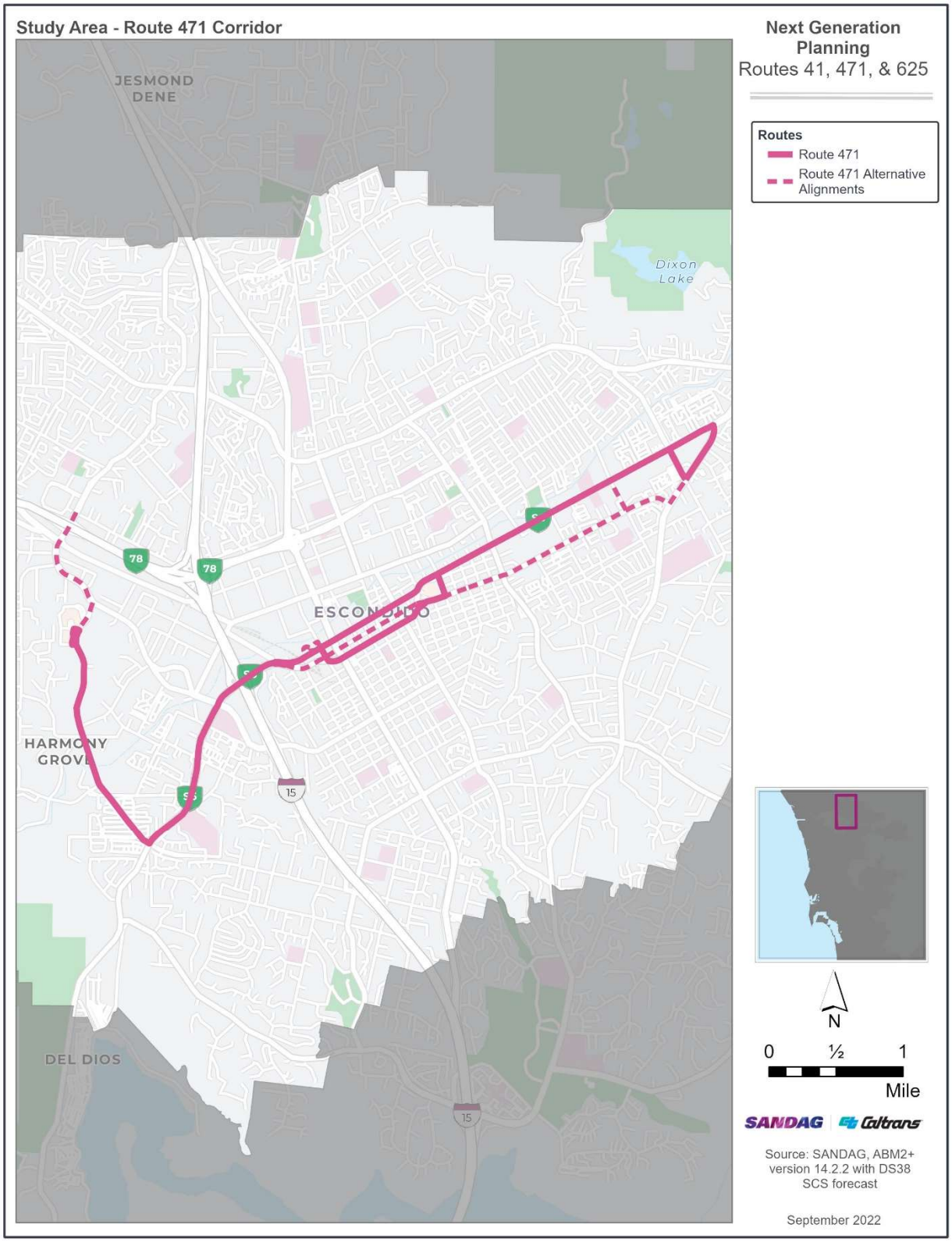
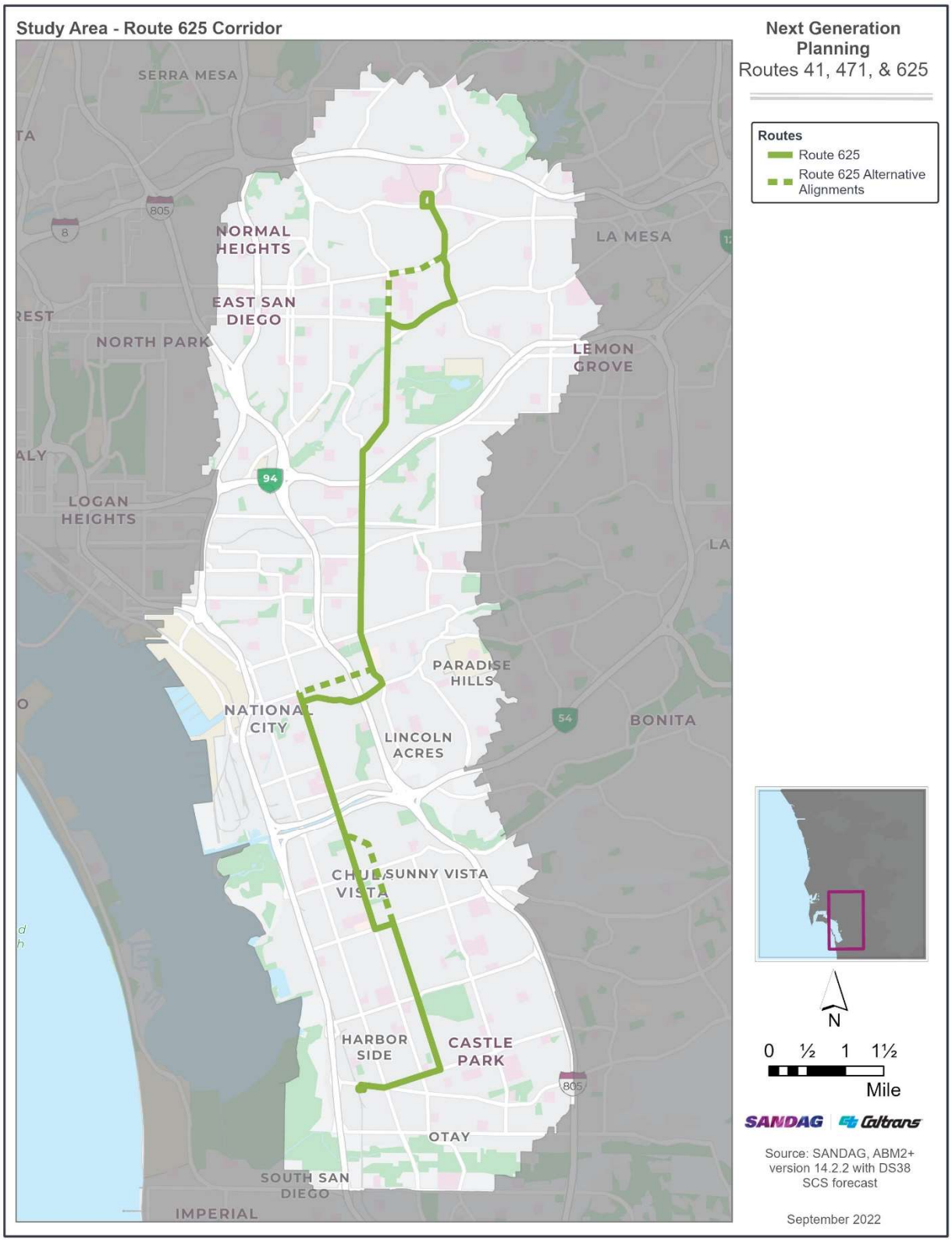


Figure 1-3. *Rapid 625* Corridor – Study Area



2.0 Goals, Objectives, Performance Measures, and Evaluation Criteria

A series of goals and objectives, performance measures, and evaluation criteria were identified by the project team in coordination with the Project Development Team (PDT). Table 2-1 summarizes the proposed objectives for each Next Gen *Rapid* goal. These goals and objectives were developed in conjunction with California Department of Transportation (Caltrans) Sustainable Transportation Planning Grant (STPG) objectives and encompass the unique challenges of the three corridors. An assessment of each corridor concept is included in Section 4.0. More information on goals, objectives, evaluation criteria and performance measures is included in Appendix A.

Table 2-1. Study Goals and Objectives, Evaluation Criteria, and Performance Measures

Goals	Objectives	Evaluation Criteria	Performance Measures
Provide reliable, high-quality transit service that is competitive with automobile travel	Implement strategies that minimize delays to buses caused by congestion along roadways and at intersections Provide station amenities that expedite the boarding and alighting process	Transit Service Reliability	New miles of dedicated bus facilities[1]
			Percent difference in trip time between proposed *Rapid* routes and automobiles on the corridor
			Percent difference in trip time between existing or assumed local bus and proposed *Rapid* routes on the corridor
			Change in person throughput along each corridor
Maximize ridership potential	Serve key activity centers and areas with high concentrations of population and employment	Ridership Potential	Total number of people and jobs within 0.5 mile travelshed of stations

Goals	Objectives	Evaluation Criteria	Performance Measures
	Serve key activity centers and areas with high concentrations of population and employment		Number of known activity centers within 0.5 mile of stations
	Enhance non-motorized access to transit beyond a 5- or 10-minute travelshed		Total number of people and jobs that can access stations within 10 to 20 minutes (bicycle flex fleet access market)
	Identify active transportation (AT) improvements that have the potential to improve safety		Miles of existing/proposed AT facilities on alternative (miles)[1]
Improve access for social equity focus and transit-dependent populations	Implement service that directly connects social equity focus populations with employment centers, higher education institutions, and basic needs (e.g., healthcare and grocery stores)	Socially Equity Focus and Transit-Dependent Population Benefits	Percentage of total corridor social equity focus populations (low-income, minority and senior) within 0.5 mile travelshed of each route alternative's proposed stations
	Ensure stations are accessible		Feedback from Social Services Transportation Advisory Council (SSTAC) meeting on station access strategies
Gain support from the public and key stakeholders	Implement context sensitive strategies	Stakeholder Support	Feedback from stakeholders on conceptual design elements
	Implement services that serve multiple travel markets in each corridor		Number of unique land uses accessible within 0.5 mile of stops[a]
Implement cost-effective and financially feasible Next Gen service	Design cost-effective routes; design a project with high funding feasibility	Cost Effectiveness and Financial Feasibility	Annual O&M cost per potential rider
	Identify TOD opportunities that could be used to fund a portion of capital and/or Operations and Maintenance (O&M) costs		Redevelopment Potential Index

Note:

[a] Index scores were calculated for the following performance measures: new miles of dedicated bus facilities, miles of existing/proposed AT facilities, and number of unique land uses accessible within 0.5 mile of stops. Index scores are shown in Section 4.0 and Attachment C.

3.0 Corridor Concepts

This section provides an overview of the characteristics for each corridor concept. More information on the types of strategies that were considered is included in Appendix B. A detailed summary of each option — including routing characteristics — is included in Appendix D.

3.1 *Rapid 41*

The *Rapid 41* corridor concepts are shown in Figure 3-1 (Option 1), Figure 3-2 (Option 2), and Figure 3-3 (Option 3). Option 1 provides the lowest capital cost option, but with slightly slower service than Option 2. Option 1 includes mostly bus-only lanes, with some mixed flow operations near FV TC, Mesa College, and UCSD. Option 2 provides faster, more reliable service than Option 1, but with a higher capital cost. Option 2 utilizes center running bus-only lanes in Clairemont and UC, some mixed flow operations near UCSD, and bus-only lanes elsewhere. Option 3 has similar characteristics to Option 2, except it extends south into Hillcrest. Buses operate in mixed flow conditions for most of the extension and in bus-only lanes along First Avenue and Fourth Avenue.

Figure 3-1. *Rapid 41*, Option 1

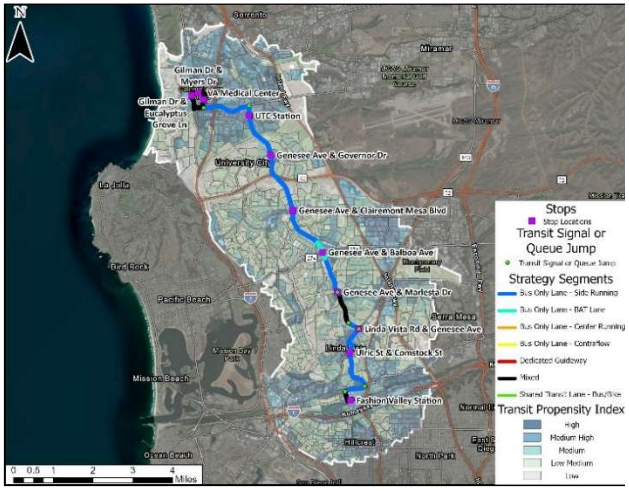


Figure 3-2. *Rapid 41*, Option 2

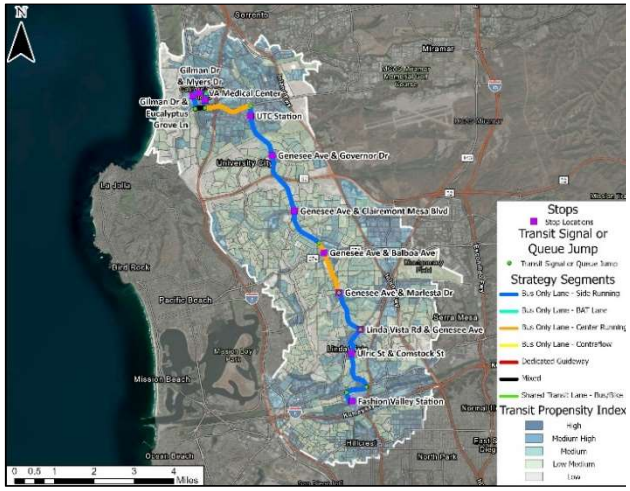
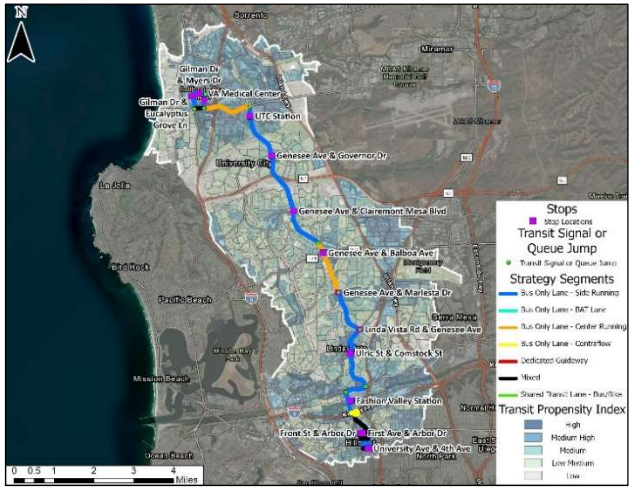


Figure 3-3. *Rapid 41*, Option 3



3.2 *Rapid 471*

The *Rapid 471* corridor concepts are shown in Figure 3-4 (Option 1), Figure 3-5 (Option 2), and Figure 3-6 (Option 3). Option 1 provides the lowest capital cost option, but with slightly slower service. Option 1 includes mostly bus only lanes, with some mixed flow operations near Downtown (DT) and eastern Escondido. In Options 2 and 3, the western terminus would be extended to Nordahl Marketplace, just north of SR-78. Option 2 provides faster, more reliable service, but with a higher capital cost. Option 2 includes a dedicated guideway along Grand Avenue in DT Escondido and shared bus/bike lanes along Grand Avenue east of 2nd Avenue. Option 3 provides the fastest service with the highest capital cost. Option 3 also includes a dedicated guideway along Grand Avenue in DT Escondido, as well as center running bus-only lanes near Interstate 15 and east of DT, along Valley Parkway

Figure 3-4. *Rapid 471*, Option 1

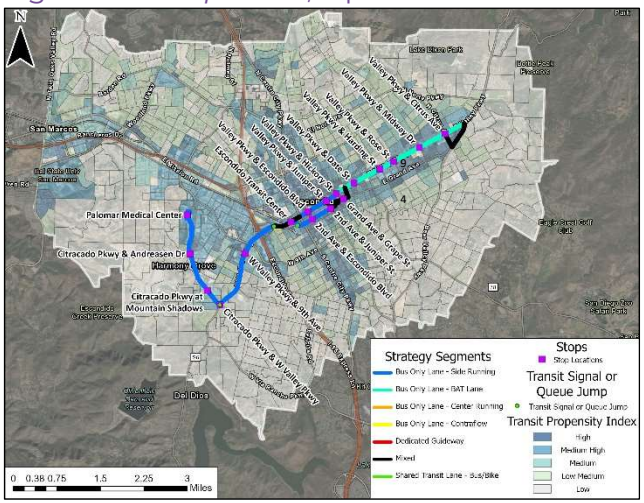


Figure 3-5. *Rapid 471*, Option 2

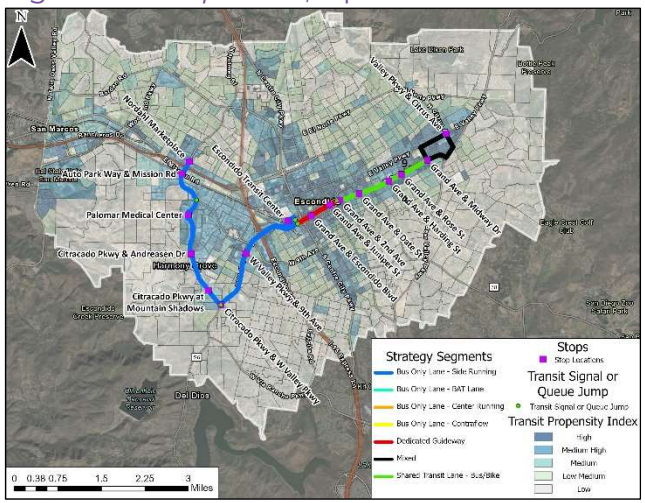
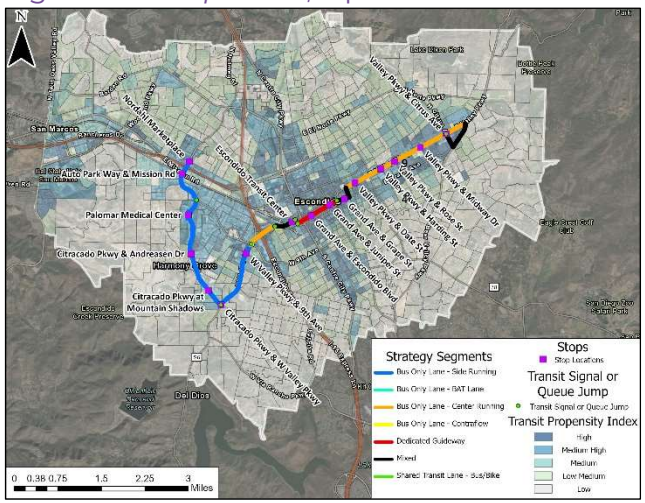


Figure 3-6. *Rapid 471*, Option 3



3.3 *Rapid 625*

The *Rapid 625* corridor concepts are shown below in Figure 3-7 (Option 1), Figure 3-8 (Option 2), and Figure 3-9 (Option 3), Option 1 provides the lowest capital cost option, but with slightly slower service. Option 1 includes mostly bus-only lanes, with some mixed flow operations along 3rd Avenue in Chula Vista, along Euclid Avenue in National City, and near SDSU. Option 2 provides faster, more reliable service than Option 1, but with a higher capital cost. Travel times for Option 2 are longer because the route itself is longer, however it is more efficient as it only takes one minute longer than Option 1 to travel 0.3 additional miles. Option 2 utilizes center- running bus-only lanes along Plaza Boulevard in National City, mixed flow operations near SDSU, and bus-only lanes elsewhere. Option 3 provides somewhat faster service and a medium-high capital cost. Option 3 utilizes bus-only lanes along most of the route, shared bus/bike lanes along 3rd Avenue in Chula Vista, a dedicated guideway north of Euclid Avenue and Federal Boulevard, a Business Access and Transit (BAT) lane along University Avenue, and mixed flow operations near SDSU.

Figure 3-7. *Rapid 625*, Option 1

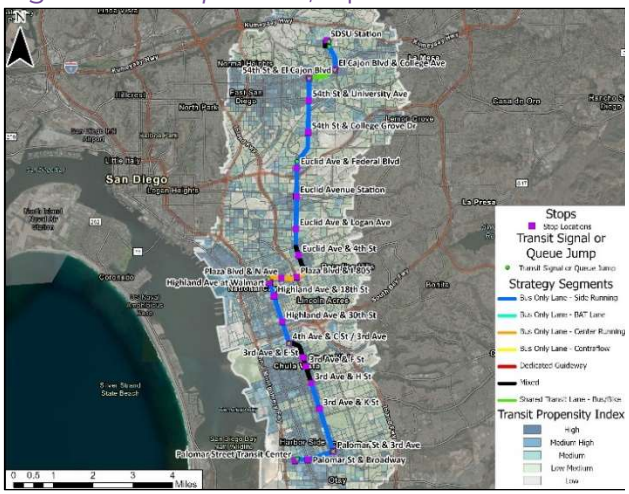


Figure 3-8. *Rapid 625*, Option 2

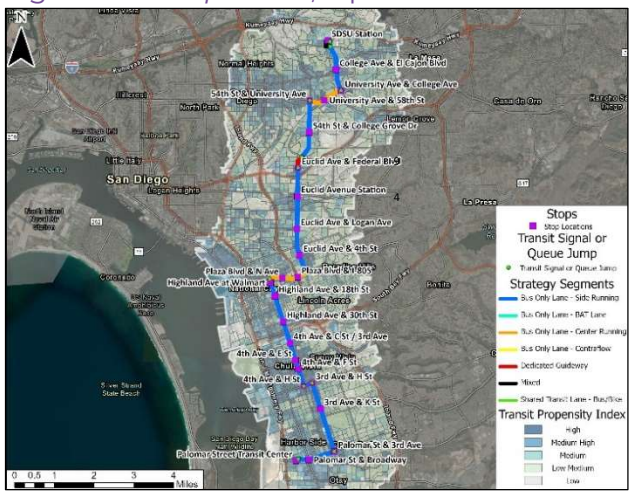
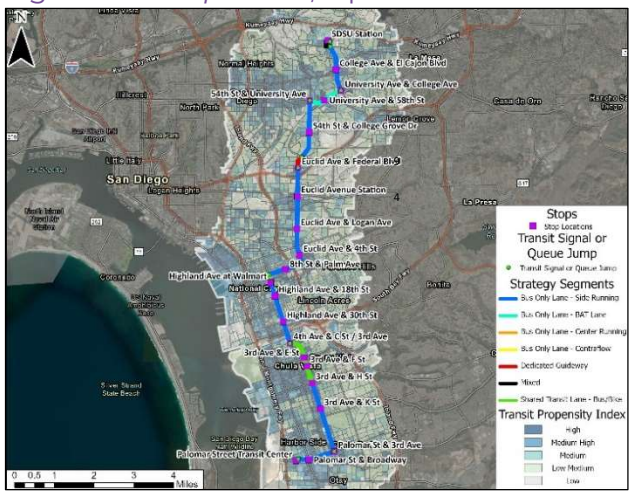


Figure 3-9. *Rapid 625*, Option 3



4.0 Analysis of Corridor Concepts

This section summarizes the assessment of corridor concepts against the study performance measures summarized in Section 2.0. An overview of concept performance measures and an assessment comparing concepts is included in Table 4-1. Rapid 41 – Summary of Concept Performance

Summary	Option 1	Option 2	Option 3
Option 3 performed the best overall in the *Rapid* 41 corridor. Regarding transit service reliability, it includes the greatest investment in dedicated bus facilities and shows the greatest potential to reduce travel time compared to local bus service. It also has the greatest ridership potential as it serves more activity centers and provides access to more people and jobs than Options 1 and 2. From a social equity standpoint, Option 3 serves a slightly higher percentage of senior residents, whereas Options 1 and 2 serve slightly higher percentages of minority and low-income residents. Option 3 also received the highest level of support from the community and has a slightly higher land use score than Options 1 and 2. Option 3 also has the lowest annual O&M cost per rider and a slightly higher redevelopment potential index.			
Concept Information			
General Characteristics	Low level of investment, slower speeds	Higher level of investment, faster service	Higher level of investment, faster service
System Length (miles)	12.0	12.0	14.4
Number of Stations/Stops (per direction)	11	11	14
End-to-End Travel Time (minutes)	42	39	51
Capital Cost	$90 - $132 Million	$107 - $158 Million	$116 - $173 Million
Annual O&M Cost (gross)	$8,304,472	$7,474,025	$9,965,366
Transit Service Reliability (PDT Rank: #1)			
Weighted dedicated bus facilities score (index, see Attachment C)	1.4	1.9	2.1
% Change in trip time (*Rapid* vs. autos)	-10% to 11%	-18% to 6%	-1% to 62%
% Change in trip time (*Rapid* vs. local bus)	-24%	-30% to -28%	-47% to -33%
Change in potential person throughput along each corridor	80%	80%	80%
Ridership Potential (PDT Rank: #2)			
People + Jobs within 0.5 mile of stations	82,917	82,917	121,332
Known activity centers within 0.5 mile of stations	6	6	10
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	126,492	126,492	149,167
Existing/proposed AT facilities score (index, see Attachment C)	2.1	2.3	2.8
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)			
% of social equity focus populations within 0.5 mile of stations	Senior 10.52% / Minority 61.36% / Low Income 30.15%	Senior 10.52% / Minority 61.36% / Low Income 30.15%	Senior 10.97% / Minority 57.86% / Low Income 27.55%
Feedback from Social Services Transportation Advisory Council (SSTAC) meeting on station access strategies (ranking)	3	2	1
Stakeholder Support (PDT Rank: #5)			
Feedback from stakeholders on conceptual design elements	11%	34%	55%
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.70	2.70	2.80

