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Agenda - Final

Thursday, March 25, 2021

10:00 AM

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Board of Directors - Regular Board Meeting

Eric Garcetti, Chair
Hilda L. Solis, 1st Vice Chair
Ara Najarian, 2nd Vice Chair
Kathryn Barger
Mike Bonin
James Butts
Jacquelyn Dupont-Walker
Fernando Dutra
Janice Hahn
Paul Krekorian
Sheila Kuehl
Holly Mitchell
Tim Sandoval
Tony Tavares, non-voting member

Phillip A. Washington, Chief Executive Officer

METROPOLITAN TRANSPORTATION AUTHORITY BOARD RULES
(ALSO APPLIES TO BOARD COMMITTEES)

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A member of the public may address the Board on agenda items, before or during the Board or Committee's consideration of the item for one (1) minute per item, or at the discretion of the Chair. A request to address the Board must be submitted electronically using the tablets available in the Board Room lobby. Individuals requesting to speak will be allowed to speak for a total of three (3) minutes per meeting on agenda items in one minute increments per item. For individuals requiring translation service, time allowed will be doubled. The Board shall reserve the right to limit redundant or repetitive comment.

The public may also address the Board on non agenda items within the subject matter jurisdiction of the Board during the public comment period, which will be held at the beginning and/or end of each meeting. Each person will be allowed to speak for one (1) minute during this Public Comment period or at the discretion of the Chair. Speakers will be called according to the order in which their requests are submitted. Elected officials, not their staff or deputies, may be called out of order and prior to the Board's consideration of the relevant item.

Notwithstanding the foregoing, and in accordance with the Brown Act, this agenda does not provide an opportunity for members of the public to address the Board on any Consent Calendar agenda item that has already been considered by a Committee, composed exclusively of members of the Board, at a public meeting wherein all interested members of the public were afforded the opportunity to address the Committee on the item, before or during the Committee's consideration of the item, and which has not been substantially changed since the Committee heard the item.

In accordance with State Law (Brown Act), all matters to be acted on by the MTA Board must be posted at least 72 hours prior to the Board meeting. In case of emergency, or when a subject matter arises subsequent to the posting of the agenda, upon making certain findings, the Board may act on an item that is not on the posted agenda.

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REMOVAL FROM THE BOARD ROOM The Chair shall order removed from the Board Room any person who commits the following acts with respect to any meeting of the MTA Board:

a. Disorderly behavior toward the Board or any member of the staff thereof, tending to interrupt the due and orderly course of said meeting.
b. A breach of the peace, boisterous conduct or violent disturbance, tending to interrupt the due and orderly course of said meeting.
c. Disobedience of any lawful order of the Chair, which shall include an order to be seated or to refrain from addressing the Board; and
d. Any other unlawful interference with the due and orderly course of said meeting.

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x7 русский *(Russian)*
x8 Հայերէն *(Armenian)*

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Live Public Comment Instructions:

Live public comment can only be given by telephone.

The Board Meeting begins at 10:00 AM Pacific Time on March 25, 2021; you may join the call 5 minutes prior to the start of the meeting.

Dial-in: 888-251-2949 and enter
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Public comment on all numbered agenda items will be taken at the beginning of the meeting. General public comment will be heard after the conclusion of the non-consent agenda. To give public comment, enter #2 (pound-two) when the comment period opens. Please note that the live video feed lags about 30 seconds behind the actual meeting. There is no lag on the public comment dial-in line.

Instrucciones para comentarios publicos en vivo:

Los comentarios publicos en vivo solo se pueden dar por telefono.

La Reunion de la Junta comienza a las 10:00 AM, hora del Pacifico, el 25 de Marzo de 2021. Puedes unirte a la llamada 5 minutos antes del comienso de la junta.

Marque: 888-251-2949 y ingrese el codigo
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Los comentarios del público sobre todos los puntos de la agenda numerados se tomarán al comienzo de la reunión. Los comentarios del público en general se escucharán después de la conclusión de la agenda de no consentimiento. Para dar un comentario público, ingrese # 2 (Tecla de numero y dos) cuando se abra el período de comentarios. Por favor tenga en cuenta que la transmisión de video en vivo se retrasa unos 30 segundos con respecto a la reunión real. No hay retraso en la línea de acceso telefónico para comentarios públicos.

Written Public Comment Instruction:

Written public comments must be received by 5PM the day before the meeting.
Please include the Item # in your comment.
Email: goinsc@metro.net
Post Office Mail: Board Secretary's Office, One Gateway Plaza, MS: 99-3-1,
Los Angeles, CA 90012

CALL TO ORDER

ROLL CALL

1. APPROVE Consent Calendar Items: 2, 12, 13, 15, 16, 17, 19, 20, 21, 24, 31, 32*, 33, 34, 35, 38, 41, 42, and 44.

Consent Calendar items are approved by one vote unless held by a Director for discussion and/or separate action.

*Item requires 2/3 vote

CONSENT CALENDAR

2. SUBJECT: MINUTES 2021-0144

RECOMMENDATION

APPROVE Minutes of the Regular Board Meeting held February 25, 2021.

Attachments: Regular Board Meeting MINUTES - February 25, 2021

PLANNING AND PROGRAMMING COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

12. SUBJECT: MEASURE M MULTI-YEAR SUBREGIONAL PROGRAM ANNUAL UPDATE - LAS VIRGENES/MALIBU SUBREGION 2021-0032

RECOMMENDATION

CONSIDER:

A. APPROVING the programming of an additional $430,000 within the capacity of the Measure M Multi-Year Subregional Program (MSP) Highway Efficiency Program;

B. DELEGATING the Chief Executive Officer (CEO) or his designee the authority to:

1. AMEND Measure M MSP funding agreements to modify the scope of work of projects and project development phases consistent with eligibility requirements;

2. ADMINISTRATIVELY extend funding agreement lapse dates for Measure M MSP funding agreements to meet environmental, design, right-of-way and construction time frames; and

C. AUTHORIZING the CEO or his designee to negotiate and execute all necessary agreements and/or amendments for approved projects.

Attachments: Attachment A - Active Transportation Transit Tech Program Project List
Attachment B - Highway Efficiency Program Project List

PLANNING AND PROGRAMMING COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

13. SUBJECT: ALAMEDA CORRIDOR-EAST GRADE SEPARATIONS PHASE II PROGRAM 2020-0866

RECOMMENDATION

CONSIDER:

A. REPROGRAMMING of Measure R funds for the Alameda Corridor-East (ACE) Grade Separations Phase II Program to reflect the program schedule change; and

B. AUTHORIZING the Chief Executive Officer (CEO) or his designee to negotiate and execute project addenda consistent with the Board-approved ACE Grade Separations Phase II Funding Program.

Attachments: ATTACHMENT A - ACE Measure R Revised Expenditure Plan
ATTACHMENT B - ACE Program Map
Presentation

PLANNING AND PROGRAMMING COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

15. SUBJECT: MODERNIZING THE METRO HIGHWAY PROGRAM 2021-0008

RECOMMENDATION

CONSIDER adopting the recommendations to modernize the Highway Program and approving the release for public review:

1) REVISED Measure R Highway Program Criteria - Project Eligibility for Highway Operational Improvements and Ramp/Interchange Improvements, shown in Attachment A, and

2) REVISED Measure M Guidelines, Section X - Multi-Year Programs (Highway Subfunds), shown in Attachment B.

Attachments: Attachment A - Recommended Revisions to Measure R Highway Program Crite
Attachment B - Recommended Revisions to Measure M Guidelines, Section X -
Attachment C - Summary Table of Comment Letters

PLANNING AND PROGRAMMING COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

16. SUBJECT: BUS RAPID TRANSIT VISION AND PRINCIPLES STUDY 2020-0595

RECOMMENDATIONS

CONSIDER the following BRT Vision and Principles Study recommendations:

1. DIRECT staff to apply both the BRT Standards and Design Guidelines developed through the BRT Vision & Principles study to all Metro-funded BRT projects and initiate the process to refine the design guidelines further into design criteria; and

2. APPROVE the recommended five top-performing Bus Rapid Transit (BRT) candidate corridors for future project development consideration and advance the Broadway corridor as a first decade Measure M project, subject to available funding.

Attachments: Attachment A - BRT Vision and Principles Final Report
Attachment B - BRT Vision and Principles Design Guideline Manual
Attachment C - Outreach Summary Report
Presentation
Attachment D - Amendment by Directors Bonin, Solis, and Hahn

PLANNING AND PROGRAMMING COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

17. SUBJECT: EXPO/CRENSHAW STATION JOINT DEVELOPMENT AND FIRST/LAST MILE PLAN 2020-0902

RECOMMENDATION

CONSIDER:

1. AUTHORIZING the Chief Executive Officer to execute an amendment to the Exclusive Negotiation Agreement and Planning Document with WIP-A, LLC, a wholly-owned subsidiary of Watt Companies, Inc., and the County of Los Angeles to extend the term for 12 months, and provide for an additional 12-month administrative extension, which agreement is in regards to the joint development of 1.77 acres of Metro-owned property and 1.66 acres of County-owned property at the Expo/Crenshaw Station in partnership with West Angeles Community Development Corporation; and

2. ADOPTING the Expo/Crenshaw First/Last Mile Plan.

Attachments: Attachment A - Site Map
Attachment B - Expo-Crenshaw First-Last Mile Plan
Presentation

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

19. SUBJECT: RAIL VEHICLE LUBRICATING STICKS 2020-0897

RECOMMENDATIONS

AUTHORIZE the CEO to award a 36-month March 2021 through March 2024, firm fixed price contract with two one (1) year extensions, on Contract Number SD66581000, to LB Foster Rail Technologies, Inc., the lowest responsive and responsible bidder for HPF & LCF Lubricating Block for an amount not to exceed $1,176,592.09. Board approval of the contract award is subject to resolution of any properly submitted protest.

Attachments: Attachment A - Procurement Summary
Attachment B - DEOD Summary

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

20. SUBJECT: PARTS WASHER LEASING AND MAINTENANCE SERVICES 2020-0912

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to award a five-year, firm fixed unit rate Contract No. PS7235000, to FRS Environmental Inc., for parts washer leasing, and maintenance services in an amount not to exceed $1,443,375.00 effective May1, 2021.

Attachments: Attachment A - Procurement Summary
Attachment B - DEOD Summary

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

21. SUBJECT: ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES 2020-0860

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to execute Contract Modification No. 5 to Contract No. PS46172000, with Gannett Fleming Transit & Rail Systems, for engineering support of rail maintenance to exercise the second-year option extending the period of performance through April 26, 2022 and increasing the

total contract not-to- exceed amount by $5,000,000 from $21,000,000 to $26,000,000.

Attachments: Attachment A – List of Supported Project Uses
Attachment B – Procurement Summary
Attachment C – Contract Modification Change Order Log
Attachment D - DEOD Summary

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

24. SUBJECT: P2550 LIGHT RAIL VEHICLE (LRV) MIDLIFE MODERNIZATION/OVERHAUL PROGRAM, RAIL VEHICLE CONTRACTOR 2020-0055

RECOMMENDATION

A. Increase the Life-of-Project (LOP) Budget for the P2550 Light Rail Vehicle (LRV) Midlife Modernization/Overhaul Program (CP 214003) by $46,340,841 from $160,000,000 to $206,340,841.

B. Authorize the Chief Executive Officer to award a firm-fixed unit rate Contract No. P2550-2019 Light Rail Vehicle (LRV) Midlife Modernization to Kinkisharyo International, L.L.C. in the not-to-exceed amount of $170,349,474 inclusive of Options, for a period of 55 months from Notice-to-Proceed (NTP) for the midlife modernization of the 50 AnsaldoBreda P2550 LRVs.

Attachments: Attachment A - Procurement Summary
Attachment B - DEOD Summary
Attachment C - Funding Expenditure Plan
Attachment D – USEP Board Motion dated January 18, 2018
Attachment E – Metro Board Report Dated May 16, 2019

CONSTRUCTION COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

31. SUBJECT: I-5 NORTH COUNTY ENHANCEMENTS PROJECT 2021-0051

RECOMMENDATION

A. ESTABLISH a life-of-project budget for the I-5 North County Enhancements Project in the amount of $679,400,000.

B. AUTHORIZE the Chief Executive Officer to negotiate and execute project related agreements, including contract modifications, up to the authorized Life-of-Project Budget.

Attachments: Attachment A.FundingandExpenditurePlan

CONSTRUCTION COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

32. SUBJECT: METRO G LINE BUS RAPID TRANSIT IMPROVEMENTS PROJECT 2020-0884

RECOMMENDATION

CONSIDER:

A. FINDING that authorization of the use of alternative delivery methods, including Progressive Design/Build (PDB), will achieve integration of design, project works, and other components in an efficient manner for the Metro G Line Bus Rapid Transit Improvements Project, pursuant to Public Utilities Code Section 130242; and

B. APPROVING a competitive solicitation of a PDB contract to achieve the proposed design approach, specific project features and functions, and other project criteria in addition to price, pursuant to Public Utilities Code 130242 (e)

(REQUIRES 2/3 VOTE OF THE BOARD OF DIRECTORS)

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (6-0):

33. SUBJECT: AMEND TAYLOR YARD BRIDGE CONSTRUCTION FUNDING AGREEMENT 2021-0014

RECOMMENDATION

AUTHORIZE the Chief Executive Officer (CEO) to negotiate and execute an amendment to a Memorandum of Understanding (MOU) dated March 7, 2018 with the City of Los Angeles for the Taylor Yard Bridge with a not-to-exceed amount of $25,450,000, an increase of $3,750,000 over the previously authorized amount of $21,700,000.

Attachments: Attachment A MOU for the Construction of Taylor Yard Bikeway/Pedestrian O

Attachment B - Letter from City of Los Angeles Request for Additional Funding

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (6-0):

34. SUBJECT: REPORT ON FARE CAPPING IN RESPONSE TO MOTION 31.1 2020-0704

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to:

A. APPROVE moving forward with the fare capping pilot; and

B. NEGOTIATE and execute project-related contract awards, including contract modifications, up to the amount needed for software development and integration to implement fare capping.

Attachments: Presentation

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (6-0):

35. SUBJECT: UNIVERSAL CITY/STUDIO CITY STATION ACTIVATION AND MOBILITY HUB CONCEPT 2020-0736

RECOMMENDATION

CONSIDER:

a. INTRODUCING a station activation and mobility hub concept at Universal City/ Studio City B Line (Red) Station; and

b. AUTHORIZING staff to develop a strategic plan, including identifying necessary real estate, infrastructure and financing to support the station activation and increased mobility.

Attachments: Presentation

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (6-0):

38. SUBJECT: STATE LEGISLATION 2020-0846

RECOMMENDATION

ADOPT staff recommended position:

1. Senate Bill 671 (Gonzalez) - Transportation: Clean Freight Corridor Efficiency Program - SUPPORT

Attachments: Attachment A - SB 671 (Gonzalez) Legislative Analysis

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

41. SUBJECT: ZERO EMISSION BUS ROLLOUT PLAN 2020-0636

RECOMMENDATION

APPROVE Zero Emission Bus Rollout Plan for submittal to California Air Resources Board (CARB).

Attachments: Attachment A - Metro's Rollout Plan

Presentation

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

42. SUBJECT: INGLEWOOD TRANSIT CONNECTOR JOINT POWERS AUTHORITY 2021-0065

RECOMMENDATION

CONSIDER:

A. AUTHORIZING AND DIRECTING the Chief Executive Officer (CEO) to execute the Inglewood Transit Connector Joint Powers Authority Joint Exercise of Powers Agreement to join with the City of Inglewood to own, manage, and oversee the design, construction, financing, operation and maintenance of the 1.6-mile Inglewood Transit Connector Project, an elevated automated people mover to provide a critically needed direct transit connection between Metro's network, the soon to be completed regional Crenshaw/LAX Line, and key housing and employment centers, and sports and entertainment venues within the City.

B. AUTHORIZING the CEO to take such further actions incident to execution of the Joint Exercise of Powers Agreement as are necessary to formalize formation and establishment of the Inglewood Transit Connector Joint Powers Authority as a separate legal entity.

Attachments: Attachment A - Inglewood Transit Connector Joint Exercise of Powers Agreeme

Attachment B - Project Supporters

CONSTRUCTION COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

44. SUBJECT: EASTSIDE ACCESS IMPROVEMENTS PROJECT 2020-0931

RECOMMENDATION

A. ESTABLISH a life-of-project budget for the Eastside Access Improvements Project (Project) in the amount of $29,703,098 consistent with the provisions of the Board-adopted Measure R and Measure M Unified Cost Management Policy (Attachment B).

B. AUTHORIZE the Chief Executive Officer to negotiate and execute project related agreements, including contract modifications, up to the authorized Life-of-Project budget.

Attachments: Attachment A - Funding and Expenditures Table

Attachment B - Measure R and Measure M Unified Cost Management Policy

NON-CONSENT

3. SUBJECT: REMARKS BY THE CHAIR 2021-0141

RECOMMENDATION

RECEIVE remarks by the **Chair.**

4. SUBJECT: REPORT BY THE CHIEF EXECUTIVE OFFICER 2021-0142

RECOMMENDATION

RECEIVE report by the **Chief Executive Officer.**

FINANCE, BUDGET, AND AUDIT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

7. SUBJECT: CORONAVIRUS RESPONSE AND RELIEF SUPPLEMENTAL APPROPRIATIONS (CRRSA) ACT FUNDING 2020-0919

RECOMMENDATION

CONSIDER:

A. APPROVING the allocation of $784,942,958 from Los Angeles County's partial share of Federal Transit Administration (FTA) Section 5307/ Section 5337 funds from the CRRSA Act to transit operators, as described in Attachment A, for operating expenses;

B. AUTHORIZING the Chief Executive Officer (CEO) or his designee to

solicit proposals and allocate $1,327,107 from Los Angeles County's share of FTA funds from the CRRSA Act, as described in Attachment B, to Metro's existing subrecipients of Federal Section 5310 funds for operating expenses;

C. AUTHORIZING the CEO to allocate Los Angeles County's share of FTA Section 5311 funds from the CRRSA Act (estimated to be about $1,127,870) for transit service in rural areas upon notification by the California Department of Transportation (Caltrans), as described in Attachment B, for operating expenses;

D. APPROVING exchanges of CRRSA Act funding allocations, as appropriate, with other local or eligible State or Federal funds to accelerate grant approval and disbursement of funds by the FTA;

E. AUTHORIZING the CEO or his designee to negotiate and execute all necessary agreements to implement Board approved support of transit programs in Los Angeles County; and

F. DELEGATING to the CEO or his designee the authority to administratively approve minor changes to the allocations to reflect any revisions made by the Southern California Association of Governments (SCAG), FTA and/or Caltrans that may impact Los Angeles County's share of the funds.

Attachments: Attachment A - CRRSA Act Funding Allocation by Transit Operator/Agency
Attachment B - CRRSA Act Apportionments and Los Angeles County's Share of
Attachment C - CARES Act Funding Drawdown Update
Presentation

FINANCE, BUDGET, AND AUDIT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

8. SUBJECT: PROPOSITION C BONDS 2021-0039

RECOMMENDATION

CONSIDER:

A. ADOPTING a Resolution, Attachment A, that:

1. AUTHORIZES the competitive sale and issuance of up to $450 million in aggregate principal amount of Proposition C Senior Sales Tax Revenue Bonds in one or more series, to finance capital projects; and refinance outstanding revolving credit notes;

2. APPROVES the forms of the Notice of Intention to Sell Bonds, Notice Inviting Bids, Supplemental Trust Agreement, Continuing Disclosure Certificate, Preliminary Official Statement and such other documents as required for the issuance of the bonds, and approves related documents on file with the Board Secretary as set forth in the resolution all as subject to modification as set forth in the Resolution; and

3. AUTHORIZES taking all action necessary to achieve the foregoing, including, without limitation, the further development and execution of the bond purchase contract and bond documentation associated with the issuance of the Proposition C Senior Sales Tax Revenue Bonds (the "Bonds").

(REQUIRES SEPARATE, SIMPLE MAJORITY BOARD VOTE.)

Attachments: Attachment A - Authorizing Resolution

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE MADE THE FOLLOWING RECOMMENDATION (5-0):

25. SUBJECT: 2020 CUSTOMER EXPERIENCE SURVEY RESULTS 2021-0085

RECOMMENDATION

RECEIVE AND FILE 2020 Customer Experience Survey Results.

Attachments: Attachment A - Customer Experience Survey Results

Presentation

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE FORWARDED THE FOLLOWING WITHOUT RECOMMENDATION:

26. SUBJECT: TRANSIT LAW ENFORCEMENT SERVICES 2021-0137

RECOMMENDATION

A. AMEND the combined contract value for the three multi-agency law enforcement contracts for services through December 31, 2021 by an increase of $36,000,000 from $645,675,758 to $681,675,758. The Board delegates to the CEO, or his designee, the discretion to allocate the $36M among the three law enforcement contracts, as deemed appropriate.

B. ENGAGE the Public Safety Advisory Committee (PSAC) for the remaining six months of the multi-agency law enforcement contract.

Attachments: Attachment A - Procurement Summary
Attachment B - Contract Modification/Change Order Log
Attachment C - DEOD Summary
Presentation

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

40. SUBJECT: SEPULVEDA TRANSIT CORRIDOR PROJECT 2021-0072

RECOMMENDATION

A. AUTHORIZE the Chief Executive Officer (CEO) to award the following two (2) Contracts, subject to resolution of protests, if any.

   a. Contract No. PS66773MRT to LA SkyRail Express, a special purpose corporation to be formed between John Laing Investments Limited and BYD Transit Solutions LLC, for pre-development services for a proposed Monorail technology transit solution concept ("TSC") in an amount not to exceed $63,605,132.

   b. Contract No. PS66773HRT to Sepulveda Transit Corridor Partners -Bechtel, a special purpose vehicle to be formed between Bechtel Development Company, Inc., Meridiam Sepulveda, LLC and American Triple I Partners, LLC, for pre-development services for a proposed Heavy Rail technology transit solution concept ("TSC") in an amount not to exceed $69,882,427.

B. APPROVE Contract Modification Authority in the amount of 25% for each of the two contract award values, respectively, and authorize the CEO to execute individual Contract Modifications within the Board-approved Contract Modification Authority.

Attachments: Attachment B - Procurement Summary
Attachment C - DEOD Summary
Presentation

EXECUTIVE MANAGEMENT COMMITTEE MADE THE FOLLOWING RECOMMENDATION (4-0):

43. SUBJECT: FARELESS SYSTEM INITIATIVE UPDATE 2021-0074

RECOMMENDATION

RECEIVE AND FILE status report on Fareless System Initiative Update

43.1. SUBJECT: FARELESS SYSTEM INITIATIVE 2021-0157

RECOMMENDATION

APPROVE Motion by Directors Hahn, Garcetti, Solis, Najarian, Mitchell, and Sandoval that the Board direct the Chief Executive Officer to:

1. Report back at the April 2021 Board Meeting on the following regarding a possible FSI:

    a. How Metro is including municipal operators in the planning process, including what it would cost to fully include them and how many of their riders would qualify;

    b. All the subsidies Metro, Municipal Operators, and Cities already offer, including LIFE and U-Pass, and how those programs play a role in and inform a fareless initiative;

    c. How fareless will impact the Formula Allocation Procedure (FAP), state and federal grants, and ACCESS Services; and,

    d. What Metro's customer surveys tell us about fareless and other priorities.

    e. Potential cost savings and implications for what can be realized through a fareless program for all residents through elimination of TAP infrastructure, administration of pass and subsidy programs, etc.

2. As part of any recommendation to implement a fareless initiative, provide the following:

    a. Funding source details, including what those funds could go to if not fareless transit;

    b. A plan to decide how to evaluate the success of the program, including permanent funding sources and what would trigger an end to or continuation of the program;

    c. A commitment to not cut service, state of good repair, or customer experience priorities; and,

    d. If a FSI pilot is approved, regular reports back to the Board on how the initiative is impacting ridership, equity, Metro's finances, and the customer experience.

45. SUBJECT: UPDATE CRENSHAW/LAX PROJECT 2021-0109

RECOMMENDATION

RECEIVE Oral Report on Crenshaw/LAX Project.

Attachments: Presentation

END OF NON-CONSENT

46. SUBJECT: CLOSED SESSION 2021-0153

A. Conference with Legal Counsel - Existing Litigation - G.C. 54956.9(d)(1)
William Thomas v. LACMTA, Case No. 19STCV36325

B. Public Employment - G.C. 54957
Title: Board Secretary

C. Public Employment - G.C. 54957
Title: Chief Executive Officer

SUBJECT: GENERAL PUBLIC COMMENT 2021-0143

RECEIVE General Public Comment

Consideration of items not on the posted agenda, including: items to be presented and (if requested) referred to staff; items to be placed on the agenda for action at a future meeting of the Committee or Board; and/or items requiring immediate action because of an emergency situation or where the need to take immediate action came to the attention of the Committee subsequent to the posting of the agenda.

COMMENTS FROM THE PUBLIC ON ITEMS OF PUBLIC INTEREST WITHIN COMMITTEE'S SUBJECT MATTER JURISDICTION

Adjournment

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2021-0144, **File Type:** Minutes **Agenda Number:** 2.

REGULAR BOARD MEETING
MARCH 25, 2021

SUBJECT: MINUTES

RECOMMENDATION

APPROVE Minutes of the Regular Board Meeting held February 25, 2021.

Metro
Los Angeles, CA

Virtual Online Meeting

MINUTES

Thursday, February 25, 2021

10:00 AM

Board of Directors - Regular Board Meeting

DIRECTORS PRESENT:
Eric Garcetti, Chair
Hilda L. Solis, 1st Vice Chair
Ara Najarian, 2nd Vice Chair
Kathryn Barger
Mike Bonin
James Butts
Jacquelyn Dupont-Walker
Robert Garcia
Janice Hahn
Paul Krekorian
Sheila Kuehl
Holly Mitchell
Tim Sandoval
Tony Tavares, non-voting member

Phillip A. Washington, Chief Executive Officer

CALLED TO ORDER: 10:03 A.M.

ROLL CALL

1. APPROVED Consent Calendar Items: 2, 5, 6, 11, 13, 14, 16, 17, 18, 19, 20, 24, 32, 33, 34, 36, 37, and 46.

Consent Calendar items were approved by one vote unless held by a Director for discussion and/or separate action.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

2. SUBJECT: MINUTES **2021-0022**

APPROVED ON CONSENT CALENDAR Minutes of the Regular Board Meeting held January 28, 2021.

3. SUBJECT: REMARKS BY THE CHAIR **2021-0052**

RECEIVED remarks by the **Chair.**

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	P	P	P	P	P	P	P	P	P	P

4. SUBJECT: REPORT BY THE CHIEF EXECUTIVE OFFICER **2021-0053**

RECEIVED report by the **Chief Executive Officer.**

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	P	P	P	P	P	P	P	P	P	P

5. SUBJECT: INVESTMENT POLICY **2020-0475**

APPROVED ON CONSENT CALENDAR:

A. ADOPTING the Investment Policy in Attachment A;

B. APPROVING the Financial Institutions Resolution authorizing financial institutions to honor signatures of LACMTA Officials, Attachment B; and

C. DELEGATING to the Treasurer or her designees, the authority to invest funds for a one year period, pursuant to California Government Code ("Code") Section 53607.

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PK = P. Krekorian	JB = J. Butts	JDW = J. Dupont-Walker	TS = T. Sandoval
JH = J. Hahn	EG = E. Garcetti	AN = A. Najarian	
MB = M. Bonin	SK = S. Kuehl	RG = R. Garcia	
HS = H. Solis	KB = K. Barger	HM = H. Mitchell	

LEGEND: Y = YES, N = NO, C = CONFLICT, ABS = ABSTAIN, A = ABSENT, P = PRESENT

6. SUBJECT: SALE OF EXEMPT SURPLUS LAND **2020-0908**

DECLARED ON CONSENT CALENDAR that portions of 13848 Rosecrans Avenue (RM-27) and 13900 Rosecrans Avenue (RM-28) are not necessary for use by LACMTA and are "exempt surplus land" as defined in Section 54221(f)(1) (C) of the California Surplus Land Act (the "Act") (California Gov. Code Sections 54220-54234).

11. SUBJECT: FREEWAY SERVICE PATROL **2020-0873**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer (CEO) to execute a five (5) year agreement for **FY21, FY22, FY23, FY24 & FY25 with the California Highway Patrol (CHP) to provide services in support of the Metro Freeway Service Patrol (FSP) program**, in the aggregate amount of $3,738,310.10.

13. SUBJECT: 1ST & SOTO JOINT DEVELOPMENT **2020-0767**

AUTHORIZED ON CONSENT CALENDAR:

A. the Chief Executive Officer ("CEO") to execute a Joint Development Agreement ("JDA"), ground lease and other development-related documents (collectively, the "Development Documents") with a joint venture between Bridge Housing Corporation - Southern California and East LA Community Corporation (collectively, the "Developer") or an affiliate of the Developer, for the construction and operation of a mixed-use affordable housing project (the "Project") on a portion of the Metro-owned property at and adjacent to the Metro L Line (Gold) Soto station in Boyle Heights (the "Site"), all in accordance with the Summary of Key Terms and Conditions ("Term Sheet") attached hereto as Attachment A;

B. an exception to the Joint Development Policy, to allow for a $3,117,000 (approximately 72%) discount to the $4,317,000 fair market capitalized rent for the Site under the ground lease, which is above the current policy limit of 30%;

C. pursuant to Public Resources Code Section 21155.2, the environmental effects of the Project as shown in the Sustainable Communities Environmental Assessment prepared for the Project (City of Los Angeles, Department of City Planning, Case No. ENV-2019-2314 -SCEA) attached hereto as Attachment B;

D. ADOPTING the additional measures regarding archaeological and paleontological resources set forth on Attachment C;

(continued on next page)

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E. FINDING that the Project is a transit-priority project that meets all the requirements of Public Resources Code Section 21155.1(a), (b) and (c)(1) and is declared to be a sustainable communities project that is exempt from the California Environmental Quality Act ("CEQA"); and

F. Metro staff to file with the County Clerk and the State Clearinghouse a Notice of Exemption for the Project consistent with Recommendation E.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
	C	C			C			C			C	

14. SUBJECT: 1ST & LORENA JOINT DEVELOPMENT **2020-0834**

AUTHORIZED ON CONSENT CALENDAR:

A. the Chief Executive Officer ("CEO") to execute a Joint Development Agreement ("JDA"), ground lease and other development-related documents (collectively, the "Development Documents") with A Community of Friends (the "Developer") or an affiliate of the Developer, for the construction and operation of a 49-unit affordable housing project with up to 7,500 square feet of ground floor commercial space (the "Project") on a portion of Metro-owned property at the northeast corner of 1st and Lorena Streets in Boyle Heights (the "Site"), all in accordance with the Summary of Key Terms and Conditions ("Term Sheet") attached hereto as Attachment A;

B. an exception to the Joint Development Policy, to allow for a $711,963 (approximately 57%) discount to the $1,254,963 adjusted fair market capitalized rent for the Site under the ground lease, which is above the current policy limit of 30%;

C. the environmental effects of the Project as shown in the Mitigated Negative Declaration prepared for the Project by the City of Los Angeles (City of Los Angeles, Department of City Planning No. ENV-2014-2392-MND) that was originally adopted by the Director of Planning on March 2, 2016 (attached hereto as Attachment B), and was subsequently amended by the City Council on March 6, 2018 to include the "Substitute Environmental Mitigation Measures" set forth in the revised Exhibit A to the Department of City Planning's Letter of Determination for the Project attached hereto as Attachment C;

(continued on next page)

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D. ADOPTING the additional measures regarding archaeological and paleontological resources set forth on Attachment D; and

E. Metro staff to file with the County Clerk and the State Clearinghouse a Notice of Determination for the Project consistent with Recommendations C and D.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
	C	C					C	C	C		C	

16. SUBJECT: METRO G LINE (ORANGE) SEPULVEDA STATION FIRST / LAST MILE PLAN AND BUS RAPID TRANSIT IMPROVEMENTS **2020-0851**

AUTHORIZED ON CONSENT CALENDAR:

A. ADOPTING the G Line (Orange) Sepulveda Station First/Last Mile Plan (Attachment A);

B. the Chief Executive Officer (CEO) to modify the scope of work for the Metro G Line (Orange) Bus Rapid Transit Improvements project (Project) to include bikeway improvements in lieu of the grade-separated bicycle/pedestrian overcrossing bridge at Van Nuys and crossing improvements for the existing bikeway in lieu of the grade-separated bicycle/pedestrian overcrossing bridge at Sepulveda; and

C. the CEO or his designee to negotiate a grant agreement scope change with the California Transportation Commission (CTC) to ensure state grant funding for the Project is maintained.

17. SUBJECT: I-10 EXPRESSLANES EXTENSION PROJECT APPROVAL/ENVIRONMENTAL DOCUMENT, CONCEPT OF OPERATIONS, COOPERATIVE AGREEMENT, AND ADVANCED DESIGN CONTRACT AWARD **2020-0792**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to:

A. AWARD a 33-month, firm fixed price Contract No. AE65145000 to Parsons Transportation Group, Inc. in the amount of $23,904,353 for Architectural and Engineering services to produce the I-10 ExpressLanes Project Report, engineering studies, select environmental studies, the Concept of Operations report and advanced design development, subject to resolution of protest(s), if any;

(continued on next page)

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B. EXECUTE a Cooperative Agreement with the California Department of Transportation (Caltrans) to prepare the I-10 ExpressLanes Extension Environmental Document in an amount not to exceed $4,600,000.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
C	C	C		C				C		C		

18. SUBJECT: TURBOCHARGERS **2020-0840**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to award a two-year, indefinite delivery/indefinite quantity Contract No. MA72029-2000 to Cummins Inc., the lowest responsive and responsible bidder for Turbocharger Assemblies. The Contract one-year base amount is for $583,353 inclusive of sales tax, and the one-year option amount is $594,670, inclusive of sales tax, for a total contract amount of $1,178.023, subject to resolution of protest(s), if any.

19. SUBJECT: EXHAUST GAS RECIRCULATION COOLER KITS **2020-0843**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to award a two-year, indefinite delivery/indefinite quantity Contract No. MA71916-2000 to Cummins Inc., the lowest responsive and responsible bidder for Exhaust Gas Recirculation (EGR) Cooler Kits. The Contract one-year base amount is for $549,195 inclusive of sales tax, and the one-year option amount is $562,929, inclusive of sales tax, for a total contract amount of $1,112,124 subject to resolution of protest(s), if any.

20. SUBJECT: COVID-19/BIOHAZARD DISINFECTION SERVICES **2020-0865**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to execute Amendment No. 3 to Contract No. PS134942000 with Marquise, Inc. dba SERVPRO of Hollywood Hills/Los Feliz to continue to provide emergency restoration services, increasing the total authorized not-to-exceed amount by $2,000,000, from $795,023 to $2,795,023.

24. SUBJECT: CONTRACT MODIFICATION - LA COUNTY DEPARTMENT OF HEALTH SERVICES C3 HOMELESS OUTREACH TEAMS **2020-0911**

AUTHORIZED ON CONSENT CALENDAR:

A. the Chief Executive Officer to execute Amendment No. 2 to the Letter of Agreement for Multidisciplinary Street-Based Engagement Services (Contract No. MO13672900032385), for a four (4) month homeless shelter bed pilot program, in an amount not-to-exceed $1,500,000, increasing the total cost from $14,820,000 to $16,320,000, inclusive of administrative fees; and

(continued on next page)

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B. the Chief Executive Officer to execute Amendment No. 3 to the Letter of Agreement for Multidisciplinary Street-Based Engagement Services (Contract No. MO13672900032385), for a two (2) year extension (July 1, 2021 to June 30, 2023), in an amount not-to-exceed $9,880,000, increasing the total cost from $16,320,000 to $26,200,000, inclusive of administrative fees.

25. SUBJECT: TRANSIT LAW ENFORCEMENT SERVICES **2020-0847**

THE FOLLOWING HAS BEEN CARRIED OVER TO THE MARCH 2021 BOARD CYCLE:

A. AUTHORIZE the CEO to execute Contract Modification No. 3 to Contract PS95866000LBPD24750 with the City of Long Beach to continue to provide transit law enforcement services and increase the not-to-exceed contract value by $6,878,776 from $30,074,628 to $36,953,404;

B. AUTHORIZE the CEO to execute Contract Modification No. 2 to Contract PS5862100LAPD24750 with the City of Los Angeles to continue to provide transit law enforcement services and increase the not-to-exceed contract value by $60,154,998 from $369,330,499 to $429,485,497; and

C. AUTHORIZE the CEO to execute Contract Modification No. 2 to Contract PS5863200LASD24750 with the County of Los Angeles to continue to provide transit law enforcement services and increase the not-to-exceed contract value by $44,168,199 from $246,270,631 to $290,438,830.

27. SUBJECT: FY22 REVENUE SERVICE HOUR (RSH) PROGRAM PARAMETERS AND MOTION 11.1 FY21 SERVICE INCREASE MOTION UPDATE **2020-0934**

RECEIVED AND FILED status report on the FY22 revenue service hour parameters and provide an update on Motion 11.1 related to FY21 service increases.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	A	P	P	P	P	P	P	P	P	P

27.1. SUBJECT: AMENDMENT TO FY22 REVENUE SERVICE HOUR (RSH) PROGRAM PARAMETERS AND MOTION 11.1 FY21 SERVICE INCREASE MOTION UPDATE **2021-0083**

APPROVED Motion by Director Garcetti that the Board direct the Chief Executive Officer to:

Amend the current timeline to accelerate the implementation of 6.5 million Revenue Service Hours by June 2021 and 7 million by September 2021.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
Y	Y	Y	A	Y	Y	Y	Y	Y	Y	Y	Y	Y

29. SUBJECT: CONSULTING SERVICES FOR THE P2550 LIGHT RAIL VEHICLE (LRV) MIDLIFE MODERNIZATION/OVERHAUL PROGRAM, TECHNICAL AND PROGRAM MANAGEMENT SUPPORT SERVICES **2020-0054**

AWARDED a cost plus fixed fee contract for Technical and Program Management Support Services under Contract No. PS73193-2550 for P2550 Light Rail Vehicle (LRVs) Midlife Modernization/Overhaul Program Consultant Support Services, to LTK Consulting Services, Inc. in the not-to-exceed amount of $6,470,848.47 for a period of 60 months from issuance of a Notice-to-Proceed (NTP) for the midlife modernization/overhaul of 50 AnsaldoBreda P2550 LRVs.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
Y	C	C	Y	Y	Y	Y	Y	Y	Y	Y	C	C

32. SUBJECT: I-5 NORTH CAPACITY ENHANCEMENTS FROM SR- 118 TO SR-134; SEGMENT 3 **2020-0874**

APPROVED ON CONSENT CALENDAR amending the Life-of-Project (LOP) budget with a loan/advance to the California Department of Transportation (Caltrans) in an amount not to exceed $73,200,000 for Segment 3 of I-5 North Capacity Enhancements Project between SR-134 and SR-118 (Project) to fill the funding gap between the approved amended LOP of $880,903,000 and the $954,103,000 anticipated cost to close the Project consistent with the provisions of the Board-adopted Measure R and Measure M Unified Cost Management Policy (Attachment A).

33. SUBJECT: WEST SANTA ANA BRANCH - MASTER COOPERATIVE AGREEMENTS **2020-0742**

AUTHORIZED ON CONSENT CALENDAR:

A. the Chief Executive Officer (CEO) or his designee to negotiate and execute Master Cooperative Agreements (MCAs) with WSAB Project Corridor Cities of Bell, Downey and Paramount and

B. the Chief Executive Officer (CEO) or his designee to negotiate and execute remaining MCAs with other corridor cities.

34. SUBJECT: THIRD PARTY ADMINISTRATION **2020-0893**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to execute an annual expenditure budget plan of $16,619,340 for the FY21 Annual Work Plan for the City of Los Angeles.

36. SUBJECT: VIDEO PRODUCTION SERVICES **2020-0885**

AUTHORIZED ON CONSENT CALENDAR:

A. the Chief Executive Officer to execute the following bench contracts for video production services to the following firms, for a cumulative not-to-exceed amount of $3,541,000 for the four (4) year term, effective March 1, 2021, through February 28, 2025, subject to resolution of protests, if any:

a) Contract No. PS68458000 with ALAS Media
b) Contract No. PS68458001 with Bubba's Chop Shop
c) Contract No. PS68458002 with Clockwork Media
d) Contract No. PS68458003 with Dreamseeker Media
e) Contract No. PS68458004 with Friendly Filmworks
f) Contract No. PS68458005 with MainSpring Business Video
g) Contract No. PS68458006 with Sanchez Media
h) Contract No. PS68458007 with Zero1 Agency

B. AWARD AND EXECUTE task orders for an aggregate not-to-exceed amount of $3,541,000.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
								C				

37. SUBJECT: METRO MEDICAL CLINIC SERVICES **2020-0876**

AUTHORIZED ON CONSENT CALENDAR the Chief Executive Officer to:

A. AWARD six, nine-year, firm fixed unit rate Contract Nos. PS70268000 through PS70268005, to the following firms, for **Medical Clinic Services,** for a not-to-exceed amount of $6,833,016 for the five-year base term, effective March 1, 2021 through February 28, 2026, plus $2,384,203 for the first, two-year option and $2,436,542 for the second, two-year option, for a combined total amount not-to-exceed $11,653,761, subject to resolution of protest(s), if any.

Contract No.	Contractor
PS70268000	ProHealth Glendale Occupational Medical Group, Inc.
PS70268001	ProHealth Valley Occupational Medical Group, Inc.
PS70268002	CareOnSite, Inc.
PS70268003	Concentra Medical Centers - Los Angeles
PS70268004	Concentra Medical Centers - Commerce
PS70268005	Concentra Medical Centers - Van Nuys

B. EXECUTE individual task orders under these Contracts for medical clinic services for an aggregate not-to-exceed amount of $11,653,761.

40. SUBJECT: COMMERCIAL SPONSORSHIP AND ADOPTION POLICY **2020-0888**

APPROVED AS AMENDED the Commercial Sponsorship and Adoption Policy (Attachment B) in order to create a Commercial Sponsorship and Adoption Program with the goals of generating revenues to support agency programs and initiatives.

Amendment by Director Butts:
I, therefore move, that we amend the language in the proposed policy under "Temporary Sponsorship" to put in place the 90-day maximum short-term duration for all station dominations, station naming and sponsorships unless approved by the Board to go beyond 90 days as currently reflected in contract language 8.6.2. of Metro's Rail Advertising vendor, Intersection.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N

41. SUBJECT: SEPULVEDA TRANSIT CORRIDOR PROJECT **2020-0889**

RECEIVED AND FILED staff recommendation for the award of up to two contracts to furnish all goods and services required for the performance of pre-development work for the Sepulveda Transit Corridor Project, for future consideration.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	P	P	P	P	P	P	P	P	P	P

43. SUBJECT: FARELESS SYSTEM INITIATIVE UPDATE **2021-0013**

RECEIVED Oral report on Fareless System Initiative.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	P	P	P	P	A	P	P	P	P	P

44. SUBJECT: TRAFFIC REDUCTION STUDY **2020-0913**

RECEIVED oral report on Traffic Reduction Study.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
P	P	P	P	P	P	P	A	P	P	P	P	P

46. SUBJECT: I-5 NORTH CAPACITY ENHANCEMENTS FROM SR-134 TO SR-118 SEGMENT 3 **2021-0036**

AUTHORIZED ON CONSENT CALENDAR Contract Modification No. 288 (CCO 288) for payment to the California Department of Transportation (Caltrans) for the construction contract of Segment 3 of the I-5 North Capacity Enhancements Project from SR-134 to SR-118 (Project) in the amount of $33.75 million contingent upon the Board's approval of the Board Report 2020-0874 and the increase of the Life of Project budget for this Project.

47. SUBJECT: UPDATE CRENSHAW/LAX PROJECT **2021-0026**

THE FOLLOWING HAS BEEN CARRIED OVER TO THE MARCH 2021 BOARD CYCLE:

RECEIVE oral report on Crenshaw/LAX Project

48. SUBJECT: CLOSED SESSION **2021-0054**

A. Conference with Legal Counsel - Existing Litigation - G.C. 54956.9(d)(1)
Rosiland O'Connor v. LACMTA, Case No. BC643784

Authorized settlement in the amount of $350,000.

TS	HM	KB	JDW	MB	EG	HS	AN	RG	JB	PK	JH	SK
Y	Y	Y	Y	Y	Y	Y	A	Y	Y	Y	Y	Y

B. Conference with Labor Negotiator - G.C. 54957.6
Agency Designated Representatives: Patrice McElroy, Jim Gallagher, and Teyanna Williams
Employee Organizations: SMART, ATU, AFSCME, TCU, and Teamsters

No report.

(continued on next page)

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C. Conference with Legal Counsel - Anticipated Litigation - G.C. 54956.9(d)(2)

Significant Exposure to Litigation (One case)

No report.

D. Public Employment - G.C. 54957

Title: Chief Executive Officer

No report.

ADJOURNED AT 3:23 P.M. IN MEMORY OF NORMA PERERA-MACIAS.

Prepared by: Mandy Cheung
Administrative Analyst, Board Administration

Christina Goins

Christina Goins, Interim Board Secretary

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Public Comments Received for February 2021

1.Aaron Paley (Items 25 and 27)
2.ActiveSGV /David Diaz (Item 25)
3.Adam Holmes (Items 25 and 27)
4.Adrienna Wong (Items 25 and 27)
5.Aidan Geronimus (Items 25 and 27)
6.Alejandro Banuelos (Items 25 and 27)
7.Alex Marchinski (Items 25 and 27)
8.Alexandra Malek (Items 25 and 27)
9.Alfonso Directo Jr (Item 25)
10.Alfonso Directo Jr (Items 25 and 27)
11.Alice Ziesing (items 25 and 27)
12.Alliance for American Manufacturing Scott N. Paul
13.Amada Valle (General)
14.Amanda Roessler (Items 25 and 27)
15.Amy Hutto (Items 25 and 27)
16.Ana Cobarrubias (Items 25 and 27)
17.Anisha Hingorani (Items 25 and 27)
18.Anne Freiermuth (Items 25 and 27)
19.Anthony Ng (Item 25)
20.Austin Phung (Items 25 and 27)
21.Aziz Fellague Ariouat (Items 25 and 27)
22.Ben Creed (Items 25 and 27)
23.Bill Lam (Items 43 and 47)
24.Bin Lee (Items 25 and 27)
25.Bob Anderson (Item 41)
26.Brad Fallk (Items 25 and 27)
27.Brian Edwards (Items 25 and 27)
28.Britney Wise (Items 25 and 27)
29.Brittani Nichols (Items 25 and 27)
30.Brooke Nowling (Items 25 and 27)
31.Carey Bennett (Items 25 and 27)
32.Carlos Medina (Items 25 and 27)
33.Carmina Calderon (Item 27 and General)
34.Caroline Crawford Johnson (Item 25)
35.Carolyn "Jiyoung" Park (Items 25 and 27)
36.Carrie Madden (Item 25)
37.Cecilia Garcia (Items 25 and 27)
38.Central City Association / Clara Karger (Items 27 and 43)
39.Chase Engelhardt (Item 25)
40.Chika Michelle Okafo (Items 25 and 27)
41.Christine Buckhout (Construction General Public Comment)
42.Citlaly Flores (Items 25 and 27)
43.City of West Hollywood (Item 25)
44.CJ Hoke (Items 25 and 27)
45.Clara Taylor (Items 25 and 27)
46.Cordelia Arterian (Items 25 and 27)
47.Cynde Soto (Items 25 and 27)
48.Cyndi Otteson (Items 25 and 27)

49.Cynthia Orozco (Item 27)
50.Daisy Villafuerte (Items 25 and 27)
51.Dalia Michel (Item 43)
52.Dan Wentzel (Item 41)
53.Daniel Uytiepo (Items 25 and 27)
54.Danielle Dirksen (Items 25 and 27)
55.Danny Park (Items 25 and 27)
56.David Carini (Items 25 and 27)
57.David Valle (General)
58.Deborah Hsiung (Item 27)
59.Diane G Gonzalez (Item 27)
60.Doris Perl (Item 41)
61.Eli Jacobovitz (Items 25 and 27)
62.Eliot Phillips (items 25 and 27)
63.Elizabeth Medrano (Items 25 and 27)
64.Emily Han (Items 25 and 27)
65.Emma Suchard (Item 41)
66.Eric Sheehan (Items 25 and 27)
67.Erich Bollmann (Items 25 and 27)
68.Erik Abriss (Items 25 and 27)
69.Erik Saenz
70.Erika Armin (Items 25 and 27)
71.Ethan Bochicchio (Items 25 and 27)
72.Evan Clark (Items 25 and 27)
73.Fariyan Alam (Items 25 and 27)
74.Felipe Rojas (Item 25)
75.Feshang (Item 41)
76.Foster Wilson (Items 25 and 27)
77.Georgina Mendoza (Items 25 and 27)
78.Georgina Serrano (Items 25 and 27)
79.Gilda Garcia (Construction General Public Comment)
80.Gili Cohen (Item 41)
81.Héctor Huezo (Items 25 and 27)
82.Hon. Anthony J. Portantino (Item 32)
83.Investing in Place / Jessica Meaney (Items 25 and 27)
84.Iván Barragan (Item 25)
85.Jackie Aguirre (Items 25 and 27)
86.Jacquelin Alcala (Item 43)
87.Jaime Carrera (Item 41)
88.Jamie Farrell (Items 25 and 27)
89.Jeffrey Hartsough (Item 41)
90.Jeffrey M. Kalban (Item 41)
91.Jenny Morataya (Items 25 and 27)
92.Jeri Dye Lynch (Item 27)
93.Jeshow Yang (Items 25 and 27)
94.Jessica Barclay-Strobel (Items 25 and 27)
95.Jessica Craven (Items 25 and 27)
96.Jessica Elaina Eason (Items 25 and 27)
97.Jessica Tardieu Haines (Items 25 and 27)
98.Jobs to Move America / Wynter Hawk (Items 25 and 27)

99.Joe Cappelletti (Item 41)
100.Joey Fischground (Items 25 and 27)
101.John Barthell (Item 25)
102.John Perry (Item 25)
103.Jonah Paten (Item 41)
104.Jonathan Marcus (Construction General Public Comment)
105.Josh Fruhlinger (Item 41)
106.Joshua L. Crowell (Items 25 and 27)
107.Joshua Ray (Items 25 and 27)
108.Josiah O'Balles (Items 25 and 27)
109.Kate Grodd (Items 25 and 27)
110.KIWA / Brady Collins (Items 25 and 27)
111.Labor Community Strategy Center/ Channing Martinez (Item 25)
112.Laura Raymond (Item 25)
113.Laura Vazquez (Item 27)
114.Lauren Batten (Items 25 and 27)
115.Lena Williams (Items 25 and 27)
116.Leonor (Construction General Public Comment)
117.Lesley Martinez (General)
118.Liam Fitzpatrick (Items 25 and 27)
119.Lili Ye (Items 25 and 27)
120.Lisa Cappelletti (Item 41)
121.Lois Keller (Items 25 and 27)
122.Lucas O'Connor (Items 25 and 27)
123.Lyndsey Nolan (Items 25 and 27)
124.Maggie Clancy (Item 25)
125.Marcel Flores (Item 27)
126.Marie M (General)
127.Marina Zitser (items 25 and 27)
128.Marisol Sanchez (Items 25 and 27)
129.Marsha Swiller (Item 41)
130.Matt Ruscigno (Item 25)
131.Matthew Swanson (Items 25 and 27)
132.Max Rico (Item 41)
133.Megan Lutz (Items 25 and 27)
134.Mehmet Berker (Item 25 and 27)
135.Melissa Casey (Item 27)
136.Mia Livas Porter (Items 25 and 27)
137.Mia Trachinger (Items 25 and 27)
138.Micah Zimmermaker (Items 25 and 27)
139.Michael MacDonald (Item 27)
140.Michael Siegel (Items 25 and 27)
141.Mimi Holt (Items 25 and 27)
142.Monica Rodriguez (Item 35)
143.Nancy Matson (Items 25 and 27)
144.Narayan Gopinathan (Item 41)
145.Narine Galstian (Item 41)
146.Neal Roden (Item 41)
147.Niall Huffman (Item 27)
148.Olga Lexell (Item 25)

149.Olivia Aguilar (Item 25)
150.Padric Gleason Gonzales (Item 25)
151.Pinguino Kolb (Item 25)
152.Pueblo Planning / Monique G. Lopez (Item 25)
153.Rachel Carmen Ceasar (Items 25 and 27)
154.Ralph Stan (Construction General Public Comment)
155.Randy Allaire (Construction General Public Comment)
156.Riley Byrne (Items 25 and 27)
157.SAJE (Item 44)
158.Samantha Steinhauser (Items 25 and 27)
159.Sarah Manuel (Item 41)
160.Sarah Syed (Items 25 and 27)
161.Savannah Gardner (Items 25 and 27)
162.Scarlett De Leon (Items 25 and 27)
163.Scott Ferguson (Item 32)
164.Scott Johnson (Items 25 and 27)
165.Scott Keiner (Items 25 and 27)
166.Scott Morchower (Item 43)
167.Shelby Eggers (Items 25 and 27)
168.Sierra Marcelius (Items 25 and 27)
169.Sofia C. Zaragoza (Item 43)
170.SOHA Transportation Committee / Bob Anderson (Item 41)
171.Sophie Strauss (Items 25 and 27)
172.Spike Friedman (Items 25 and 27)
173.Suellen Keiner (Items 25 and 27)
174.Takeshi Tawarada (Items 25 and 27)
175.The Happy City Coalition (Items 25 and 27)
176.Thurmon Green (Item 25)
177.Tom Materna (Item 41)
178.Tommy Woolfolk (Items 25 and 27)
179.Topher Hendricks (Item 25)
180.Venecia Avina (Items 25 and 27)
181.Veronica Shirley (Items 25 and 27)
182.Victoria Garcia (General)
183.Virginia and Rick Arnold (Construction General Public Comment)
184.Wesley Reutimann (Items 25 and 27)
185.WORKS / Channa (Item 25)
186.Yun Hsiung (Items 25 and 27)
187.Zach Gaston (Items 25 and 27)
188.Zachary Rynew (Item 27)
189.Zully Juarez (Item 25)

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Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2021-0032, **File Type:** Program **Agenda Number:** 12.

PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

SUBJECT: MEASURE M MULTI-YEAR SUBREGIONAL PROGRAM ANNUAL UPDATE - LAS VIRGENES/MALIBU SUBREGION

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. APPROVING the programming of an additional $430,000 within the capacity of the Measure M Multi-Year Subregional Program (MSP) Highway Efficiency Program;

B. DELEGATING the Chief Executive Officer (CEO) or his designee the authority to:

   1. AMEND Measure M MSP funding agreements to modify the scope of work of projects and project development phases consistent with eligibility requirements;

   2. ADMINISTRATIVELY extend funding agreement lapse dates for Measure M MSP funding agreements to meet environmental, design, right-of-way and construction time frames; and

C. AUTHORIZING the CEO or his designee to negotiate and execute all necessary agreements and/or amendments for approved projects.

ISSUE

Measure M MSPs are included in the Measure M Expenditure Plan. All MSP funds are limited to capital projects. The annual update approves additional eligible projects for funding and allows the Las Virgenes/Malibu Subregion and implementing agencies to revise scope of work and schedule, as well as amend project budgets.

This update includes changes to projects which have received prior Board approval and funding allocation for new projects. Funds are programmed through Fiscal Year (FY) 2023-24. The Board's approval is required to program additional funds and the updated project lists (Attachments A and B) serve as the basis for Metro to enter into agreements and/or amendments with the respective implementing agencies.

DISCUSSION

On January 2019, the Metro Board of Directors approved Las Virgenes/Malibu Subregion's first MSP Five-Year Plan and programmed funds in: 1) Measure M MSP - Active Transportation/Transit/Tech Program (expenditure line 56); and 2) Measure M MSP - Highway Efficiency Program (expenditure line 57).

Metro staff continued working closely with the Las Virgenes/Malibu Subregion Council of Governments (COG) and the implementing agencies on project eligibility reviews of the proposed projects for this annual update. Metro required, during staff review, a detailed project scope of work to confirm eligibility and establish the program nexus, e.g., project location and limits, length, elements, phase(s), total expenses and funding request, and schedule, etc. This level of detail will ensure timeliness of the execution of the project funding agreements once the Metro Board approves the projects. For those proposed projects that will have programming of funds in FY 2022-23 and beyond, Metro accepted high level (but focused and relevant) project scope of work during the review process. Metro staff will work on the details with the COG and the implementing agencies through a future annual update process. Those projects will receive conditional approval as part of this approval process. However, final approval of funds for those projects shall be contingent upon the implementing agency demonstrating the eligibility of each project as required in the Measure M Master Guidelines.

The changes in this annual update include $430,000 in additional programming for one new and funding adjustments for 10 existing projects.

Active Transportation/Transit/Tech Program (expenditure line 56)

This update includes funding adjustments to six existing projects as follows:

Calabasas

- Reprogram $3,156,164 as follows: $5,000 in FY20, $1,045,000 in FY 21, $1,191,341 in FY22 and $914,823 in FY23 for MM4401.02 - City-wide Green Streets Project. The funds will be used to complete the Plans Specification and Estimates (PS&E) and construction phases of the project.

- Reprogram $2,200,000 as follows: $100,000 in FY 21 and $2,100,000 in FY22 for MM4401.03 - Mulholland Highway Gap Closure - Old Topanga Canyon Road Phase I Project. The funds will be used to complete the PS&E, right-of-way and construction phases of the project.

- Reprogram $6,513,250 as follows: $150,000 in FY 21, $605,000 in FY22 and $5,758,250 in FY23 for MM4401.11 - Mulholland Highway Gap Closure - Old Topanga Canyon Road to City Limits Phase II Project. The funds will be used to complete the PS&E and construction phases of the project.

Malibu

- Reprogram $3,500,000 as follows: $3,500,000 in FY21 for MM4401.06 - Westward Beach Parking and Walkway Improvements Project. The funds will be used to complete the PS&E and construction phases of the project.

Los Angeles County

- Reprogram $875,000 as follows: $100,000 in FY20, $175,000 in FY21, $500,000 in FY22 and $100,000 in FY 23 for MM4401.09 - Malibu Canyon Road Bridge Replacement Project. The funds will be used to complete the PS&E and construction phases of the project.

- Reprogram $400,000 as follows: $20,000 in FY19, $100,000 in FY20, $250,000 in FY21, and $30,000 in FY22 for MM4401.10 - Topanga Beach Shuttle Bus Stops Improvements Project. The funds will be used to complete the PS&E and construction phases of the project.

Highway Efficiency Program (expenditure line 57)

This update includes funding adjustment to four existing projects and program of one new project as follows:

Agoura Hills

- Update the project funding phases for MM5503.02 - Kana Road Corridor to include Project Study Report (PSR) currently taking place under Project #MR311.14. The funds will be used to complete the PSR, environmental and PS&E phases of the project.

Hidden Hills

- Reprogram $1,215,652 as follows: $249,247 in FY 21 and $966,405 to FY22 for MM5503.03 - Long Valley Road/Valley Circle/US-101 On-Ramp Improvements Project. The funds will be used to complete the PS&E, right-of-way and construction phases of the project.

Malibu

- Reprogram $2,000,000 as follows: $150,000 in FY22, $150,000 in FY23 and $1,700,000 in FY24 for MM5503.05 - Median Improvements PCH Project. The funds will be used to complete the PS&E and construction phases of the project.

Los Angeles County

- Reprogram $1,500,000 as follows: $125,000 in FY20, $700,000 in FY21, $475,000 in FY22 and $200,000 in FY23 for MM5503.06 - Malibu Canyon Road Improvements Project. The funds will be used to complete the PS&E, right-of-way and construction phases of the project.

- Program $430,000 in FY24 for MM5503.09 - Agoura Hills and Westlake Village Intelligent

Transportation System Project. The funds will be used to complete the PS&E phase of the project.

Equity Platform

Consistent with Metro's Equity Platform, the MSP outreach effort recognizes and acknowledges the need to establish comprehensive, multiple forums to meaningfully engage the community to comment on the proposed projects under all Programs. The Las Virgenes/Malibu COG along with member agencies and adjacent unincorporated area of Los Angeles County undertook an extensive outreach effort and invited the general public to a series of public workshops and meetings. Metro will continue to work with the Subregion to seek opportunities to reach out to a broader constituency of stakeholders.

DETERMINATION OF SAFETY IMPACT

Programming of Measure M MSP funds to the Las Virgenes/Malibu Subregion projects will not have any adverse safety impacts on Metro's employees or patrons.

FINANCIAL IMPACT

In FY 2020-21, $4.07 million is budgeted in Cost Center 0441 (Subsidies to Others) for the Active Transportation Program (Project #474401) and $435,000 is budgeted in Cost Center 0442 (Highway Subsidies) for the Highway Efficiency Program (Project #475504). Upon approval of this action, staff will reallocate necessary funds to appropriate projects within Cost Centers 0441 and 0442. Since these are multi-year projects, Cost Centers 0441 and 0442 will be responsible for budgeting the cost in future years.

Impact to Budget

The source of funds for these projects is Measure M Highway Construction 17% which is not eligible for Metro bus and rail operating and capital expenditures.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports the following goals of the Metro Vision 2028 Strategic Plan:

Goal 1: Provide high-quality mobility options that enable people to spend less time traveling by alleviating the current operational deficiencies and improving mobility along the projects.

Goal 4: Transform LA County through regional collaboration by partnering with the Council of Governments and the local jurisdictions to identify the needed improvements and take the lead in development and implementation of their projects.

ALTERNATIVES CONSIDERED

The Board could elect not to approve the additional programming of funds for the Measure M MSP projects for the Las Virgenes/Malibu Subregion. This is not recommended as the proposed projects

were developed by the Subregion in accordance with the Measure M Ordinance, Guidelines and the Administrative Procedures.

NEXT STEPS

Metro staff will continue to work with the Subregion to identify and deliver projects. Program/project updates will be provided to the Board on an annual basis.

ATTACHMENTS

Attachment A - Active Transportation/Transit/Tech Program Project List
Attachment B - Highway Efficiency Program Project List

Prepared by: Fanny Pan, DEO, Countywide Planning & Development, (213) 418-3433
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Reviewed by: James de la Loza, Chief Planning Officer, (213) 922-2920

Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

Las Virgenes/Malibu Subregion
Measure M Multi-Year Subregional Plan - Active Transportation/Transit/Tech Program (Expenditure Line 56)

	Agency	Project ID #	Project/Location	Funding Phases	Note	Pror Alloc	Alloc Change	Current Alloc	Prior Year Prog	FY2019-20	FY2020-21	FY 2021-22	FY2022-23	FY 2023-24
1	Calabasas	MM4401.02	City-wide Green Streets - Malibu Hills Road, Calabasas Road, Old Town Calabasas, Las Virgenes Road and Parkway Calabasas	PS&E Construction	chg	$ 3,156,164		$ 3,156,164		$ 5,000	$1,045,000	$1,191,341	$ 914,823	
2	Calabasas	MM4401.03	Mulholland Highway Gap Closure - Old Topanga Canyon Road - Phase I (CFP #F7516)	PS&E ROW Construction	chg	2,200,000		2,200,000			100,000	$2,100,000		
3	Calabasas	MM4401.04	Old Town Parkway Improvements - Park Granada to City Limits*	PS&E Construction		1,987,335		1,987,335				1,987,335		
4	Calabasas	MM4401.11	Mulholland Highway Gap Closure - Old Topanga Canyon Road to City Limits (Phase II)	PS&E Construction	chg	6,513,250		6,513,250			150,000	605,000	5,758,250	
5	Malibu	MM4401.05	Pedestrian/Bicyclist Crosswalk Improvements - PCH @ Big Rock Dr. & 20356 PCH	PS&E Construction		683,219		683,219		41,915	118,238	523,066		
6	Malibu	MM4401.06	Westward Beach Parking and Walkway Improvements	PS&E Construction	chg	3,500,000		3,500,000			3,500,000			
7	Westlake Village	MM4401.07	Lindero Linear Park - Lindero Canyon Blvd from Agoura Rd to Foxfield Dr.	PS&E Construction		4,452,678		4,452,678	3,206,314	1,246,364				
8	Westlake Village	MM4401.08	Lindero Sidewalk Extension - Thousand Oaks Blvd to Via Colinas	PS&E ROW		2,378,247		2,378,247			1,175,023	1,203,224		
9	LA County	MM4401.09	Malibu Canyon Road Bridge Replacement	PS&E Construction	chg	875,000		875,000		100,000	175,000	500,000	100,000	
10	LA County	MM4401.10	Topanga Beach Shuttle Bus Stops Improvements (Metro Orange Line to Metro Expo Line in Downtown Santa Monica)	PS&E Construction	chg	400,000		400,000	20,000	100,000	250,000	30,000		
			Total Programming Amount			**$26,145,893**	**$ -**	**$26,145,893**	**$3,226,314**	**$1,493,279**	**$6,513,261**	**$8,139,966**	**$6,773,073**	**$ -**

* Conditional programming approval as only high level scope of work was developed and reviewed. Future annual update process will reconfirm the programming.

ATTACHMENT B

Las Virgenes/Malibu Subregion
Measure M Multi-Year Subregional Plan - Highway Efficiency Program (Expenditure Line 57)

	Agency	Project ID #	Project/Location	Funding Phases	Note	Pror Alloc	Alloc Change	Current Alloc	Prior Year Prog	FY2019-20	FY2020-21	FY 2021-22	FY 2022-23	FY 2023-24
1	Agoura Hills	MM5503.01	U.S 101/Palo Comado Interchange - Chesebro Rd S to Driver Ave. & Chesebro Rd to N of interchange	PS&E Construction		$ 8,195,436		$ 8,195,436	$5,393,212	$2,802,224				
2	Agoura Hills	MM5503.02	Kanan Road Corridor from Thousand Oaks Blvd to Cornell Road (MR311.14)	PSR Env PS&E	chg	2,813,493		2,813,493			1,051,879	1,761,614		
3	Agoura Hills	MM5503.07	Kanan Road - Thousand Oaks Blvd to Canwood Street Project *	PS&E Construction		2,500,000		2,500,000			2,500,000			
4	Calabasas	MM5503.08	Calabasas Road Improvements	PS&E Construction		4,500,000		4,500,000			190,000	1,300,000	3,010,000	
5	Hidden Hills	MM5503.03	Long Valley Road/Valley Circle/US-101 On-Ramp Improvements	PS&E, ROW Construction	chg	1,215,652		1,215,652			249,247	966,405		
6	Malibu	MM5503.04	Malibu Park and Ride Lots	ROW		3,100,000		3,100,000	3,100,000					
7	Malibu	MM5503.05	Median Improvements PCH	PS&E Construction	chg	2,000,000		2,000,000				150,000	150,000	1,700,000
8	LA County	MM5503.06	Malibu Canyon Road Improvements - Malibu Canyon Rd @ Piuma Rd. & Las Virgenes Rd @ Las Virgenes Canyon Rd	PS&E ROW Construction	chg	1,500,000		1,500,000		125,000	700,000	475,000	200,000	
9	LA County	MM5503.09	Agoura Hills and Westlake Village Intelligent Transportation System Project	PS&E	new	-	430,000	430,000						430,000
			Total Programming Amount			**$25,824,581**	**$ 430,000**	**$26,254,581**	**$8,493,212**	**$2,927,224**	**$4,691,126**	**$4,653,019**	**$3,360,000**	**$2,130,000**

* Conditional programming approval as only high level scope of work was developed and reviewed. Future annual update process will reconfirm the programming.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2020-0866, **File Type:** Program **Agenda Number:** 13.

PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

SUBJECT: ALAMEDA CORRIDOR-EAST GRADE SEPARATIONS PHASE II PROGRAM

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. REPROGRAMMING of Measure R funds for the Alameda Corridor-East (ACE) Grade Separations Phase II Program to reflect the program schedule change; and

B. AUTHORIZING the Chief Executive Officer (CEO) or his designee to negotiate and execute project addenda consistent with the Board-approved ACE Grade Separations Phase II Funding Program.

ISSUE

In May 2013 the Metro Board approved Measure R funds for the Alameda Corridor-East (ACE) Phase II Project and authorized the CEO to execute a Master Agreement with the San Gabriel Valley Council of Governments (SGVCOG) to support the delivery of the ACE Phase II Project. The Master Agreement set forth the ACE Phase II Project expenditure plan which identified the authorized (but not yet allocated) Measure R funds in the amount of $358,000,000 to be programmed over six fiscal years (FY2012-13 through FY2017-18).

The project addendum 1 (signed on June 14, 2013) programmed $93,000,000 of Measure R funds over three fiscal years, FY2012-13 through FY2014-15. The project addendum 2 (signed on November 27, 2017) programmed an additional $159,000,000 of Measure R funds over the next three fiscal years, FY2014-15 through FY2016-17. Per the Master Agreement, $106,000,000 of Measure R funds remains yet to be programmed to support the completion of the ACE Project.

Various factors affecting the project delivery schedule have shifted the overall schedule several years beyond what was initially envisioned. The current project schedule will require: (1) Metro to reprogram the remaining Measure R funds in later years than the Master Agreement outlined, and (2)

the CEO to issue project addenda such that the cumulative expenditures of ACE funds will be less than or equal to the cumulative expenditures identified in the ACE Funding Program. Staff seeks Board approval of the reprogramming of the remaining Measure R funds in the original expenditure plan to reflect the schedule changes and project addenda to allow for Metro's contribution and support for the ACE Phase II Program.

This request does not seek to add any additional funds to the ACE Grade Separation Phase II Program than authorized in the Measure R expenditure plan.

BACKGROUND

In November 2008 LA County voters approved Measure R and its expenditure plan which included up to $400,000,000 for the ACE Grade Separations Phase II Program. Of this amount, $42,000,000 has been allocated to the ACE San Gabriel Trench project through a Funding Agreement dated on March 30, 2010 and $358,000,000 was allocated to the ACE Phase II Program through a Master Agreement dated on June 14, 2013.

The ACE Grade Separations Phase II Program includes ten projects (Puente Avenue, Fairway Drive, Fullerton Road, Hamilton Road, Turnbull Canyon Road, Durfee Avenue, Montebello Corridor, Pomona At-grade Safety Improvements, Maple Avenue Pedestrian Overcrossing and Montebello At-grade Crossing Improvement). The Puente Avenue Grade Separation project is nearly complete, and the Fairway Drive, Fullerton Road and Durfee Avenue Grade Separations are currently in construction phase, while other projects are in various pre-construction phases. Each of these projects currently uses programmed Measure R funds and will require the remaining Measure R funds allocated for the ACE Grade Separations Phase II Program to finish construction.

DISCUSSION

The SGVCOG oversees the construction of the ACE Grade Separations Phase II Program projects along the Union Pacific Alhambra subdivision and Los Angeles subdivision in the San Gabriel Valley. The SGVCOG finances these projects through various federal, state and local funding sources, including Metro's Measure R and Proposition C funds.

The Master Agreement for Measure R funds for the ACE Phase II Program allocated $358,000,000 to be programmed from FY 2012-13 through FY 2017-18 per the expenditure plan. The ACE Phase II Program experienced overall schedule delays since the Master Agreement was signed in May 2013 due to changes in program scope and unforeseen circumstances that affected the right-of-way acquisitions and construction schedules. To date $252,000,000 of the authorized $358,000,000 has been programmed through FY2015-16; however, the remaining $106,000,000 needs to be programmed in current and future fiscal years to make the funds available for use by the ACE Phase II Program.

Equity Platform

The ACE Program supports the Equity Platform Pillar III (Focus and Deliver) by delivering much

needed grade separation projects that address impacts experienced by communities exposed to high, and growing, volumes of rail freight movements.

DETERMINATION OF SAFETY IMPACT

This Board action will further Metro's commitment to improving safety across LA County by implementing highway/rail grade separations.

FINANCIAL IMPACT

The FY2020-21 budget includes $50,000,000 for this project under cost center 0441 (Subsidies to Others) for the ACE Program (project number 460307). As a multi-year program the cost center manager and Chief Planning Officer will be responsible for budgeting in future years on an annual basis.

Impact to Budget

The funding source is Measure R 20% which is earmarked to the ACE Grade Separations Phase II within the Measure R highway capital projects. As such, these funds are not eligible for bus and rail capital and operating expenditures.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Board approval will support Metro's Strategic Plan Goals to (1) Provide high-quality mobility options that enable people to spend less time traveling and (3) Enhance communities and lives through mobility and access to opportunity.

ALTERNATIVES CONSIDERED

The Board could decide not to approve the reprogramming of Measure R funds and execution of addendums. This action is not recommended because the reprogramming of the funds and addenda are necessary to fulfill Metro's commitment and support to complete the ACE Program.

NEXT STEPS

Upon Board approval staff will execute addenda to program the remaining Measure R funds for the ACE Phase II Program.

ATTACHMENTS

Attachment A - Alameda Corridor-East Measure R Revised Expenditure Plan
Attachment B - ACE Program Map

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Reviewed by: James de la Loza, Chief Planning Officer, (213) 922-2920

Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

ALAMEDA CORRIDOR EAST MEASURE R REVISED EXPENDITURE PLAN

($ in 1,000s)

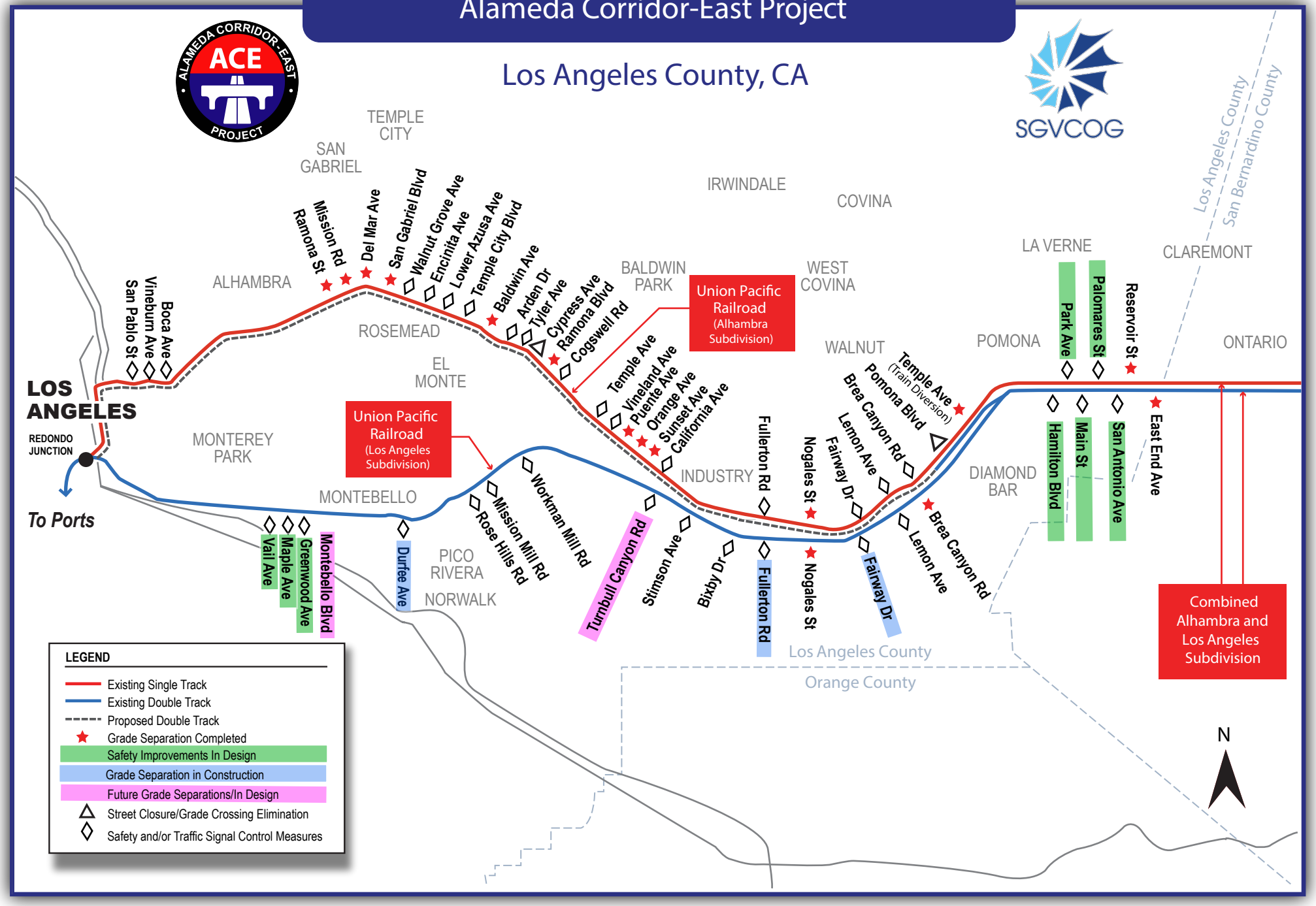
Sources of Funds	**Previous Addenda**	**FY20-21**	**FY21-22***	**FY22-23***	**FY23-24***	**Total Budget**
Measure R Funds	$252,000	$30,500	$30,000	$35,500	$10,000	$358,000

* Measure R funds that are anticipated to be programmed beyond FY20-21 are subject to the revised working capital loan amount and terms to be negotiated and finalized between Metro and the San Gabriel Valley Council of Governments.

ATTACHMENT B

Alameda Corridor-East Project

Los Angeles County, CA



Alameda Corridor-East Project Area

We're planning a better way to move goods.