Cost Effectiveness and Financial Feasibility (PDT Rank: #3)			
Annual O&M cost per potential rider	$100.15	$90.14	$82.13
Redevelopment Potential Index	38.42	38.42	39.24
Overall Ranking (weighted index)	3	2	1

Note: The highest scoring performance measures are shaded purple

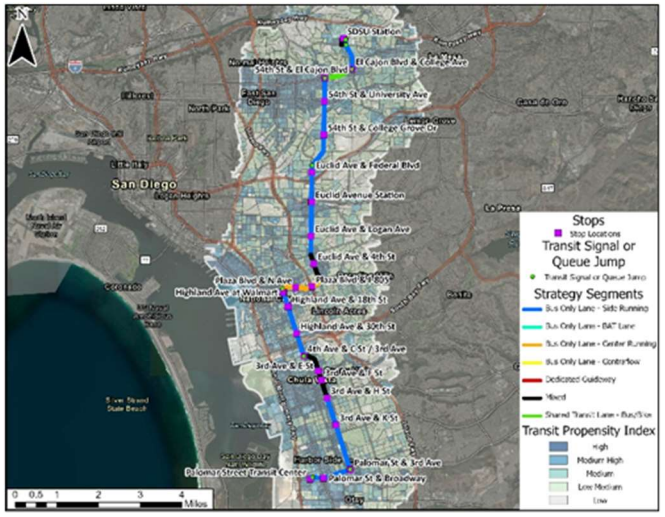
Table 4-2. Rapid 471 – Summary of Concept Performance

Summary	Option 1			Op	
Option 1 performed the best overall in the *Rapid* 471 corridor. Regarding transit service reliability, Option 3 includes the greatest investment in dedicated bus facilities, but Option 1 shows the greatest potential to reduce travel time compared to local bus service and has travel times that are most competitive with automobile travel. Regarding ridership potential, Option 1 serves slightly fewer people and jobs than Option 3; however, it serves the same number of activity centers and has a higher AT facilities index than the other two options. Option 2 serves a slightly higher percentage of senior residents, whereas Option 1 serves slightly higher percentages of minority and low-income residents. Option 1 also received the highest level of support from the SANDAG SSTAC, tied Option 3 for the highest level of support from the community, and has a higher land use score than Options 2 and 3.					
Concept Information					
General Characteristics	Lowest level of investment, slower service			Higher level of inve	
System Length (miles)	9.9				
Number of Stations/Stops (per direction)	14				
End-to-End Travel Time (minutes)	38				
Capital Cost	$65 - $97 Million			$58 - $	
Annual O&M Cost (gross)	$9,502,848			$10,5	
Transit Service Reliability (PDT Rank: #1)					
Weighted dedicated bus facilities score (index, see Attachment C)	1.1				
% Change in trip time (*Rapid* vs. autos)	2% to 18%			9%	
% Change in trip time (*Rapid* vs. local bus)	-58% to -21%			-47%	
Change in potential person throughput along each corridor	35%			2	
Ridership Potential (PDT Rank: #2)					
People + Jobs within 0.5 mile of stations	97,824			9	
Known activity centers within 0.5 mile of stations	8				
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	62,259			7	
Existing/proposed AT facilities score (index, see Attachment C)	1.6				
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)					
% of social equity focus populations within 0.5 mile of stations	Senior 8.41%	Minority 71.53%	Low Income 40.97%	Senior 8.53%	Mi 70

Feedback from SSTAC meeting on station access strategies	1	
Stakeholder Support (PDT Rank: #5)		
Feedback from stakeholders on conceptual design elements	34%	3
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.62	2
Cost Effectiveness and Financial Feasibility (PDT Rank: #3)		
Annual O&M cost per potential rider	$97.14	$1
Redevelopment Potential Index	40.30	4
Overall Ranking (weighted index)	1	

Note: The highest scoring performance measures are shaded purple

Table 4-3. Rapid 625 – Summary of Concept Performance

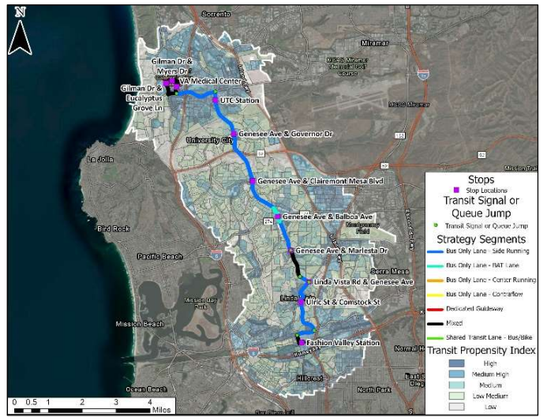
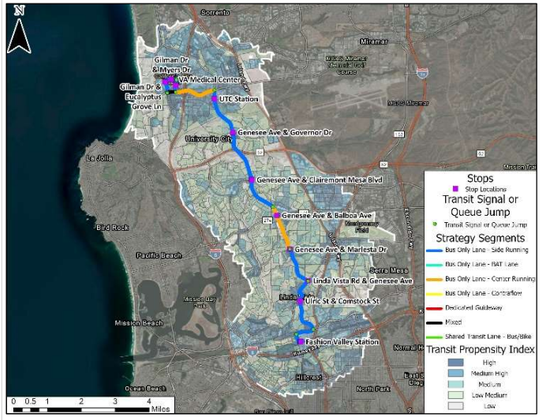
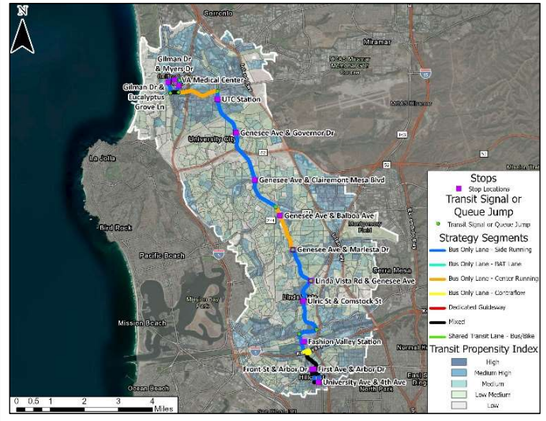
Summary	Option 1	Op
Option 2 performed the best overall in the *Rapid* 625 corridor. Regarding transit service reliability, Option 2 had slightly lower performance than Option 3. Option 2 stands out primarily due to its ridership potential and stakeholder support. Option 2 serves the highest number of people and jobs, the same number of activity centers as Option 1, and has the highest AT facilities score. Regarding social equity focus populations, Option 2 serves the same percentage of minority and low-income residents as Option 1. Option 3 received the most endorsement from the SSTAC. Regarding stakeholder support, Option 2 received the highest level of support from the community and has the highest land use score. Option 3 has the lowest annual O&M cost per rider because it is shorter than Option 2 and has more transit priority treatments than Option 1, resulting in a slightly faster end-to-end travel time. Option 2 has a slightly lower redevelopment potential index than Options 1 and 3.		
Concept Information		
General Characteristics	Lowest capital cost, slower speeds	Highest capital
System Length (miles)	15.3	
Number of Stations/Stops (per direction)	22	
End-to-End Travel Time (min)	70	
Capital Cost	$105 - $156 Million	$127 - $
Annual O&M Cost (gross)	$14,117,602	$14,
Transit Service Reliability (PDT Rank: #1)		
Weighted dedicated bus facilities score (index, see Attachment C)	2.0	
% Change in trip time (*Rapid* vs. autos)	85% to 156%	89%
% Change in trip time (*Rapid* vs. local bus)	-46% to -33%	-45%
Change in potential person throughput along each corridor	90%	1
Ridership Potential (PDT Rank: #2)		
People + Jobs within 0.5 mile of stations	206,178	21
Known activity centers within 0.5 mile of stations	15	
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	182,366	18
Existing/proposed AT facilities score (index, see Attachment C)	2.3	
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)		

% of social equity focus populations within 0.5 mile of stations	Senior 7.86%	Minority 82.17%	Low Income 44.99%	Senior 7.83%	Mi 8
Feedback from SSTAC meeting on station access strategies	3				
Stakeholder Support (PDT Rank: #5)					
Feedback from the community on conceptual design elements	34%				
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.60				
Cost Effectiveness and Financial Feasibility (PDT Rank: #3)					
Annual O&M cost per potential rider	$68.47				$
Redevelopment Potential Index	39.93				3
Overall Ranking	2				

Note: The highest scoring performance measures are shaded purple

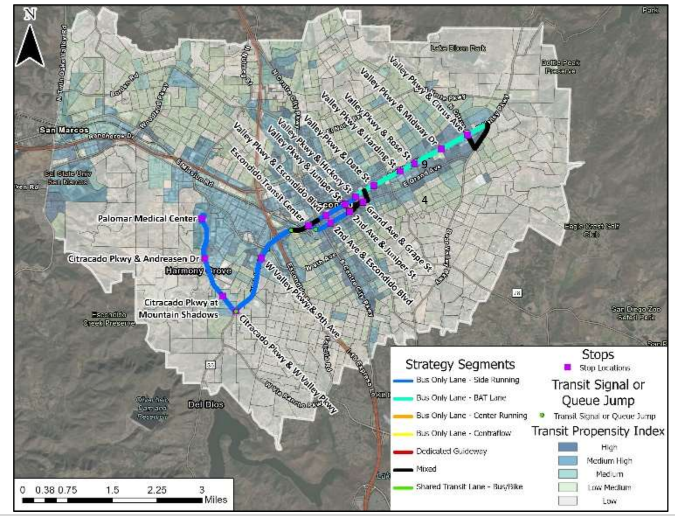
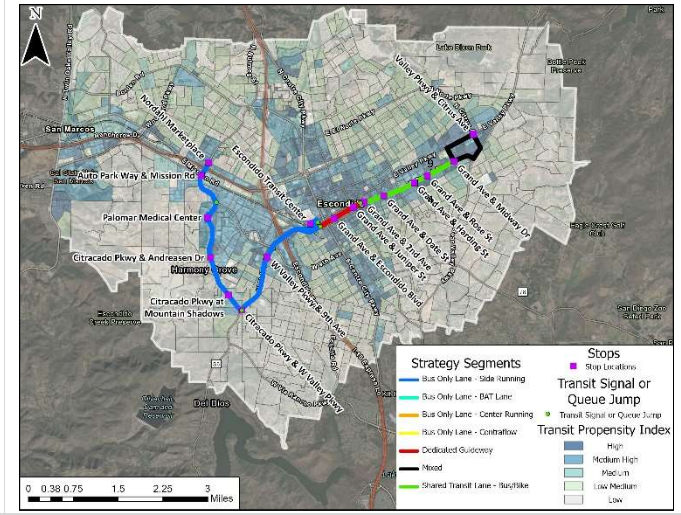
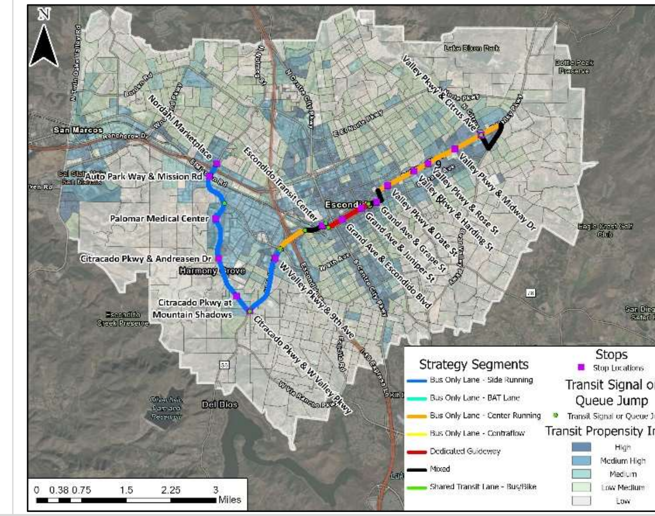
for *Rapid* 41, **Error! Reference source not found.** for *Rapid* 471, and **Error! Reference source not found.** for *Rapid* 625. A detailed summary of performance measures and rankings is included in **Attachment C**.

Table 4-1. Rapid 41 – Summary of Concept Performance

Summary	Option 1	Option 2	Option 3
Option 3 performed the best overall in the *Rapid* 41 corridor. Regarding transit service reliability, it includes the greatest investment in dedicated bus facilities and shows the greatest potential to reduce travel time compared to local bus service. It also has the greatest ridership potential as it serves more activity centers and provides access to more people and jobs than Options 1 and 2. From a social equity standpoint, Option 3 serves a slightly higher percentage of senior residents, whereas Options 1 and 2 serve slightly higher percentages of minority and low-income residents. Option 3 also received the highest level of support from the community and has a slightly higher land use score than Options 1 and 2. Option 3 also has the lowest annual O&M cost per rider and a slightly higher redevelopment potential index.			
Concept Information			
General Characteristics	Low level of investment, slower speeds	Higher level of investment, faster service	Higher level of investment, faster service
System Length (miles)	12.0	12.0	14.4
Number of Stations/Stops (per direction)	11	11	14
End-to-End Travel Time (minutes)	42	39	51
Capital Cost	$90 - $132 Million	$107 - $158 Million	$116 - $173 Million
Annual O&M Cost (gross)	$8,304,472	$7,474,025	$9,965,366
Transit Service Reliability (PDT Rank: #1)			
Weighted dedicated bus facilities score (index, see Attachment C)	1.4	1.9	2.1
% Change in trip time (*Rapid* vs. autos)	-10% to 11%	-18% to 6%	-1% to 62%
% Change in trip time (*Rapid* vs. local bus)	-24%	-30% to -28%	-47% to -33%
Change in potential person throughput along each corridor	80%	80%	80%
Ridership Potential (PDT Rank: #2)			
People + Jobs within 0.5 mile of stations	82,917	82,917	121,332
Known activity centers within 0.5 mile of stations	6	6	10
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	126,492	126,492	149,167
Existing/proposed AT facilities score (index, see Attachment C)	2.1	2.3	2.8
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)			
% of social equity focus populations within 0.5 mile of stations	Senior 10.52% / Minority 61.36% / Low Income 30.15%	Senior 10.52% / Minority 61.36% / Low Income 30.15%	Senior 10.97% / Minority 57.86% / Low Income 27.55%
Feedback from Social Services Transportation Advisory Council (SSTAC) meeting on station access strategies (ranking)	3	2	1
Stakeholder Support (PDT Rank: #5)			
Feedback from stakeholders on conceptual design elements	11%	34%	55%
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.70	2.70	2.80
Cost Effectiveness and Financial Feasibility (PDT Rank: #3)			
Annual O&M cost per potential rider	$100.15	$90.14	$82.13
Redevelopment Potential Index	38.42	38.42	39.24
Overall Ranking (weighted index)	3	2	1

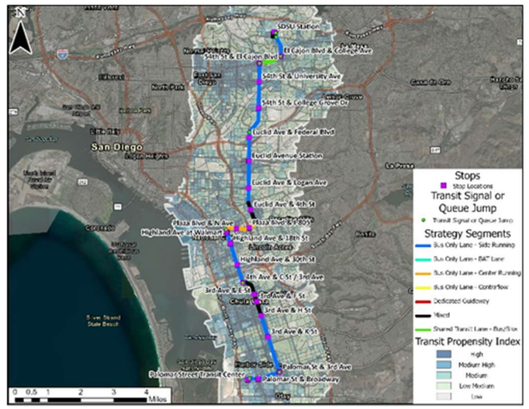
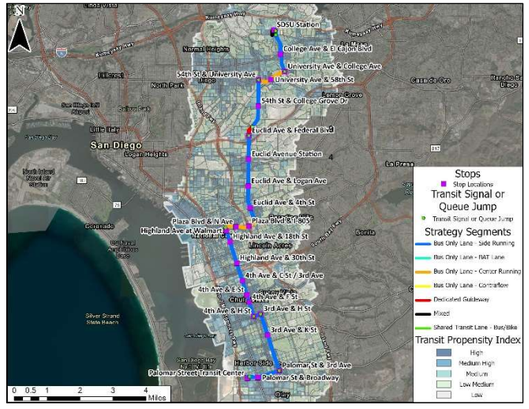
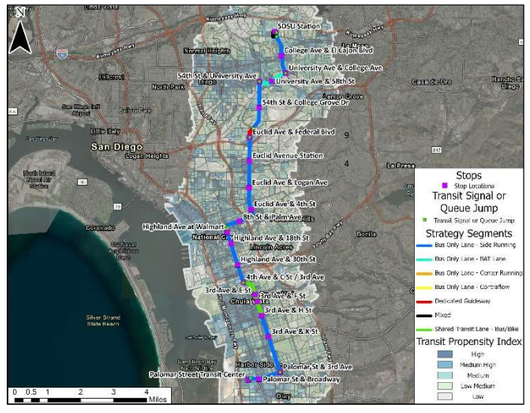
Note: The highest scoring performance measures are shaded purple

Table 4-2. Rapid 471 – Summary of Concept Performance

Summary	Option 1	Option 2	Option 3
Option 1 performed the best overall in the *Rapid* 471 corridor. Regarding transit service reliability, Option 3 includes the greatest investment in dedicated bus facilities, but Option 1 shows the greatest potential to reduce travel time compared to local bus service and has travel times that are most competitive with automobile travel. Regarding ridership potential, Option 1 serves slightly fewer people and jobs than Option 3; however, it serves the same number of activity centers and has a higher AT facilities index than the other two options. Option 2 serves a slightly higher percentage of senior residents, whereas Option 1 serves slightly higher percentages of minority and low-income residents. Option 1 also received the highest level of support from the SANDAG SSTAC, tied Option 3 for the highest level of support from the community, and has a higher land use score than Options 2 and 3.			
Concept Information			
General Characteristics	Lowest level of investment, slower service	Higher level of investment, faster service	Highest level of investment, faster service
System Length (miles)	9.9	10.1	9.9
Number of Stations/Stops (per direction)	14	16	16
End-to-End Travel Time (minutes)	38	40	38
Capital Cost	$65 - $97 Million	$58 - $86 Million	$58 - $87 Million
Annual O&M Cost (gross)	$9,502,848	$10,558,720	$9,502,848
Transit Service Reliability (PDT Rank: #1)			
Weighted dedicated bus facilities score (index, see Attachment C)	1.1	1.3	1.4
% Change in trip time (*Rapid* vs. autos)	2% to 18%	9% to 94%	11% to 76%
% Change in trip time (*Rapid* vs. local bus)	-58% to -21%	-47% to -27%	-52% to -26%
Change in potential person throughput along each corridor	35%	24%	36%
Ridership Potential (PDT Rank: #2)			
People + Jobs within 0.5 mile of stations	97,824	95,612	98,856
Known activity centers within 0.5 mile of stations	8	8	8
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	62,259	73,832	72,549
Existing/proposed AT facilities score (index, see Attachment C)	1.6	1.2	1.5
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)			
% of social equity focus populations within 0.5 mile of stations	Senior 8.41% Minority 71.53% Low Income 40.97%	Senior 8.53% Minority 70.56% Low Income 40.37%	Senior 8.51% Minority 70.73% Low Income 40.26%
Feedback from SSTAC meeting on station access strategies	1	2	3
Stakeholder Support (PDT Rank: #5)			
Feedback from stakeholders on conceptual design elements	34%	32%	34%
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.62	2.50	2.53
Cost Effectiveness and Financial Feasibility (PDT Rank: #3)			
Annual O&M cost per potential rider	$97.14	$110.43	$96.13
Redevelopment Potential Index	40.30	40.59	41.05
Overall Ranking (weighted index)	1	3	2

Note: The highest scoring performance measures are shaded purple

Table 4-3. Rapid 625 – Summary of Concept Performance

Summary	Option 1	Option 2	Option 3
Option 2 performed the best overall in the *Rapid* 625 corridor. Regarding transit service reliability, Option 2 had slightly lower performance than Option 3. Option 2 stands out primarily due to its ridership potential and stakeholder support. Option 2 serves the highest number of people and jobs, the same number of activity centers as Option 1, and has the highest AT facilities score. Regarding social equity focus populations, Option 2 serves the same percentage of minority and low-income residents as Option 1. Option 3 received the most endorsement from the SSTAC. Regarding stakeholder support, Option 2 received the highest level of support from the community and has the highest land use score. Option 3 has the lowest annual O&M cost per rider because it is shorter than Option 2 and has more transit priority treatments than Option 1, resulting in a slightly faster end-to-end travel time. Option 2 has a slightly lower redevelopment potential index than Options 1 and 3.			
Concept Information			
General Characteristics	Lowest capital cost, slower speeds	Highest capital cost, faster service	Highest capital cost, faster service
System Length (miles)	15.3	15.6	15.3
Number of Stations/Stops (per direction)	22	24	22
End-to-End Travel Time (min)	70	71	67
Capital Cost	$105 - $156 Million	$127 - $190 Million	$112 - $167 Million
Annual O&M Cost (gross)	$14,117,602	$14,117,602	$13,287,155
Transit Service Reliability (PDT Rank: #1)			
Weighted dedicated bus facilities score (index, see Attachment C)	2.0	2.4	2.5
% Change in trip time (*Rapid* vs. autos)	85% to 156%	89% to 163%	75% to 148%
% Change in trip time (*Rapid* vs. local bus)	-46% to -33%	-45% to -32%	-49% to -35%
Change in potential person throughput along each corridor	90%	153%	169%
Ridership Potential (PDT Rank: #2)			
People + Jobs within 0.5 mile of stations	206,178	210,124	199,471
Known activity centers within 0.5 mile of stations	15	15	14
People + Jobs within 10-20 minutes (bicycle/flex fleet access)	182,366	180,463	184,887
Existing/proposed AT facilities score (index, see Attachment C)	2.3	2.7	2.4
Socially Equity Focus and Transit-Dependent Population Benefits (PDT Rank: #4)			
% of social equity focus populations within 0.5 mile of stations	Senior 7.86% / Minority 82.17% / Low Income 44.99%	Senior 7.83% / Minority 82.17% / Low Income 44.99%	Senior 7.85% / Minority 82.13% / Low Income 44.74%
Feedback from SSTAC meeting on station access strategies	3	2	1
Stakeholder Support (PDT Rank: #5)			
Feedback from the community on conceptual design elements	34%	41%	25%
Weighted land use score per parcel accessible within 0.5 mile of stops (index, see Attachment C)	2.60	2.60	2.60
Cost Effectiveness and Financial Feasibility (PDT Rank: #3)			
Annual O&M cost per potential rider	$68.47	$67.19	$66.61
Redevelopment Potential Index	39.93	39.82	39.37
Overall Ranking	2	1	3

Note: The highest scoring performance measures are shaded purple

5.0 Key Findings and Next Steps

This document summarizes Study goals and objectives, evaluation criteria, and performance measures, development of corridor concepts, and the evaluation of concepts against Study performance measures. Findings of this effort, items for consideration, and next steps are described in the following sections.

5.1 General Findings and Items for Consideration

It is important to note that while one option performed the best in each corridor, at times it outperformed other options by a small margin. As such, stakeholders within each corridor should consider trade-offs of implementing one option compared to another, specifically if the difference in performance is marginal.

Also, while each option includes specific routing and service characteristics (e.g., bus-only lanes on discrete roadways), the composition of improvements along each corridor is subject to change in subsequent phases of study based on evolving community and stakeholder needs. The effects of improvements on bus operations and vehicular traffic operations along corridor roadways and intersections should be evaluated in subsequent phases of study.

Finally, though this report identifies which option performs the best against study performance measures, the ultimate configuration in each corridor will likely include a mix of features from multiple concepts. Specific concept elements will be determined in subsequent phases of study.

5.2 *Rapid 41*

5.2.1 Findings

Of the three options evaluated for *Rapid* 41, Option 3 performed the best against Study performance measures. Option 3 has the highest transit service reliability due to the greatest investment in dedicated bus facilities. It also shows the greatest potential to reduce travel time compared to local bus service.

Option 3 has the highest ridership potential. A key reason for this is the extension to Hillcrest, which provides service to more people, jobs, and activity centers, and creates a direct connection between the UCSD La Jolla and Hillcrest campuses.

Option 3 garnered the most support from the SANDAG SSTAC and the community, and its higher diversity of land use means it has the potential to serve a greater breadth of travel markets.

5.2.2 Items for Consideration

During discussions with the PDT, MTS noted that both FV TC and Gilman TC are currently at capacity and would need to be expanded to accommodate *Rapid 41* service. Potential costs and operational changes associated with an expanded FV TC were not developed as part of this Study and should be assessed during subsequent phases of project development.

The City of San Diego noted that any improvements implemented along Fashion Valley Road between FV TC and Friars Road should be done in coordination with the PURE Water Program.

The City of San Diego noted that along Genesee Avenue between Marlesta Drive and Mt. Alifan Avenue, the study team should consider having a queue jump use the same area as the right turn lane. It also recommended moving future bicycle facilities curbside and placing right turn lanes/bus queue jumps west of the bicycle facilities. These considerations and their potential effects will be considered in subsequent phases of study.

5.3 *Rapid* 471

5.3.1 Findings

Of the three options evaluated for *Rapid* 471, Option 1 performed the best against Study performance measures. Option 1 shows the greatest potential to reduce travel time compared to local bus service, and has travel times that are most competitive with automobile travel.

Option 1 serves slightly less people and jobs than Option 3; however, it serves the same activity centers and has the highest AT facilities index, which could generate additional ridership through enhanced first- and last-mile connectivity.

Option 3 garnered the most support from the SANDAG SSTAC, tied Option 1 with the most support from the community, and its higher diversity of land use means it has the potential to serve a greater breadth of travel markets.

5.3.2 Items for Consideration

During the fifth PDT meeting, the City of Escondido requested to evaluate a fourth alternative that would not include roadway-based bus priority treatments (e.g., bus-only lanes) and instead include GPS-based transit signal prioritization (TSP). While this option is not evaluated as part of this assessment, it could be considered in subsequent phases of project development.