2020-0866 Alameda Corridor Grade Separation Projects Phase II

March 17, 2021

Planning & Programming Committee

Metro

Measure R Contribution for the ACE Projects

Measure R Expenditure Plan (as adopted by the Metro Board in July 2008)

> $400 million for ACE Grade Separation Phase II (under Highway Capital Projects)
  - $42 million was programmed for the San Gabriel Valley Trench Project
  - $358 million was programmed through a Master Agreement (June 2013)

Original Alameda Corridor East Measure R Expenditure Plan ($ in 000's)							
Use of Funds	FY12/13	FY13/14	FY14/15	FY15/16	FY16/17	FY17/18	Total Budget
PS&E*	$3,100	$13,100					$16,200
ROW**	$30,400	$42,400	$45,800	$60,100			$178,700
Construction		$3,400	$33,900	$19,900	$80,000	$25,900	$163,100
Total Measure R	**$33,500**	**$58,900**	**$79,700**	**$80,000**	**$80,000**	**$25,900**	**$358,000**

*Plans, Specifications, and Estimates
** Right-of-Way

Metro

Reprogramming Request

Current remaining Measure R funds to be reprogrammed: $106 million

> These funds were budgeted for FY16/17 and FY17/18 in the Master Agreement

Alameda Corridor East Measure R Expenditure Plan ($ in 000's)							
Use of Funds	FY12/13	FY13/14	FY14/15	FY15/16	FY16/17	FY17/18	Total Budget
PS&E	$3,100	$13,100					$16,200
ROW	$30,400	$42,400	$45,800	$60,100			$178,700
Construction		$3,400	$33,900	$19,900	**$80,000**	**$25,900**	$163,100
Total Measure R	**$33,500**	**$58,900**	**$79,700**	**$80,000**	**$80,000**	**$25,900**	**$358,000**

$106 million

Reprogramming Request (cont'd)

Request to reprogram FY16/17 and FY17/18 funds in FY20/21 and beyond

Alameda Corridor East Measure R Expenditure Plan ($ in 000's)							
Use of Funds	FY12/13	FY13/14	FY14/15	FY15/16	FY16/17	FY17/18	Total Budget
PS&E	$3,100	$13,100					$16,200
ROW	$30,400	$42,400	$45,800	$60,100			$178,700
Construction		$3,400	$33,900	$19,900	$80,000	$25,900	$163,100
Total Measure R	**$33,500**	**$58,900**	**$79,700**	**$80,000**	**$80,000**	**$25,900**	**$358,000**

Updated Measure R Expenditure Plan						
Sources of Funds	Previous Addenda	FY20/21	FY21/22	FY22/23	FY23/24	Total Budget
Total Measure R	$252,000	**$30,500**	**$30,000**	**$35,500**	**$10,000**	**$358,000**

$106 million

March 2021 Board Item 2020-0866

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

> CONSIDER:

> A. Reprogramming of Measure R funds for the Alameda Corridor-East (ACE) Grade Separations Phase II Program to reflect the program schedule change; and

> B. Authorizing the CEO or his designee to negotiate and execute project addenda consistent with the Board approved ACE Grade Separations Phase II Funding Program.

Los Angeles County
Metropolitan Transportation
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One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2021-0008, **File Type:** Policy **Agenda Number:** 15.

PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

SUBJECT: MODERNIZING THE METRO HIGHWAY PROGRAM

ACTION: APPROVE THE RELEASE OF THE DRAFT REVISED MEASURE R HIGHWAY PROGRAM CRITERIA AND DRAFT REVISED MEASURE M MULTI-YEAR PROGRAMS (HIGHWAY SUBFUNDS) GUIDELINES

RECOMMENDATION

CONSIDER adopting the recommendations to modernize the Highway Program and approving the release for public review:

1) REVISED Measure R Highway Program Criteria - Project Eligibility for Highway Operational Improvements and Ramp/Interchange Improvements, shown in Attachment A, and

2) REVISED Measure M Guidelines, Section X - Multi-Year Programs (Highway Subfunds), shown in Attachment B.

ISSUE

In June 2020, the Metro Board directed staff to circulate the recommendations to modernize the Highway Program, including broadening its mission, expanding funding eligibility, recommitting to the previously adopted Metro Complete Streets Policy, and updating performance metrics. Staff is targeting Board adoption of the Revised Program Criteria and Guidelines at the June 2021 Board meeting.

BACKGROUND

The Project Eligibility for Highway Operational Improvement and Ramp/Interchange Improvements, of Measure R Highway Program Funding Strategy, was adopted by the Metro Board at its October 14, 2009 meeting. In May 2014, clarification on Project Eligibility was amended by the Metro Board.

The Measure M Multi-Year Program (Highway Subfunds) Guidelines were adopted by the Metro Board at its June 22, 2017 meeting, as part of the Measure M Master Guidelines.

DISCUSSION

In fall 2020, Metro staff reached out to the Council of Governments to solicit early input/feedback to the Board-proposed revisions to the Criteria and Guidelines. Additionally, staff presented the Board-proposed revisions to the Metro Technical Advisory Committee and the Policy Advisory Committee at their November and December 2020 meetings. At the conclusion of this early and targeted outreach, we received a total of 14 comment letters. Staff summarized those written comments in the attached summary table (Attachment C).

DETERMINATION OF SAFETY IMPACT

The proposed approval will not have any adverse safety impacts on employees and patrons.

FINANCIAL IMPACT

Impact to Budget

Approving the recommendations will have no impact on the FY 2020-21 Budget.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports the following goals of the Metro Vision 2028 Strategic Plan:

Goal 1: Provide high-quality mobility options that enable people to spend less time traveling by alleviating the current operational deficiencies and improving mobility along the projects.

Goal 4: Transform LA County through regional collaboration by partnering with the Council of Governments and the local jurisdictions to identify the needed improvements and take the lead in development and implementation of their projects.

ALTERNATIVES CONSIDERED

The Board could elect not to approve the public release of the Revised Measure R Highway Program Criteria and Revised Measure M Highway Subfunds Guidelines. This is not recommended as the proposed revisions were the result of Board direction.

NEXT STEPS

If approved by the Board, the Draft Revised Measure R Highway Program Criteria and the Draft Revised Measure M Guidelines, Section X - Multi-Year Programs (Highway Subfunds) will be released for public review. Both Guidelines will be posted on the Metro website on April 1, 2021, and there will be a place at the same location for people to submit comments. Following public input and comment, a final revised Program Criteria and Guidelines will be presented to the Board in June 2021 for adoption.

ATTACHMENTS

Attachment A - Recommended Revisions to Measure R Highway Program Criteria

Attachment B - Recommended Revisions to Measure M Guidelines, Section X - Multi-Year Programs (Highway Subfunds)
Attachment C - Summary Table of Comment Letters

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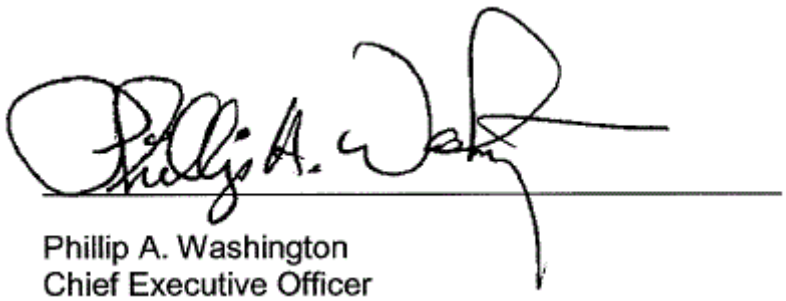

Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

RECOMMENDED REVISIONS TO MEASURE R HIGHWAY PROGRAM CRITERIA

The following shall replace Measure R Highway Program eligibility criteria in their entirety:

Project Eligibility for Highway Operational Improvements and Ramp/Interchange Improvements

The intent of a Measure R Highway Operational Improvement is to improve multimodal efficiency, safety, equity, and sustainability along an existing State Highway corridor by reducing congestion and operational deficiencies that do not significantly expand the motor vehicle capacity of the system, or by incorporating complete streets infrastructure into the corridor, in accordance with the Board-adopted policies set forth in Metro's Complete Streets Policy, Active Transportation Strategic Plan, and First/Last Mile Strategic Plan. In addition to those eligible projects on the State Highway System, for Measure R, projects located on primary roadways, including principal arterials, minor arterials, and key collector roadways, will be considered eligible for Operational Improvements and for ramp and interchange improvements.

Examples of eligible improvement projects include:

- interchange modifications;
- ramp modifications;
- auxiliary lanes for merging or weaving between adjacent interchanges;
- curve corrections/improve alignment;
- signals and/or intersection improvements;
- two-way left-turn lanes;
- intersection and street widening
- traffic signal upgrade/timing/synchronization, including all supporting infrastructure;
- traffic surveillance;
- channelization;
- Park and Ride facilities;
- turnouts;
- shoulder widening/improvement;
- safety improvements;
- on-street bus priority infrastructure, including but not limited to bus lanes, signal prioritization, queue jumps, bus boarding islands/curb extensions, and bus stop improvements;
- Class I, II, III, or IV bikeways;
- sidewalk improvements, including but not limited to widening, shade trees, and curb ramps;
- pedestrian safety improvements, including but not limited to bulb-outs, refuge islands, midblock crossings, pedestrian signals/beacons, raised intersections/pedestrian crossings, and scramble crosswalks;

- transportation infrastructure in a public right-of-way that supports the implementation of TDM strategies.

Up to 20% of a subregion's Operational Improvement dollars may be used for soundwalls. Landscaping installed as a component of an operational improvement must be limited to no more than 20% of a project's budget. State of good repair, maintenance and/or stand-alone beautification projects are not eligible. Other projects could be considered on a case-by-case basis as long as a nexus to State Highway Operational Improvements can be shown, such as a measurable reduction in Vehicle Miles Traveled.

ATTACHMENT B

RECOMMENDED REVISIONS TO MEASURE M GUIDELINES, SECTION X MULTI-YEAR PROGRAMS (HIGHWAY SUBFUNDS)

The following shall replace subsection 'A. "Highway Efficiency and Operational Improvements" definition:' in its entirety.

Highway Efficiency and Operational Improvements includes those projects, which upon implementation, would improve regional mobility and system performance; enhance multimodal efficiency, safety, equity, and sustainability; improve traffic flow, trip reliability, travel times; and reduce recurring congestion, high-frequency traffic incident locations, and operational deficiencies on State Highways. Similarly, improvements which achieve these same objectives are eligible on major/minor arterials or key collector roadways. Highway subfunds are eligible for pre-construction and construction related project phases as referenced in Sections IX and X and are subject to eligibility criteria and phasing thresholds that will be developed within 6 months as part of the applicable administrative procedures. In accordance with the Board-adopted policies set forth in Metro's Complete Streets Policy, Active Transportation Strategic Plan, and First/Last Mile Strategic Plan, complete streets projects and project elements are eligible for highway subfunds. State of good repair, maintenance and/or stand-alone beautification projects are not eligible for Highway subfunds. Other projects could be considered on a case-by-case basis as long as a nexus to Highway Efficiency and Operational Improvements can be shown, such as a measurable reduction in Vehicle Miles Traveled.

Examples of Eligible Projects:

- System and local interchange modifications
- Ramp modifications/improvements
- Auxiliary lanes for merging or weaving between adjacent interchanges
- Alignment/geometric design improvements
- Left-turn or right-turn lanes on state highways or arterials
- Intersection and street widening/improvements
- New traffic signals and upgrades to existing signals, including left turn phasing, signal synchronization, and all supporting infrastructure
- Turnouts for safety purposes
- Shoulder widening/improvements for enhanced operation of the roadway
- Safety improvements
- Freeway bypass/freeway to freeway connections providing traffic detours in case of incidents, shutdowns or emergency evacuations
- ExpressLanes
- On-street bus priority infrastructure, including but not limited to bus lanes, signal prioritization, queue jumps, bus boarding islands/curb extensions, and bus stop improvements
- Class I, II, III, or IV bikeways
- Sidewalk improvements, including but not limited to widening, shade trees, and curb ramps

- Pedestrian safety improvements, including but not limited to bulb-outs, refuge islands, midblock crossings, pedestrian signals/beacons, raised intersections/pedestrian crossings, and scramble crosswalks
- Transportation infrastructure in a public right-of-way that supports the implementation of TDM strategies

The following shall replace subsection 'C. "Multi-Modal Connectivity" definition:' in its entirety.

"Multi-modal Connectivity" definition:

Multi-modal connectivity projects include those projects, which upon implementation, would improve regional mobility and network performance; provide network connections; reduce congestion, queuing or user conflicts; enhance multimodal efficiency, safety, equity, and sustainability; encourage ridesharing; and reduce vehicle miles traveled. Project should encourage and provide multi-modal access based on existing demand and/or planned need and observed safety incidents or conflicts. Subfunds are eligible for pre-construction and construction related work phases of projects with the restrictions outlined under "Pre-Construction Activities" title under Readiness in Section IX. State of good repair, maintenance and/or stand-alone beautification projects are not eligible for Highway subfunds.

Examples of Eligible Projects:

- Transportation Center expansions
- Park and Ride expansions
- Multi-modal access improvements
- New mode and access accommodations
- First/last mile infrastructure

The following shall replace subsection 'D. "Freeway Interchange Improvement" definition:' in its entirety.

"Freeway Interchange Improvements" definition:

Freeway Interchange Improvements includes those projects, which upon implementation, would improve regional mobility and system performance; enhance safety by reducing conflicts; improve traffic flow, trip reliability, and travel times; and reduce recurring congestion and operational deficiencies on State Highways. Similarly, improvements on major/minor arterials or key collector roadways which achieve these same objectives are also eligible under this category. Highway subfunds are eligible for pre-construction and construction related work phases of projects with the restrictions outlined under "Pre-Construction Activities" title under Readiness in Section IX. In accordance with the Board-adopted policies set forth in Metro's Complete Streets Policy, Active Transportation Strategic

Plan, and First/Last Mile Strategic Plan, complete streets projects and project elements are eligible for highway subfunds. State of good repair, maintenance improvements and/or stand-alone beautification projects are not eligible for Highway subfunds.

The following shall replace subsection 'E. "Arterial Street Improvements" definition:' in its entirety.

"Arterial Street Improvements" definition:

Arterial Street improvements include those projects, which upon implementation would improve regional mobility and system performance; enhance multimodal efficiency, safety, equity, and sustainability; improve traffic flow, trip reliability, and travel times; and reduce recurring congestion and operational deficiencies. Projects must have a nexus to a principal arterial, minor arterial or key collector roadway. The context and function of the roadway should be considered (i.e., serves major activity center(s), accommodates trips entering/exiting the jurisdiction or subregion, serves intra-area travel) and adopted in the City's general plan. In accordance with the Board-adopted policies set forth in Metro's Complete Streets Policy, Active Transportation Strategic Plan, and First/Last Mile Strategic Plan, complete streets projects and project elements are eligible for highway subfunds. Highway subfunds are eligible for pre-construction and construction related work phases of projects with the restrictions outlined under
"Pre-Construction Activities" title under Readiness in Section IX. State of good repair, maintenance improvements and/or stand-alone beautification projects are not eligible for Highway subfunds.

Examples of Eligible Projects:

- Intersection or street widening
- Two-way left-turn or right turn lanes
- New traffic signals and upgrades to existing signals, including left turn phasing
- Sight distance corrections/improve alignment
- Turnouts
- Safety improvements
- On-street bus priority infrastructure, including but not limited to bus lanes, signal prioritization, queue jumps, bus boarding islands/curb extensions, and bus stop improvements
- Class I, II, III, or IV bikeways
- Sidewalk improvements, including but not limited to widening, shade trees, and curb ramps
- Pedestrian safety improvements, including but not limited to bulb-outs, refuge islands, midblock crossings, pedestrian signals/beacons, raised intersections/pedestrian crossings, and scramble crosswalks
- Transportation infrastructure in a street right-of-way that supports the implementation of TDM strategies

Summary Table of Comment Letters

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
High Level Summary			
N	Do not apply proposed guideline changes to Metro approved Measure R and M projects	Palmdale, NCTC, San Gabriel Valley, Lancaster, PAC, Gateway Cities COG	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.
Y	Support incorporating multi-modal improvements within a project's scope	Joint ATP Coalition Letter, PAC,	Metro provides for the incorporation of multimodal improvements into project scopes via the previously adopted Metro Complete Streets Policy.
N	Do not limit ability to develop capacity enhancement projects	Palmdale, Santa Clarita, NCTC, County of Los Angeles, Lancaster, Gateway COG,	The revised guidelines expand eligibility for multimodal improvements without limiting eligibility for more traditional capacity increasing projects.
N	Do not remove the 1 mile buffer from state highway system	Gateway Cities COG, Palmdale, NCTC, Lancaster	The revised guidelines expand eligibility for projects outside the 1-mile buffer, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Y/N	Allow for projects outside the 1 mile buffer to be eligible on a case by case basis	Gateway Cities COG, Palmdale, NCTC, Lancaster	The revised guidelines expand eligibility for projects outside the 1-mile buffer, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Y/N	Projects that reduce VMT should be considered on a case by case basis	NCTC, Arroyo Verdugo, Gateway, South Bay	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
Y	Support using VMT as a performance metric	City of Los Angeles, Westside Cities, Joint ATP Coalition letter	Metro agrees with using VMT as a planning metric and will be using it in countywide planning processes as well as when required for project-level analysis.
N	Preserve the intent of the voter approved measures and their objectives of reducing congestion and traffic	Palmdale, Santa Clarita, NCTC, County of Los Angeles, Lancaster, Gateway COG, PAC	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the expenditure plans of voter-approved measures.
Y	Support proposed guideline changes	South Pasadena, Westside Cities, Joint ATP Coalition letter	Metro acknowledges the comment.
N	Highway and Congestion relief projects and initiatives are important. Do not limit ability to develop these type of improvements	County of Los Angeles, Gateway COG, NCTC, Palmdale, Lancaster, South Bay	The revised guidelines expand eligibility for multimodal improvements without limiting eligibility for more traditional capacity increasing projects.
N	Urban and Rural needs vary and complete street improvements might not be feasible in all locations of county	County of Los Angeles, NCTC, Palmdale, Lancaster, Gateway Cities	The previously adopted Metro Complete Streets Policy allows for context-sensitive solutions reflecting L.A. County's diverse geography and urban, suburban, and rural contexts. It also includes an exceptions process under specified circumstances.
N	Limit the eligibility of additional multi-modal improvements to the boundaries of highway corridor projects. Implementation of multi-modal improvements at any geographic location should not be permitted.	Gateway Cities COG, Palmdale, NCTC, Lancaster	The revised guidelines expand eligibility for projects outside of highway corridor boundaries, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Agency Specific Comments			
Do not limit ability to pursue or develop highway capacity enhancement projects		County of Los Angeles	The revised guidelines expand eligibility for multimodal improvements without limiting eligibility for more traditional capacity increasing projects.
Urban and rural geographic areas should be considered when evaluating complete street infrastructure, rural corridors may not be feasible for these type of improvements		County of Los Angeles	The previously adopted Metro Complete Streets Policy allows for context-sensitive solutions reflecting L.A. County's diverse geography and urban, suburban, and rural contexts. It also includes an exceptions process under specified circumstances.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
Projects currently funded by the Measures should not be impacted by new requirements. This may lead to additional need for studies or redesign		County of Los Angeles	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.
Add bullet that clarifies Transportation System Management projects that improve roadway operations		County of Los Angeles	Improving roadway operations continues to be eligible under the revised guidelines.
Add freeway and arterial transportation system projects that improve roadway operations.		County of Los Angeles	Improving roadway operations continues to be eligible under the revised guidelines.
Retain the wording within one-mile of a state highway; or farther than one mile on a case by case basis to preserve the benefit to highway safety and mobility		Gateway Cities	The revised guidelines expand eligibility for projects outside the 1-mile buffer, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Define what new mode and access accommodations means		Gateway Cities	"New mode and access accommodations" is existing language under the "Multi-Modal Connectivity" program. It is only applicable to the Arroyo Verdugo subregion.
Retain the wording enhance safety by reducing conflicts. For subregions with high truck volumes this is a critical goal.		Gateway Cities	Under the revised guidelines, "safety improvements" would be eligible in all applicable categories. This language is broadened from the existing language, which only allowed "safety improvements that reduce incident delay."
Add to guidelines, other projects could be considered on a case-by-case basis as long as a nexus to highway efficiency and operational imp can be shown such as a measurable reduction in VMT or safety improvements.		Gateway Cities	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process. Under the revised guidelines, "safety improvements" would be eligible in all applicable categories.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
	Eligibility of multimodal improvements should be limited to the geographic parameters or boundaries of highway corridor projects. A bus priority or active transportation corridor that is an integral part of a highway project should be eligible.	Gateway Cities	The revised guidelines expand eligibility for projects outside of highway corridor boundaries, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
	Eligible new projects elements should be limited to major corridors to provide positive mobility relief and not be implemented anywhere.	Gateway Cities	The revised guidelines expand eligibility for projects outside of highway corridor boundaries, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
	Do not remove the words, "improve traffic flow" from highway improvement program. This language is part of the voter-approved ordinance and ballot language is critical term.	Gateway Cities	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the language or expenditure plans of voter-approved measures.
	Both sales tax measures were "sold" by promising to improve traffic congestions. Do not dilute integrity of freeway corridor based plans with broad definitions.	Gateway Cities	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the language or expenditure plans of voter-approved measures.
	Measure R and M highway program funding is extremely important to address severely impacted roadways (freeway and highway). Most residents still need a car for basic mobility need and access. Do not diminish effectiveness of	Gateway Cities	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT.
	Highways and Arterials are imperative to mobility and limited alternatives are available to the freeway network. Do not limit ability to develop SR-138 safety roadway enhancements or SR-14 bottleneck improvements.	Lancaster	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
Do not force the study of complete street concepts in areas not viable.		Lancaster	The previously adopted Metro Complete Streets Policy allows for context-sensitive solutions reflecting L.A. County's diverse geography and urban, suburban, and rural contexts. It also includes an exceptions process under specified circumstances.
While expanding use of highway program funds makes sense in some subregions, do not make the guideline changes at the expense of North Los Angeles County which relies on the scarce highway program funds.		Lancaster	The revised guidelines expand eligibility for multimodal projects, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Do not adversely impact current approved projects in the pipeline		Lancaster	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.
Do not reduce the strength of these programs to provide congestion relief benefits to our residents.		Lancaster	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT.
Voter measures with tax increases were justified by allocating funds to improve traffic. do not exclude or restrict ability to improve vehicular traffic.		Palmdale	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the language or expenditure plans of voter-approved measures.
Equitably consider the needs of all jurisdictions impacted by Metro's highway modernization efforts. Do not remove any eligible project opportunities		Palmdale	The revised guidelines expand eligibility for multimodal improvements without limiting eligibility for more traditional capacity increasing projects.
Do not remove the ability to have projects within a specific distance from a state highway and do not exclude improving vehicular traffic.		Palmdale	The revised guidelines expand eligibility for projects outside the 1-mile buffer, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
	Provide flexibility in guideline changes, but preserve the original intent of the voter approved ballot measures.	Santa Clarita	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the language or expenditure plans of voter-approved measures.
	Do not force study of complete street concepts or limit ability to spend funds on highway capacity enhancements that Measure R and M intended.	NCTC	The revised guidelines expand eligibility for multimodal improvements without limiting eligibility for more traditional capacity increasing projects.
	Changing Measure R definition to "improve multimodal efficiency, safety, equity sustainability" prohibits intent of Measure R and improving vehicle flow projects don't meet intent anymore.	NCTC	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT. The recommendations do not modify the language or expenditure plans of voter-approved measures.
	Removal of "within 1-mile of state highway" negatively impacts existing projects.	NCTC	The revised guidelines expand eligibility for projects outside the 1-mile buffer, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
	Add bike facilities, sidewalk/curb ramps, ped improvements on case-by-case basis.	NCTC	Metro provides for the incorporation of multimodal improvements into project scopes via the previously adopted Metro Complete Streets Policy.
	Allow project sponsors to use metrics and eligibility criteria appropriate to the projects needs and benefits	South Bay	The revised guidelines expand eligibility, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
	Allow highway projects to be funded that reduce delay on congested streets or that reduce VMT	South Bay	The revised guidelines expand eligibility for multimodal projects and projects that ease congestion by reducing VMT.
	Do not use VMT only performance criteria. Improvement in LOS maybe occur without improving VMT.	South Bay	Metro agrees with using VMT as one of multiple planning metrics and will be using it in countywide planning processes as well as when required for project-level analysis. The revised guidelines expand eligibility, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
	Support inclusion of complete street elements in a project	South Bay	Metro provides for the incorporation of multimodal improvements into project scopes via the previously adopted Metro Complete Streets Policy.

Yes/No to Changes	Comment (Main Points)	Commenting Entity	Board's Response
Do not impact the scope, schedule or budgets of approved projects		San Gabriel Valley	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.
Oppose policy changes that affect already approved projects for this subregion or other subregions.		Arroyo Verdugo	Measure R and M projects are in various states of project development and environmental review. These projects are already subject to Metro and/or Caltrans' complete streets policies. The recommendations do not establish new requirements for these projects, but do expand eligibility for some project scope elements. Metro expects that projects that have already completed environmental review or are nearing completion will see little or no change as a result of these guidelines.
Local agencies and subregions should retain flexibility to address their local needs.		Arroyo Verdugo	The revised guidelines expand eligibility, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.
Allow for local agencies and subregions to retain flexibility to use other performance metrics		Arroyo Verdugo	Metro agrees with using VMT as one of multiple planning metrics and will be using it in countywide planning processes as well as when required for project-level analysis. The revised guidelines expand eligibility, but continue to delegate project selection to subregions. Subregions may choose to fund or not fund any individual project based on their own prioritization process.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2020-0595, **File Type:** Plan **Agenda Number:** 16.

REVISED
PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

SUBJECT: BUS RAPID TRANSIT VISION AND PRINCIPLES STUDY

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATIONS

CONSIDER the following BRT Vision and Principles Study recommendations:

1. DIRECT staff to apply both the BRT Standards and Design Guidelines developed through the BRT Vision & Principles study to all Metro-funded BRT projects and initiate the process to refine the design guidelines further into design criteria; and

2. APPROVE the recommended five top-performing Bus Rapid Transit (BRT) candidate corridors for future project development consideration and advance the Broadway corridor as a first decade Measure M project, subject to available funding.

ISSUE

The Bus Rapid Transit Vision and Principles study (BRTV&P) establishes a cohesive set of guidelines and standards to direct Metro investment in on-street BRT projects. Metro's existing BRT guidance pertains almost entirely to projects constructed on exclusive rights-of-way such as the G Line (Orange Line). The adoption of new BRT guidelines and standards will ensure a high-quality customer experience for our transit patrons while increasing transparency with our local agency partners and our community stakeholders by clarifying the types of street improvements required to deliver a BRT project.

The study further identifies and prioritizes strong BRT candidate corridors based on indicators of service demand, equity and capacity for BRT supportive elements. Using a multi-tier screening process that applies both quantitative and qualitative indicators, the study examined potential BRT corridors throughout Los Angeles County to identify where BRT would best be deployed as a mobility solution. The results of the screening provided in the BRTV&P final report (Attachment A) provide a road map for future BRT investments that can be used by Metro, local agencies and municipal bus operators alike.

BACKGROUND

As required under the Measure M Administrative Guidelines, Section XVIII, Countywide BRT Expansion, the BRTV&P develops requisite guidance for Measure M BRT program funds and projects. Specifically, the Measure M guidelines committed Metro to revisit the study of BRT corridors identified in the Metro 2013 Bus Rapid Transit (BRT) and Street Improvement study, Mobility Matrices, and/or any potential corridors that may fill missing gaps in the countywide BRT network, excluding those already funded. The BRTV&P final report (Attachment A) and Design Guideline Manual (Attachment B) complete this analysis, providing the following key deliverables:

- Metro BRT standards
- Metro Design Guideline handbook
- Final Report with a recommended list of potential BRT corridors

The work completed through this study establishes a local definition of BRT, supportive design guidelines and identifies the corridors where BRT can best be deployed to meet Metro mobility goals as defined in the Vision 2028 Strategic Plan.