5.4 *Rapid* 625

5.4.1 Findings

Of the three options evaluated for *Rapid* 625, Option 2 performed the best against Study performance measures. Option 2 stands out primarily due to its ridership potential and stakeholder support. Option 2 serves the highest number of people and jobs, the same number of activity centers as Option 1, and has the highest AT facilities score, which could generate additional ridership through enhanced first- and last-mile connectivity. Option 2 garnered the highest level of support during community outreach activities.

Option 2 did not rank as high as Options 1 or 3 with regards to cost effectiveness; however, the difference is marginal.

5.4.2 Items for Consideration

During discussions with stakeholders, MTS and SDSU noted that the SDSU TC is currently at capacity and would need to be expanded to accommodate *Rapid 625* service. Potential costs and operational changes associated with an expanded SDSU TC were not developed as part of this study and should be assessed during subsequent phases of project development.

5.5 Next Steps

A summary of potential funding sources and revenue streams for each of the three corridors will be included in the Task 7 memorandum. Combined with the findings of this report, these assessments will provide a more comprehensive picture of potential next steps regarding project implementation phasing and timing of subsequent project development phases for each route.

Attachment A. Study Goals and Objectives, Evaluation Criteria, and Performance Measures

Provide reliable, high-quality transit service that is competitive with automobile travel

This goal is reflective of the primary purpose of providing *Rapid* service along a corridor that is competitive with the automobile regarding travel time and reliability. This goal corresponds to the Caltrans STPG objectives of "Sustainability" and "Health." Providing reliable, high-quality transit service will promote reliable and efficient movement of people and has the potential to encourage mode shift and decrease vehicle miles traveled (VMT) along study corridors. The use of public transportation can improve health because passengers engage in more physical activity when traveling to and from transit stations.

Goal	Objectives	Evaluation Criteria	Performance Measures	Performance Measure Analysis
Provide reliable, high-quality transit service that is competitive with automobile travel	• Implement strategies that minimize delays caused by congestion along roadways and at intersections • Provide station amenities that expedite boarding and alighting process	Transit Service Reliability	New miles of dedicated bus facilities	Use geographic information system (GIS) to calculate new miles of dedicated bus facilities by strategy type
			Percent difference in trip time between proposed *Rapids* and automobiles on the corridor	Excel comparison between automobile trip time (measured using Google Typical Traffic or Directions) and *Rapids* (excel-based running time calculations) for each route alternative
			Percent difference in trip time between existing or assumed local bus and proposed *Rapids* on the corridor	Excel comparison between existing scheduled local bus travel times (or estimated travel times calculated from multiple route schedules and assumed transfer times where local service does not serve the entire corridor) and *Rapids* (excel-based running time calculations) for each route alternative
			Change in person throughput along each corridor	Excel comparison between automobile-only throughput (Highway Capacity Manual arterial throughputs by lane + assumption of passengers per vehicle) and "transit throughput" (number of buses per hour multiplied by an assumed passengers per trip) each route alternative

Maximize ridership potential

This goal seeks to capture more riders by both serving key activity centers and areas with high concentrations of people and jobs. Implementing better pedestrian and bicycle infrastructure will make accessing transit easier and have the potential to increase ridership. This goal corresponds to the Caltrans STPG objectives of "Sustainability," "Accessibility," "Safety," "Economy," and "Health." The more people use transit, the less they will drive, which can reduce overall greenhouse gas (GHG) emissions. Enhancing non-motorized access increases the accessibility of the system and mobility of people. Providing dedicated non-motorized facilities can improve safety by reducing the number of conflict points along a corridor. Providing high-quality service to employment and other activity centers means people are getting to their jobs quicker and cheaper, and more people have access to activity centers, including commercial land uses. Both of these can enhance economic vitality along a corridor.

Goal	Objectives	Evaluation Criteria	Performance Measures	Performance Measure Analysis
Maximize ridership potential	Serve key activity centers and areas with high concentrations of population and employment	Ridership Potential	Total number of people and jobs within 0.5 mile travelshed of stations	Use GIS to create a 0.5 mile travelshed utilizing the street network dataset (via SanGIS[2]). Cross reference these polygons with available activity center data (via SanGIS). Determine the number of activity centers within 0.5 mile of each transit stop for each route alternative.
	Serve key activity centers and areas with high concentrations of population and employment		Number of known activity centers within 0.5 mile of stations	Use GIS to create a 0.5 mile travelshed utilizing the street network dataset (via SanGIS). Cross reference these polygons with available activity center data (via SanGIS). Determine the number of activity centers within 0.5 mile of each transit stop for each route alternative
	Enhance non-motorized access to transit beyond a 5- or 10-minute travelshed		Total number of people and jobs that can access stations within 10-20 minutes (bicycle/flex fleet access market)	Use GIS to create 10-20 minute travelsheds utilizing the street network dataset. Cross reference these polygons with population and employment data (via SanGIS MGRA [3]Data).
	Identify active transportation improvements that have the potential to improve safety		Miles of existing/proposed AT facilities on alternative (miles)	Use GIS to calculate miles of primarily bicycle lanes of each alternative by type (this also will incorporate existing facilities if our proposal is not recommending changes)

[2] SANGIS (San Diego Geographic Information Source). 2023. SANGIS Regional Geographic Information System (GIS). Available at: https://www.sangis.org/.

[3] SANDAG (San Diego Association of Governments). 2023. SANDAG/SanGIS Regional GID Data Warehouse Open Data Portal (MGRA). Available at: https://sdgis-sandag.opendata.arcgis.com/datasets/a9a6a3ef1a0d4e92905227e69b936a6f/explore.

Improve access for social equity focus and transit-dependent populations

This goal corresponds to the Caltrans STPG objectives of "Social Equity," "Economy," and "Accessibility." Many residents along study corridors do not have access to high-quality transit, which means they spend more time commuting than people who drive. This limits their employment options and can reduce opportunities for economic growth and improved quality of life. Providing high-quality transit service to social equity focus populations will give them better access to employment, activity centers, and other basic needs. Improving station access is essential to serving social equity populations, in particular seniors and others with mobility challenges.

Goal	Objectives	Evaluation Criteria	Performance Measures	Performance Measure Analysis
Improve access for social equity focus and transit-dependent populations	Implement service that directly connects social equity focus populations with employment centers, higher education institutions, and basic needs (e.g., healthcare and grocery stores)	Socially Equity Focus and Transit-Dependent Population Benefits	Percentage of total corridor social equity focus populations (low-income, minority, and senior) within 0.5 mile travelshed of each route alternative's proposed stations	Use GIS to create 0.5 mile travelsheds around transit stations utilizing the street network dataset. Cross reference these polygons with SanGIS or MGRA data related to social equity focus populations (SEFP). Compare SEFP population with total population in these areas to determine percentage of SEFP population impacted for each route alternative
	Ensure stations are accessible		Feedback from SSTAC meeting on station access strategies	Use a Mentimeter[4] presentation to collect qualitative feedback on general station access for each route alternative.

Gain support from the public and key stakeholders

Public support is critical to the successful implementation of projects. One of the best ways to gain support is to implement projects that are contextually appropriate and serve multiple travel markets. Accomplishing this goal requires collaboration with local governments, the public, businesses, and other corridor stakeholders. To provide high-quality service, these routes should be designed with sensitivity to public desires and the ability to connect multiple travel markets through each corridor. This goal corresponds to the Caltrans STPG objectives of "Preservation," "Economy," "Health," and "Accessibility." Implementing context-appropriate transit services can enhance the built environment along corridors, providing opportunities for TOD, which can stimulate economic activity. High-quality transit service can also improve public health by reducing VMT and GHG and providing more opportunities to engage in physical activity by accessing stations using non-motorized modes of transportation.

Goal	Objectives	Evaluation Criteria	Performance Measures	Performance Measure Analysis
Gain support from the public and key stakeholders	Implement context sensitive strategies	Stakeholder Support	Feedback from stakeholders on conceptual design elements	Use a Mentimeter presentation to collect qualitative feedback on conceptual design elements (with a possible focus on strategy transitions at intersections/key areas) for each route alternative
	Implement services that serves multiple travel markets in each corridor		Number of unique land uses accessible within 0.5 mile of stops	Use GIS to create 0.5 mile travelsheds around transit stations utilizing the street network dataset (via SanGIS) and calculate the number of parcels by unique land uses. Key residential, commercial, and institutional uses will be quantified (totals by type) for each route alternative

Implement cost-effective and financially feasible Next Gen service

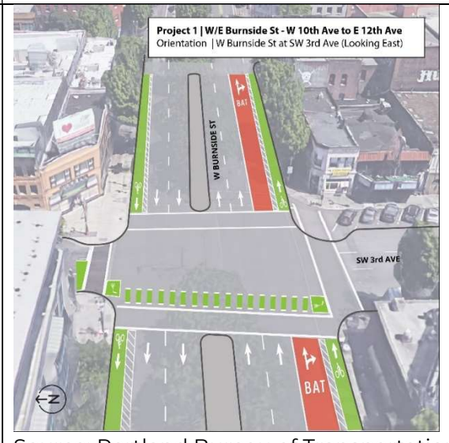
Accomplishing this goal requires implementing cost-effective service that generates high ridership, minimizes duplicative service, and competes well for funding from local, state, and federal sources. This goal corresponds to the Caltrans STPG objectives of "Economy" and "Sustainability." Implementing cost-effective service benefits the regional economy by connecting people to jobs and using public monies effectively. Coupling high-quality transit services with TOD opportunities along study corridors can further enhance cost-effectiveness. A financially effective route is more likely to remain in service, meaning the associated VMT and GHG reduction benefits will be realized for a longer period of time.

[4] Mentimeter. 2023. Mentimeter Meeting Software. Available at: https://www.mentimeter.com/.

Goal	Objectives	Evaluation Criteria	Performance Measures	Performance Measure Analysis
Implement cost-effective and financially feasible Next Gen service	Design cost-effective routes; design a project with high funding feasibility	Cost Effectiveness and Financial Feasibility	Annual O&M cost per potential rider	Determine gross O&M costs for each route alternative (develop proposed *Rapid* running time estimates and service plans to determine at least revenue hours and miles). Use GIS to create 0.5-mile travelsheds utilizing the street network dataset (via SanGIS[2]). Cross reference these polygons with available employment and population data (via SanGIS MGRA[3] Data) to determine number of people and jobs within 0.5 mile buffer of stations. Divide gross O&M costs by potential ridership for each route alternative.
	Identify TOD opportunities that could be used to fund a portion of capital and/or O&M costs		Redevelopment Potential Index	Use GIS to determine Redevelopment Potential Index using the same methodology as the 2021 Regional Plan[1] (MGRA Job and Housing capacity excluding undevelopable land). Create a Production, Exchange, Consumption, Allocation Model metric to determine redevelopment potential for each strategy.

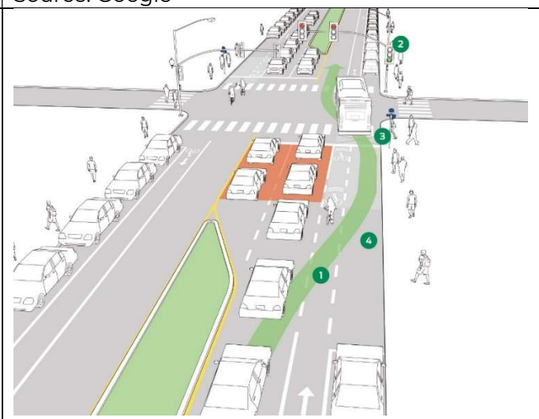
Attachment B. Strategy Types

Table B-1. Strategy Types

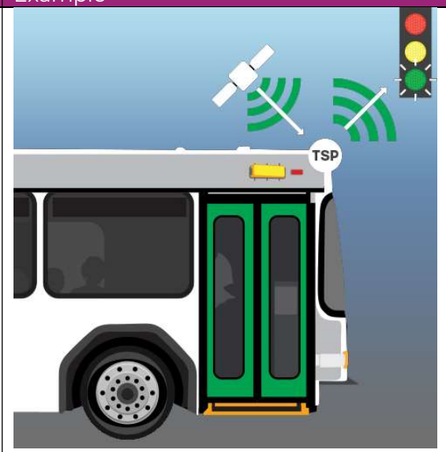
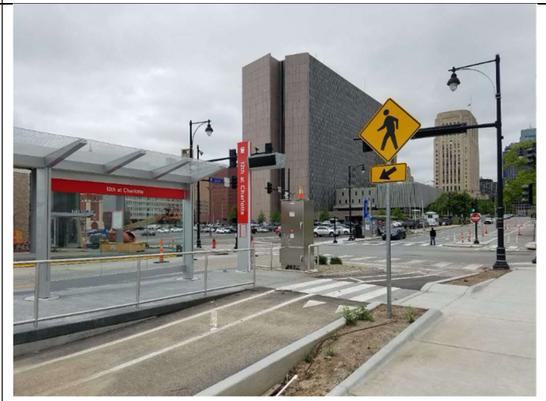
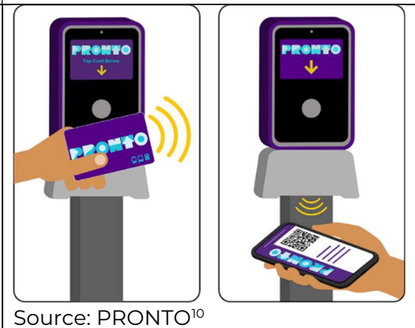
Strategy Type	Description	Example
Bus-Only Lanes	Bus-only lanes provide a dedicated space for transit vehicles to operate while minimizing interactions and potential conflicts with vehicular traffic. Bus-only lanes can be used to allow transit vehicles to bypass vehicular congestion along arterial roadways, reducing travel times and improving service reliability. Bus-only lanes can also allow for increased transit service levels by providing space for multiple routes to operate without being affected by congestion.	 Source: NACTO[5]
Business Access and Transit Lanes	BAT lanes are a variation of bus-only lanes that allow for right-turn movements into businesses or other driveways. Similar to bus-only lanes, BAT lanes can increase transit service capacity along arterial roadways by reducing or eliminating delays caused by vehicular congestion.	 Source: Portland Bureau of Transportation[6]

[5] NACTO. 2023. Available at: https://nacto.org/

[6] Portland Bureau of Transportation. 2018.Available at: https://twitter.com/PBOTinfo/status/1037410480141164544/photo/1

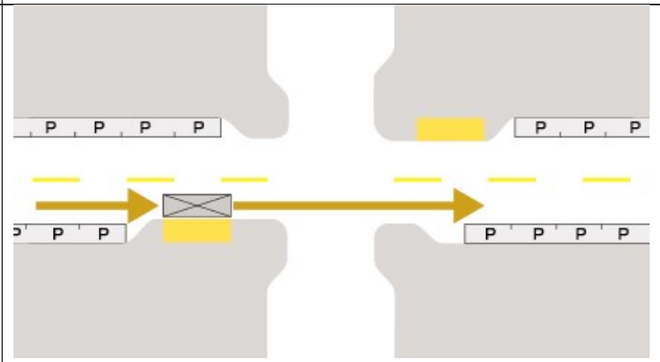
Strategy Type	Description	Example
Dedicated Guideway	Dedicated guideways allow transit vehicles to be operated in a space that is completely separated from other modes. These lanes allow transit vehicles to bypass traffic with no interruptions. Dedicated guideways can lead to faster, more reliable service along heavily congested arterial corridors.	 Source: Google[7]
Queue Jump Lanes	Queue jump lanes are short, dedicated bus lanes that allow transit vehicles to bypass vehicular queuing at signalized intersections. When coupled with TSP, queue jumps allow buses to enter an intersection in advance of vehicular traffic, giving transit vehicles an opportunity to access stations or maneuver across lanes where necessary.	 Source: NACTO[8]

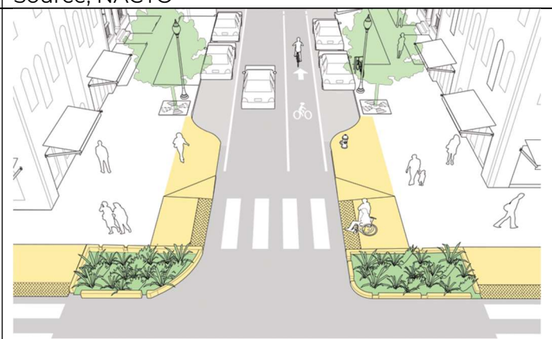
[7] Google Maps. 2022.
[8] NACTO. 2023. Available at: https://nacto.org/

Strategy Type	Description	Example
Transit Signal Priority	TSP is used to modify traffic signal timing and/or phasing when transit vehicles are present. In doing so, TSP allows transit vehicles to enter an intersection in advance of vehicular traffic, giving transit vehicles an opportunity to access stations or maneuver across lanes where necessary. TSP is only effective if transit vehicles can enter an intersection unobstructed. As such, in many applications, TSP is only successful when coupled with dedicated bus lanes, queue jumps, or other dedicated transit right-of-way.	 Source: HNTB[9]
Other Intersection/Roadway Improvements	Improvements to roadways and intersections can be used to mitigate potential conflicts between transit vehicles and other modes. For example, a bicycle facility can be rerouted behind a transit station to eliminate conflicts between bicyclists and transit vehicles that are approaching or departing stations. Improvements like this can enhance station accessibility, increase safety, and improve service reliability.	 Source: HNTB[9]
Off-Board Fare Payment	Off-board fare collections allow riders to pay from a variety of different methods. Allowing riders to pay at a stop or station before boarding a transit vehicle can reduce station dwell times and improve service reliability. The development of the PRONTO app, which allows riders to load passes to their phones, can also be applicable to the off-board payment systems. This can reduce the need for payments to be made while on-board, which can expedite the boarding process.	 Source: PRONTO[10]

[9] HNTB. 2022.

[10] PRONTO. 2023. Available at: https://www.ridepronto.com/

Strategy Type	Description	Example
Level Boarding	Level boarding, also referred to as transit curbs, allows transit vehicles to provide a level plane with the stop or station. Transit curbs allow drivers to pull within 2 inches of a curb without risking damage to the transit vehicle. Providing level boarding services can reduce the need for ramp deployment or vehicle kneeling, which can make the boarding process more seamless and improve service reliability.	 Source: NACTO[8]
Station/Stop Relocations or Consolidations	Stations may be relocated or consolidated to improve passenger experience and maximize travel time effectiveness. In instances where stops are too frequent or do not provide high ridership, relocation of or consolidation of service in that station/stop area may also be considered. Stopping less frequently has the potential to decrease travel times and attract choice riders.	 Source: HNTB[9]
Enhanced Station Amenities	All stations should be retrofitted with seating, shelters, off-board payment systems, wayfinding, arrival boards, bicycle parking, and other amenities, as needed. Seating allows passengers to rest while waiting for their bus to arrive. Off-board payment machines enable riders to prepay, which can reduce dwell times. Wayfinding maps and arrival boards help riders plan their trips and coordinate their schedules. Bike lockers promote security at transit stations and encourage biking to transit stations. These amenities can improve the overall rider experience and can attract choice riders.	 Source: Google[7]

Strategy Type	Description	Example
Pedestrian/Bicycle Improvements	Improvements to bicycle and pedestrian infrastructure include upgrades to existing bicycle facilities, new bicycle facilities, and new or improved pedestrian facilities. Each can improve station accessibility, increase ridership, and improve safety for non-motorized users.	 Source; NACTO[8]
Accessibility Improvements	All stations should be Americans with Disabilities Act (ADA) compliant, allowing all riders to access transit. ADA accessibility improvements can include simplified station layouts, sidewalk slopes, warning pads, level boarding infrastructure, new or enhanced seating, shelter, and other infrastructure where applicable.	 Source: NACTO[8]
Flexible Fleets	Flexible Fleets services like micromobility, ridesharing, and ride-hailing can improve transit accessibility by improving first- and last-mile connectivity. Providing e-scooters, bicycles, and designated pick-up and drop-off services for Uber, Lyft, or NEV shuttle services at transit stations can make transit more accessible for potential riders and increase ridership.	 Source: SANDAG[11]

[11] SANDAG. 2022. Available at: https://www.sandag.org/projects-and-programs/innovative-mobility/flexible-fleets

Strategy Type	Description	Example
Modifications to Planned Alignments	Existing or planned alignments could be modified by extending, truncating, or rerouting to avoid or minimize duplicative service.	
Reconfiguration of Intersecting or Interlined Bus Routes	Routes that intersect or are interlined with study routes could be reconfigured to avoid or minimize duplicative service.	
Transit-Oriented Development Opportunities	TOD includes dense, mixed-use, walkable developments near a transit station. TOD have multiple benefits, including increased transit use and reduced VMT and GHG. TOD can also be used as a funding mechanism as a portion of the revenue generated from the development can be used to fund transit services.	 Source: National CORE[12]

[12] National CORE. 2023. National CORE Website: Image of Encanto Village Project. Available at: https://nationalcore.org/communities/encanto-village/.

Attachment C. Performance Measures

Performance Measure	Evaluation Criteria	Performance Measure Description	Ranking	Weight	*Rapid 41 Option 1*	*Rapid 41 Option 2*	*Rapid 41 Option 3*	*Rapid 471 Option 1*	*Rapid 471 Option 2*	*Rapid 471 Option 3*	*Rapid 625 Option 1*	*Rapid 625 Option 2*	*Rapid 625 Option 3*
N/A	Baseline Conditions	Number of Stations/Stops (per direction)			11	11	14	14	16	16	22	24	22
N/A		Total Route Length (miles)			12.0	12.0	14.4	9.9	10.1	9.9	15.3	15.6	15.3
N/A		Average Stop Spacing (miles)			1.2	1.2	1.1	0.6	0.7	0.7	0.7	0.7	0.7
N/A		Square Miles within 0.5-mile walkshed			4.4	4.4	5.2	4.9	5.4	5.5	10.3	10.6	10.3
N/A		Square Miles between 0.5- and 1-mile walkshed			9.1	9.1	10.4	6.8	7.8	7.8	13.5	13.4	13.3
PM_1	Transit Service Reliability	Weighted dedicated bus facilities score			1.4	1.9	2.1	1.1	1.3	1.4	2.0	2.4	2.5
PM_1		**Weighted dedicated bus facilities score**	**Ranking**		3	2	1	3	2	1	3	2	1
PM_2		Percent difference in trip time between proposed *Rapids* and auto on the corridor - Segment 1			-10%	-18%	62%	2%	94%	76%	85%	89%	75%
PM_2		**Percent difference in trip time between proposed *Rapids* and auto on the corridor - Segment 1**	**Ranking**		2	1	3	1	3	2	2	3	1
PM_2		Percent difference in trip time between proposed *Rapids* and autos on the corridor - Segment 2			11%	6%	-1%	18%	9%	11%	156%	163%	148%
PM_2		**Percent difference in trip time between proposed *Rapids* and autos on the corridor - Segment 2**	**Ranking**		3	2	1	3	1	2	2	3	1
PM_3		Percent difference in trip time between existing or assumed local bus and proposed *Rapid* on the corridor - Segment 1			-24%	-30%	-47%	-58%	-47%	-52%	-46%	-45%	-49%
PM_3		**Percent difference in trip time between existing or assumed local bus and proposed *Rapid* on the corridor - Segment 1**	**Ranking**		3	2	1	1	3	2	2	3	1

Performance Measure	Evaluation Criteria	Performance Measure Description	Ranking	Weight	*Rapid 41 Option 1*	*Rapid 41 Option 2*	*Rapid 41 Option 3*	*Rapid 471 Option 1*	*Rapid 471 Option 2*	*Rapid 471 Option 3*	*Rapid 625 Option 1*	*Rapid 625 Option 2*	*Rapid 625 Option 3*
PM_3		Percent difference in trip time between existing or assumed local bus and proposed *Rapid* on the corridor - Segment 2			-24%	-28%	-33%	-21%	-27%	-26%	-33%	-32%	-35%
PM_3		**Percent difference in trip time between existing or assumed local bus and proposed *Rapid* on the corridor - Segment 2**	**Ranking**		3	2	1	3	1	2	2	3	1
PM_4		Change in potential person throughput along each corridor - Location 1			48%	48%	48%	32%	32%	32%	125%	139%	209%
PM_4		Change in potential person throughput along each corridor - Location 2			58%	58%	58%	59%	70%	70%	272%	272%	272%
PM_4		Change in potential person throughput along each corridor - Location 3			119%	119%	119%	26%	-13%	26%	11%	115%	115%
PM_4		Change in potential person throughput along each corridor			80%	80%	80%	35%	24%	36%	90%	153%	169%
PM_4		**Change in potential person throughput along each corridor**	**Ranking**		1	1	1	2	3	1	3	2	1
PM_1 - PM_4		**Transit Service Reliability**	**Summary Ranking**	**1**	2.5	1.7	1.3	2.2	2.2	1.7	2.3	2.7	1.0
PM_5	Ridership Potential	Population within 0.5 mile of stations			51,437	51,437	69,700	69,790	62,865	65,823	148,833	150,222	143,086
PM_5		Population density within 0.5 mile of stations (people per sq mi)			11,772	11,772	13,377	14,146	11,537	11,914	14,509	14,146	13,862
PM_5		**Population density within 0.5 mile of stations (people per sq mi)**	**Ranking**		2	2	1	1	3	2	1	2	3
PM_5		Jobs within 0.5 mile of stations			31,480	31,480	51,632	28,034	32,747	33,033	57,345	59,902	56,385
PM_5		Job density within 0.5 mile of stations (jobs per sq mi)			7,205	7,205	9,909	5,682	6,009	5,979	5,590	5,641	5,462

Performance Measure	Evaluation Criteria	Performance Measure Description	Ranking	Weight	*Rapid 41 Option 1*	*Rapid 41 Option 2*	*Rapid 41 Option 3*	*Rapid 471 Option 1*	*Rapid 471 Option 2*	*Rapid 471 Option 3*	*Rapid 625 Option 1*	*Rapid 625 Option 2*	*Rapid 625 Option 3*
PM_5		**Job density within 0.5 mile of stations (jobs per sq mi)**	**Ranking**		2	2	1	3	1	2	2	1	3
PM_6		Activity Centers within 0.5 mile of stations			6	6	10	8	8	8	15	15	14
PM_6		Activity Centers within 0.5 mile of stations per sq mi			1.37	1.37	1.92	1.62	1.47	1.45	1.46	1.41	1.36
PM_6		**Activity Centers within 0.5 mile of stations per sq mi**	**Ranking**		2	2	1	1	2	3	1	2	3
PM_7		Population between 0.5 and 1 mile of stations			84,892	84,892	105,299	38,965	50,043	48,730	138,330	138,380	140,447
PM_7		Population density between 0.5 and 1 mile of stations (people per sq mi)			9,364	9,364	10,138	5,756	6,428	6,238	10,264	10,309	10,580
PM_7		**Population density between 0.5 and 1 mile of stations (people per sq mi)**	**Ranking**		2	2	1	3	1	2	3	2	1
PM_7		Jobs between 0.5 and 1 mile of stations			41,600	41,600	43,868	23,294	23,789	23,819	44,036	42,083	44,440
PM_7		Job density between 0.5 and 1 mile of stations (people per sq mi)			4,589	4,589	4,224	3,441	3,056	3,049	3,267	3,135	3,348
PM_7		**Job density between 0.5 and 1 mile of stations (people per sq mi)**	**Ranking**		1	1	3	1	2	3	2	3	1
PM_7		Population between 0 and 1 mile of stations			136,329	136,329	174,999	108,755	112,908	114,553	287,163	288,602	283,533
PM_7		Population density between 0 and 1 mile of stations (people per sq mi)			10,148	10,148	11,220	9,293	8,531	8,589	12,098	12,004	12,016
PM_7		**Population density between 0 and 1 mile of stations (people per sq mi)**	**Ranking**		2	2	1	1	3	2	1	3	2
PM_7		Jobs between 0 and 1 mile of stations			73,080	73,080	95,500	51,328	56,536	56,852	101,381	101,985	100,825

Performance Measure	Evaluation Criteria	Performance Measure Description	Ranking	Weight	*Rapid 41 Option 1*	*Rapid 41 Option 2*	*Rapid 41 Option 3*	*Rapid 471 Option 1*	*Rapid 471 Option 2*	*Rapid 471 Option 3*	*Rapid 625 Option 1*	*Rapid 625 Option 2*	*Rapid 625 Option 3*
PM_7		Job density between 0 and 1 mile of stations (people per sq mi)			5,440	5,440	6,123	4,386	4,272	4,263	4,271	4,242	4,273
PM_7		**Job density between 0 and 1 mile of stations (people per sq mi)**	**Ranking**		2	2	1	1	2	3	2	3	1
PM_8		Weighted AT facilities score			2.1	2.3	2.8	1.6	1.2	1.5	2.3	2.7	2.4
PM_8		**Weighted AT facilities score**	**Ranking**		3	2	1	1	3	2	3	1	2
PM_5 - PM_8		**Ridership Potential**	**Summary Ranking**	**2**	2.0	1.9	1.3	1.5	2.1	2.4	1.9	2.1	2.0
PM_9	Socially Equity Focus & Transit-Dependent Population Benefits	Percentage Senior within 0.5 mile of stations			10.52%	10.52%	10.97%	8.41%	8.53%	8.51%	7.86%	7.83%	7.85%
PM_9		**Percentage Senior within 0.5 mile of stations**	**Ranking**		2	2	1	3	1	2	1	3	2
PM_9		Percentage Minority within 0.5 mile of stations			61.36%	61.36%	57.86%	71.53%	70.56%	70.73%	82.17%	82.19%	82.13%
PM_9		**Percentage Minority within 0.5 mile of stations**	**Ranking**		1	1	3	1	3	2	2	1	3
PM_9		Percentage Low Income within 0.5 mile of stations			30.15%	30.15%	27.55%	40.97%	40.37%	40.26%	44.99%	44.99%	44.74%
PM_9		**Percentage Low Income within 0.5 mile of stations**	**Ranking**		1	1	3	1	2	3	2	1	3
PM_10		Feedback from SSTAC meeting on station access strategies	**Ranking**		3	2	1	1	2	3	3	2	1
PM_9 - PM_10		**Socially Equity Focus & Transit-Dependent Population Benefits**	**Summary Ranking**	**4**	1.8	1.5	2.0	1.5	2.0	2.5	2.0	1.8	2.3
PM_11	Stakeholder Support	Feedback from stakeholders on concepts			11%	34%	55%	34%	32%	34%	34%	41%	25%

Performance Measure	Evaluation Criteria	Performance Measure Description	Ranking	Weight	*Rapid 41 Option 1*	*Rapid 41 Option 2*	*Rapid 41 Option 3*	*Rapid 471 Option 1*	*Rapid 471 Option 2*	*Rapid 471 Option 3*	*Rapid 625 Option 1*	*Rapid 625 Option 2*	*Rapid 625 Option 3*
PM_11		**Feedback from stakeholders on concepts**	**Ranking**		3	2	1	1	3	1	2	1	3
PM_12		Weighted land use score per parcel accessible within 0.5 mile of stops			2.70	2.70	2.80	2.62	2.50	2.53	2.60	2.60	2.60
PM_12		**Weighted land use score per parcel accessible within 0.5 mile of stops**	**Ranking**		2	2	1	1	3	2	1	1	1
PM_11 - PM_12		**Stakeholder Support**	**Summary Ranking**	**5**	2.5	2.0	1.0	1.0	3.0	1.5	1.5	1.0	2.0
PM_13	Cost Effectiveness and Financial Feasibility	Annual O&M cost per potential rider			$100.15	$90.14	$82.13	$97.14	$110.43	$96.13	$68.47	$67.19	$66.61
PM_13		**Annual O&M cost per potential rider**	**Ranking**		3	2	1	2	3	1	3	2	1
PM_14		Redevelopment Potential Index			38.42	38.42	39.24	40.30	40.59	41.05	39.93	39.82	39.37
PM_14		**Redevelopment Potential Index**	**Ranking**		2	2	1	3	2	1	1	2	3
PM_13 - PM_14		**Cost Effectiveness and Financial Feasibility**	**Summary Ranking**	**3**	2.5	2.0	1.0	2.5	2.5	1.0	2.0	2.0	2.0
PM_1 - PM_14	**Overall Ranking**	**Overall ranking (weighted)**	**Overall Ranking**		34	27	20	24	37	27	28	25	30

Notes: The highest scoring performance measures are shaded

Attachment D. Corridor Concept Characteristics

Rapid 41

Concept Characteristics

Rapid 41 Option 1 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 1 is shown in Figure D-1. The proposed roadway treatments for each segment of the alignment are presented in Table D-1.

Figure D-1. Rapid 41 Option 1 Concept Characteristics

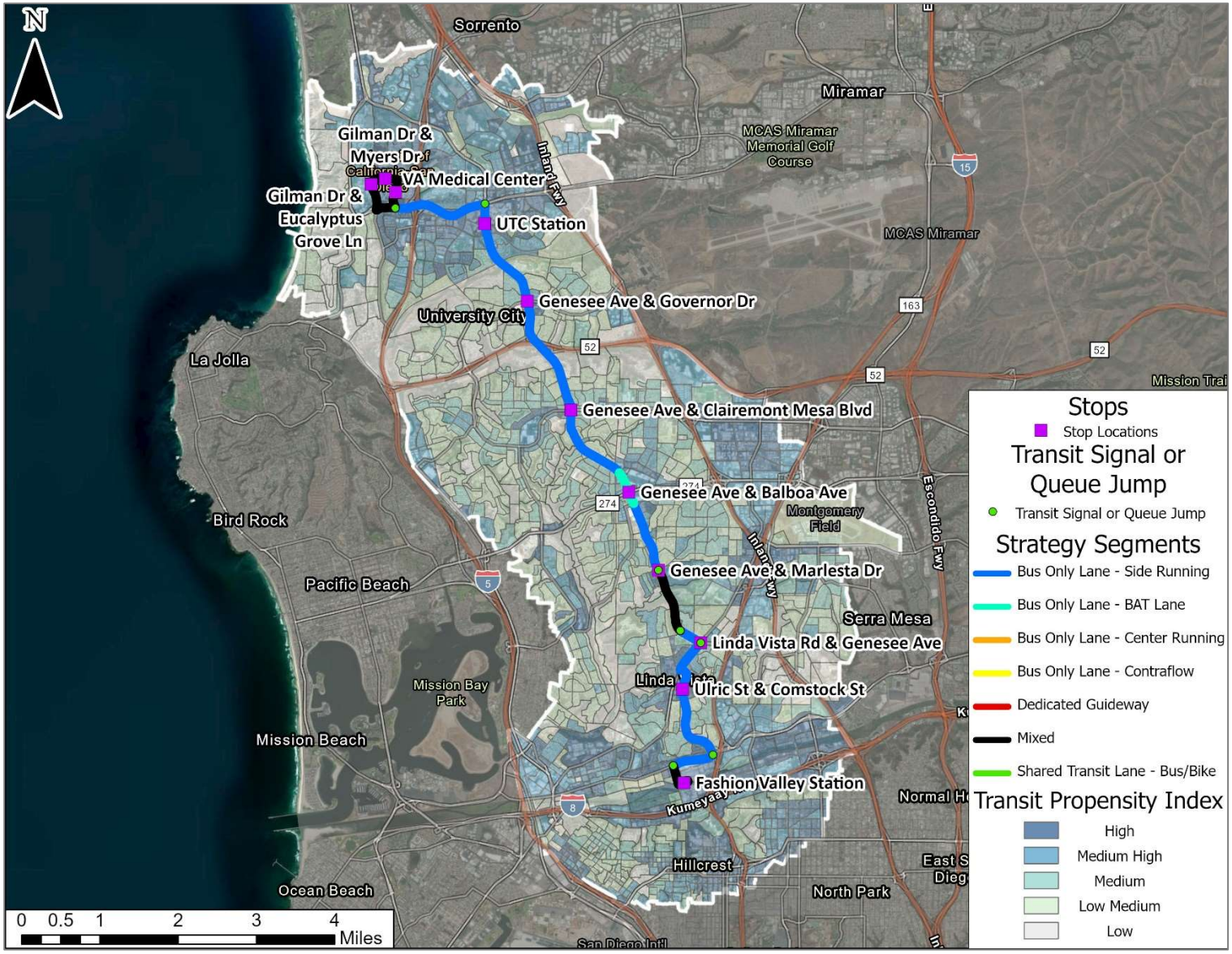


Table D-1. Rapid 41 Option 1 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Riverwalk Dr	FV Station	Fashion Valley Rd	Mixed	Two Way Cycle Track
2	Fashion Valley Rd	Riverwalk Dr	End of left pocket lanes on Fashion Valley Rd (looking North)	Mixed	Two Way Cycle Track
3	Fashion Valley Rd	End of left pocket lanes on Fashion Valley Rd (looking North)	Friars Rd	Mixed	Two Way Cycle Track
4	Friars Rd	Fashion Valley Rd	Intersection @ Convergence Communications	Bus Only Lane - Side Running	Buffered Lane-Both
5	Friars Rd	Intersection @ Convergence Communications	Intersection @ Apex Mission Valley	Bus Only Lane - Side Running	Buffered Lane-Both
6	Friars Rd	Intersection @ Apex Mission Valley	Ulric St	Bus Only Lane - Side Running	Buffered Lane-Both
7	Ulric St	Friars Rd	163 South On Ramp	Bus Only Lane in southbound (SB), Mixed in northbound (NB)	Buffered Lane-Both
8	Ulric St	163 South On Ramp	Linda Vista Rd	Bus Only Lane - Side Running	Buffered Lane-Both
9	Linda Vista Rd	Ulric St	Genesee Ave	Bus Only Lane - Side Running	Buffered Lane-Both
10	Genesee Ave	Linda Vista Rd	Osler St	Bus Only Lane - Side Running	Buffered Lane-Both
11	Genesee Ave	Osler St	Marlesta Dr	Mixed	Buffered Lane-Both
12	Genesee Ave	Marlesta Dr	Boyd Ave	Bus Only Lane - Side Running	Buffered Lane - One, Shared Lane - One
13	Genesee Ave	Boyd Ave	Genesee Ct E	Bus Only Lane - Side Running	Buffered Lane - One, Shared Lane - One

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
14	Genesee Ave	Genesee Ct E	Mt Alifan Dr	Bus Only Lane - Side Running	Buffered Lane - One, Shared Lane - One
15	Genesee Ave	Mt Alifan Dr	Balboa Ave	Bus Only Lane - BAT Lane	Buffered Lane - Both
16	Genesee Ave	Balboa Ave	Mt Etna Dr	Bus Only Lane - BAT Lane	Buffered Lane - Both
17	Genesee Ave	Mt Etna Dr	Derrick Dr	Bus Only Lane - BAT Lane	Buffered Lane - Both
18	Genesee Ave	Derrick Dr	Mt Herbert Ave	Bus Only Lane - Side Running	Buffered Lane - Both
19	Genesee Ave	Mt Herbert Ave	Clairemont Mesa Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
20	Genesee Ave	Clairemont Mesa Blvd	Lehrer Dr/Appleton St	Bus Only Lane - Side Running	Buffered Lane - Both
21	Genesee Ave	Lehrer Dr/Appleton St	State Route (SR) 52	Bus Only Lane - Side Running	Buffered Lane - Both
22	Genesee Ave	SR 52	Governor Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
23	Genesee Ave	Governor Dr	Nobel Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
24	Genesee Ave	Nobel Dr	La Jolla Village Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
25	La Jolla Village Dr	Genesee Ave	Villa La Jolla Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
26	Villa La Jolla Dr	La Jolla Village Dr	Gilman Dr	Mixed	Two-Way Cycle Track
28	Gilman Dr	Villa La Jolla Dr	La Jolla Village Dr	Mixed	Two-Way Cycle Track
29	La Jolla Village Dr	Gilman Dr	Villa La Jolla Dr	Mixed	Two-Way Cycle Track

Rapid 41 Option 2 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 2 is shown in Figure D-2. The proposed roadway treatments for each segment of the alignment are presented in Table D-2.

Figure D-2. Rapid 41 Option 2 Concept Characteristics

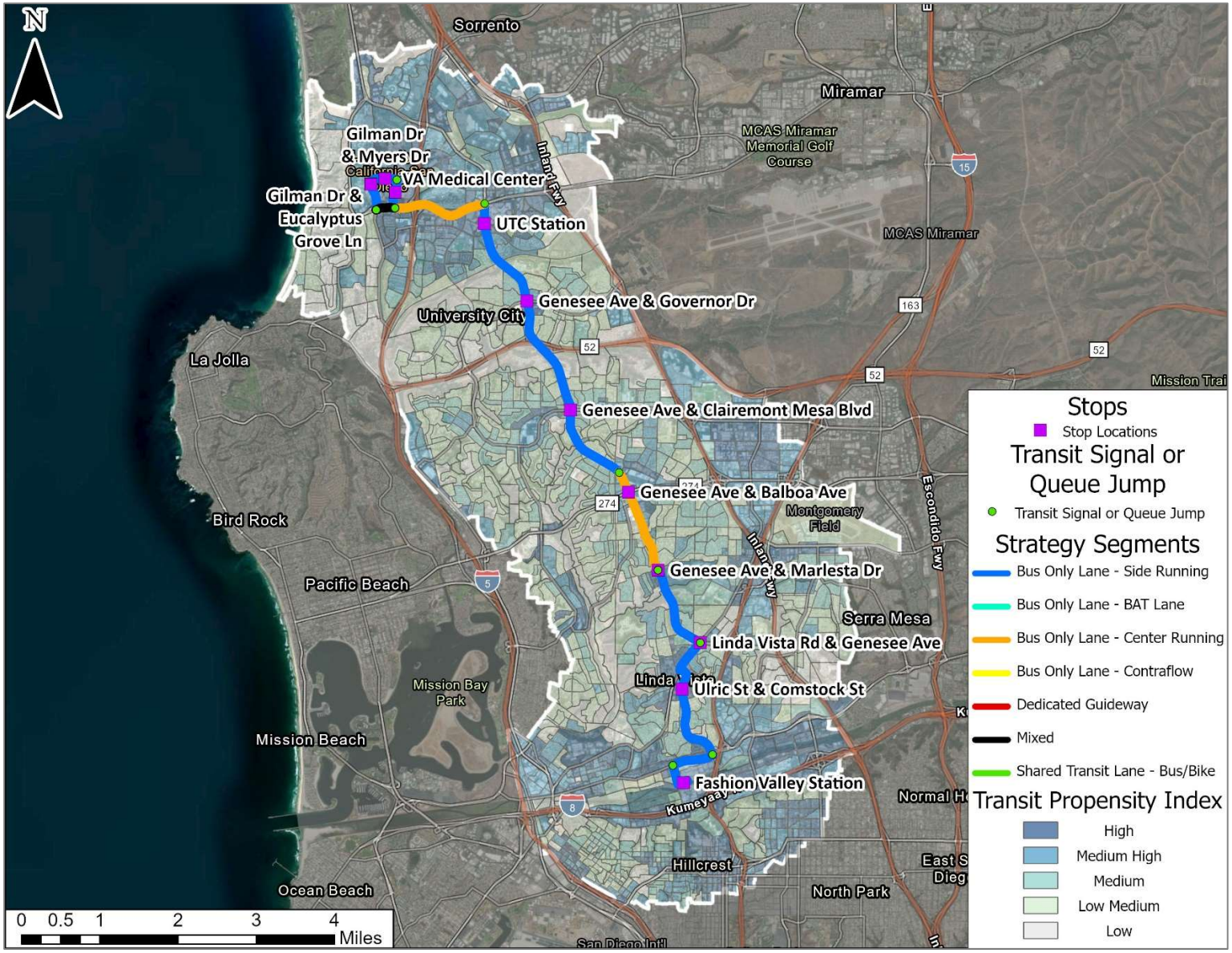


Table D-2. Rapid 41 Option 2 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Riverwalk Dr	FV Station	Fashion Valley Rd	Bus Only Lane - Side Running	Buffered Lane-Both
2	Fashion Valley Rd	Riverwalk Dr	End of left pocket lanes on Fashion Valley Rd (looking North)	Mixed	Two Way Cycle Track
3	Fashion Valley Rd	End of left pocket lanes on Fashion Valley Rd (looking North)	Friars Rd	Mixed	Two Way Cycle Track
4	Friars Rd	Fashion Valley Rd	Intersection @ Convergence Communications	Bus Only Lane - Side Running	Buffered Lane-Both
5	Friars Rd	Intersection @ Convergence Communications	Intersection @ Apex Mission Valley	Bus Only Lane - Side Running	Buffered Lane-Both
6	Friars Rd	Intersection @ Apex Mission Valley	Ulric St	Bus Only Lane - Side Running	Buffered Lane-Both
7	Ulric St	Friars Rd	163 South On Ramp	Bus Only Lane in SB, Mixed in NB	Buffered Lane-Both
8	Ulric St	163 South On Ramp	Linda Vista Rd	Bus Only Lane - Side Running	Buffered Lane-Both
9	Linda Vista Rd	Ulric St	Genesee Ave	Bus Only Lane - Side Running	Buffered Lane-Both
10	Genesee Ave	Linda Vista Rd	Osler St	Bus Only Lane - Side Running	Buffered Lane-Both
11	Genesee Ave	Osler St	Marlesta Dr	Bus Only Lane - Side Running	Buffered Lane-Both
12	Genesee Ave	Marlesta Dr	Boyd Ave	Bus Only Lane - Center Running	Buffered Lane - Both
13	Genesee Ave	Boyd Ave	Genesee Ct E	Bus Only Lane - Center Running	Buffered Lane - Both
14	Genesee Ave	Genesee Ct E	Mt Alifan Dr	Bus Only Lane - Center Running	Buffered Lane - Both
15	Genesee Ave	Mt Alifan Dr	Balboa Ave	Bus Only Lane - Center Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
16	Genesee Ave	Balboa Ave	Mt Etna Dr	Bus Only Lane - Center Running	Buffered Lane - Both
17	Genesee Ave	Mt Etna Dr	Derrick Dr	Bus Only Lane - Center Running	Buffered Lane - Both
18	Genesee Ave	Derrick Dr	Mt Herbert Ave	Bus Only Lane - Side Running	Buffered Lane - Both
19	Genesee Ave	Mt Herbert Ave	Clairemont Mesa Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
20	Genesee Ave	Clairemont Mesa Blvd	Lehrer Dr/Appleton St	Bus Only Lane - Side Running	Buffered Lane - Both
21	Genesee Ave	Lehrer Dr/Appleton St	SR 52	Bus Only Lane - Side Running	Buffered Lane - Both
22	Genesee Ave	SR 52	Governor Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
23	Genesee Ave	Governor Dr	Nobel Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
24	Genesee Ave	Nobel Dr	La Jolla Village Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
25	La Jolla Village Dr	Genesee Ave	Villa La Jolla Dr	Bus Only Lane - Center Running	Two-Way Cycle Track
26	Villa La Jolla Dr	La Jolla Village Dr	Gilman Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
27	Gilman Dr	Villa La Jolla Dr	La Jolla Village Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
28	La Jolla Village Dr	Gilman Dr	Villa La Jolla Dr	Mixed	Two-Way Cycle Track

Rapid 41 Option 3 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 3 is shown in Figure D-3. The proposed roadway treatments for each segment of the alignment are presented in Table D-3.

Figure D-2. Rapid 41 Option 3 Concept Characteristics

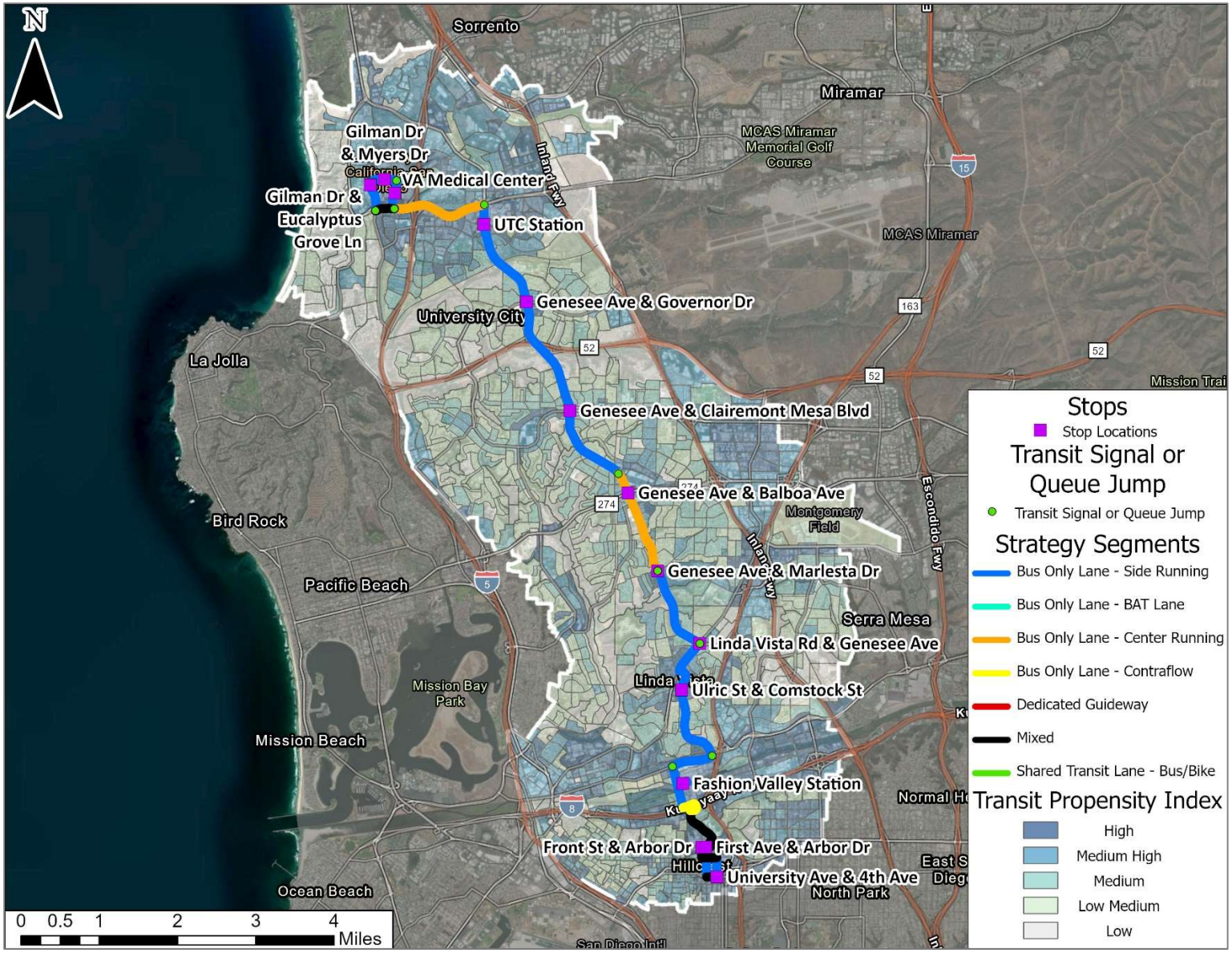


Table D-3. Rapid 41 Option 3 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	First Ave	Arbor Dr	Washington St	Bus Only Lane - Side Running	Buffered Lane-One-Way
2	First Ave	Washington St	University Ave	Bus Only Lane - Side Running	Buffered Lane-One-Way
3	University Ave	First Ave	Fourth Ave	Mixed	Buffered Lane - Both
4	Fourth Ave	University Ave	Washington St	Bus Only Lane - Side Running	Buffered Lane-One-Way
5	Fourth Ave	Washington St	Lewis St	Bus Only Lane - Side Running	Buffered Lane-One-Way
6	Lewis St	4th Ave	Front St	Mixed	EB Contra-Flow Bike Lane from Bachman Pl to Third Ave
7	Front St	Lewis St	Arbor Dr	Mixed	Buffered Lane-One-Way
8	Arbor Dr	Front St	Bachman Pl	Mixed	TBD pending UCSD Hillcrest Campus Redevelopment
9	Bachman Pl	Arbor Dr	Hotel Circle S	Mixed	Buffered Bike Lane / Bike Lane and NB Shared Lane (Sharrow)
10	Hotel Circle S	Bachman Pl	Hotel Circle N	Bus Only Lane - Contraflow	Two-Way Cycle Track
11	Hotel Circle N	Hotel Circle S	Fashion Valley Rd	Bus Only Lane - Contraflow	Two-Way Cycle Track
12	Fashion Valley Rd	Hotel Circle N	FV Station	Bus Only Lane - Side Running	Two-Way Cycle Track
13	Riverwalk Dr	FV Station	Fashion Valley Rd	Bus Only Lane - Side Running	Buffered Lane-Both
14	Fashion Valley Rd	Riverwalk Dr	End of left pocket lanes on Fashion Valley Rd (looking North)	Dedicated Guideway	Two-Way Cycle Track