Relation to Other Metro Bus Improvement Initiatives

This BRT study was closely coordinated with ongoing bus improvement initiatives, including the NextGen Bus Plan and Speed and Reliability program, which fall under the umbrella of the new Better Bus Initiative (to be introduced during the March 2021 Board cycle). Each of these initiatives, BRT included, draws from a common bus improvement toolkit. This toolkit includes, but is not limited to, bus-only lanes, transit signal priority, all-door boarding, station amenities and frequent, reliable service.

While these bus improvement initiatives share a common toolkit and goal of improving service for our customers, the investment of time, resources, planning horizon and scope vary. Nevertheless, the work here is not mutually exclusive and equally important. Planned long-term investments in BRT invite opportunities to engage communities and municipal partners early to explore potential for early action items such as dedicated bus lanes and transit signal priority that can provide immediate benefits to our customers. Additionally, early engagement may lay the groundwork for future BRT investment.

In addition, the intention of Metro's bus projects and programs are to improve service across the bus network as well as focus improvements on specific BRT corridors where warranted. Some projects are intended to build the full complement of improvements in the BRT toolkit along a specified corridor or route, while other projects and programs, such as all-door boarding, transit signal priority, and congestion hot spot treatments through NextGen are aimed at deploying such improvements across the bus network. Ongoing collaboration across these initiatives will ensure that the focus centers on our customers and the community needs.

DISCUSSION

BRT offers the potential to deliver reliable, high-quality rail-like service at a substantially lower cost. It

is unconstrained by track or existing rail rights-of-way and can more easily be deployed in an on-street environment to connect communities at pedestrian scale. The inherent flexibility of BRT makes it a valuable tool in Metro's mobility toolkit that complements parallel efforts such as NextGen, the Bus Speed Improvement Working group and the Measure R & M rail expansion.

Measure M provides funding for both BRT projects and Countywide BRT program funds. In order to ensure that BRT service quality and infrastructure is commensurate with Metro investment, staff have developed BRT standards, design guidelines and identified corridors suitable for BRT investment.

BRT Standards

Standards provide the foundational definition of BRT. The standards define which types of bus improvements and performance standards at what thresholds constitute a BRT project. The purpose of the standards is to provide guidance for Metro BRT projects and establish eligibility criteria for Measure M BRT program funds.

The standards are both prescriptive and performance-based and include the following elements:

Standard	Description
Headway	Average interval of time between vehicles
Speed	Average corridor speed inclusive of dwell time with provisions for percent improvement over existing speeds
On-Time Performance/Reliability	Percentage of on-time arrival at stations
Dwell Time	Average time per person per boarding or average per station
Dedicated Lanes	Percentage of corridor with dedicated bus lanes
Intersection Priority	Percentage of signals in a corridor with active signal priority
Station Amenities	Expressed as percentage of stations that provide specific amenities at each stop
All-Door Boarding	Provided on vehicles and available at all stations
Branding	Design and logo distinguishing BRT from local service

The standards are further delineated into tiers: Full BRT and BRT-Lite. The differentiation in standards is not only to provide for context sensitive solutions in a county as large as Los Angeles but also in recognition that service performance should drive infrastructure investment. In this way, the whole of the standards is greater than the sum of its parts with performance-based standards of speed, dwell time, headway and on-time performance necessitating the use of prescriptive standards to achieve the requisite performance levels identified in the standards. The full description of standards, tiers and thresholds can be found in the BRTV&P final report (Attachment A, page 24, Table 6).

Design Guideline Manual

The design guidelines expand on the BRT standards to define the key attributes and elements that comprise a BRT project. The design guideline manual is made up of both required and recommended elements and provides the necessary guidance to the designer/builder. The six

chapters of the design guideline manual include the following chapters:

- Stations and Platforms: adapting the Metro Rail Kit of Parts to an on-street setting, this chapter details station footprint and configuration, shelter design, materials and finishes, lighting, landscaping, passenger amenities, systems components and public art. The design elements use a kit of parts approach so stations can be expanded and contracted to adapt to space-constrained environments and a variety of BRT running-way alignments: side-running, curb-running and center-running.
- Running Ways: provides guidance on considerations of selecting a running-way alignment such as side-, curb- or center-running. Also details roadway and intersection geometrics, street signing and striping, traffic operations, utility considerations and green streets.
- Intelligent Transportation Systems (ITS): details the technologies and systems deployed for BRT, including roadside elements, stations, vehicles and control center elements, operations & data.
- Operations: provides guidance on route length, station spacing, travel speed, service frequency, span of service, fare collection and boarding protocols, other services sharing a BRT corridor and service reviews.
- Branding: provides guidance on consistent application of graphics tone and images to reinforce an identifiable brand that enhances customer experience. The chapter guidance includes consideration of branding opportunities at stations, on vehicles and running ways.
- Transit Oriented Communities (TOC): reinforces and applies existing TOC policies such as first/last mile access, transfer considerations, joint development opportunities, managing mobility access and addressing the urban heat island effect.

Full details are provided in the design guideline manual (Attachment B).

BRT Corridor Screening Process

The corridor screening process produced two complementary deliverables: Top Five BRT corridors and the Strategic BRT Network. The two deliverables can be seen as a continuum of viable BRT corridors, where the top five identify where BRT investment should begin and the BRT network is where it may continue subject to available funding or investment from local municipalities or municipal bus operators.

Identification of corridors for study began with an initial literature review of prior Metro BRT studies, subregional mobility matrices, as well as any Board motions or directives. To ensure that no potential high-quality BRT corridors were overlooked, a parametric screening tool was applied to develop a heat map of potential corridors using indicators of service demand as well as the Equity Focus Community (EFC) metric that was developed through the Metro Long Range Transportation Plan.

Given the large number of potential corridors, in keeping with common transit planning practice, a three-level screening process was used, wherein each successive screening level introduced additional data to arrive at a prioritized set of corridors. The initial level 1 screening analyzed corridors based on network connectivity, land use, points of interest, education facilities, demographics and Metro's EFC metric.

In the second level screening, additional parameters were entered into the model, including a

corridor's suitability for supporting Transit Oriented Communities, corridor constructability, transit propensity (as developed through NextGen), trip lengths in the corridor, travel delay, network connectivity and EFCs.

The third and final screening process incorporated quantitative and qualitative analysis. Included in this analysis were qualitative evaluations of TOC and transit-friendly plans and policies in the corridors, a qualitative assessment of travel time savings potential, surveys of ground conditions, assessment of alignment with local government's specific modal vision for any identified corridor and input from key stakeholders. This final assessment brought the final list of corridors to a top five list, which are highlighted below. The complete accounting of the screening process and corridors analyzed can be found in the attached final report. A map illustrating the top five corridors has also been attached to this report (Attachment C).

BRT Top 5 Corridors (listed in alphabetic order):

Atlantic Blvd---East Los Angeles Gold Line terminus to downtown Long Beach
The Atlantic corridor is 19.64 miles in length. It provides high-capacity network coverage in southeast LA County, from the San Gabriel Valley to the City of Long Beach. In comparison to the other top five corridors, this corridor has a moderate level of network connectivity. Atlantic had Metro Rapid service until recently as far south as the C Line (Green). Long Beach Transit operates frequent service on the southern end of the corridor. Atlantic also has a moderate opportunity to build BRT-friendly infrastructure and realize travel time savings, although sidewalks are wide relative to other corridors, allowing more opportunity to build stations with full BRT passenger amenities. Although this corridor has a comparatively low ridership score, it does provide access to industrial jobs.

Broadway---Little Tokyo Gold Line Station to Imperial Highway
The Broadway corridor is 9.64 miles in length. It is a vibrant transit corridor with very high network connectivity and is also a NextGen Tier One corridor (and former Metro Rapid corridor). This corridor had a very high score in the Equity Focus Community index. Broadway runs through two City of LA Community Plan areas which feature TOC and transit-supportive policies. This corridor has moderate level ridership and a moderate opportunity to build BRT-friendly infrastructure and realize travel time savings. A future Alternatives Analysis could consider both Broadway and Figueroa, which closely parallel each other and perform comparably.

Cesar Chavez/Sunset--- Atlantic Blvd via Vermont/Los Feliz/Central to Broadway
The Cesar Chavez/Sunset corridor is 13.64 miles in length. It has a very high network connectivity score and connects East Los Angeles through the eastern edge of Hollywood/Los Feliz neighborhood then northwest to downtown Glendale. Cesar Chavez is a NextGen Tier One corridor that has existing Metro Rapid service through East LA. Sunset is a NextGen Tier One corridor that runs through six City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies. The corridor segment across from Los Feliz to Glendale is also part of a NextGen Tier One corridor. This corridor has a moderate-level ridership and a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings.

La Cienega---Santa Monica Blvd via Obama/Jefferson to Slauson
The La Cienega corridor provides high-capacity north-south network coverage on the westside,

linking cities and communities including West Hollywood, Beverly Grove, eastern Beverly Hills, Pico-Robertson and Culver City. It runs through three City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies. Culver City has recently completed a TOD Visioning Study, and West Hollywood has TOC-supportive policies in place that could support the implementation of a BRT on the La Cienega corridor. La Cienega has a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has a low network connectivity score, low ridership score, it is a NextGen Tier One corridor and has previously enjoyed Metro Rapid service. It has a low score in the Equity Focus Community Index.

Venice Blvd---Pacific Avenue via Flower Street to 7th Street
Venice has a very high network connectivity score and a very high ridership score. Venice is a NextGen Tier One corridor with existing Metro Rapid service and with a high-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has pedestrian-friendly features along much of its distance with a strong mix of land uses oriented to the street. The Venice corridor runs through seven City of LA Community Plan areas which feature TOC and transit-supportive policies. Culver City has recently completed a TOD Visioning Study, which includes Venice. Venice has communities with strong transit-supportive policies along corridor and it is an LADOT high-priority corridor.

Recommended Corridor for Further Study
Staff recommends that Broadway be advanced for further study as the initial BRT corridor eligible for Countywide BRT program funds. Each of the top five corridors presents excellent opportunities for BRT investment, but none are without challenges. Among the top corridors, Broadway ranks highest in terms of equity considerations as measured through the EFC metric, scoring near the top of all corridors analyzed. With the Board's recent adoption of the NextGen bus plan, Broadway is also slated for five-minute service frequencies.

Supportive BRT infrastructure in the Broadway corridor would ensure the most prudent use of service hours and improve travel speeds for our transit riders. In addition, the Broadway corridor has been identified for multiple potential improvements by the City of Los Angeles, which could be leveraged to advance a Broadway BRT corridor project.
Subsequent decisions on sequencing of the remaining top four corridors should be coordinated concurrent with the decennial Measure M review process which, per the Measure M ordinance, begins in Fiscal Year 2027. This would allow the Board discretion to review funding availability and mobility needs supported by the most current data.

Strategic BRT Network
The Strategic BRT Network is a complementary effort that builds on the top five BRT corridors. It is a strategic unfunded list of potential BRT projects that Metro or other local agencies could pursue should additional funding become available. The Strategic BRT network builds upon the strong candidate corridors that were identified in the multi-step screening process used to develop the top five corridors and applies a gap analysis to connect potential BRT corridors to Metro's existing and planned BRT and rail system. A map of the Strategic BRT network is included in Attachment A, including a list of corridors and a full description of the process.

Project Coordination

Metro currently has multiple initiatives underway to improve bus speeds and bus service. Most visible among these efforts are the NextGen Bus Study, which encompasses routing, frequency and network design improvements as well as speed and reliability improvements through the Bus Speed Engineering Working Group.
Identification and selection of the top five corridors was closely coordinated with these groups throughout the study process in the interest of sharing information, identifying areas for potential improvements and validating findings. In addition, Metro is poised to launch the Better Bus Initiative in March 2021, which seeks to align all bus improvement efforts under one umbrella to establish a comprehensive and unified approach to elevating the quality of the bus system to the benefit for the riders.

Outreach

Staff developed a comprehensive outreach program designed to inform, educate and solicit input from a variety of stakeholders, including Metro employees, municipal transit operators, city officials, elected officials, community and transit organizations and members of the general public. Throughout the project, stakeholder engagement at all levels was conducted to complement and help inform the technical process. Activities have included stakeholder workshops, presentations and project briefings, countywide survey engagement, and formation of a Technical Advisory Committee.

Staff also worked closely with Metro's NextGen Bus Plan project staff to leverage opportunities for outreach at public meetings and collaborate where possible to assist in maximizing outreach options and stakeholder relationships and share data relevant for both projects. Outreach was tailored to be inclusive and gather feedback that accurately reflects the diversity of LA County's population including ethnicity, race, age, language, income levels and level of transit access and utilization.

A full accounting of the outreach effort can be found in the outreach summary (Attachment C).

Equity Platform

The BRT Vision & Principles study leverages Pillar I of the Equity Platform: Define and Measure. Per Board direction the Equity Focus Communities (EFC) criteria was applied and carried through the corridor prioritization screening process of candidate corridors to ensure consideration of vulnerable communities.

DETERMINATION OF SAFETY IMPACT

The BRT Vision & Principles study did prioritize safety in its design criteria. This Board action will have no adverse impact on safety standards for Metro.

FINANCIAL IMPACT

Approval of the recommended actions would have no financial impact to the agency.

Impact to Budget

There is no impact to the current fiscal year budget. Completion of the study was included in the

current fiscal year budget.

The recommended actions identify a top five list of potential BRT candidate corridors, one of which may be carried into project development at a future date based on available funding. Any programming of funds and recommendation to carry a BRT corridor into project development would be a subsequent action presented to the Board. Any prospective study should identify funding of capital investment in BRT infrastructure, fleet and service levels. Ongoing service operations and facility maintenance would be fiscally sustained and operationally integrated with the existing NextGen network.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The BRT Vision & Principles study furthers the first strategic plan goal to “provide high quality mobility options that enable people to spend less time traveling.”

Specifically, Goal 1.2 calls for improvements to LA County’s overall transit network and assets, committing Metro to:

- Expand the BRT program along major arterials and highways throughout Los Angeles County
- Use Metro funds to provide incentives for regional partners to accelerate the delivery of elements that are critical to BRT success, such as signal priority and exclusive lanes
- Convert strategic Metro Rapid corridors to BRT corridors
- Develop BRT implementation details through the BRT Vision & Principles study

The completion of the BRT Vision & Principles study including the adoption of the standards, design guidelines and top five priority corridors provides the foundational steps to delivery of the above strategic plan goals.

ALTERNATIVES CONSIDERED

The Board could elect to plan BRT projects absent a cohesive set of standards and guidelines. This is not recommended as BRT project development is a collaborative process with our local agency partners that is best facilitated with clear standards and guidelines that provide transparency in each partners’ respective roles and responsibilities. The Board could also reject the prioritization of BRT corridors. This is also not recommended as the top five corridors provide staff with guidance on which BRT corridors to advance in future years and to guide future programming decisions relative to the Measure M Countywide BRT program funds.

NEXT STEPS

Upon Board approval, staff will proceed with the continued application of BRT standards and design guidelines to our BRT mobility corridor studies. In addition, staff will take the necessary steps to incorporate the design guidelines into select administrative and technical documents where necessary to ensure adherence to the adopted guidance. Staff will return to the Board with recommended programming actions of Measure M Countywide BRT Program funds to advance one of the top five BRT corridors into project development, subject to available funding.

ATTACHMENTS

Attachment A - BRT Vision and Principles Final Report
Attachment B - BRT Vision and Principles Design Guideline Manual
Attachment C - Outreach Summary Report
Attachment D - Amendment by Directors Bonin, Solis, and Hahn

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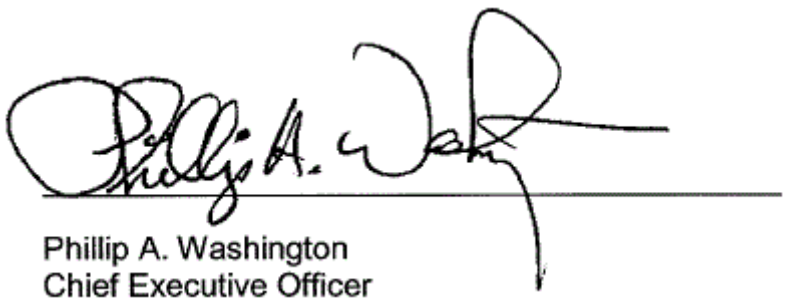

Phillip A. Washington
Chief Executive Officer

Los Angeles County
Metropolitan Transportation Authority

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visioning BRT

BUS RAPID TRANSIT VISION & PRINCIPLES STUDY

Metro®

Final Report
November 2020

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Executive Summary

In November 2016, LA County voters passed Measure M, a half-cent sales tax measure that provides funding for mobility projects, including a total of four specific Bus Rapid Transit (BRT) projects, as well as a countywide BRT program to deliver additional BRT projects with funding available in each of the next five decades.

With Metro and municipal transit agencies poised to make major BRT investments, the BRT Vision & Principles Study was undertaken to establish a cohesive set of guidelines and standards to direct Metro investment in on-street BRT projects. The majority of Metro's existing BRT guidance pertains only to projects constructed on exclusive right-of-ways, such as the L line (Orange Line). As such, this study establishes a local definition of BRT, supportive design guidelines and identifies the corridors where BRT can best meet Metro mobility goals as defined in the Vision 2028 Strategic Plan. The adoption of these BRT guidelines and standards will ensure a high-quality customer experience for our transit patrons, while increasing transparency with our local agency partners and our community stakeholders by clarifying the types of street improvements required to deliver a BRT project. In addition, the study further identifies and prioritizes strong BRT candidate corridors based on indicators of service demand, equity and capacity for BRT supportive elements.

Overall, the BRT Vision & Principles Study generated the following guiding deliverables:

> Metro BRT standards

> Metro Design Guidelines Manual

> Final Report with a recommended list of potential BRT corridors

The BRT Vision & Principles Study was conducted through close coordination with the following separate but parallel Metro efforts to enhance bus service and improve mobility in the region: the Long Range Transportation Plan (LRTP), the NextGen Bus Plan and the Bus Speed Improvement Working Group. The coordinated effort ensured that future plans for BRT systems and bus lane improvements were in close alignment.

Study Purpose, Vision, Guiding Principles, Goals & Objectives

The purpose of this study is to provide a foundational definition of BRT that sets high performance standards, while establishing clear eligibility criteria for Measure M Countywide BRT program funds. This study helps improve LA County's public transit network and ensures that BRT will fulfill a distinct role as a mode of transportation that enhances and integrates with existing LA County mobility services and future mobility hubs, as part of the world-class transportation system envisioned for all Metro customers. This purpose is supported by the study's vision statement, "BRT-the Convenient Choice for Connecting Customers and Communities" and the guiding principles on the following page.

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TABLE 1: BRT VISION & PRINCIPLES STUDY - GUIDING PRINCIPLES

Guiding Principles	Description
World-class	Offer exceptional service, operations and amenities that enhance the customer experience.
Equitable	Focus on on understanding and meeting the mobility needs of underserved communities.
Customer-centric	Prioritize the needs of our customers over public agency challenges and constraints.
Reliable	Run on time, eliminates bus bunching and provides accurate, real-time information.
Safe and Secure	Operate safely and has secure stations and vehicles with proper lighting and visible security measures.
Integrated and Connected	Seamlessly connect people and places with existing and planned transportation services across the region.
Community-focused	Promote and support vibrant communities around transit through community investment, including walking and biking infrastructure.

The following goals were developed to guide implementation of the LA County BRT Network:

> Provide an attractive, convenient and reliable mode choice that is a safe, secure, inviting and comfortable experience for all users for the entire trip.

> Fulfill a distinct role that enhances and integrates with existing mobility services.

> Connect people to where they need and want to go.

> Operate at high-performance levels allowing users to bypass congestion.

> Provide excellent infrastructure, vehicles, amenities and customer service.

> Consider community needs and enhance quality of life.

> Align design standards and service needs to maximize benefits.

In order to realize these goals, specific objectives were developed to detail the activities necessary to achieve them. These objectives informed several key areas of the study, including BRT standards, performance indicators, design guidelines and corridor selection. (Refer to **TABLE 5:** BRT GOALS & OBJECTIVES)

BRT Standards

Standards provide the foundational definition of BRT. The standards define which types of bus improvements and performance standards, and at what thresholds constitute a BRT project. The purpose of the standards is to provide guidance for Metro BRT projects and establish eligibility criteria for Measure M BRT program funds.

These standards are further organized and defined in two distinct tiers, Full BRT and BRT Lite, that set an "ideal" and mimum level of service which are also separated into performance and prescriptive based standards. These are further delineated by tiers of performance (speed, dwell time, headway and on-time) and prescriptive-based standards (all-door boarding, intersection priority, dedicated lanes, branding and station amennities). (Refer to **FIGURE 1:** BRT VISION & PRINCIPLES STUDY - GUIDING PRINCIPLES)

The differentiation in standards is not only to provide for context sensitive solutions in a county as large as Los Angeles, but also in recognition that service performance should drive infrastructure investment. In this way, performance-based standards necessitate the use of prescriptive standards to achieve the requisite performance levels identified in the BRT standards.

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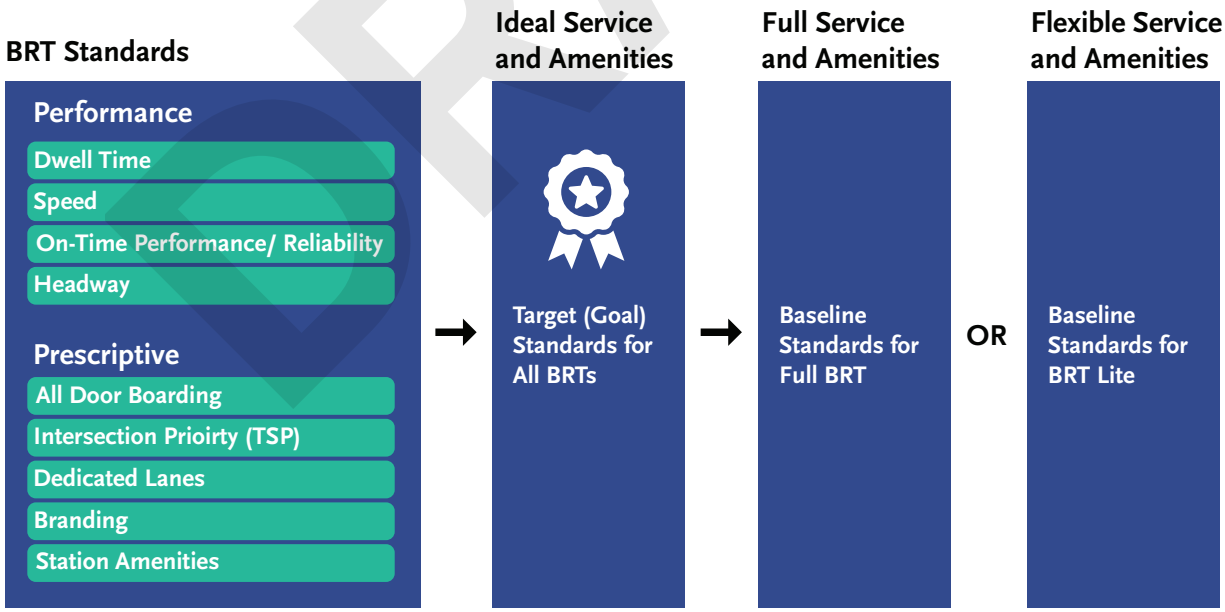
TABLE 2: ORGANIZATION OF BRT STANDARDS

Standard	Description
Headway	Average interval of time between vehicles.
Speed	Average corridor speed inclusive of dwell time with provisions for percent improvement over existing speeds.
On-time Performance/ Reliability	Percentage of on-time arrival at stations.
Dwell Time	Average time per person per boarding or average per station.
Dedicated Lanes	Percentage of corridor with dedicated bus lanes.
Intersection Priority	Percentage of signals in a corridor with active signal priority.
Station Amenities	Expressed as percentage of stations that provide specific amenities at each stop.
All-door Boarding	Provided on vehicles and available at all stations.
Branding	Design and logo distinguishing BRT from local service.

FIGURE 1: BRT VISION & PRINCIPLES STUDY - GUIDING PRINCIPLES



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All standards, both performance and prescriptive, result in better transit performance independently. However, various combinations can produce synergist improvements. Therefore, comparing Full BRT versus BRT Lite might result in similar overall benefits with Full BRT having the highest overall benefit.

The following are categorical benefits expected from both Full BRT and BRT Lite:

> Improved Travel Times

> Quick Boarding and Alighting

> Brand Recognition

> Station Amenities

And the following tools will enable improved travel times for both Full BRt and BRT Lite:

> Improved or Dedicated Running Ways

> Intelligent Transportation Systems (ITS)

> Intersection Priority (TSP)

BRT Design Guidelines

The following BRT design guidelines align with the BRT vision, goals and objectives, and draw on best practices from BRT systems across North America and around the world. The BRT Design Guidelines Manual, a separate companion document to this final report, provides recommendations on six interconnected aspects of BRT:

> Stations and Platforms

> Running Ways

> ITS

> Operations

> Branding

> Transit-oriented Communities (TOCs)

These design guidelines are flexible enough to address potential site-specific constraints and/or applicable local ordinances. They will be used by Metro in updating its existing BRT Design Criteria Manual, and by municipal transit agencies wishing to run new BRT lines under Measure M's BRT Program, facilitating the implementation of the county's next iteration of BRT services.

BRT Corridors

The screening and selection process was designed to identify the corridors where BRT is best deployed as a mobility solution. These have characteristics that include an optimal intersection of need and opportunity, meaning that there is not only a demand for service, but the corridor contains the requisite characteristics to support BRT infrastructure.

The main features Metro considers of primary importance in this selection include: service demand, regional connectivity, along with an opportunity to improve bus speeds, supportive infrastructure and equity. Three primary sources were used to identify potential corridors:

> BRT candidate corridors identified in recent planning studies and efforts by Metro

> Direct input from the project's targeted stakeholders

> Use of a parametric design tool to identify promising corridors not identified through the efforts mentioned above

The map on the following page depicts the universe of potential BRT corridors.