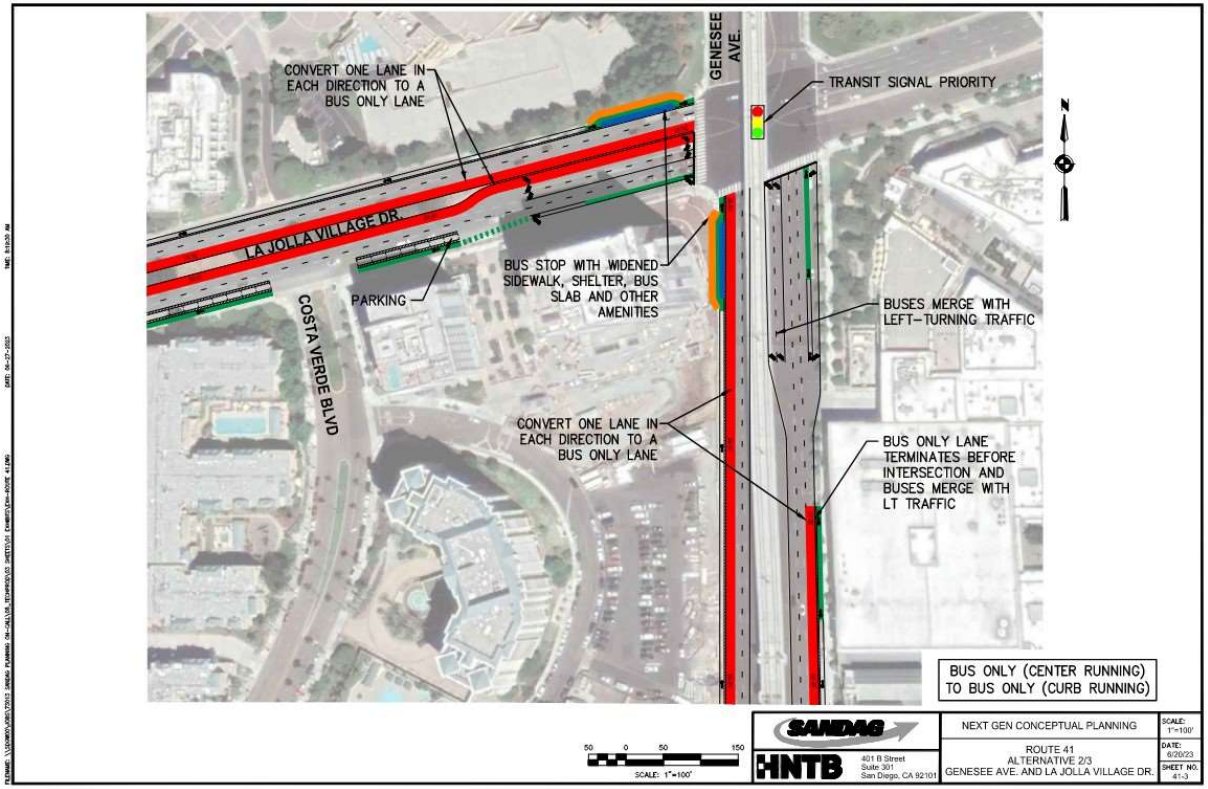
Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
15	Fashion Valley Rd	End of left pocket lanes on Fashion Valley Rd (looking North)	Friars Rd	Dedicated Guideway	Two-Way Cycle Track
16	Friars Rd	Fashion Valley Rd	Intersection @ Convergence Communications	Bus Only Lane - Side Running	Buffered Lane-Both
17	Friars Rd	Intersection @ Convergence Communications	Intersection @ Apex Mission Valley	Bus Only Lane - Side Running	Buffered Lane-Both
18	Friars Rd	Intersection @ Apex Mission Valley	Ulric St	Bus Only Lane - Side Running	Buffered Lane-Both
19	Ulric St	Friars Rd	163 South On Ramp	Bus Only Lane - Side Running	Buffered Lane-Both
20	Ulric St	163 South On Ramp	Linda Vista Rd	Bus Only Lane - Side Running	Buffered Lane-Both
21	Linda Vista Rd	Ulric St	Genesee Ave	Bus Only Lane - Side Running	Buffered Lane-Both
22	Genesee Ave	Linda Vista Rd	Osler St	Bus Only Lane - Side Running	Buffered Lane-Both
23	Genesee Ave	Osler St	Marlesta Dr	Bus Only Lane - Side Running	Buffered Lane-Both
24	Genesee Ave	Marlesta Dr	Boyd Ave	Bus Only Lane - Center Running	Buffered Lane - Both
25	Genesee Ave	Boyd Ave	Genesee Ct E	Bus Only Lane - Center Running	Buffered Lane - Both
26	Genesee Ave	Genesee Ct E	Mt Alifan Dr	Bus Only Lane - Center Running	Buffered Lane - Both
27	Genesee Ave	Mt Alifan Dr	Balboa Ave	Bus Only Lane - Center Running	Buffered Lane - Both
28	Genesee Ave	Balboa Ave	Mt Etna Dr	Bus Only Lane - Center Running	Buffered Lane - Both
29	Genesee Ave	Mt Etna Dr	Derrick Dr	Bus Only Lane - Center Running	Buffered Lane - Both
30	Genesee Ave	Derrick Dr	Mt Herbert Ave	Bus Only Lane - Side Running	Buffered Lane - Both
31	Genesee Ave	Mt Herbert Ave	Clairemont Mesa Blvd	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
32	Genesee Ave	Clairemont Mesa Blvd	Lehrer Dr/Appleton St	Bus Only Lane - Side Running	Buffered Lane - Both
33	Genesee Ave	Lehrer Dr/Appleton St	SR 52	Bus Only Lane - Side Running	Buffered Lane - Both
34	Genesee Ave	SR 52	Governor Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
35	Genesee Ave	Governor Dr	Nobel Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
36	Genesee Ave	Nobel Dr	La Jolla Village Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
37	La Jolla Village Dr	Genesee Ave	Villa La Jolla Dr	Bus Only Lane - Center Running	Two-Way Cycle Track
38	Villa La Jolla Dr	La Jolla Village Dr	Gilman Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
39	Gilman Dr	Villa La Jolla Dr	La Jolla Village Dr	Bus Only Lane - Side Running	Two-Way Cycle Track
40	La Jolla Village Dr	Gilman Dr	Villa La Jolla Dr	Mixed	Two-Way Cycle Track

Design Drawings

Conceptual design drawings were prepared at key locations along the *Rapid* 41 corridor. Drawings were prepared using right-of-way data from SanGIS. They are intended to demonstrate how concept features could fit within existing right-of-way without encroaching into adjacent parcels. A more detailed engineering assessment should be conducted in future phases of study to determine potential right-of-way and other environmental impacts. Notes about each location are included below.

Genesee Avenue & La Jolla Village Drive



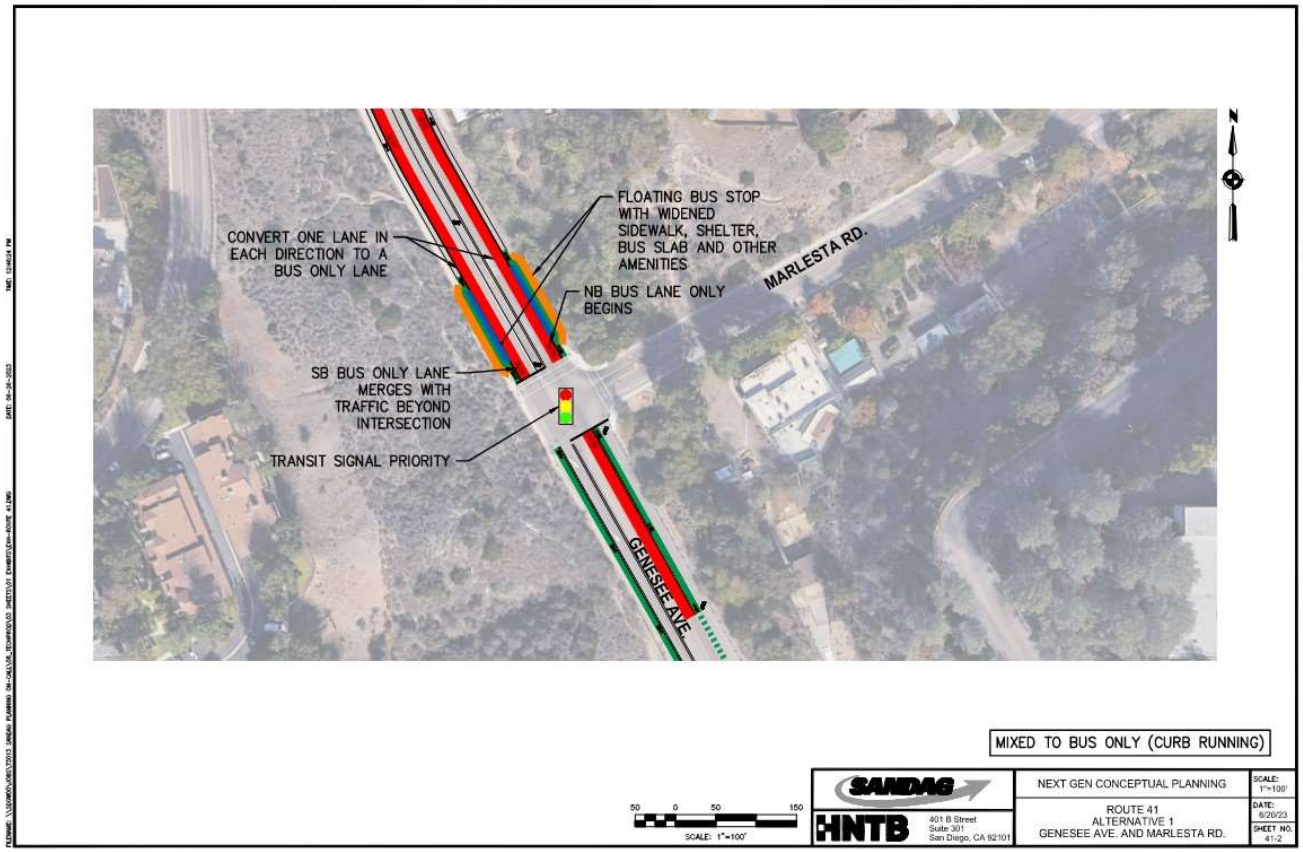
A similar configuration would be located at:

- Highland Avenue & Plaza Boulevard (National City)
- Euclid Avenue & Plaza Boulevard (National City)
- College Avenue & University Avenue (San Diego)

Notes

- This concept illustrates bus only center running to bus only side running
- Buses heading NB on Genesee Avenue would merge across NB lanes to turn left (west) onto La Jolla Village Drive
- The NB bus only lane on Genesee Avenue could be extended to the intersection with La Jolla Village Drive by eliminating one NB through lane. In this scenario a dedicated bus phase could allow NB buses to turn left onto La Jolla Village Drive without conflicting with NB through movements.
- Floating bus stops along La Jolla Village Drive eliminate conflicts between buses and cyclists
- The EB to SB movement requires a dedicated transit signal phase, like at Park Boulevard & El Cajon Boulevard
- Rapid 41 would serve UTC TC; the existing bus stop on Genesee Avenue would only be used by local routes.

Genesee Avenue & Marlesta Road



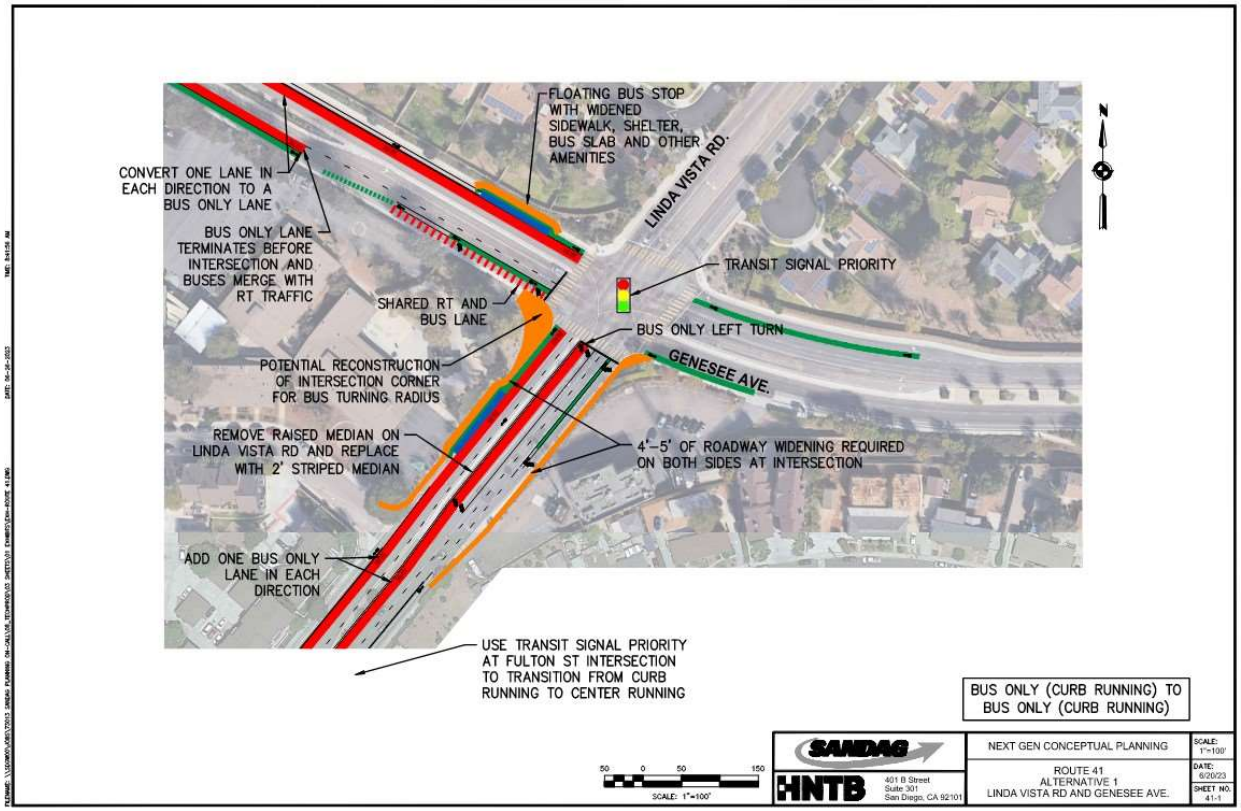
A similar configuration would be located at:

- Euclid Avenue & Division Street (National City/San Diego)
- 3rd Avenue & H Street (Chula Vista)

Notes

- This concept illustrates mixed flow to bus only side running
- This configuration avoids taking right-of-way. As such, it would require through traffic on Genesee Avenue to make slight deviation mid-intersection for through traffic on Genesee. Genesee Avenue could be widened south of Marlesta to eliminate the need for a mid-intersection deviation.

Linda Vista Road & Genesee Avenue



A similar configuration would be located at:

- Citracado Parkway & West Valley Parkway (Escondido)
- Palomar Street & 3rd Avenue (Chula Vista)
- 8th Avenue & Euclid Avenue (National City)
- Friars Road & Ulric Street (San Diego)

Notes

- This concept illustrates bus only side running bus only side running
- One NB left lane would be repurposed
- Floating bus stops would eliminate conflicts between buses and cyclists
- On the NB approach, buses would use TSP at an upstream intersection to move from side running to center running to make the NB left turn
- A more thorough assessment should be conducted in subsequent phases to determine whether to repurpose a NB left lane or NB through lane
- Widening would be required on the southwest corner to provide adequate turning radius

Rapid 471

Operating Plan

Rapid 471 Option 1 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 1 is shown in Figure D-4. The proposed roadway treatments for each segment of the alignment are presented in Table D-4.

Figure D-4. Rapid 471 Option 1 Concept Characteristics

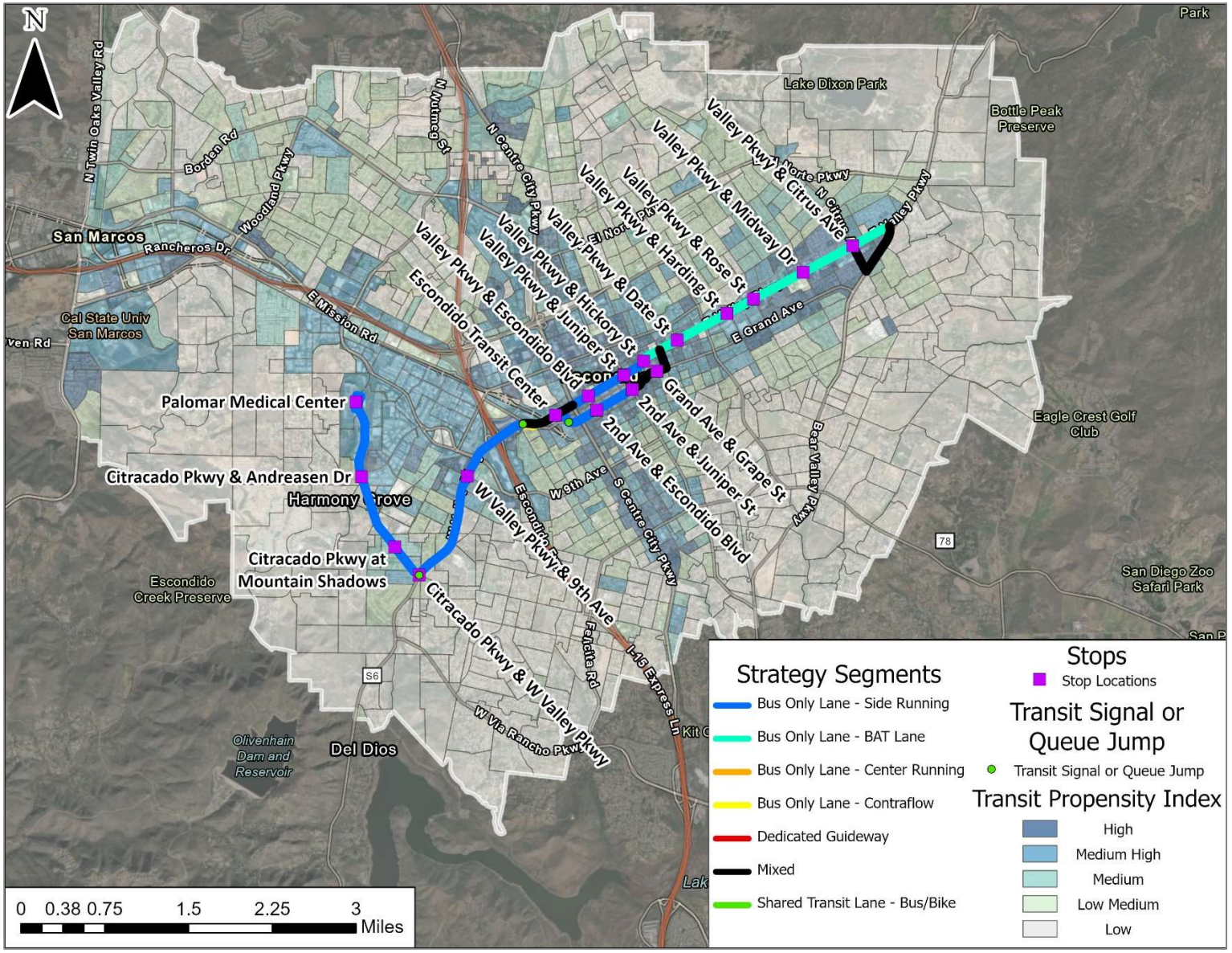


Table D-4. Rapid 471 Option 1 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Citracado Pkwy	Palomar Medical Center	Andreasen Dr	Bus Only Lane - Side Running	Buffered Lane - Both
2	Citracado Pkwy	Andreasen Dr	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
3	W Valley Pkwy	Citracado Pkwy	11th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
4	W Valley Pkwy	11th Ave	9th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
5	W Valley Pkwy	9th Ave	Auto Park Way	Bus Only Lane - Side Running	Buffered Lane - Both
6	W Valley Pkwy	Auto Park Way	Tulip St	Bus Only Lane - Side Running	Buffered Lane - Both
7	W Valley Pkwy/ W Grand Ave	Tulip St	Quince St	Bus Only Lane - Contraflow	None
8	Quince St	Grand Ave	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
9	2nd Ave	Quince St	Juniper St	Bus Only Lane - Side Running	Buffered Lane - One Way
10	2nd Ave	Juniper St	Grand Ave	Mixed	Buffered Lane - One Way
11	Grand Ave	2nd Ave	Fig St	Mixed	Buffered Lane - One Way
12	Valley Pkwy	Hickory St	Fig St	Bus Only Lane - BAT Lane	Buffered Lane - Both
13	Valley Pkwy	Fig St	Date St	Bus Only Lane - BAT Lane	Buffered Lane - Both
14	Valley Pkwy	Date St	Cedar St	Bus Only Lane - BAT Lane	Buffered Lane - Both
15	Valley Pkwy	Cedar St	Beech St	Bus Only Lane - BAT Lane	Buffered Lane - Both
16	Valley Pkwy	Beech St	Ash St	Bus Only Lane - BAT Lane	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	Valley Pkwy	Ash St	Harding St	Bus Only Lane - BAT Lane	Buffered Lane - Both
18	Valley Pkwy	Harding St	Rose St	Bus Only Lane - BAT Lane	Buffered Lane - Both
19	Valley Pkwy	Rose St	Midway Dr	Bus Only Lane - BAT Lane	Buffered Lane - Both
20	Valley Pkwy	Midway Dr	Citrus Ave	Bus Only Lane - BAT Lane	Buffered Lane - Both
21	Valley Pkwy	Citrus Ave	Bear Valley Pkwy	Bus Only Lane - BAT Lane	Buffered Lane - Both
22	Fig St	Grand Ave	Valley Pkwy	Mixed	Buffered Lane - One Way
23	Bear Valley Pkwy	Valley Pkwy	Citrus Ave	Mixed	Buffered Lane - Both
24	Citrus Ave	Bear Valley Pkwy	Valley Pkwy	Mixed	None
25	Valley Pkwy	Hickory St/Valley Pkwy	Broadway	Bus Only Lane - Side Running	Buffered Lane - One Way
26	Valley Pkwy	Broadway	City Centre Pkwy	Bus Only Lane - Side Running	Two-Way Cycle Track
27	Valley Pkwy	City Centre Pkwy (and ETC)	Tulip St	Mixed	Buffered Lane

Rapid 471 Option 2 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 2 is shown in Figure D-5. The proposed roadway treatments for each segment of the alignment are presented in Table D-5.

Figure D-5. Rapid 471 Option 2 Concept Characteristics

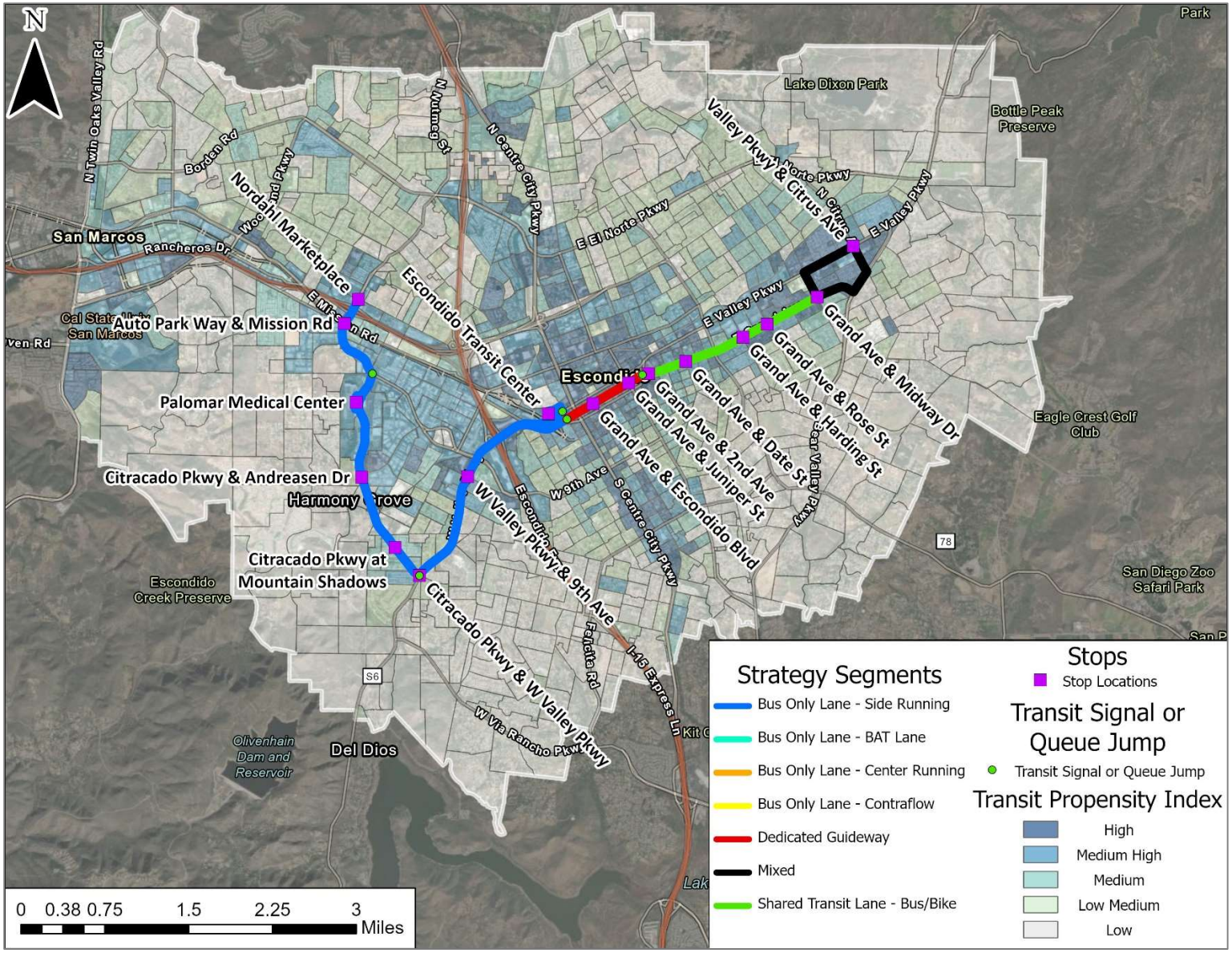


Table D-5. Rapid 471 Option 2 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Nordahl Rd	Nordahl Marketplace	Mission Rd	Bus Only Lane - Side Running	Buffered Lane - Both
2	Auto Park Way	Mission Rd	Citracado Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
3	Citracado Pkwy	Palomar Medical Center	Andreasen Dr	Bus Only Lane - Side Running	Buffered Lane - Both
4	Citracado Pkwy	Andreasen Dr	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
5	W Valley Pkwy	Citracado Pkwy	11th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
6	W Valley Pkwy	11th Ave	9th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
7	W Valley Pkwy	9th Ave	Auto Park Way	Bus Only Lane - Side Running	Buffered Lane - Both
8	W Valley Pkwy	Auto Park Way	Tulip St	Bus Only Lane - Side Running	Buffered Lane - Both
9	W Valley Pkwy/ W Grand Ave	Tulip St	Quince St	Bus Only Lane - Side Running	None
10	Quince St	Grand Ave	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
11	Quince St / ETC	ETC	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
12	Grand Ave	Quince St	Valley Blvd	Dedicated Guideway	Buffered Lane - Both
13	Grand Ave	Valley Blvd	Date St	Shared Transit Lane – Bus/Bike	Shared Lane – Bus/Bike
14	Grand Ave	Date St	Ash St	Shared Transit Lane – Bus/Bike	Shared Lane – Bus/Bike
15	Grand Ave	Ash St	Rose St	Shared Transit Lane – Bus/Bike	Shared Lane – Bus/Bike
16	Grand Ave	Rose St	Midway Dr	Shared Transit Lane – Bus/Bike	Shared Lane – Bus/Bike

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	Midway Dr	Grand Ave	Valley Pkwy	Mixed	None
18	Valley Pkwy	Midway Dr	Citrus Ave	Mixed	None
19	Citrus Ave	Valley Pkwy	Bear Valley Pkwy	Mixed	None
20	Bear Valley Pkwy	Citrus Ave	Grand Ave	Mixed	Buffered Lane - Both
21	Grand Ave	Bear Valley Pkwy	Midway Dr	Mixed	None
22	W Valley Pkwy	ETC/Quince St	Tulip St	Bus Only Lane - Side Running	Buffered Lane - Westbound

Rapid 471 Option 3 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 3 is shown in Figure D-6. The proposed roadway treatments for each segment of the alignment are presented in Table D-6.

Figure D-6. Rapid 471 Option 3 Concept Characteristics

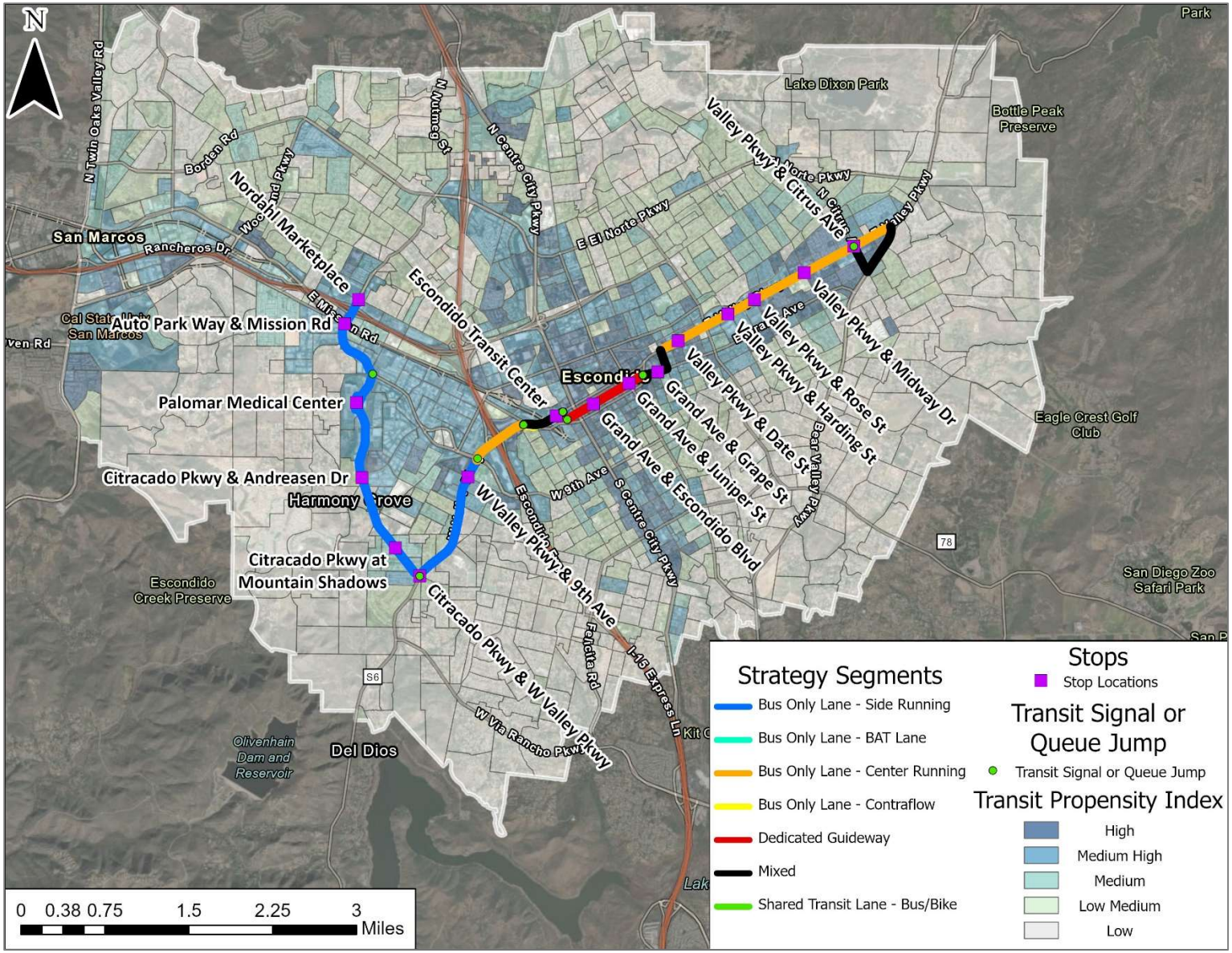


Table D-6. Rapid 471 Option 3 Concept Characteristics

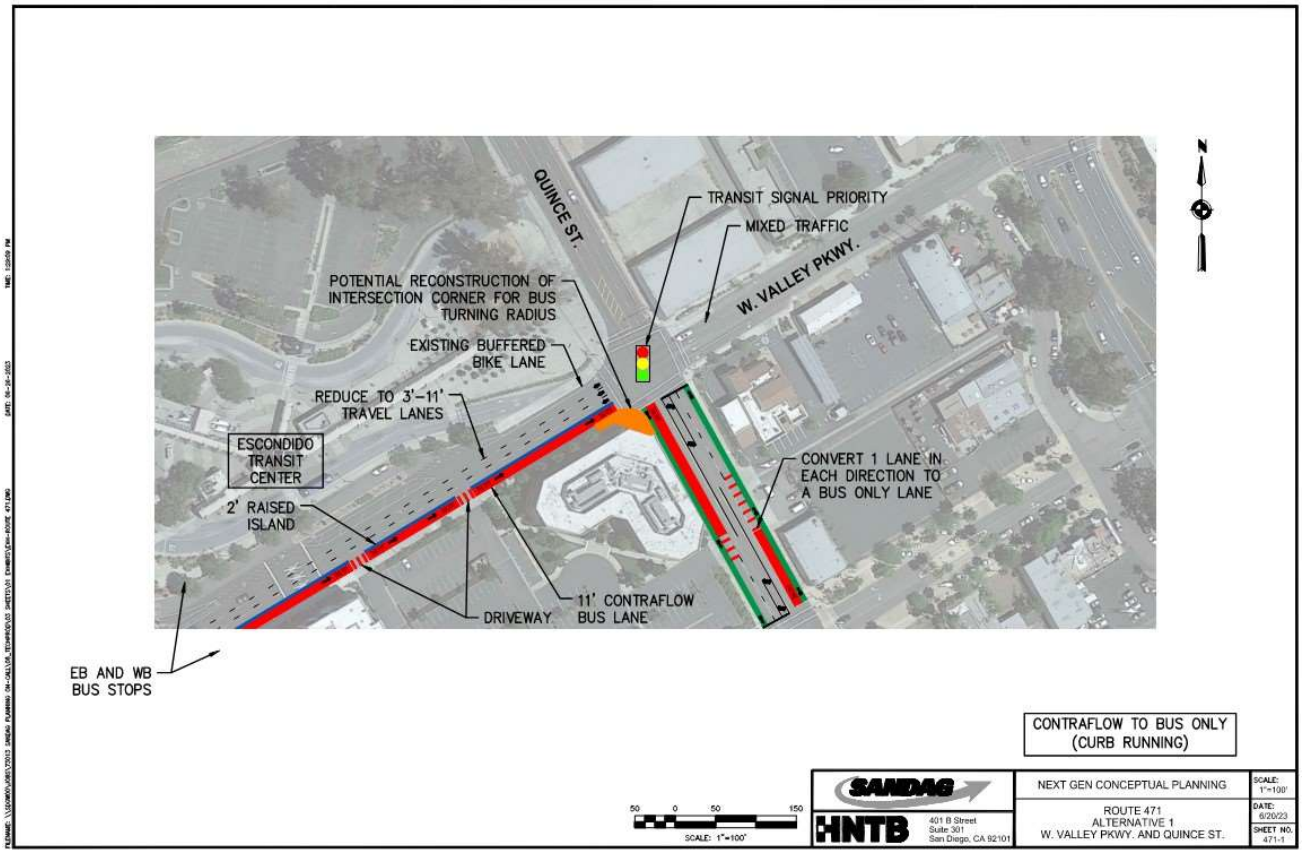
Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Nordahl Rd	Nordahl Marketplace	Mission Rd	Bus Only Lane - Side Running	Buffered Lane - Both
2	Auto Park Way	Mission Rd	Citracado Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
3	Citracado Pkwy	Palomar Medical Center	Andreasen Dr	Bus Only Lane - Side Running	Buffered Lane - Both
4	Citracado Pkwy	Andreasen Dr	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
5	W Valley Pkwy	Citracado Pkwy	11th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
6	W Valley Pkwy	11th Ave	9th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
7	W Valley Pkwy	9th Ave	Auto Park Way	Bus Only Lane - Side Running	Buffered Lane - Both
8	W Valley Pkwy	Auto Park Way	Tulip St	Bus Only Lane – Center Running	Buffered Lane - Both
9	W Valley Pkwy/ W Grand Ave	Tulip St	Quince St	Bus Only Lane – Contraflow	None
10	Quince St	Grand Ave	W Valley Pkwy	Bus Only Lane - Side Running	Buffered Lane - Both
11	Grand Ave	Quince St	Valley Blvd	Dedicated Guideway	Buffered Lane - Both
12	Grand Ave	2nd Ave	Fig St	Mixed	Buffered Lane – One Way
13	Fig St	Grand Ave	Valley Pkwy	Mixed	Buffered Lane – One Way
14	Valley Pkwy	Fig St	Date St	Bus Only Lane – Center Running	Buffered Lane - Both
15	Valley Pkwy	Date St	Cedar St	Bus Only Lane – Center Running	Buffered Lane - Both
16	Valley Pkwy	Cedar St	Beech St	Bus Only Lane – Center Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	Valley Pkwy	Beech St	Ash St	Bus Only Lane – Center Running	Buffered Lane - Both
18	Valley Pkwy	Ash St	Harding St	Bus Only Lane – Center Running	Buffered Lane - Both
19	Valley Pkwy	Harding St	Rose St	Bus Only Lane – Center Running	Buffered Lane - Both
20	Valley Pkwy	Rose St	Midway Dr	Bus Only Lane – Center Running	Buffered Lane - Both
21	Valley Pkwy	Midway Dr	Citrus Ave	Bus Only Lane – Center Running	Buffered Lane - Both
22	Valley Pkwy	Citrus Ave	Bear Valley Pkwy	Bus Only Lane – Center Running	Buffered Lane - Both
23	Bear Valley Pkwy	Valley Pkwy	Citrus Ave	Mixed	Buffered Lane - Both
24	Citrus Ave	Bear Valley Pkwy	Valley Pkwy	Mixed	None
25	W Valley Pkwy	ETC/Quince St	Tulip St	Mixed	Buffered Lane - Westbound

Design Drawings

Conceptual design drawings were prepared at key locations along the *Rapid* 471 corridor. Drawings were prepared using right-of-way data from SanGIS. They are intended to demonstrate how concept features could fit within existing right-of-way without encroaching into adjacent parcels. A more detailed engineering assessment should be conducted in future phases of study to determine potential right-of-way and other environmental impacts. Notes about each location are included below.

West Valley Parkway & Quince Street



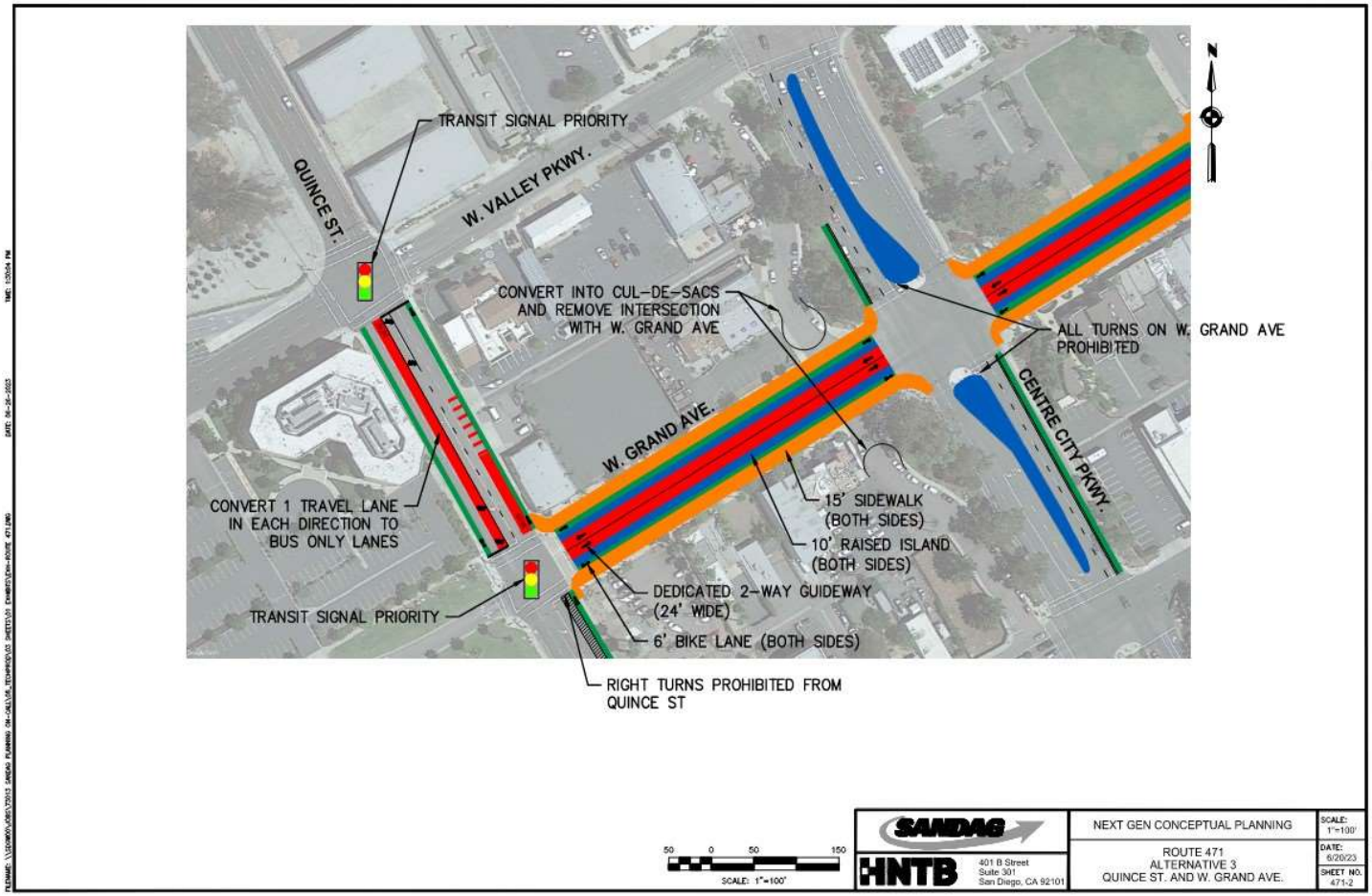
A similar configuration would be located at:

- Hotel Circle North & Fashion Valley Road (San Diego)

Notes

- A contra-flow lane would facilitate the EB-to-SB bus movement from West Valley Parkway to Quince Street. Buses would be separated from WB traffic by a raised island
- *Rapid* 471 would stop along West Valley Parkway west of the current view, serving ETC
- In this configuration, buses continue south on Quince then left on 2nd Avenue. Bus only lanes likely wouldn't be extended because of the short distance along Quince Street between Grand and 2nd Avenue

Quince Street & West Grand Avenue



Notes

- A contra-flow lane would facilitate the EB-to-SB bus movement from West Valley Parkway to Quince Street. Buses would be separated from WB traffic by a raised island
- *Rapid* 471 would stop along West Valley Parkway west of the current view, serving ETC
- In this configuration, buses would turn left onto Grand Avenue into a dedicated guideway
- This configuration would require closing Grand Avenue to auto traffic

Rapid 625

Operating Plan

Rapid 625 Option 1 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 1 is shown in Figure D-7. The proposed roadway treatments for each segment of the alignment are presented in Table D-7.

Figure D-7. Rapid 625 Option 1 Concept Characteristics

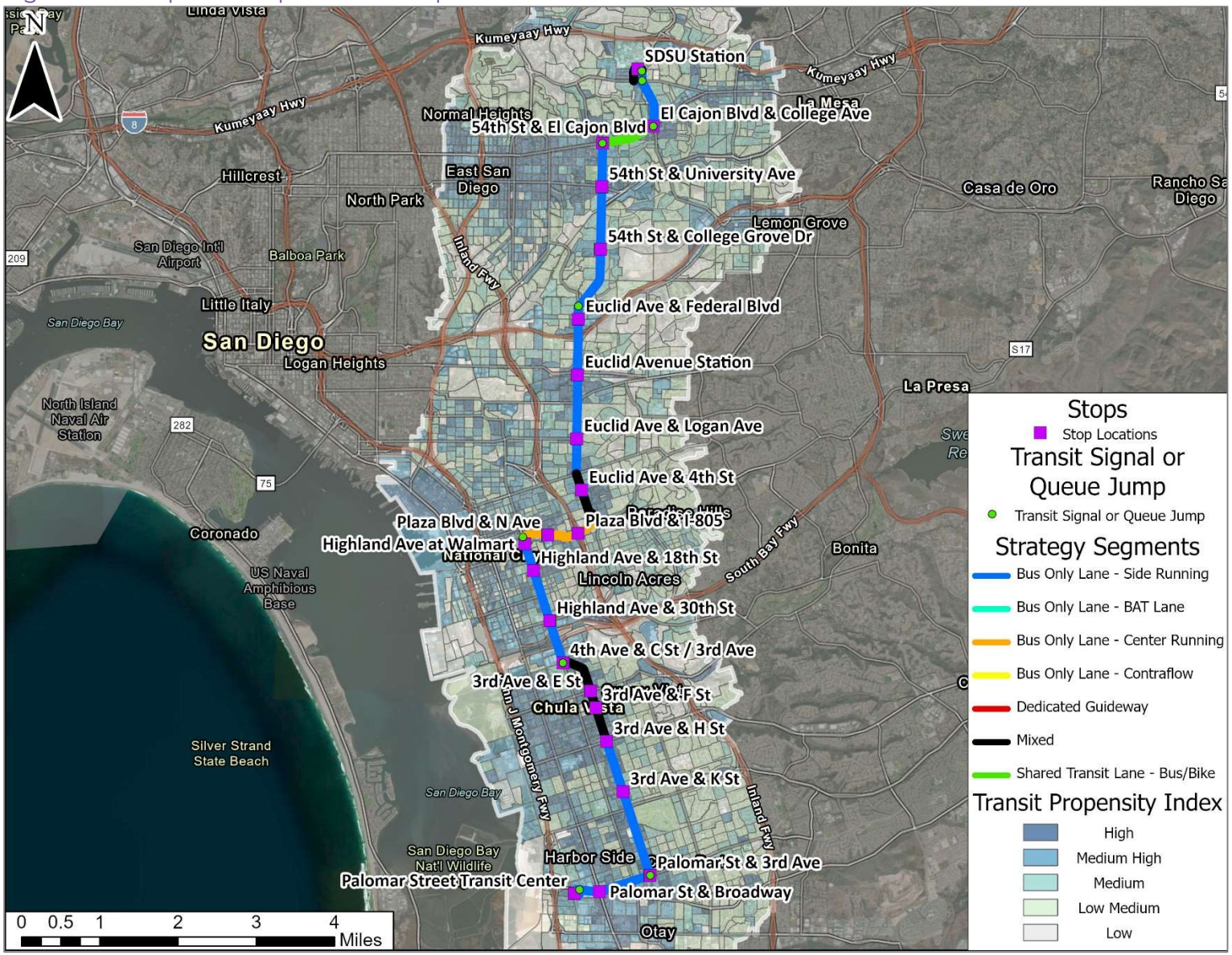


Table D-7. Rapid 625 Option 1 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Palomar St	Palomar Street Transit Center	Broadway	Bus Only Lane - Side Running	Buffered Lane - Both
2	Palomar St	Broadway	3rd Ave	Bus Only Lane - Side Running	Buffered Lane - Both
3	3rd Ave	Palomar St	Oxford St	Bus Only Lane - Side Running	Buffered Lane - Both
4	3rd Ave	Oxford St	Naples St	Bus Only Lane - Side Running	Buffered Lane - Both
5	3rd Ave	Naples St	Moss St	Bus Only Lane - Side Running	Buffered Lane - Both
6	3rd Ave	Moss St	L St	Bus Only Lane - Side Running	Buffered Lane - Both
7	3rd Ave	L St	K St	Bus Only Lane - Side Running	Buffered Lane - Both
8	3rd Ave	K St	J St	Bus Only Lane - Side Running	Buffered Lane - Both
9	3rd Ave	J St	I St	Bus Only Lane - Side Running	Buffered Lane - Both
10	3rd Ave	I St	H St	Bus Only Lane - Side Running	Buffered Lane - Both
11	3rd Ave	H St	G St	Mixed	None - Mixed/shared
12	3rd Ave	G St	F St	Mixed	None - Mixed/shared
13	3rd Ave	F St	E St	Mixed	None - Mixed/shared
14	3rd Ave	E St	D St	Mixed	None - Mixed/shared
15	3rd Ave	D St	4th Ave	Mixed	None - Mixed/shared
16	4th Ave/Highland Ave	3rd Ave / C St	30th St	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	4th Ave/Highland Ave	30th St	24th St	Bus Only Lane - Side Running	Buffered Lane - Both
18	4th Ave/Highland Ave	24th St	18th St	Bus Only Lane - Side Running	Buffered Lane - Both
19	4th Ave/Highland Ave	18th St	Plaza Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
20	Plaza Blvd	Highland Ave	Euclid Ave	Bus Only Lane - Center Running	Buffered Lane - Both
21	Euclid Ave	Plaza Blvd	Division St	Mixed	Buffered Lane - Both
22	Euclid Ave	Division St	Solola Ave	Bus Only Lane - Side Running	Buffered Lane - Both
23	Euclid Ave	Solola Ave	Logan Ave	Bus Only Lane - Side Running	Buffered Lane - Both
24	Euclid Ave	Logan Ave	Imperial Ave	Bus Only Lane - Side Running	Buffered Lane - Both
25	Euclid Ave	Imperial Ave	Market St / Euclid Ave Station	Bus Only Lane - Side Running	Buffered Lane - Both
26	Euclid Ave	Market St / Euclid Ave Station	Federal Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
27	Euclid Ave/54th St	Federal Blvd	Elm St	Bus Only Lane - Side Running	Buffered Lane - Both
28	54th St	Elm St	Grape St	Bus Only Lane - Side Running	Buffered Lane - Both
29	54th St	Grape St	Pirotte Dr	Bus Only Lane - Side Running	Buffered Lane - Both
30	54th St	Pirotte Dr	Redwood St	Bus Only Lane - Side Running	Buffered Lane - Both
31	54th St	Redwood St	Streamview Dr	Bus Only Lane - Side Running	Buffered Lane - Both
32	54th St	Streamview Dr	University Ave	Bus Only Lane - Side Running	Buffered Lane - Both
33	54th St	University Ave	El Cajon Blvd	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
34	El Cajon Blvd	54th St	College Ave	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
35	College Ave	El Cajon Blvd	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both
36	Montezuma Rd	College Ave	Campanile Dr	Bus Only Lane - Side Running	Buffered Lane - Both
37	Campanile Dr	Montezuma Rd	SDSU Transit center	Mixed	None
38	College Ave	SDSU Transit center	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both

Rapid 625 Option 2 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 2 is shown in Figure D-8. The proposed roadway treatments for each segment of the alignment are presented in Table D-8.