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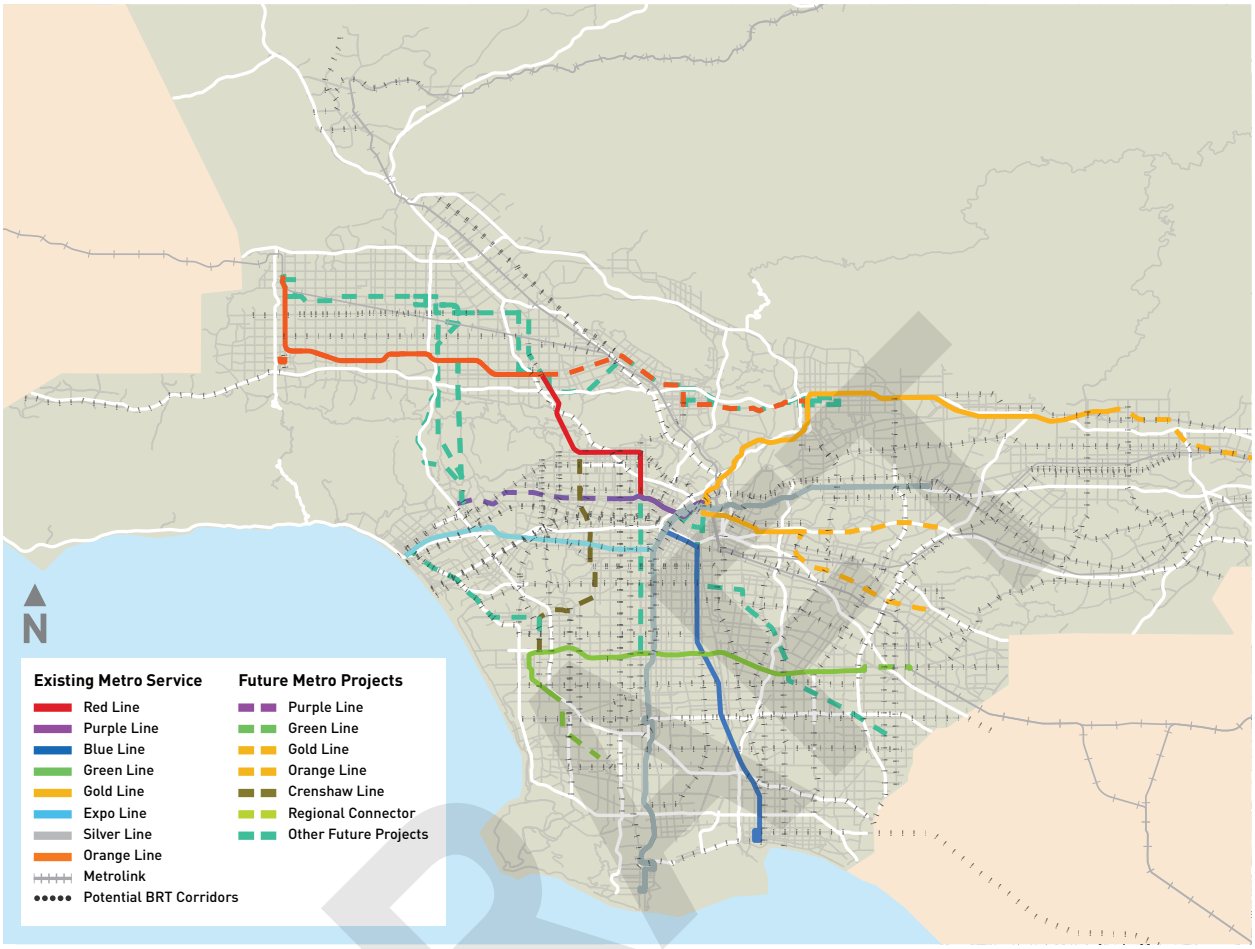
FIGURE 2: UNIVERSE OF POTENTIAL BRT CORRIDORS IN LOS ANGELES COUNTY



Corridor Screening Process

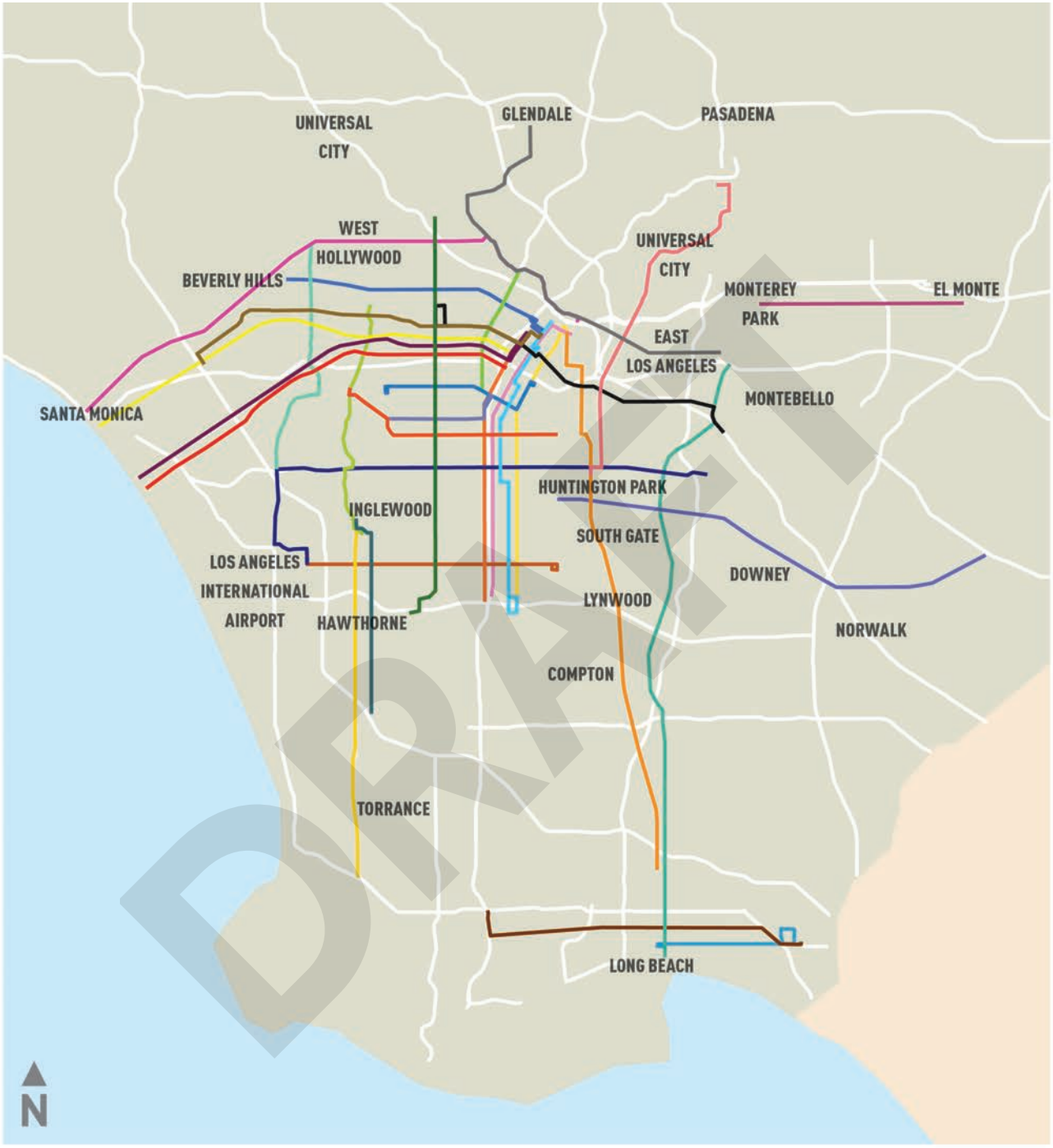
Given the large number of corridors a three-level screening process was used, wherein each successive screening level introduces additional data to arrive at a prioritized set of corridors.

Level 1 Screening

To begin the evaluation process, all potential corridors were reviewed for "fatal" flaws and either eliminated from consideration or their routing was adjusted. After this initial screening/refinement, the remaining corridors were loaded into the parametric model that analyzed network connectivity, land use, points of interest, demographics and Metro's Equity Focus Community (EFC)[1] metric. The model compared the area within ¼ mile of each corridor relative to the area along every other corridor and generated a score for each option. A total of 30 corridors, shown on the following map, were selected for Level 2 analysis.

1 As part of the LRTP, Metro has defined "Equity Focus Communities" (EFCs) as communities representing geographic areas that have the following socioeconomic characteristics; more than 40% of households are low-income and either 80% of households are non-white or 10% have no access to a vehicle.

FIGURE 3: TOP 30 BRT VISION & PRINCIPLES STUDY CORRIDORS MAP



BRT Highest Ranked 30 Corridors

- 3rd Street
- 7th Street
- Alvarado/Hoover
- Anaheim
- Atlantic
- Avalon Blvd
- Broadway
- Century
- Figueroa
- Florence - Whittier
- Garvey
- Hawthorne
- Jefferson
- Jefferson/Slauson
- La Brea
- La Cienega Culver City
- Long Beach Blvd
- MLK
- Main
- Olympic
- Pico
- Prairie
- Santa Monica
- Soto
- Sunset
- Venice Blvd
- Vernon
- Washington Mid City
- West Olympic
- Western to Green Line

Level 2 Screening

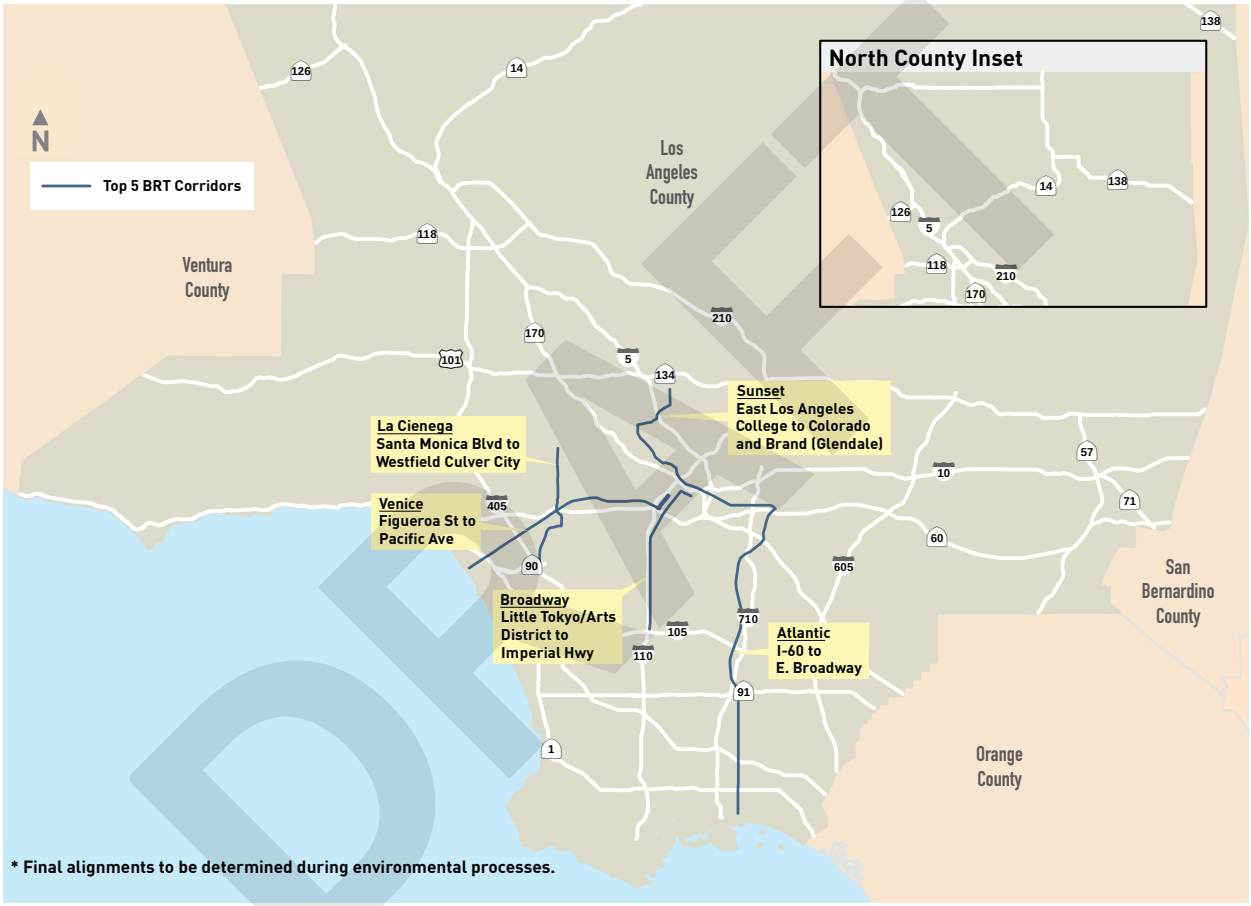
The 30 most promising corridors identified in the Level 1 screening were put through a second level of parametric analysis with additional criteria added, including: supporting TOCs, trip length, travel delay, network connectivity, equity, corridor constructability and transit propensity (as developed through NextGen). This second screening was coupled with another visual inspection process, which allowed the team to identify any other attributes of or difficulties with the corridor that would assist in the identification of the most promising and best performing 15 corridors.

FIGURE 4: TOP 15 BRT VISION & PRINCIPLES STUDY CORRIDORS MAP

Level 3 Screening

The third and final screening process further reviewed the top 15 performing corridors with additional quantitative and qualitative analysis. Network connectivity, transit propensity and equity were carried forward from previous screening with new criteria including: qualitative evaluations of TOC and transit-friendly plans and policies in the corridors, a qualitative assessment of travel time savings potential, surveys of ground conditions, assessment of alignment with local government's specific modal vision for any identified corridor and input from key stakeholders. This final assessment identified the top five performing corridors to support future BRT service.

FIGURE 5: TOP FIVE BRT VISION & PRINCIPLES STUDY CORRIDORS MAP



Top Five BRT Corridors

Metro has identified the following as the top five candidates eligible for Measure M Countywide BRT program funds, including: Atlantic Blvd (East Los Angeles Gold Line terminus to Downtown Long Beach), Broadway (Little Tokyo Gold Line Station to Imperial Highway), Cesar Chavez/Sunset (Atlantic Blvd via Vermont/Los Feliz/Central to Broadway), La Cienega (Santa Monica Blvd via Obama/ Jefferson to Slauson), and Venice Blvd (Pacific Avenue via Flower Street to 7th Street). Each of these present excellent opportunities for BRT investment. Of these top five BRT corridors, Metro staff will present a recommendation to the Metro Board of Directors for the initial advancement of one these corridors into project development, subject to available funding. The balance of the remaining corridors would be eligible for Measure M Countywide BRT program funds in subsequent years as funding becomes available.

Atlantic

The Atlantic corridor provides high-capacity network coverage in Southeast LA County, from the San Gabriel Valley to the City of Long Beach, connecting cities and communities. When compared to the other top five corridors, this corridor has a moderate level of network connectivity and opportunity to build BRT-supportive infrastructure and realize travel time savings, although sidewalks are wide relative to other corridors, allowing more opportunity to build stations with Full BRT passenger amenities. Although this corridor has a comparatively low ridership score, it provides access to industrial jobs for lower-income workers, addressing Metro's equity goals.

Broadway

Broadway is a vibrant transit corridor with very high network connectivity and is also a NextGen Tier One corridor. When compared to the other top five corridors, this corridor had a very high score in the Equity Focus Community index and is a high-priority corridor per Los Angeles Department of Transportation's (LADOT) assessment. Broadway runs through two City of LA Community Plan areas which feature TOC and transit-supportive policies. This corridor has moderate level ridership and a moderate opportunity to build BRT-friendly infrastructure and realize travel time savings. A future alternatives analysis could consider both Broadway and Figueroa, which closely parallel each other and perform comparably.

La Cienega

The La Cienega corridor provides high-capacity north-south network coverage on the Westside, linking cities and communities, including West Hollywood, Beverly Grove, eastern Beverly Hills, Pico-Robertson and Culver City. It runs through three City of LA Community Plan areas, which feature or are being updated to feature TOC and transit-supportive policies. Culver City has recently completed a TOD Visioning Study, and West Hollywood has TOC-supportive policies in place that could support the implementation of a BRT on the La Cienega corridor. In comparison to the other top five corridors, La Cienega has a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has a low network connectivity score, low ridership score, it is not a NextGen Tier One corridor and it has a low score in the Equity Focus Community Index.

Sunset

The Sunset corridor has a very high network connectivity score and connects downtown Los Angeles with the San Fernando Valley. Sunset is a NextGen Tier One corridor that runs through six City of LA Community Plan areas, which feature or are being updated to feature TOC and transit-supportive policies. When compared to the other top five corridors, this corridor has a moderate-level of ridership and a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings.

Venice

Venice has a very high network connectivity score and a very high ridership score. Venice is a NextGen Tier One corridor with a high-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has pedestrian-friendly features along much of its distance with a strong mix of land uses oriented to the street. The Venice corridor runs through seven City of LA Community Plan areas, which feature TOC and transit-supportive policies. Culver City has recently completed a Transit Oriented Development (TOD) Visioning Study, which includes Venice. Venice has communities with strong transit-supportive policies along corridor and it is an LADOT high-priority corridor.

Strategic BRT Network

The Strategic BRT Network is a complementary effort that builds on the top five BRT corridors. It is a strategic unfunded list of potential BRT projects that Metro or other local agency could pursue should additional funding become available. The Strategic BRT Network derives from the strong

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candidate corridors that were identified in the multi-step screening process used to develop the top five corridors and applies a gap analysis to connect potential BRT corridors to Metro's existing and planned BRT and rail system. This network provides a roadmap for future BRT expansion in LA County that Metro or other local agencies could pursue should additional funding become available. Staff examined local city plans, Council of Governments studies, and other regional transportation plans to identify locally preferred transit corridors to assure alignment between our proposed corridors and those our local partners may have already identified. Input was also solicited on the network from local agency partners – including the study Technical Advisory Committee (TAC), as well as through individual meetings with local agencies and key stakeholders.

Conclusion and Next Steps

Metro is making unprecedented investments in our LA County mobility system, including specific investments in BRT. The work completed through the BRT Vision & Principles study establishes the necessary foundation to guide those BRT investments into the foreseeable future.

With three early potential BRT projects currently in some level of study, and more to follow, the completion of this work is timely and necessary. Upon Board approval, staff will proceed with the continued application of BRT standards and design guidelines to our BRT mobility corridor studies. In addition, staff will take the necessary steps to incorporate the design guidelines into select administrative and technical documents where necessary to ensure adherence to the adopted guidance. Staff will also present this top five list to the Metro Board for consideration, recommending that one of these corridors be taken into project development in the near-term, subject to available funding. With Board concurrence on a specific corridor, staff will return to the Board with recommended programming actions of Measure M Countywide BRT Program funds to advance one of the top five BRT corridors into project development, subject to available funding.

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Background

BRT is generally defined as a high-quality bus service that provides fast, reliable and convenient service through the use of several key attributes, including, dedicated bus lanes, branded vehicles and stations, frequent service, intelligent transportation systems, and all-door boarding or off-board fare collection. These improvements allow BRT systems to minimize or avoid many of the delays typically experienced by local bus service and therefore have the potential to improve regional mobility, reduce transportation costs, and ease commutes. Local examples of BRT service in LA County include the Metro G Line (Orange), serving the San Fernando Valley and the Metro J Line (Silver) serving El Monte, downtown LA and San Pedro.

While Metro has detailed design criteria to guide the development of BRT systems constructed in exclusive rights-of-way (such as the G Line), guidance for on-street BRT operations is limited. With Metro and municipal transit agencies poised to make major investment in BRT systems in the future, the BRT Vision & Principles Study was undertaken as a comprehensive effort to guide the development of future on-street BRT systems. This study expands on previous Metro BRT studies such as the 2013 LA County Bus Rapid Transit and Street Design Improvement Study (CBRT) to develop standards and design guidelines for on-street BRT systems and also refreshes prior corridor analyses with new data sets.

Metro's Current Transit Service[1]

Metro service includes a variety of transit modes that fulfill various connectivity and passenger needs, including five types of bus service and two types of rail service .

> **Bus** – The five types of bus service currently provided by Metro include:

- **Shuttle** – operates on local streets with closely spaced stops (0.25 mile) and predominantly serves riders traveling between neighborhoods
- **Local Service** – operates on major arterials with stops at least 0.25 miles apart and serves riders traveling inter-community
- **Rapid** – operates on the highest ridership corridors where demand warrants additional capacity beyond that offered by Local service
- **Express** – operates on major arterials and freeways with stops at least 1.25 miles apart and serves riders traveling between communities and regionally
- **BRT Service** – operates on either a dedicated right-of-way, a major arterial or in High-Occupancy Vehicle/High-Occupancy Toll lanes, and stops about 1.25 miles apart and serves riders traveling inter-community

> **Rail** –Both of Metro's rail options operate along dedicated right-of-way and are powered by electricity. There are a total of 93 stations in the system, each offering connections to Metro bus service. The two types of rail service currently provided by Metro include:

- **Heavy Rail** – a subway system that includes two lines, served by the D Line (Red) and the B Line (Purple)
- **Light Rail** – consists of four lines, A Line (Blue), C Line (Green), E Line (Expo) and the L Line (Gold)

The work completed through this BRT Vision & Principles study pertains exclusively to the BRT service category noted above.

1 This list does not include micro mobility and microtransit services, which are emerging Metro transit programs

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Key Advantages of BRT

BRT is an assemblage of bus speed improvement strategies, operational enhancements and infrastructure that when combined, create a distinct mobility solution. The primary attributes that make BRT an attractive and distinct transit option for select corridors in LA County are:

> **Context Sensitivity -** Provides flexibility in the standards and design guidelines to accommodate the diverse needs of the various cities and transit operators in the region, while not diluting the overall operational and physical characteristics that distinguish BRT from regular or Rapid bus service.

> **Leverages Existing Infrastructure** - Presents the ability to use the streets and highways that are already accessible as right-of-way. If conditions change over time along a BRT route, it is possible to adjust alignments more readily than for LRT.

> **Cost-Effective -** Offers a cost-effective way to provide mass transit. Even at the highest levels of infrastructure investment, BRT is a fraction of the cost of both light and heavy rail options. Based on BRT projects currently in development by Metro, as well as a review of recently constructed BRT lines around North America, the cost per mile for BRT implementation falls roughly within the following ranges shown in **TABLE 3**.

TABLE 3: ESTIMATED RANGE OF COSTS PER MILE FOR A BRT IMPLEMENTATION

LOW RANGE ESTIMATE	MEDIUM RANGE ESTIMATE	HIGH RANGE ESTIMATE
$10-15 million/mile	$25-30 million/mile	$100+ million/mile
BRT Lite; about 20% of route has a dedicated running way, no or minimal right-of-way acquisition, no grade-separation	Full BRT; at least 50% of route has a dedicated running way; no or minimal right-of-way acquisition, no grade-separation	Full BRT; at least 80% of route has a dedicated running way; extensive right-of-way acquisition and/or grade-separation

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Study Purpose

The BRT Vision & Principles Study develops a comprehensive vision for BRT project development, selection and operation in LACounty. BRT standards provide a foundational definition of BRT that not only sets high performance standards but establishes clear eligibility criteria for Measure M Countywide BRT program funds. Design guidelines assist Metro and other municipal transit operators in the planning, design and operation of an efficient and effective BRT system.

Performance indicators developed through the study provide the necessary tools to monitor system performance and customer satisfaction. A BRT corridor selection process has been developed that screens projects based not only on indicators of service demand and equity but on assessments of constructability. Finally, using the aforementioned tools, the study identifies and prioritizes corridors that are best suited for future BRT project development.

Project Vision & Guiding Principles

Given that there is some variability in national and international definitions of BRT and even within those definitions some latitude for variability in implementation, an initial vision and guiding principles was developed to orient all subsequent work. This initial step not only allowed for a pragmatic assessment of desired BRT outcomes but also allowed for the assessment of alignment with supportive Metro policies, such as Vision 2028 and the Equity Platform.

The five overarching goals of the Vision 2028 plan provided a customer-centric framework that was critical to crafting the vision for the BRT Vision & Principles Study. Similarly, the Metro Board's adopted Equity Framework provided guidance on considerations pertaining to vulnerable populations. The study team also considered parallel studies and guiding documents, such as the NextGen Bus Plan and the Long-Range Transportation Plan to ensure cohesion with their respective goals and objectives.

The vision statement chosen for the study is "BRT-the Convenient Choice for Connecting Customers and Communities." In addition to the vision statement, seven guiding principles were identified that influenced the development of goals for this project, shown in **TABLE 4** below.

Vision Statement: BRT-the Convenient Choice for Connecting Customers and Communities

Guiding principles were developed to assist the project stakeholders in expressing a common set of values. This study continued with a process that recognized the important attributes of BRT for LA County, based on these principles and through the creation of a set of goals and objectives which, in turn, supported the development of key performance indicators, standards and design guidelines for BRT.

TABLE 4: BRT GUIDING PRINCIPLES

Guiding Principles	Description
World-class	Offer exceptional service, operations and amenities that enhance the customer experience.
Equitable	Focus on on understanding and meeting the mobility needs of underserved communities.
Customer-centric	Prioritize the needs of our customers over public agency challenges and constraints.
Reliable	Run on time, eliminates bus bunching and provides accurate, real-time information.
Safe and Secure	Operate safely and has secure stations and vehicles with proper lighting and visible security measures.
Integrated and Connected	Seamlessly connect people and places with existing and planned transportation services across the region.
Community-focused	Promote and support vibrant communities around transit through community investment, including walking and biking infrastructure.

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Project Goals & Objectives

Goals Tailored for the Region

Goals developed for this study express specific and desired outcomes for LA County BRT services and infrastructure. The purpose of the goals is to answer what we intend to accomplish or achieve with the BRT network, while ensuring alignment with the values expressed in the guiding principles. In this study, the goals directly influenced the development of objectives, performance measures and key performance indicators (KPIs). KPIs provide a mechanism of accountability for Metro and other municipalities and transit service providers as BRT projects work toward achieving the goals.

The following goals were developed to guide implementation of the LA County BRT Network:

> Our BRT will provide an attractive, convenient and reliable mode choice that is a safe, secure, inviting and comfortable experience for all users for the entire trip.

> Our BRT will fulfill a distinct role that enhances and integrates with existing mobility services.

> Our BRT will connect people to where they need and want to go.

> Our BRT will consistently operate at high-performance levels allowing users to bypass congestion.

> Our BRT will provide excellent infrastructure, vehicles, amenities and customer service.