Figure D-8. Rapid 625 Option 2 Concept Characteristics

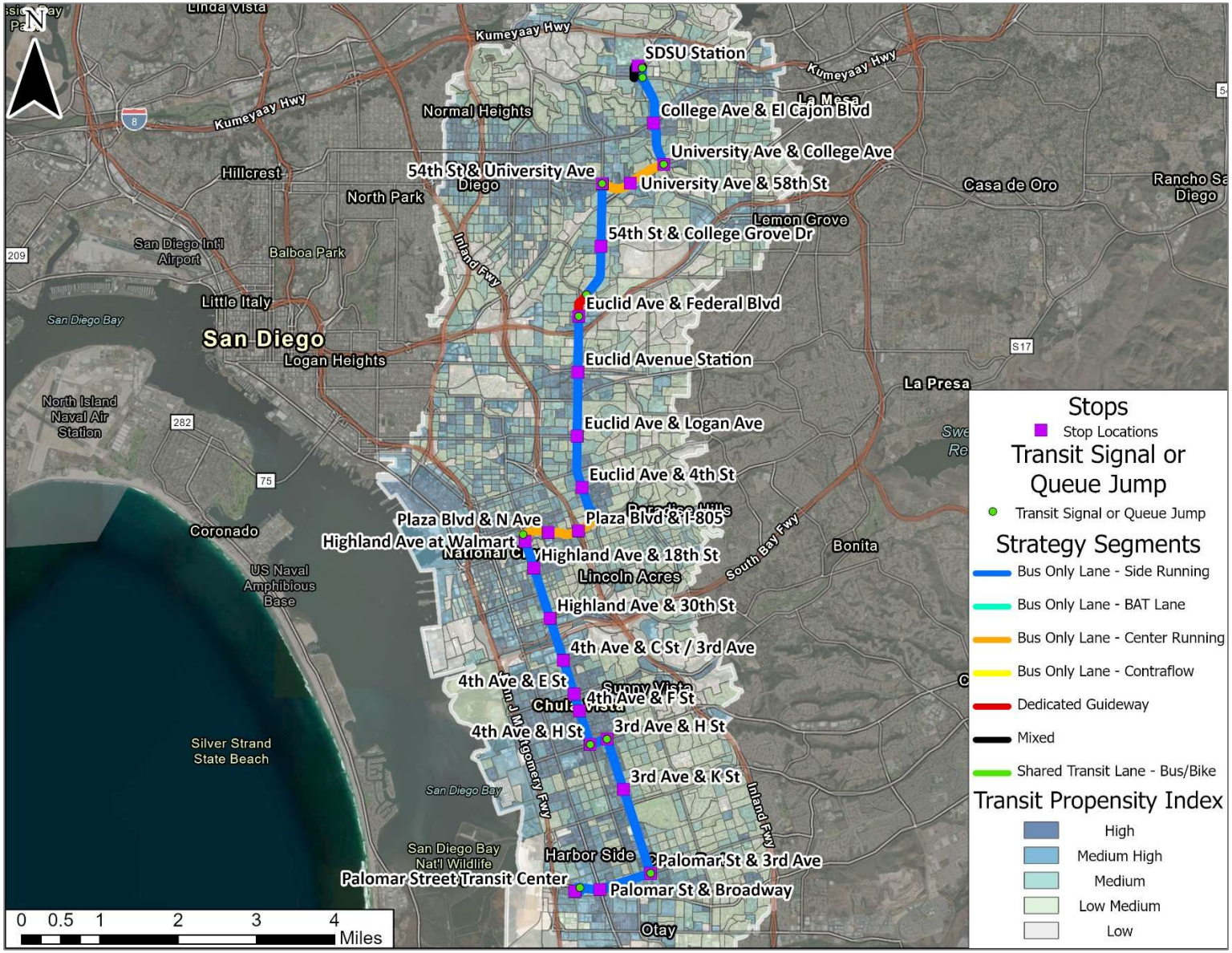


Table D-8. Rapid 625 Option 2 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Palomar St	Palomar Street Transit Center	Broadway	Bus Only Lane - Side Running	Buffered Lane - Both
2	Palomar St	Broadway	3rd Ave	Bus Only Lane - Side Running	Buffered Lane - Both
3	3rd Ave	Palomar St	Oxford St	Bus Only Lane - Side Running	Buffered Lane - Both
4	3rd Ave	Oxford St	Naples St	Bus Only Lane - Side Running	Buffered Lane - Both
5	3rd Ave	Naples St	Moss St	Bus Only Lane - Side Running	Buffered Lane - Both
6	3rd Ave	Moss St	L St	Bus Only Lane - Side Running	Buffered Lane - Both
7	3rd Ave	L St	K St	Bus Only Lane - Side Running	Buffered Lane - Both
8	3rd Ave	K St	J St	Bus Only Lane - Side Running	Buffered Lane - Both
9	3rd Ave	J St	I St	Bus Only Lane - Side Running	Buffered Lane - Both
10	3rd Ave	I St	H St	Bus Only Lane - Side Running	Buffered Lane - Both
11	H St	3rd Ave	4th Ave	Bus Only Lane - Side Running	Buffered Lane - Both
12	4th Ave	H St	G St	Bus Only Lane - Side Running	Buffered Lane - Both
13	4th Ave	G St	F St	Bus Only Lane - Side Running	Buffered Lane - Both
14	4th Ave	F St	E St	Bus Only Lane - Side Running	Buffered Lane - Both
15	4th Ave	E St	D St	Bus Only Lane - Side Running	Buffered Lane - Both
16	4th Ave	D St	C St	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	4th Ave/Highland Ave	3rd Ave / C St	30th St	Bus Only Lane - Side Running	Buffered Lane - Both
18	4th Ave/Highland Ave	30th St	24th St	Bus Only Lane - Side Running	Buffered Lane - Both
19	4th Ave/Highland Ave	24th St	18th St	Bus Only Lane - Side Running	Buffered Lane - Both
20	4th Ave/Highland Ave	18th St	Plaza Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
21	Plaza Blvd	Highland Ave	Euclid Ave	Bus Only Lane – Center Running	Buffered Lane - Both
22	Euclid Ave	Plaza Blvd	Division St	Bus Only Lane - Side Running	Buffered Lane - Both
23	Euclid Ave	Division St	Solola Ave	Bus Only Lane - Side Running	Buffered Lane - Both
24	Euclid Ave	Solola Ave	Logan Ave	Bus Only Lane - Side Running	Buffered Lane - Both
25	Euclid Ave	Logan Ave	Imperial Ave	Bus Only Lane - Side Running	Buffered Lane - Both
26	Euclid Ave	Imperial Ave	Market St / Euclid Ave Station	Bus Only Lane - Side Running	Buffered Lane - Both
27	Euclid Ave	Market St / Euclid Ave Station	Federal Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
28	Euclid Ave/54th St	Federal Blvd	Elm St	Dedicated guideway	Two-way cycle track
29	54th St	Elm St	Grape St	Dedicated guideway	Two-way cycle track
30	54th St	Grape St	Pirotte Dr	Bus Only Lane - Side Running	Buffered Lane - Both
31	54th St	Pirotte Dr	Redwood St	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
32	54th St	Redwood St	Streamview Dr	Bus Only Lane - Side Running	Buffered Lane - Both
33	54th St	Streamview Dr	University Ave	Bus Only Lane - Side Running	Buffered Lane - Both
34	University Ave	54th St	College Ave	Bus Only Lane – Center Running	Buffered Lane - Both
35	College Ave	University Ave	Adelaide Ave	Bus Only Lane - Side Running	Buffered Lane - Both
36	College Ave	Adelaide Ave	El Cajon Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
37	College Ave	El Cajon Blvd	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both
38	Montezuma Rd	College Ave	Campanile Dr	Bus Only Lane - Side Running	Buffered Lane - Both
39	Campanile Dr	Montezuma Rd	SDSU Transit center	Mixed	None
40	College Ave	SDSU Transit center	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both

Rapid 625 Option 3 would operate daily at 10-minute headways from 4 a.m. to 12 a.m. No service reductions are anticipated for weekends or holidays. A map of Option 3 is shown in Figure D-9. The proposed roadway treatments for each segment of the alignment are presented in Table D-9.

Figure D-9. Rapid 625 Option 3 Concept Characteristics

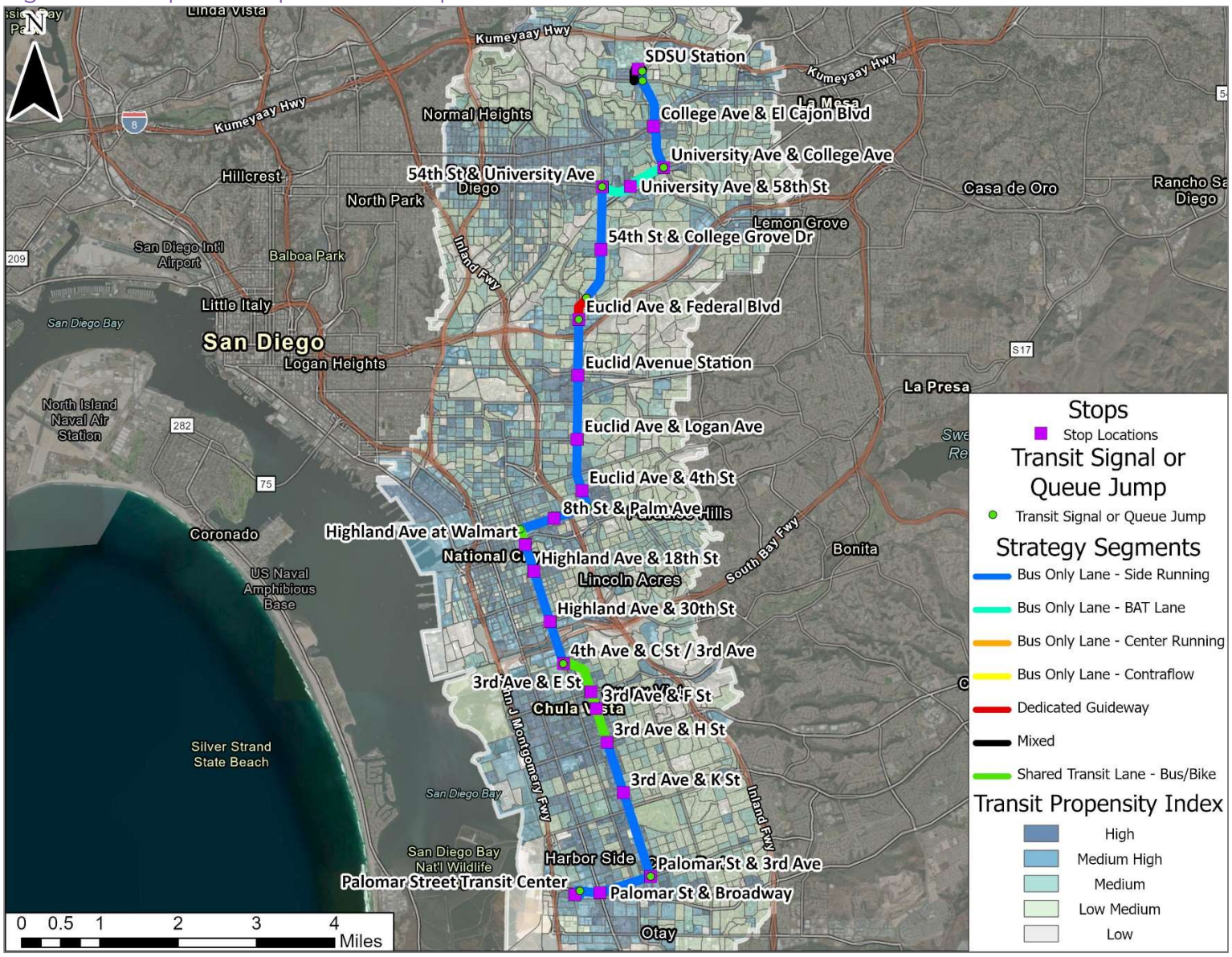


Table D-9. Rapid 625 Option 3 Concept Characteristics

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
1	Palomar St	Palomar Street Transit Center	Broadway	Bus Only Lane - Side Running	Buffered Lane - Both
2	Palomar St	Broadway	3rd Ave	Bus Only Lane - Side Running	Buffered Lane - Both
3	3rd Ave	Palomar St	Oxford St	Bus Only Lane - Side Running	Buffered Lane - Both
4	3rd Ave	Oxford St	Naples St	Bus Only Lane - Side Running	Buffered Lane - Both
5	3rd Ave	Naples St	Moss St	Bus Only Lane - Side Running	Buffered Lane - Both
6	3rd Ave	Moss St	L St	Bus Only Lane - Side Running	Buffered Lane - Both
7	3rd Ave	L St	K St	Bus Only Lane - Side Running	Buffered Lane - Both
8	3rd Ave	K St	J St	Bus Only Lane - Side Running	Buffered Lane - Both
9	3rd Ave	J St	I St	Bus Only Lane - Side Running	Buffered Lane - Both
10	3rd Ave	I St	H St	Bus Only Lane - Side Running	Buffered Lane - Both
11	3rd Ave	H St	G St	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
12	3rd Ave	G St	F St	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
13	3rd Ave	F St	E St	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
14	3rd Ave	E St	D St	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
15	3rd Ave	D St	4th Ave	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
16	4th Ave/Highland Ave	3rd Ave / C St	30th St	Bus Only Lane - Side Running	Buffered Lane - Both

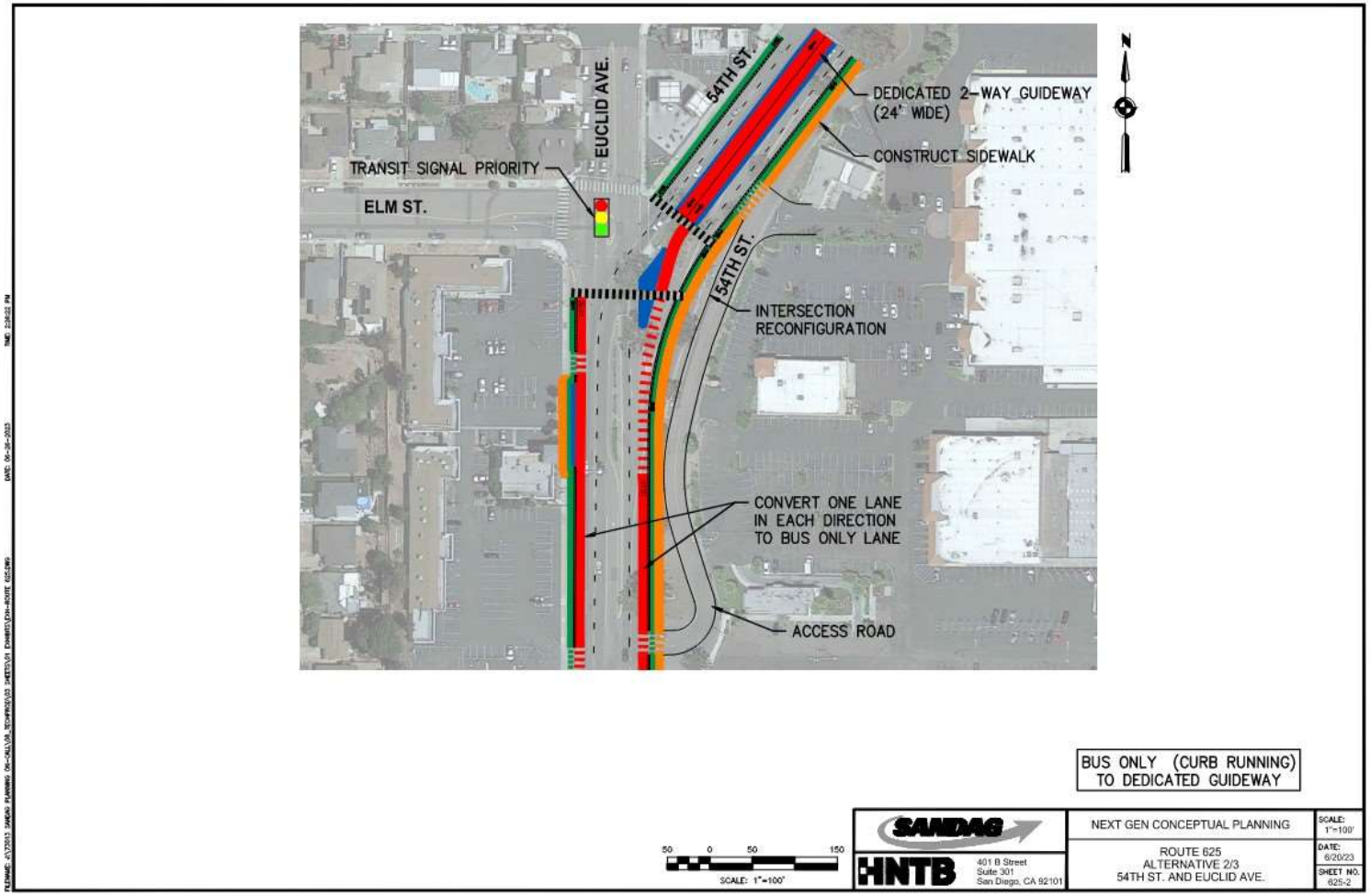
Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
17	4th Ave/Highland Ave	30th St	24th St	Bus Only Lane - Side Running	Buffered Lane - Both
18	4th Ave/Highland Ave	24th St	18th St	Bus Only Lane - Side Running	Buffered Lane - Both
19	4th Ave/Highland Ave	18th St	Plaza Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
20	Highland Ave	Plaza Blvd	8th St	Shared Transit Lane - Bus/Bike	Shared Lane - Bus/Bike
21	8th Ave	Highland Ave	Palm Ave	Bus Only Lane - Side Running	Buffered Lane - Both
22	8th Ave	Palm Ave	Euclid Ave	Bus Only Lane - Side Running	Buffered Lane - Both
23	Euclid Ave	8th St	Division St	Bus Only Lane - Side Running	Buffered Lane - Both
24	Euclid Ave	Division St	Solola Ave	Bus Only Lane - Side Running	Buffered Lane - Both
25	Euclid Ave	Solola Ave	Logan Ave	Bus Only Lane - Side Running	Buffered Lane - Both
26	Euclid Ave	Logan Ave	Imperial Ave	Bus Only Lane - Side Running	Buffered Lane - Both
27	Euclid Ave	Imperial Ave	Market St / Euclid Ave Station	Bus Only Lane - Side Running	Buffered Lane - Both
28	Euclid Ave	Market St / Euclid Ave Station	Federal Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
29	Euclid Ave/54th St	Federal Blvd	Elm St	Dedicated guideway	Two-way Cycle track
30	54th St	Elm St	Grape St	Dedicated guideway	Two-way Cycle track
31	54th St	Grape St	Pirotte Dr	Bus Only Lane - Side Running	Buffered Lane - Both
32	54th St	Pirotte Dr	Redwood St	Bus Only Lane - Side Running	Buffered Lane - Both
33	54th St	Redwood St	Streamview Dr	Bus Only Lane - Side Running	Buffered Lane - Both

Segment	Primary Road	Segment Start	Segment End	Dedication Type	Proposed Bike Lane Type
34	54th St	Streamview Dr	University Ave	Bus Only Lane - Side Running	Buffered Lane - Both
35	University Ave	54th St	College Ave	Bus Only Lane - BAT Lane	Buffered Lane - Both
36	College Ave	University Ave	Adelaide Ave	Bus Only Lane - Side Running	Buffered Lane - Both
37	College Ave	Adelaide Ave	El Cajon Blvd	Bus Only Lane - Side Running	Buffered Lane - Both
38	College Ave	El Cajon Blvd	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both
39	Montezuma Rd	College Ave	Campanile Dr	Bus Only Lane - Side Running	Buffered Lane - Both
40	Campanile Dr	Montezuma Rd	SDSU Transit center	Mixed	None
41	College Ave	SDSU Transit center	Montezuma Rd	Bus Only Lane - Side Running	Buffered Lane - Both

Design Drawings

Conceptual design drawings were prepared at key locations along the *Rapid* 625 corridor. Drawings were prepared using right-of-way data from SanGIS. They are intended to demonstrate how concept features could fit within existing right-of-way without encroaching into adjacent parcels. A more detailed engineering assessment should be conducted in future phases of study to determine potential right-of-way and other environmental impacts. Notes about each location are included below.

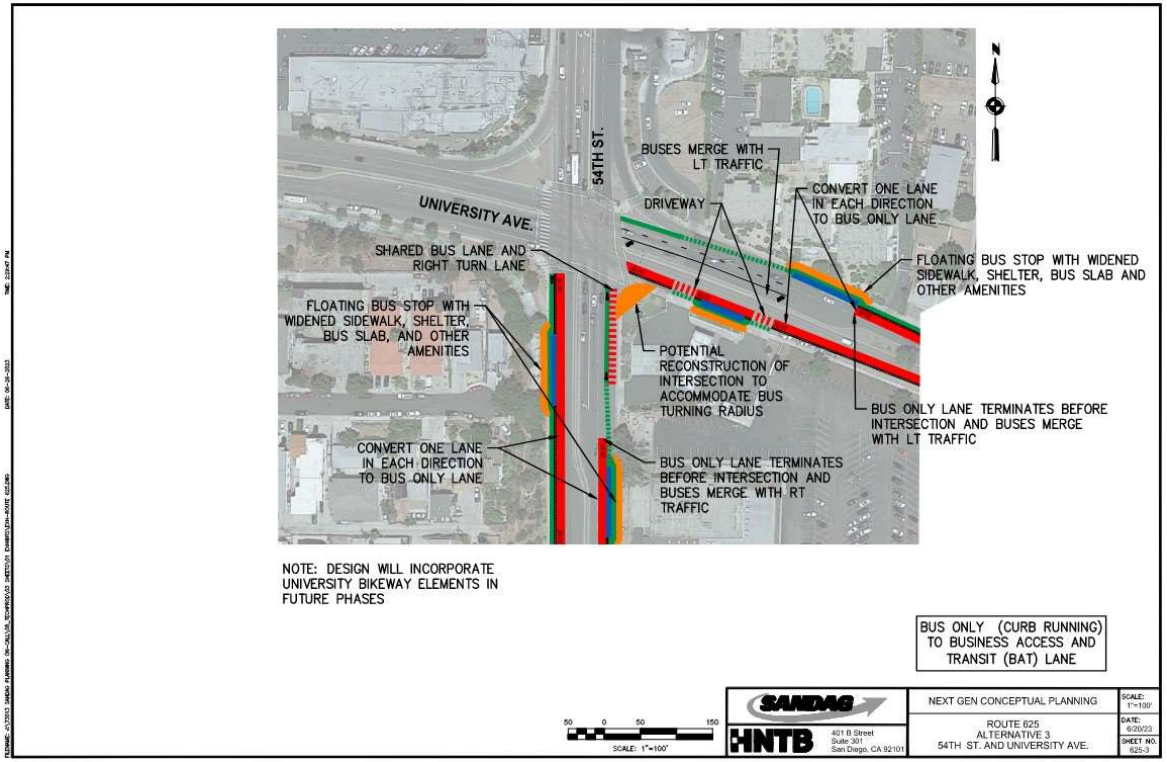
54th Street & Euclid Avenue



Notes

- This concept illustrates bus only side running to dedicated guideway
- TSP would allow buses to move in and out of the dedicated guideway
- Reconfiguration of the frontage road east of Euclid/54th retains access to the existing commercial center

54th Street & University Avenue



A similar configuration would be located at:

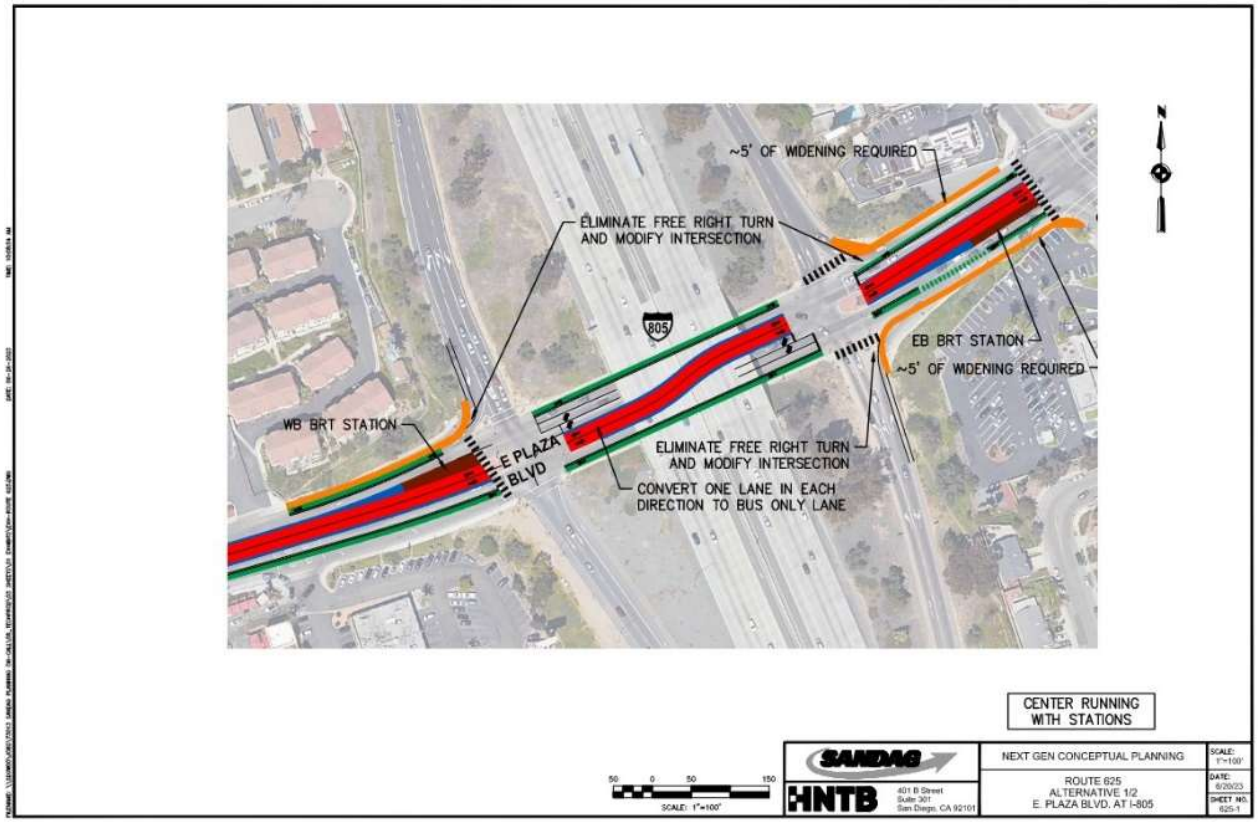
- 3rd Avenue & H Street (Chula Vista)
- Euclid Avenue & 8th Street (National City)
- Citracado Parkway & W Valley Parkway (Escondido)
- University Avenue & College Avenue (San Diego)