> Our BRT will consider community needs and enhance quality of life.

> Our BRT will align design standards and service needs to maximize benefits.

Development of Objectives to Realize BRT Goals

In order to realize BRT goals, specific objectives were developed to detail the activities necessary to achieve the corresponding goal. The process allows for a more precise and fully measurable outcome that can be tracked over time where necessary. These objectives informed several key areas of the study, including BRT standards, performance indicators, design guidelines and corridor selection. **TABLE 5** includes the complete list of detailed objectives and related goals.

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TABLE 5: BRT GOALS & OBJECTIVES

RELATED GOAL	OBJECTIVE
Our BRT will provide an attractive, convenient and reliable mode choice that is a safe, secure, inviting and comfortable experience for all users for the entire trip	Achieve a minimum 90% on-time arrival rate. Achieve excess wait time in the peak-period of no more than one minute. Limit travel time variation for Full BRT to no less than 25% MPH average speed improvement over regular bus service from end-to-end (or point-to-point where there is no comparable service). Offer a pleasing, rail-like passenger experience to BRT riders specifically with regard to travel times, dwell times, speeds and amenities. Achieve incident rates 15% below the Metro average per operational mile. Achieve on-board passenger security incident rates 15% below Metro average.
Our BRT will fulfill a distinct role that enhances and integrates with existing mobility services	Maximize the percentage of passenger transfers between BRT and other high-frequency transit or mobility services which can be made within 10 minutes (combined walk time and average waiting time). 100% of stations will offer amenities and access to first/last mile supporting services, including dedicated transportation network company (TNC) drop off/pick up, shared scooter/bike, bike lockers, etc. Provide personalized relevant information to customers on mobility options at their destination and measure based on customer opinion survey. Develop unique vehicle branding approaches that distinguish BRT as different from standard bus service and flexible enough to accommodate vehicles on multiple BRT routes.
Our BRT will connect people to where they need and want to go	Connect to one or more major BRT or light rail transit (LRT) stations or other major intermodal points to support larger transportation network connectivity. Equity Focus Community indicators will be considered at least as strongly as population and employment density in route selection and design.
Our BRT will consistently operate at high-performance levels allowing users to bypass congestion	Achieve an average peak-period end-to-end running time inclusive of stops within 1.8x (for Full BRT) and 2.4x (for BRT Lite) of the baseline free-flow travel time (inclusive of stops). Improve reporting rate on BRT locations to at least every 10 seconds. Achieve a 90% non-cash payment by 2028. Limit need to kneel bus to 10% of stations. Measure and estimate signal-based intersection delay and reduce by 20%. Reduce the number of signalized stops for the bus by 25%. Achieve average station dwell times of 12 seconds or 1.7 seconds per person.
Our BRT will provide excellent infrastructure, vehicles, amenities and customer service	Achieve an 80% positive approval through a periodic customer survey quality rating for vehicle and station condition and cleanliness. All public-facing BRT infrastructure achieve same mean time between failure (MTBF) as Metro rail system counterparts. BRT will be the proving ground for emerging technologies and strategies.

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RELATED GOAL	OBJECTIVE
Our BRT will consider community needs and enhance quality of life	Ensure customized wayfinding and mode transfer options for first/last mile at each station. Identify and improve major barriers to walking or rolling to each station; develop and collaborate with partners to achieve improvements. Involve the community through walk-audits, site-surveys, design charrettes and other inclusive community engagement strategies for every BRT project. Achieve an 80% positive approval rating in a post-implementation community survey for enhanced quality of life perceptions. Ensure that BRT network corridor selection processes include equity criteria to serve vulnerable communities and strive to continuously refine said criteria to best serve these communities. Undertake authentic engagement that centers on the voices of vulnerable communities. Implement an ongoing consultation process with all stakeholders in the public sector (e.g., police), the private sector (e.g., merchants, real estate interests) and the general public as part of planning and implementation to support place-making and place-keeping. Provide cities and residents along the BRT corridor alignment with toolkits and data to promote TOC outcomes, while providing protections for affordable housing stock.
Our BRT will align design standards and service needs to maximize benefits	Select corridors based on technical analysis and expressed community needs and ability to meet BRT design standards. Secure memo of understanding or policy agreements from local jurisdictions to provide BRT priority through infrastructure, operating strategies or policies.

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Combined with best practices, these objectives provided the best and most complete information required to move forward with the development of the following subset of BRT study products.

> **Standards:** Tracking back to the vision, goals and objectives ensured that the proposed BRT standards include thresholds that reflect consideration of baseline conditions and capabilities of Metro and local agencies that will need to implement them during the deployment of BRT.

> **Performance Indicators:** The planning elements were instrumental in the development of key performance indicators (KPIs) such as those that help the BRT planning and operations leadership create and adjust new BRTs as needed to meet envisioned service and infrastructure. As the stewards of Measure M, Metro will also use the KPIs to monitor the performance of BRT lines implemented using Measure M funds by both Metro and municipal transit agencies.

> **Design Guidelines:** Every section of the design guidelines developed as part of this study resulted in BRT design guidance that clearly reflects the vision and supports a design that can meet the expectations of Metro and the jurisdictions responsible for planning and development of a BRT.

> **BRT Corridors:** The corridor selection criteria were mapped to the planning elements to ensure that quantitative and qualitative analyses of potential study corridors were measured against the principles and values.

BRT Standards

While there are numerous reputable BRT standards and guidance that have been published both at the national and international level, strict adoption of any one of those standards to an area as large and diverse as LA County proved impractical. Therefore, this study drew upon existing national and international guidance to develop a local BRT standard, adapted to the specific context-sensitive needs of LA County.

The standards developed through this study provide the foundational definition of LA County BRT, including improvements, components and thresholds constituting BRT. This foundational definition of BRT is important not only to establish consistency in BRT project development but also to establish eligibility criteria for Metro Countywide BRT program funds.

As shown in **FIGURE 6**, the standards draw from a familiar mix of service parameters, enhancements and infrastructure that, when combined, provide a baseline definition for high-quality BRT service.

FIGURE 6: CATEGORIES OF BRT STANDARDS

The operational and brand consistency derived from the standards conveys multiple benefits, including but not limited to:

> Provide the transit rider with a consistently high-quality, seamless and reliable user experience across the entire LA County BRT network, whether operated by Metro or a municipal transit agency.

> Increase transparency with community members and public agency partners by setting clear expectations of what a BRT project entails.

> Ensure that the investment of public resources in infrastructure is commensurate with service.

> Provide consistency in approach to BRT investments.

Experience with BRT has shown that the best systems are not simply a sum of their parts. High-performance BRT systems are usually the result of ensuring that the individual components (e.g. running ways, stations, ITS elements, operating plans) work well with and reinforce each other. The standards proposed here, and the subsequent design guidelines, are aimed at ensuring this level of tight integration among BRT's components.

Organization of Standards for BRT

Standards developed in this study are organized in two distinct BRT tiers for performance and infrastructure. The tiers of standards support BRT's distinctive and premium levels of service and amenities, while providing flexibility to accommodate a variety of regional conditions under which BRT will be implemented. This approach allowed for a context-specific application of national and international standards in LA County, consistent with the goals established for the project.

This includes identifying where flexibility for those standards exists, and where standards are best

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represented by a single set of criteria or by multiple levels of criteria for different levels of BRT service.

Tiered BRT Standards

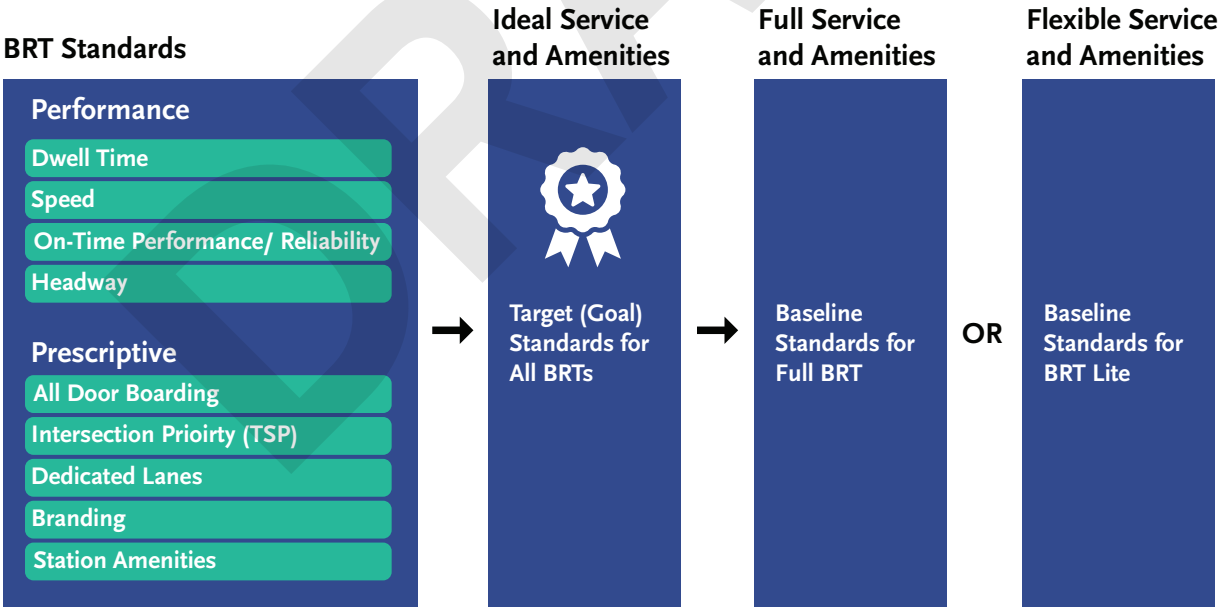
The two-tiered BRT standard sets a minimum standard for service to be considered BRT, as well as an ideal BRT standard of service. These are labeled as Full BRT and BRT Lite, respectively. This tiering of standards allows local jurisdictions and Metro to deploy BRT systems in areas where it may not be possible to achieve Full BRT standards but enhancements to service are warranted. This will ensure that BRT services can be directed to areas that need it most, while distinguishing the level of BRT service from other Metro or municipal transit services. The two levels of BRT service are defined as follows:

> **Full BRT:** A high-capacity, high-mobility, and high-amenity level of BRT service that is comparable to light rail transit (LRT). Full BRT has rail-like stations, a high percentage of dedicated running ways, and highly reliable, yet flexible service.

> **BRT Lite:** The minimum level of BRT, positioned between current Metro Rapid bus service and Full BRT. It still offers high levels of amenities and flexibility, but with a somewhat lower level of dedicated running ways and speed and reliability enhancing features.

In addition to BRT tiers, a target goal set of standards is included that represents an ideal BRT project implementation. Target standards are illustrative of opportunities to further enhance BRT performance beyond baseline requirements. The delineation of standards by tiers, performance and prescriptive-based standards is shown in **TABLE 7**.

FIGURE 7: ORGANIZATION OF BRT STANDARDS



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Performance and Prescriptive Standards

Standards are further designated as prescriptive or performance-based. The use of both prescriptive and performance-based standards is intended to create an interdependency that drives the need for infrastructure. The additional benefit is the inherent flexibility of the application of the standards:

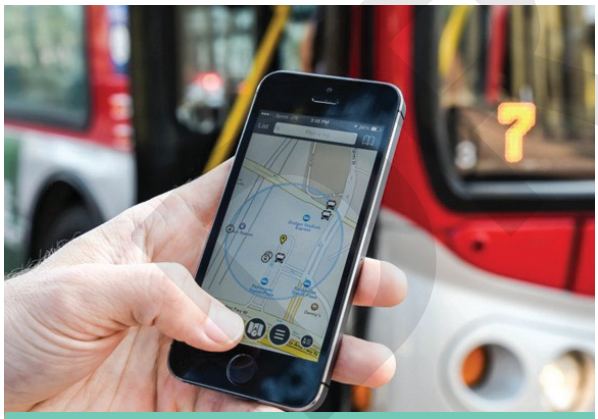
a range of prescriptive-based improvements can be deployed to achieve performance outcomes.

Performance Standards: Performance standards are outcome-based, focused on operational performance of the BRT service. Flexibility allows for meeting at least three of the four standards for the following areas:

FIGURE 8: BRT PERFORMANCE STANDARDS

Dwell Time

Speed



On-time Performance/Reliability

Headway

Prescriptive Standards: Prescriptive standards require that specific criteria are met, irrespective of outcomes. These are directed towards the physical and as-built characteristics of the BRT corridor defined within five standards:.

FIGURE 9: BRT PRESCRIPTIVE STANDARDS

All-door Boarding

Intersection Priority (TSP)

Dedicated Lanes

Branding

Station Amenities

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The use of peak period lanes and station amenities based on headways are examples of flexibility in applying standards. In addition to minimum standards, standardized targets were also identified to achieve if possible, for Full BRT and BRT Lite. These minimum and target standards represent the foundation by which BRT will be measured in LA County. Collectively achieving these standards along each BRT corridor will help to ensure a high-quality, attractive BRT service that distinguishes itself from other services in the region.

Considerations for BRT Implementation

As we consider the characteristics and benefits of BRT implementation, it is important to remember that the individual standards are interdependent, each element or treatment, building on the benefits of the others. That is not to say that certain standards do not have greater impact on performance outcomes, but that the whole of the standards is greater than the sum of each individually.

Full BRT provides the most complete implementation in terms of service and facilities and is designed and constructed to approximate LRT. This level of BRT adheres to the highest level of standards as defined though this study for the BRT network in LA County. Within this high standard, there is built-in flexibility to accommodate the diverse conditions within the communities along the corridor without sacrificing reliability; however, the corridors selected through this study include characteristics that provide the best opportunity for a Full BRT implementation.

The characteristics and benefits of a Full BRT implementation are:

> Full BRT implementation provides the greatest opportunity for realization of improved travel times along a corridor, giving priority to the efficient movement of people over vehicles. The goal of Full BRT is to provide fast (average speed, including dwell time, 18 MPH), frequent (10 minute headways) and reliable service (80% on-time).

> Full BRT quick boarding and alighting (two second/person or 15-second/stop dwell time average) contributes to the overall speed and efficiency of the BRT operation. BRT riders benefit from reduced travel times along the corridor when stops and dwell times are expedited.

> Full BRT is branded and recognized by the traveling public as a distinctive and premium transit service through a BRT designator on stations and vehicles that includes a distinctive design, logo and colors.

> Full BRT implementation relies on a significant percentage (50%) of dedicated running ways, offering a more rail-like experience for the rider, less interference from other transportation modes, and less traffic congestion-related delays.

> Full BRT running way alignment is laid out to minimize conflict with other modes, including common points of conflict, such as vehicle turning movements, on-street parking, ingress and egress from adjacent commercial and retail establishments, delivery vehicles, and taxis or transportation network company (TNC) vehicles. Proper alignment adds the benefit of improved safety and fewer delays along the route.

> Full BRT implementation includes a full complement of station amenities to continue to enhance the rail-like experience and attract additional ridership from transit-dependent and choice riders. While the target is for all stations to have Full BRT amenities, the standard indicates that 90% of stations will include the following amenities:

- Weather protection
- Lighting
- Real-time information
- Trash receptacles
- Seating/lean bars
- Branding
- Metro art

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> In space-constrained environments, where the Metro station kit of parts design cannot be adapted, no more than 10% of Full BRT stations may include the following amenities:

  - Lighting
  - Trash receptacles
  - Seating/lean bars
  - Branding

> All-door boarding reduces station dwell times by improving boarding and alighting – moving passengers quickly between the BRT vehicle and the station platform. All-door boarding is a characteristic of BRT that is shared by both Full and Lite versions of a BRT implementation.

> Intelligent Transportation Systems (ITS) elements, provide the analytical tools to monitor day-to-day and historical operations, provide faster and more reliable communications, and enhance safety and security for operators and passengers. Many ITS elements such as closed-circuit television cameras, on-board Wi-Fi, vehicle location monitoring and other supporting technology enhancements are ready for implementation now.

> Intersection Priority (TSP) for Full BRT active signal priority at 90% of the signals on the corridor. The primary benefit of more signal priority is the opportunity for the bus to progress along the corridor with less impedance and delay at intersections.

Characteristics and Benefits of BRT Lite Implementation

BRT Lite is another tool in Metro's toolkit that can be applied on corridors with special considerations or constraints. BRT Lite provides the highest levels of flexibility to accommodate corridors where Full BRT deployment may not be necessary or viable. It offers high levels of amenities but with more tractable performance standards that can improve upon existing local bus service.

The characteristics and benefits of a BRT Lite implementation are:

> BRT Lite implementation provides an opportunity for realization of improved travel times along a corridor, giving priority to the efficient movement of people over vehicles. The goal of BRT Lite is to provide fast (average speed, including dwell time, 15 MPH), frequent (12-minute headways) and reliable service (75% on time).

> BRT Lite includes quick boarding and alighting (2.5-second/person or 18-second/stop dwell time average) contributes to the overall speed and efficiency of the BRT operation. BRT riders benefit from reduced travel times along the corridor when stops and dwell times are expedited.

> BRT Lite branding is important in differentiating BRT service such that it is recognized by the traveling public as a distinctive and premium transit service. For BRT Lite, stations and vehicles include a designator at minimum that identifies the service as BRT.

> BRT Lite implementations rely on a dedicated running way (20% of the corridor during peak and 10% at all times) for the BRT vehicles to assist in mitigating interference from other modes and helping to reduce traffic congestion-related delays.

> BRT Lite running way alignment is designed to mitigate conflict with other modes as much as possible and avoid common points of conflict, such as vehicle turning movements, on-street parking, ingress and egress from adjacent commercial and retail establishments, delivery vehicles, and taxis or TNC vehicles. Proper alignment adds the benefit of improved safety and fewer delays along the route.

> BRT Lite's baseline station amenities are consistent with BRT's premium service experience and attract additional ridership from transit dependent and choice riders. Seventy-five percent of BRT Lite stations will include:

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- Weather protection
- Lighting
- Real-time information
- Trash receptacles
- Seating/leaning bars
- Branding
- Metro art

> BRT Lite's all-door boarding reduces station dwell times by improving boarding and alighting – moving more passengers more quickly between the BRT vehicle and the station platform. All-door boarding is a characteristic of BRT that is shared by both Full and Lite versions of a BRT implementation.

> BRT Lite's ITS elements provide the analytical tools to monitor day-to-day and historical operations, provide faster and more reliable communications, and enhance safety and security for operators and passengers. Many ITS elements, such as closed-circuit television cameras, on-board Wi-Fi, vehicle location monitoring, and other supporting technology enhancements are mature and ready for implementation now.

> BRT Lite's TSP encompasses 75% of signals with active signal priority on the BRT route and all of guideway signals on the corridor. The primary benefit of more signal priority is the opportunity for the bus to progress along the corridor with less impedance and delay at intersections.

On the following page, **TABLE 6** applies the defined thresholds for Full BRT and BRT Lite conditions, providing an easy accessible summary.

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TABLE 6: BRT STANDARDS DEFINITIONS

Minimum BRT Standards					Standards Flexibility Options		
Standard	Performance or Perscriptive	Full BRT	BRT Lite	Target (Goal)	Alternate	Must Meet	Special Conditions
1. Headway	Performance	10 Minutes (Peak Periods)	12 Minutes (Peak Periods)	Five Minutes (Peak Periods)	Yes	Meet three of four performance standards	Off-peak headways cannot exceed 30 min except on weekends and holidays.
2. Speed	Performance	18 MPH average speed (inclusive of dwell)	15 MPH average speed (inclusive of dwell)	20 MPH average speed (inclusive of dwell)	Yes		Shared street/station environments at terminals can be exempted from standrd if bus circulation is not mixed with autos. MPH data is inclusive of dwells and should include data within 90%. Abnormal major service disruptions and detours can be excluded from standards
Alternative: 2a. Alternative Speed		25% MPH average speed improvement over existing bus service in corridor (inclusive of dwell)	15% MPH average speed improvement over existing bus service in corridor (inclusive of dwell)	30% MPH average speed improvement over existing bus service in corridor (inclusive of dwell)	Yes		
3. On-time Performance/ Reliability	Performance	80% on time (e.g. one minute early/five minutes late)	75% on time (e.g. one minute early/five minutes late)	90% on-time (e.g. one minute early/five minutes late)	No		
4. Dwell Time	Performance	2 seconds per person (per boarding) or average 15 seconds	2.5 seconds per person (per boarding) or average 15 seconds	1.7 seconds per person (per boarding) or average 15 seconds	No		Higher average dwell times can be exempted if per person threshold is met. Abnormal events above 95% of maximum dwell can be exempted. Stations with level boarding and prepaid fares are exempt from this standard.
5. Dedicated Lanes	Prescriptive	50% of corridor	20% of the corridor during peak & 10% at all times	100% of the corridor; remove conflicting left turns and consolidate conflicting driveways	Yes	Must meet or the alternative	
Alternative: 5a. Peak Lanes		N/A	40% during peak	N/A			
6. Intersection Priority (TSP)	Prescriptive	90% of signals with active signal priority (100% of signals on guideways)	75% of signals with active signal priority (90% of signals on guideways)	100% of signals with aggressive active signal priority	No	Must meet	
7. Station Amenities	Prescriptive	90% of Full stations & 10% of Lite stations	75% of Full stations & 25% of Lite stations	100% Full stations	Yes	Must meet or alternative	Shared street/station environments and terminals may have features and information systems that match the greater environment, as long as BRT stops/bays are clearly marked with matching brand elements. If headways are five minutes or less then seating may be replaced by leaning rails in very constrained areas or areas that provide seperate supplementary seating.
Alternative: 7a. High Frequency Station Amenities		If headways 5 min or less - 80% Full stations 20% Lite stations	If headways 5 min or less - 60% Full stations 40% Lite stations				
8. All-door Boarding	Prescriptive	All stations allow all-door boarding	All stations allow all-door boarding	All stations allow all-door boarding	No	Must meet	Up to 10% of Full BRT and 20% of BRT Lite stations can be exempted from all-door boarding if off-board fare payment is used.
9. Branding	Prescriptive	Distinctive design and logo. coordinated colors	BRT designator	Distinctive branding, including design and logo on all stations and vehicles	No	Must meet	

Notes: * Full stations = Weather protection (shelter), lighting, real-time information, trash receptacles, seating/leaning, Other passenger amenities, station IDs, security cameras, art
**Lite stations = Seating, trash recepticles, ID, brand

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BRT Design Guidelines

The BRT design guidelines, developed as part of this study along with performance measures, will assist and guide Metro and other municipal transit operators in the planning, design, operation and monitoring of an efficient and effective BRT system. The design guidelines align with the BRT vision, goals and objectives, build upon lessons learned from Metro's existing BRT and rail systems, and draw on best practices from BRT systems across North America and around the world.

The BRT Design Guidelines Manual, a separate companion document to this final report, provides recommendations on six critical and interconnected aspects of Bus Rapid Transit: General Operating Characteristics, the design of BRT Running Ways, Stations, ITS, Branding and integration with Transit-oriented Communities (TOC). The design guidelines also identify creative, adaptable and innovative BRT improvements and solutions, promote BRT as an investment in communities, facilitate safe pedestrian and bicycle connections to the BRT network and encourage holistic planning efforts that support and promote TOC.

The passenger experience, safety, operational and capital requirements and cost-effectiveness were considered when developing these guidelines. The design guidelines are flexible enough to address potential site-specific constraints and/or applicable local ordinances. They will be used by Metro in updating its existing BRT Design Criteria Manual, and by municipal transit agencies wishing to implement new BRT lines under Measure M's BRT Program, ushering in the county's next iteration of BRT services.

FIGURE 11: CRITICAL & INTERCONNECTED BRT ASPECTS

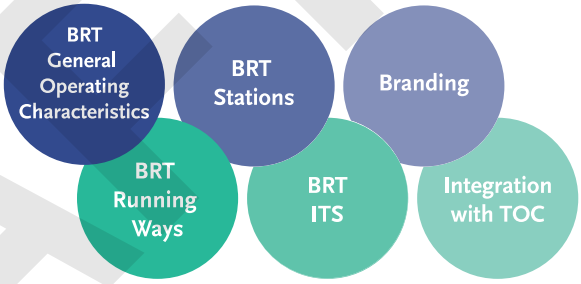
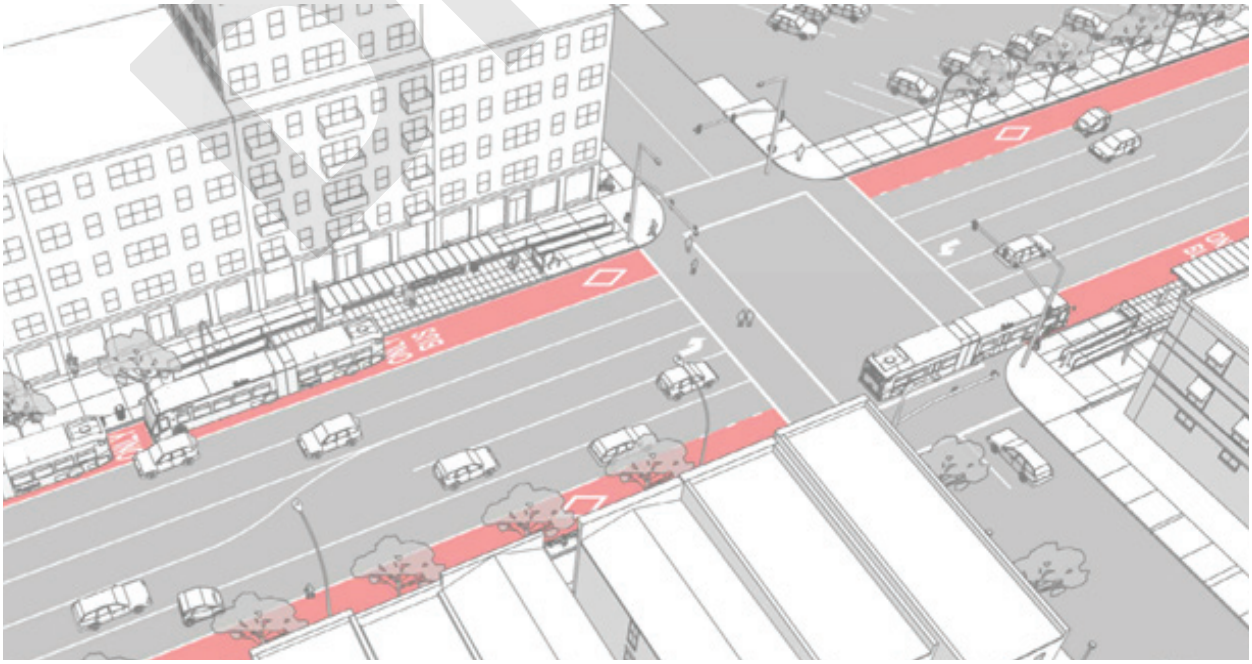


FIGURE 10: CURB RUNNING BRT OPERATION



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BRT Corridors

The corridor screening and selection process was designed to identify the corridors where BRT is best deployed as a mobility solution. It is important to note that BRT investment is not appropriate for every high-ridership corridor, nor is BRT the only tool available to improve bus speeds and service reliability. Other speed improvement tools include: queue jumps, bus only lanes, signal priority and more can be selectively deployed to alleviate choke points on any given bus route.