Notes

- This concept illustrates bus only side running to bus only side running
- WB buses on University Avenue would merge with left turn traffic to turn SB on Euclid Avenue
- NB buses would share the right-turn lane with vehicles
- Floating bus stops would eliminate conflicts between buses and cyclists
- Some reconstruction would be required on the southeast corner to provide adequate turning radius
- *Rapid* 625 would only serve one stop in each direction
- The design will incorporate University Bikeway[13] elements in future phases

Plaza Boulevard & I-805

[13] University Bikeway. Available at: https://www.sandag.org/-/media/SANDAG/Documents/PDF/projects-and-programs/bikeways-and-walkways/bikeway-walkway-projects/university-bikeway-fact-sheet-2020-04-02.pdf



A similar configuration would be located at:

- Valley Parkway & Date Street (Escondido)
- Genesee Avenue & Balboa Avenue (San Diego)

Notes

- This concept illustrates center running through signalized intersections
- One travel lane on Plaza Boulevard in each direction would need to be repurposed
- Median bus stops would be equipped with safety features (e.g., railings, pedestrian ramps)
- Free right turn movements would be eliminated at each of the I-805 ramps, improving the non-motorized environment

Attachment E. Concept Cost Estimates

Capital Cost Information

Planning-level capital cost estimates are included in the tables below. The level of detail of the capital cost estimates for this study corresponds with the current level of concept definition and conceptual engineering (less than 5% design). The level of estimating detail typically increases as the project progresses through the various phases of development during Environmental Review/ Preliminary Engineering, and eventually into Final Design. Cost estimates were developed with the following assumptions:

- Base Year – Year 2023 is used as the base year for definition of the unit prices and development of the capital cost estimates. Escalation is not included.
- Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. At this stage of the study, there is not sufficient definition of scope to prepare true construction cost estimates for alternatives under consideration. Rather, the cost estimates were developed using representative typical unit costs or allowances on a per unit basis that is consistent with the level of alternatives definition. The range of costs covers the uncertainty in scope of the project elements.
- Contingency covers the uncertainty in the estimating process due to the insufficient level of design. As the level of design detail increases, more and more items are specifically costed, leading to lower contingency costs in the estimate.
- These estimates do not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-1. Capital Cost Estimate – *Rapid* 41 – Option 1

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 41 - Option 1	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	11	EA	$500,000	$5,500,000	$800,000	$8,800,000
SCC 20 Subtotal				**$5,500,000**		**$8,800,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	226550	SF	$30	$6,796,500		
Minor Concrete (Curb and gutter)	11700	LF	$50	$585,000		
Minor Concrete (Sidewalk)	58500	SF	$15	$877,500		
Remove Concrete (Curb and gutter)	11700	LF	$20	$234,000		
Remove Concrete (Sidewalk)	58500	SF	$5	$292,500		
Remove existing median	154000	SF	$5	$770,000		
Intersection reconstruction/modification (incl curb ramps)	8	EA	$500,000	$4,000,000		
Traffic Striping	494020	LF	$1	$494,020		
Bus Lane - full width red paint	1184760	SF	$5	$5,923,800		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$20,973,320	$629,200		
Traffic Control	5%	LS	$20,973,320	$1,048,666		
Drainage and Utilities	5%	LS	$20,973,320	$1,048,666		
Mobilization	10%	LS	$23,699,852	$2,369,985		
SCC 40 Subtotal				**$26,069,837**		**$39,104,755**
SCC 50 Systems						
Communication upgrades/FO/TSP	12	Mile	$750,000	$9,000,000	$1,000,000	$12,000,000
SCC 50 Subtotal				**$9,000,000**		**$12,000,000**
Contingency	**35%**	**LS**	**$40,569,837**	**$14,199,443**	$59,904,755	$20,966,664
Construction sub total (10-50)				**$54,769,280**		**$80,871,419**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$54,769,280	$5,476,928	$80,871,419	$8,087,142
SCC 60 Subtotal				**$5,476,928**		**$8,087,142**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$54,769,280	$19,169,248	$80,871,419	$28,304,997
SCC 80 Subtotal				**$19,169,248**		**$28,304,997**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$79,415,455**		**$117,263,558**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-2. Capital Cost Estimate – *Rapid* 41 – Option 2

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 41 - Option 2	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	11	EA	$500,000	$5,500,000	$800,000	$8,800,000
SCC 20 Subtotal				**$5,500,000**		**$8,800,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	292450	SF	$30	$8,773,500		
Minor Concrete (Curb and gutter)	17600	LF	$50	$880,000		
Minor Concrete (Sidewalk)	88000	SF	$15	$1,320,000		
Guardrail	1650	LF	$50	$82,500		
Remove Concrete (Curb and gutter)	17600	LF	$20	$352,000		
Remove Concrete (Sidewalk)	88000	SF	$5	$440,000		
Remove existing median	173000	SF	$5	$865,000		
Remove guardrail	1650	LF	$10	$16,500		
Intersection reconstruction/modification (incl curb ramps)	12	EA	$500,000	$6,000,000		
Traffic Striping	548910	LF	$1	$548,910		
Bus Lane - full width red paint	1456440	SF	$5	$7,282,200		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$27,560,610	$826,818		
Traffic Control	5%	LS	$27,560,610	$1,378,031		
Drainage and Utilities	5%	LS	$27,560,610	$1,378,031		
Mobilization	10%	LS	$31,143,489	$3,114,349		
SCC 40 Subtotal				**$34,257,838**		**$51,386,757**
SCC 50 Systems						
Communication upgrades/FO/TSP	12	Mile	$750,000	$9,000,000	$1,000,000	$12,000,000
SCC 50 Subtotal				**$9,000,000**		**$12,000,000**
Contingency	**35%**	**LS**	**$48,757,838**	**$17,065,243**	$72,186,757	$25,265,365
Construction sub total (10-50)				**$65,823,082**		**$97,452,122**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$65,823,082	$6,582,308	$97,452,122	$9,745,212
SCC 60 Subtotal				**$6,582,308**		**$9,745,212**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$65,823,082	$23,038,079	$97,452,122	$34,108,243
SCC 80 Subtotal				**$23,038,079**		**$34,108,243**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$95,443,468**		**$141,305,578**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-3. Capital Cost Estimate – *Rapid* 41 – Option 3

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 41 - Option 3	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	14	EA	$500,000	$7,000,000	$800,000	$11,200,000
SCC 20 Subtotal				**$7,000,000**		**$11,200,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	317200	SF	$30	$9,516,000		
Minor Concrete (Curb and gutter)	20900	LF	$50	$1,045,000		
Minor Concrete (Sidewalk)	104500	SF	$15	$1,567,500		
Guardrail	1650	LF	$50	$82,500		
Remove Concrete (Curb and gutter)	19250	LF	$20	$385,000		
Remove Concrete (Sidewalk)	96250	SF	$5	$481,250		
Remove existing median	173000	SF	$5	$865,000		
Remove guardrail	1650	LF	$10	$16,500		
Intersection reconstruction/modification (incl curb ramps)	14	EA	$500,000	$7,000,000		
Traffic Striping	588035	LF	$1	$588,035		
Bus Lane - full width red paint	1513920	SF	$5	$7,569,600		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$30,116,385	$903,492		
Traffic Control	5%	LS	$30,116,385	$1,505,819		
Drainage and Utilities	5%	LS	$30,116,385	$1,505,819		
Mobilization	10%	LS	$34,031,515	$3,403,152		
SCC 40 Subtotal				**$37,434,667**		**$56,152,000**
SCC 50 Systems						
Communication upgrades/FO/TSP	12	Mile	$750,000	$9,000,000	$1,000,000	$12,000,000
SCC 50 Subtotal				**$9,000,000**		**$12,000,000**
Contingency	**35%**	**LS**	**$53,434,667**	**$18,702,133**	$79,352,000	$27,773,200
Construction sub total (10-50)				**$72,136,800**		**$107,125,200**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$72,136,800	$7,213,680	$107,125,200	$10,712,520
SCC 60 Subtotal				**$7,213,680**		**$10,712,520**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$72,136,800	$25,247,880	$107,125,200	$37,493,820
SCC 80 Subtotal				**$25,247,880**		**$37,493,820**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$104,598,360**		**$155,331,540**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-4. Capital Cost Estimate – *Rapid* 471 – Option 1

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 471 - Option 1	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	17	EA	$500,000	$8,500,000	$800,000	$13,600,000
SCC 20 Subtotal				**$8,500,000**		**$13,600,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	63100	SF	$30	$1,893,000		
Minor Concrete (Curb and gutter)	12700	LF	$50	$635,000		
Minor Concrete (Sidewalk)	63500	SF	$15	$952,500		
Remove Concrete (Curb and gutter)	12700	LF	$20	$254,000		
Remove Concrete (Sidewalk)	63500	SF	$5	$317,500		
Remove existing median	0	SF	$5	$0		
Intersection reconstruction/modification (incl curb ramps)	9	EA	$500,000	$4,500,000		
Traffic Striping	320200	LF	$1	$320,200		
Bus Lane - full width red paint	792700	SF	$5	$3,963,500		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$13,835,700	$415,071		
Traffic Control	5%	LS	$13,835,700	$691,785		
Drainage and Utilities	5%	LS	$13,835,700	$691,785		
Mobilization	10%	LS	$15,634,341	$1,563,434		
SCC 40 Subtotal				**$17,197,775**		**$25,796,663**
SCC 50 Systems						
Communication upgrades/FO/TSP	7.5	Mile	750000	5625000	$1,000,000	$7,500,000
SCC 50 Subtotal				**$5,625,000**		**$7,500,000**
Contingency	**35%**	**LS**	**$31,322,775**	**$10,962,971**	$46,896,663	$16,413,832
Construction sub total (10-50)				**$42,285,746**		**$63,310,495**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	42285746.39	4228574.639	$63,310,495	$6,331,049
SCC 60 Subtotal				**$4,228,575**		**$6,331,049**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	42285746.39	14800011.23	$63,310,495	$22,158,673
SCC 80 Subtotal				**$14,800,011**		**$22,158,673**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$61,314,332**		**$91,800,217**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-5. Capital Cost Estimate – *Rapid* 471 – Option 2

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 471 – Option 2	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	16	EA	$500,000	$8,000,000	$800,000	$12,800,000
SCC 20 Subtotal				**$8,000,000**		**$12,800,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	1600	SF	$30	$48,000		
Minor Concrete (Curb and gutter)	8600	LF	$50	$430,000		
Minor Concrete (Sidewalk)	125000	SF	$15	$1,875,000		
Minor Concrete (Raised Island)	82000	SF	$30	$2,460,000		
Remove Concrete (Curb and gutter)	8600	LF	$20	$172,000		
Remove Concrete (Sidewalk)	125000	SF	$5	$625,000		
Remove existing median	8000	SF	$5	$40,000		
Intersection reconstruction/modification (incl curb ramps)	0	EA	$500,000	$0		
Traffic Striping	245570	LF	$1	$245,570		
Bus Lane - full width red paint	891170	SF	$5	$4,455,850		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$11,351,420	$340,543		
Traffic Control	5%	LS	$11,351,420	$567,571		
Drainage and Utilities	5%	LS	$11,351,420	$567,571		
Mobilization	10%	LS	$12,827,105	$1,282,710		
SCC 40 Subtotal				**$14,109,815**		**$21,164,723**
SCC 50 Systems						
Communication upgrades/FO/TSP	7.5	Mile	$750,000	$5,625,000	$1,000,000	$7,500,000
SCC 50 Subtotal				**$5,625,000**		**$7,500,000**
Contingency	**35%**	**LS**	**$27,734,815**	**$9,707,185**	$41,464,723	$14,512,653
Construction sub total (10-50)				**$37,442,000**		**$55,977,375**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$37,442,000	$3,744,200	$55,977,375	$5,597,738
SCC 60 Subtotal				**$3,744,200**		**$5,597,738**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$37,442,000	$13,104,700	$55,977,375	$19,592,081
SCC 80 Subtotal				**$13,104,700**		**$19,592,081**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$54,290,900**		**$81,167,194**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-6. Capital Cost Estimate – *Rapid* 471 – Option 3

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 471 - Option 3	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	16	EA	$500,000	$8,000,000	$800,000	$12,800,000
SCC 20 Subtotal				**$8,000,000**		**$12,800,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	1600	SF	$30	$48,000		
Minor Concrete (Curb and gutter)	8600	LF	$50	$430,000		
Minor Concrete (Sidewalk)	125000	SF	$15	$1,875,000		
Minor Concrete (Raised Island)	82000	SF	$30	$2,460,000		
Remove Concrete (Curb and gutter)	8600	LF	$20	$172,000		
Remove Concrete (Sidewalk)	125000	SF	$5	$625,000		
Remove existing median	15500	SF	$5	$77,500		
Intersection reconstruction/modification (incl curb ramps)	0	EA	$500,000	$0		
Traffic Striping	347160	LF	$1	$347,160		
Bus Lane - full width red paint	924384	SF	$5	$4,621,920		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$11,656,580	$349,697		
Traffic Control	5%	LS	$11,656,580	$582,829		
Drainage and Utilities	5%	LS	$11,656,580	$582,829		
Mobilization	10%	LS	$13,171,935	$1,317,194		
SCC 40 Subtotal				**$14,489,129**		**$21,733,693**
SCC 50 Systems						
Communication upgrades/FO/TSP	7.5	Mile	$750,000	$5,625,000	$1,000,000	$7,500,000
SCC 50 Subtotal				**$5,625,000**		**$7,500,000**
Contingency	**35%**	**LS**	**$28,114,129**	**$9,839,945**	$42,033,693	$14,711,793
Construction sub total (10-50)				**$37,954,074**		**$56,745,486**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$37,954,074	$3,795,407	$56,745,486	$5,674,549
SCC 60 Subtotal				**$3,795,407**		**$5,674,549**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$37,954,074	$13,283,926	$56,745,486	$19,860,920
SCC 80 Subtotal				**$13,283,926**		**$19,860,920**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$55,033,407**		**$82,280,955**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-7. Capital Cost Estimate – *Rapid* 625 – Option 1

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 625 – Option 1	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	22	EA	$500,000	$11,000,000	$800,000	$17,600,000
SCC 20 Subtotal				**$11,000,000**		**$17,600,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	61840	SF	$30	$1,855,200		
Minor Concrete (Curb and gutter)	10580	LF	$50	$529,000		
Minor Concrete (Sidewalk)	52900	SF	$15	$793,500		
Minor Concrete (Raised Island)	0	SF	$30	$0		
Remove Concrete (Curb and gutter)	10580	LF	$20	$211,600		
Remove Concrete (Sidewalk)	52900	SF	$5	$264,500		
Remove existing median	31200	SF	$5	$156,000		
Intersection reconstruction/modification (incl curb ramps)	20	EA	$500,000	$10,000,000		
Traffic Striping	556835	LF	$1	$556,835		
Bus Lane - full width red paint	1485120	SF	$5	$7,425,600		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$22,792,235	$683,767		
Traffic Control	5%	LS	$22,792,235	$1,139,612		
Drainage and Utilities	5%	LS	$22,792,235	$1,139,612		
Mobilization	10%	LS	$25,755,226	$2,575,523		
SCC 40 Subtotal				**$28,330,748**		**$42,496,122**
SCC 50 Systems						
Communication upgrades/FO/TSP	15	Mile	$750,000	$11,250,000	$1,000,000	$15,000,000
SCC 50 Subtotal				**$11,250,000**		**$15,000,000**
Contingency	35%	LS	$50,580,748	$17,703,262	$75,096,122	$26,283,643
Construction sub total (10-50)				**$68,284,010**		**$101,379,765**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$68,284,010	$6,828,401	$101,379,765	$10,137,976
SCC 60 Subtotal				**$6,828,401**		**$10,137,976**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$68,284,010	**$23,899,403**	$101,379,765	**$35,482,918**
SCC 80 Subtotal				**$23,899,403**		**$35,482,918**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$99,011,814**		**$147,000,659**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-8. Capital Cost Estimate – *Rapid* 625 – Option 2

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	HNTB				
Rapid 625 – Option 2	Date:	8/17/2023	Range - Low		Range - High	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	24	EA	$500,000	$12,000,000	$800,000	$19,200,000
SCC 20 Subtotal				**$12,000,000**		**$19,200,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	90640	SF	$30	$2,719,200		
Minor Concrete (Curb and gutter)	15380	LF	$50	$769,000		
Minor Concrete (Sidewalk)	76900	SF	$15	$1,153,500		
Minor Concrete (Raised Island)	17000	SF	$30	$510,000		
Remove Concrete (Curb and gutter)	15380	LF	$20	$307,600		
Remove Concrete (Sidewalk)	76900	SF	$5	$384,500		
Remove existing median	48200	SF	$5	$241,000		
Intersection reconstruction/modification (incl curb ramps)	28	EA	$500,000	$14,000,000		
Traffic Striping	631990	LF	$1	$631,990		
Bus Lane - full width red paint	1822240	SF	$5	$9,111,200		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$30,827,990	$924,840		
Traffic Control	5%	LS	$30,827,990	$1,541,400		
Drainage and Utilities	5%	LS	$30,827,990	$1,541,400		
Mobilization	10%	LS	$34,835,629	$3,483,563		
SCC 40 Subtotal				**$38,319,192**		**$57,478,787**
SCC 50 Systems						
Communication upgrades/FO	15	Mile	$750,000	$11,250,000	$1,000,000	$15,000,000
SCC 50 Subtotal				**$11,250,000**		**$15,000,000**
Contingency	35%	LS		$61,569,192		$91,678,787
Construction sub total (10-50)				**$83,118,409**		**$123,766,363**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$83,118,409	$8,311,841	$123,766,363	$12,376,636
SCC 60 Subtotal				**$8,311,841**		**$12,376,636**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$83,118,409	$29,091,443	$123,766,363	$43,318,227
SCC 80 Subtotal				**$29,091,443**		**$43,318,227**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$120,521,692**		**$179,461,226**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

Table E-9. Capital Cost Estimate – *Rapid* 625 – Option 3

Conceptual Planning Level Cost Estimates for Next Gen Rapid Routes 41, 471 and 625						
	Developed by	**HNTB**				
Rapid 625 – Option 3	**Date:**	**8/17/2023**	**Range – Low**		**Range - High**	
Items	**Quantities**	**Units**	**Unit Cost**	**Item Cost**	**Unit Cost**	**Item Cost**
SCC 10 Guideway and Track Elements (route miles) - not used						
SCC 20 Stations, Stops, Terminals, Intermodal (number)						
Bus Stops (including floating islands, bus pads, shelters and other amenities)	22	EA	$500,000	$11,000,000	$800,000	$17,600,000
SCC 20 Subtotal				**$11,000,000**		**$17,600,000**
SCC 30 Support Facilities: Yards, Shops, Admin. Bldgs. - not used						
SCC 40 Sitework and special conditions						
New pavement section	85340	SF	$30	$2,560,200		
Minor Concrete (Curb and gutter)	15280	LF	$50	$764,000		
Minor Concrete (Sidewalk)	76400	SF	$15	$1,146,000		
Minor Concrete (Raised Island)	17000	SF	$30	$510,000		
Remove Concrete (Curb and gutter)	15280	LF	$20	$305,600		
Remove Concrete (Sidewalk)	76400	SF	$5	$382,000		
Remove existing median	66400	SF	$5	$332,000		
Intersection reconstruction/modification (incl curb ramps)	20	EA	$500,000	$10,000,000		
Traffic Striping	587910	LF	$1	$587,910		
Bus Lane - full width red paint	1642080	SF	$5	$8,210,400		
Pavement marking	1	LS	$1,000,000	$1,000,000		
Erosion Control/SWPPP etc.	3%	LS	$25,798,110	$773,943		
Traffic Control	5%	LS	$25,798,110	$1,289,906		
Drainage and Utilities	5%	LS	$25,798,110	$1,289,906		
Mobilization	10%	LS	$29,151,864	$2,915,186		
SCC 40 Subtotal				**$32,067,051**		**$48,100,576**
SCC 50 Systems						
Modify signal for transit priority	15	Mile	$750,000	$11,250,000	$1,000,000	$15,000,000
SCC 50 Subtotal				**$11,250,000**		**$15,000,000**
Contingency	**35%**	**LS**	**$54,317,051**	**$19,010,968**	**$80,700,576**	**$28,245,202**
Construction sub total (10-50)				**$73,328,018**		**$108,945,778**
SCC 60 ROW, Land, existing improvements						
Temporary Easements/ROW	10%	LS	$73,328,018	$7,332,802	$108,945,778	$10,894,578
SCC 60 Subtotal				**$7,332,802**		**$10,894,578**
SCC 70 Vehicles (number) - not used						
SCC 80 Professional Services (applies to Cats 10-50)						
Professional Services	35%	LS	$73,328,018	$25,664,806	$108,945,778	$38,131,022
SCC 80 Subtotal				**$25,664,806**		**$38,131,022**
SCC 90 Unallocated Contingency - not used						
SCC 100 Finance Charges - not used						
Total Project Cost (10-100)				**$106,325,627**		**$157,971,378**

Notes:

1. Based on the current level of project development and design, the intended use of this cost estimate is for strategic planning and programming. Therefore, the costs are provided as a range.
2. The base year for the cost estimate is 2023 dollars; escalation is not included.
3. This estimate does not include the cost of new vehicles, potential charging infrastructure for electric vehicles, and cost of expanded or new maintenance facilities.

O&M Cost Information

Annual O&M costs for all concept options are shown below in Table D-10. O&M costs were calculated assuming each would operate daily at 10-minute headways from 4 a.m. to 12 a.m., with no service reduction for Saturdays, Sundays, or holidays. This is a conservative method of calculating O&M costs, as most routes operate with reduced service in the early morning, midday, late evening, weekends, and holidays.

Table E-10. Estimated O&M Costs (2023)

Route & Option	One-Way Travel Time (Minutes)[1]	Headways (Minutes)[2]	Cycle Time (Bidirectional Runtime Plus Recovery) (Minutes)[3]	Vehicles Required[4]	Daily Revenue Hours[5]	Annual Revenue Hours[6]	Hourly Operating Cost[7]	Total Annual Operating Cost[8]
Rapid 41 Option 1	42.3	10	100	10	200	73,000	$113.76	$8,304,472
Rapid 41 Option 2	39.1	10	90	9	180	65,700	$113.76	$7,474,025
Rapid 41 Option 3	51.2	10	120	12	240	87,600	$113.76	$9,965,366
Rapid 471 Option 1	37.5	10	90	9	180	65,700	$144.64	$9,502,848
Rapid 471 Option 2	39.8	10	100	10	200	73,000	$144.64	$10,558,720
Rapid 471 Option 3	38.5	10	90	9	180	65,700	$144.64	$9,502,848
Rapid 625 Option 1	69.6	10	170	17	340	124,100	$113.76	$14,117,602
Rapid 625 Option 2	71.4	10	170	17	340	124,100	$113.76	$14,117,602
Rapid 625 Option 3	67.2	10	160	16	320	116,800	$113.76	$13,287,155

[1]One-Way Travel Time is calculated for each route option based on existing transit speeds with travel time savings due to stop consolidation, mileage and level of transit-only infrastructure, queue jumps and transit signal priority.
[2]Headways are established for all Next Gen *Rapid* routes at 10 minutes.
[3]Cycle Time is calculated with the following expression (rounded to the next multiple of the Headway): Bidirectional Runtime + Minimum Layover. Minimum Layover is calculated with the following expression: Bidirectional Runtime * Target Recovery Percentage. Based on the industry standard, a Target Recovery Percentage of 15% was used for this calculation.
[4]Vehicles Required is calculated with the following expression: Cycle Time / Headway
[5]Daily Revenue Hours is calculated with the following expression: (Cycle Time / 2) * (60 / Headways * Directions) * Daily Span of Service / 60. To calculate bidirectional service, Directions was set to 2. Daily Span of Service is 20 hours, with Next Gen *Rapid* service operating from 4 AM to 12 AM.
[6]Annual Revenue Hours are calculated with the following expression: Daily Revenue Hours * Annual Days of Service. A conservative, maximum cost estimate of 365 was used for the annual days of service for this calculation.
[7]Hourly Operating Cost is the average hourly operating costs provided by MTS and NCTD. Operating costs for Rapids 41 and 625 are from the MTS Mid-City *Rapid* (*Rapid* 215). Operating costs for Rapid 471 are from NCTD BREEZE Bus Service (all routes).
[8]Total Annual Operating Cost is calculated with the following expression: Annual Revenue Hours * Hourly Operating Cost