Corridors identified and selected as the best candidates for BRT, through this study, have characteristics that include an optimal intersection of need and opportunity, meaning that there is not only a demand for service, but the corridor contains the requisite characteristics to support BRT infrastructure.

Thematically, the main features that Metro considered of primary importance in the selection of BRT corridors included: service demand, regional connectivity, along with an opportunity to improve bus speeds, supportive infrastructure and Metro's Equity Focus Communities (EFCs).

Corridor Identification

Metro's technical team used three primary sources to gather a broad list of potential corridors for BRT implementation:

> BRT candidate corridors identified in recent planning studies and efforts by Metro

> Direct input from the project's targeted stakeholders

> Use of a parametric design tool to identify promising corridors not identified through the efforts mentioned above

Recent Planning Studies and Efforts by Metro

Recent planning studies and efforts by Metro provided the basis from which to begin the identification and evaluation of potential BRT corridors. A literature review and research initially yielded a list of 34 corridors primarily informed by Metro's Bus Rapid Transit and Street Design Improvement Study (2013) and the Sub-regional Mobility Matrix effort undertaken in support of Measure M. The team also coordinated with other related initiatives, including the NextGen Bus Plan, LRTP, Bus Speed Improvement Working Group and the Metro Vision 2028 Strategic Plan.

Three corridors from the 2013 study and the Mobility Matrix effort are currently in the planning and implementation stages, now known as the North Hollywood to Pasadena, North San Fernando Valley and Vermont corridor projects. In order to avoid any duplication of efforts, none of the aforementioned projects nor any mobility corridor in the Measure M expenditure plan was analyzed through this process.

Technical Advisory Committee Input

To help guide the study process, a Technical Advisory Committee (TAC) was established, comprised of staff from Metro departments, cities and municipal transit operators. The TAC provided insight on the identification and validation of BRT corridors and direction on the identification of the Strategic BRT network. Through the assistance of the TAC, an additional 39 corridors were identified for consideration. This was in addition to the previously identified corridors noted above.

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Parametric Design Tool

In order to find promising corridors not yet identified by the two aforementioned methods – corridors from previous studies or stakeholder input – a computational (or "parametric") analysis was utilized. Parametric modeling is a customizable algorithmic process enabling the efficient and effective processing of complex information, associating multiple parameters (or datasets) as design drivers for evidence-based decision making. The algorithms built for the BRT Vision provided parametric analysis for the project in two phases. The first used three criteria (equity, population density, employment density) to ensure the potential BRT routes provided county coverage and specifically served areas with the highest need. The subsequent phase added additional layers of criteria to rank the lines based on performance potential, choosing the best lines to consider.

This type of modeling is an innovative way of leveraging the available analytical technologies to incorporate many disparate datasets into a cohesive and understandable whole, thereby giving each corridor the same level of quantitative analysis.

In this final step to identify candidate corridors, the automated parametric algorithm was used to review every arterial segment in LA County and create a "heat map" of segments that score well in the areas of population density, employment density, intermodal connections, as well as Metro's EFC metric. Use of the parametric tool ensured that no viable BRT candidate corridors were neglected or overlooked due to bias or human error.

The high-performing segments identified through this process were manually combined into corridors. This analysis resulted in 11 new corridors in East Los Angeles, South Los Angeles and the San Fernando Valley, complementing and filling gaps in the corridors identified above.

The Universe of Corridors

Based on previous studies, plans and input from the BRT TAC described in the previous sections, a comprehensive set of corridors was assembled and is depicted in the map in ***Figure 12***, shown on the following page. This set of corridors became the basis for all subsequent analysis and screening activities. This was an important step in providing a foundational set of corridors where all desired BRT routes were considered. After this step, the various criteria for a successful BRT were progressively applied in three screening levels to narrow the field to those routes likely to perform the best and serve the needs of each respective community.

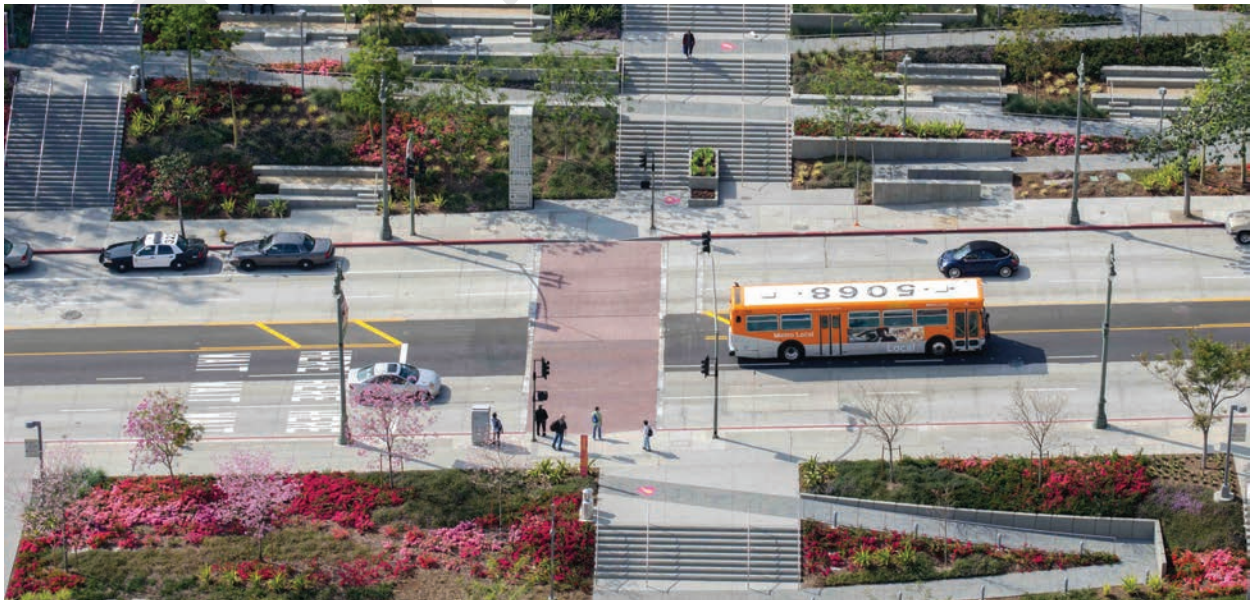

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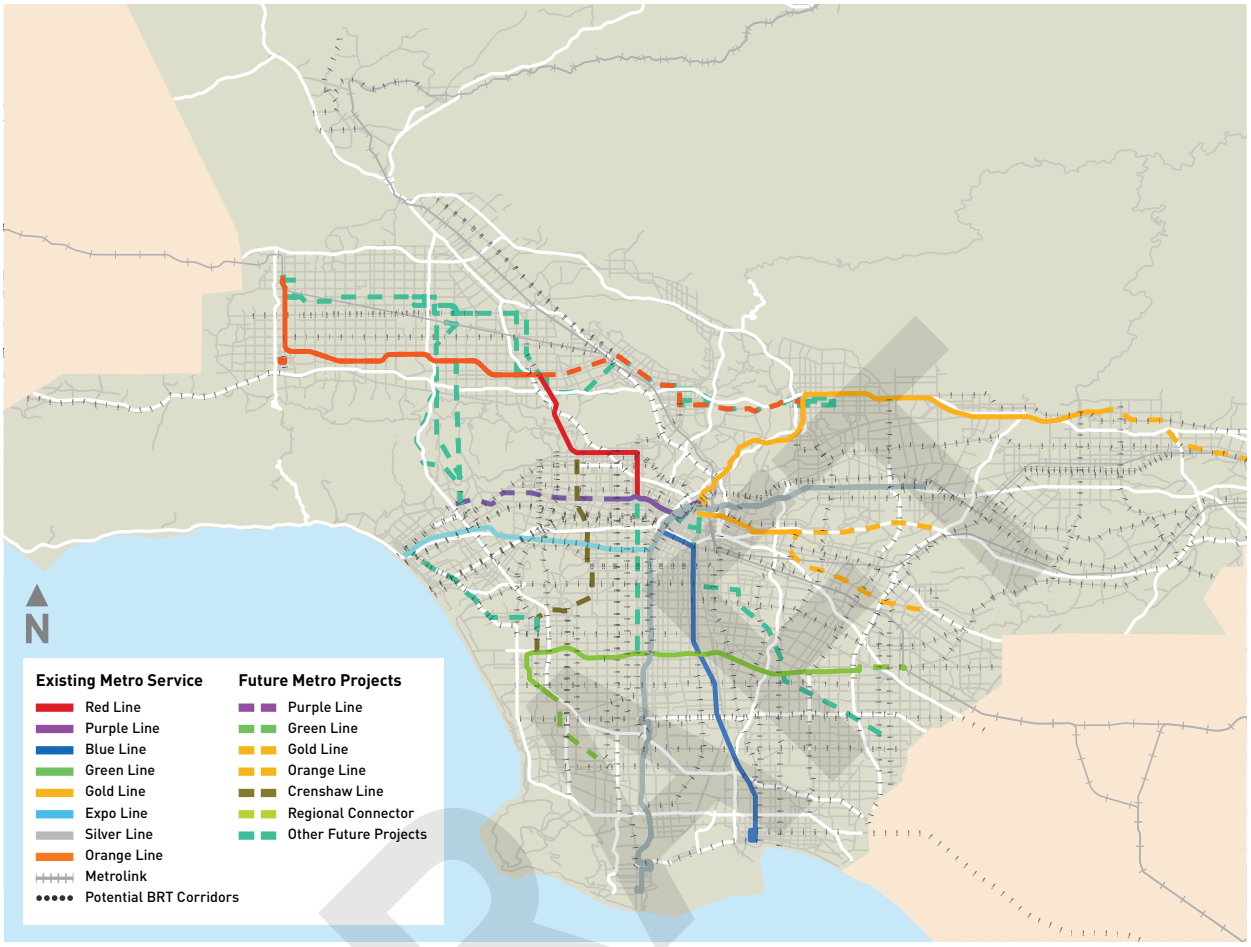
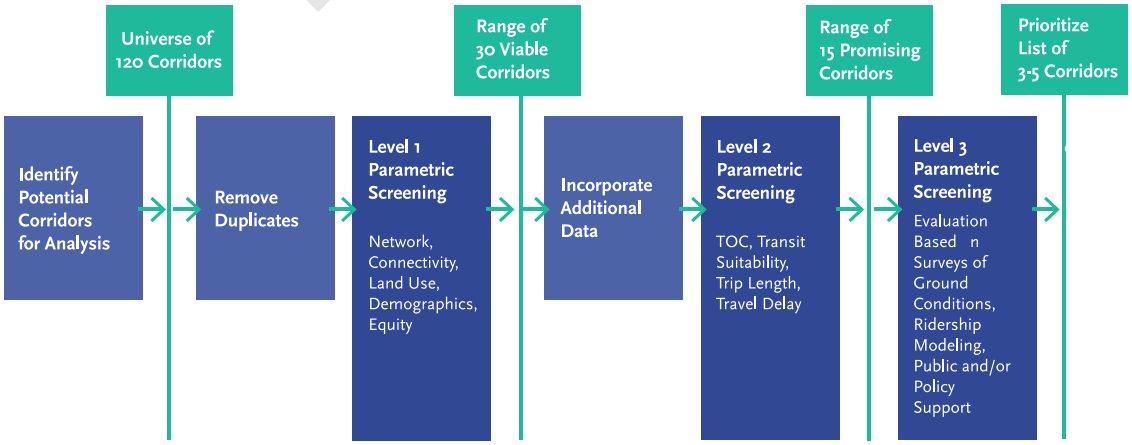
FIGURE 12: UNIVERSE OF POTENTIAL BRT CORRIDORS IN LOS ANGELES COUNTY



Corridor Screening Process

The process chart in ***Figure 13*** depicts the progression and levels of screening used to analyze potential corridors and select the most promising corridors for BRT implementation in LA County. Given the large number of corridors, and in keeping with common transit planning practice, a three-level screening process was used, wherein each successive screening level introduces additional data to arrive at a prioritized set of corridors. The following section provides detail for each level of the process.

FIGURE 13: BRT CORRIDOR THREE-LEVEL SCREENING PROCESS



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Level 1 Screening

After compiling the list of potential BRT corridors, the technical team reviewed the results for high-level feasibility. Potential corridors were eliminated from consideration, or their routing was adjusted, for the following reasons:

> The corridor does not begin, end, or connect to existing or planned high-capacity transit services or key activity centers.

> The corridor does not begin or end at key activity centers.

> The corridor is duplicative of existing or planned high-capacity transit.

> The corridor was determined to be infeasible in a prior study.

> The corridor did not meet minimum length requirements (six miles) or was a small extension to an existing or planned transit corridor.

Once the initial screening/refinement was performed, the remaining corridors were loaded into the parametric model for level 1 screening. The screening analyzed network connectivity, land use, points of interest, demographics and Metro's EFC metric. The criteria are listed in ***Table 7***. The model compared the area within ¼ mile of each corridor relative to the area along every other corridor and generated a score for each option. Corridors that best met the criteria — such as those that have higher levels of job or residential density or include a higher proportion of the corridor in an EFC area — received higher scores.

The Level 1 screening resulted in a list of 30 corridors to be taken into the next level screening, as shown in **FIGURE 14**.

TABLE 7: LEVEL 1 PARAMETRIC CRITERIA

CRITERIA	DEFINITION
Network Connectivity	Measures how well connected the corridor would be to other lines of transit service.
Demographics: Population Density	Measures how many people live adjacent to the corridor.
Demographics: Employment Density	Measures how many jobs are adjacent to the corridor.
Equity	Measures how much of the corridor falls within Metro's Equity Focus Communities metric.
Land Use: Educational Facilities	Measures the corridor's connectivity to schools.
Land Use: Transit-supportive Zoning	Measures how much of the corridor is zoned for more transit-supportive land uses (such as multi-family residential).
Land Use: Points of Interest	Measures the corridor's connectivity to points of interest, such as libraries and parks.

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FIGURE 14: TOP 30 BRT VISION & PRINCIPLES STUDY CORRIDORS MAP (COLOR)

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Level 2 Screening

In this second screening, the team introduced additional parameters into the model. The 30 most promising corridors were put through a second level of parametric analysis, which considered a rating of each corridor's suitability for supporting transit-oriented communities, trip length, travel delay, network connectivity and equity. This second screening was coupled with another visual inspection process, which allowed the team to identify any other attributes of or difficulties with the corridor that would assist in the identification of the most promising and best performing 15 corridors. The criteria used in the Level 2 screening are shown in **TABLE 8**.

TABLE 8: LEVEL 2 PARAMETRIC CRITERIA

CRITERIA	DEFINITION
Transit Propensity	Measures likelihood of residents living along a corridor to take transit.
Trip Length	Average trip length in a corridor based on location-based services data.
Trip Delay	Travel Time Index output from iPEMS, Metro's Arterial Performance database.
Corridor Constructability	Qualitative evaluation of the physical compatibility of a corridor for new BRT service.
Transit Oriented Communities (TOCs)	Qualitative evaluation of TOC potential along a corridor.
Network Connectivity	Measures how well connected the corridor would be to other lines of transit service.
Equity	Measures how much of the corridor falls within Metro's Equity Focus Communities metric.

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FIGURE 15: TOP 15 BRT VISION & PRINCIPLES STUDY CORRIDORS MAP (COLOR)

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Level 3 Screening

The final Level 3 screening process was more qualitative in nature. In this screening, the 15 top performing corridors were reviewed with additional detail incorporated into the analysis. Network connectivity, transit propensity and equity were carried forward from previous screening with new criteria incorporated: qualitative evaluations of TOC and transit-friendly plans and policies, a qualitative assessment of travel time savings potential, surveys of ground conditions, public and political support and input from key stakeholders. This final assessment shortened the list further, identifying the five priority corridors recommended for BRT implementation, as documented in the following section. The criteria used in the Level 3 screening are shown in **TABLE 9**.

TABLE 9: LEVEL 3 CORRIDOR SCREENING CRITERIA

CRITERIA	DEFINITION
Transit Propensity	Measures likelihood of residents living along a corridor to take transit.
Transit-friendly Policies	Qualitative evaluation of transit supportive traffic management plans, policies and infrastructure along the corridor.
Travel Time Savings Potential	A qualitative assessment considering corridor congestion hot-spots from the iPEMS data coupled with the likely constructability of transit-priority measures in the hot-spots.
Existing Right-of-Way and Corridor Constraints	Qualitative evaluation of the physical compatibility of a corridor for new BRT service.
Transit Supportive Land Uses and Plans	Qualitative evaluation of transit supportive plans and policies along the corridor.
Network Connectivity	Measures how well connected the corridor would be to other lines of transit service.
Equity	Measures how much of the corridor falls within Metro's Equity Focus Communities metric.
Public and/or Policy Support	Qualitative assessment of documented support for BRT in the corridor.

Top Five BRT Corridors

Based on the criteria and rigorous screening process conducted throughout this study, Metro has identified the following five corridors as the top candidates eligible for Measure M Countywide BRT program funds. Each of the top five corridors present excellent opportunities for BRT investment. Of these top five BRT corridors, Metro staff will present a recommendation to the Metro Board of Directors that one of these corridors be initially advanced into project development, subject to available funding. The balance of the remaining corridors would be eligible for Measure M Countywide BRT program funds in subsequent years as funding becomes available. The corridors are listed in alphabetical order. The selected corridors are depicted in the map in ***Figure 16***.

FIGURE 16: TOP FIVE BRT VISION & PRINCIPLES STUDY CORRIDORS

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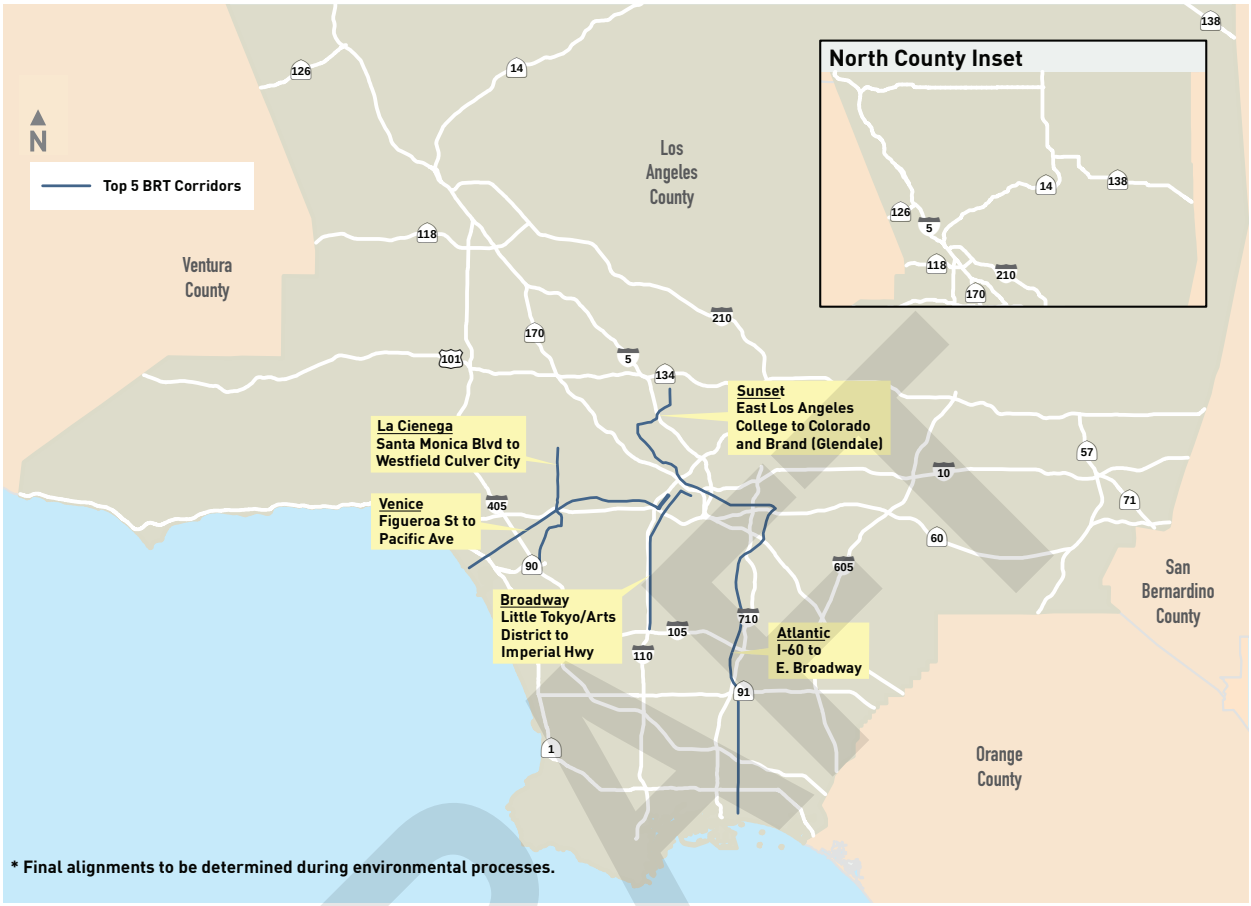
FIGURE 17: TOP FIVE BRT VISION & PRINCIPLES STUDY CORRIDORS MAP (COLOR)



Atlantic

The Atlantic corridor provides high-capacity network coverage in Southeast LA County, from the San Gabriel Valley to the City of Long Beach, connecting cities and communities. When compared to the other top five corridors, this corridor has a moderate level of network connectivity. Atlantic also has a moderate opportunity to build BRT-friendly infrastructure and realize travel time savings, although sidewalks are wide relative to other corridors, allowing more opportunity to build stations with Full BRT passenger amenities. Although this corridor has a comparatively low ridership score, it provides access to industrial jobs for lower-income workers, addressing Metro's equity goals.

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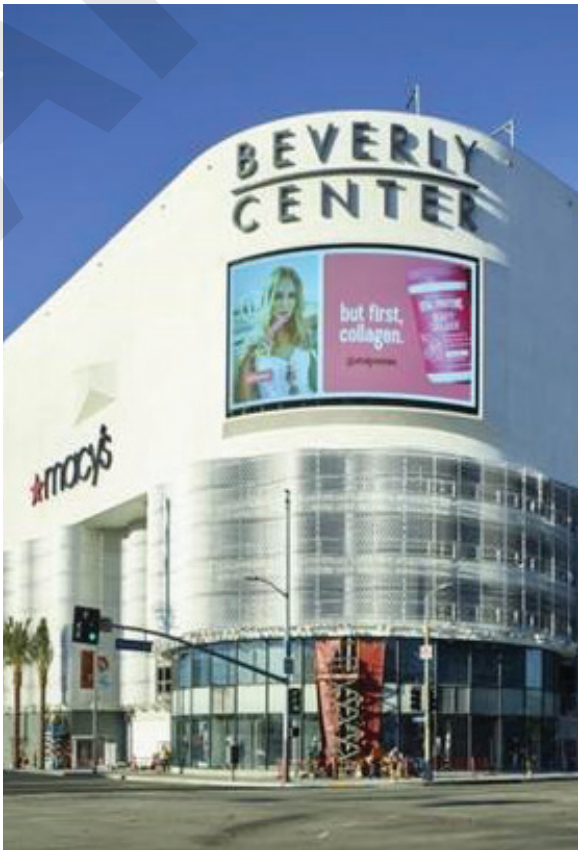
Broadway

Broadway is a vibrant transit corridor with very high network connectivity and is also a NextGen Tier One corridor[1]. When compared to the other top five corridors, this corridor had a very high score in the Equity Focus Community index and is a high-priority corridor per Los Angeles Department of Transportation's (LADOT's) assessment. Broadway runs through two City of LA Community Plan areas which feature TOC and transit-supportive policies. This corridor has moderate level ridership and a moderate opportunity to build BRT-friendly infrastructure and realize travel time savings. A future alternatives analysis could consider both Broadway and Figueroa, which closely parallel each other and perform comparably.

La Cienega

The La Cienega corridor provides high-capacity north-south network coverage on the Westside, linking cities and communities, including West Hollywood, Beverly Grove, eastern Beverly Hills, Pico-Robertson and Culver City. It runs through three City of LA Community Plan areas, which feature or are being updated to feature TOC and transit-supportive policies. Culver City has recently completed a TOD Visioning Study, and West Hollywood has TOC-supportive policies in place that could support the implementation of a BRT on the La Cienega corridor. In comparison to the other top five corridors, La Cienega has a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has a low network connectivity score, low ridership score, it is not a NextGen Tier One corridor and it has a low score in the Equity Focus Community index.



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1 Corridors analyzed during the development of the NextGen Bus Plan were also considered throughout this study. Additional information about the NextGen Bus Plan can be found at: https://www.metro.net/projects/nextgen/.

Sunset

The Sunset corridor has a very high network connectivity score and connects downtown Los Angeles with the San Fernando Valley. Sunset is a NextGen Tier One corridor that runs through six City of LA Community Plan areas, which feature or are being updated to feature TOC and transit-supportive policies. When compared to the other top five corridors, this corridor has a moderate-level of ridership and a moderate-level opportunity to build BRT-friendly infrastructure and realize travel time savings.

Venice

Venice has a very high network connectivity score and a very high ridership score. Venice is a NextGen Tier One corridor with a high-level opportunity to build BRT-friendly infrastructure and realize travel time savings. This corridor has pedestrian-friendly features along much of its distance with a strong mix of land uses oriented to the street. The Venice corridor runs through seven City of LA Community Plan areas, which feature TOC and transit-supportive policies. Culver City has recently completed a TOD Visioning Study, which includes Venice. Venice has communities with strong transit-supportive policies along corridor and it is an LADOT high-priority corridor.

Strategic BRT Network

The Strategic BRT Network builds upon the top five corridors and utilizes a three-step process to layout a roadmap for future BRT expansion in LA County. If the top five recommended BRT corridors are where investment begins, the Strategic BRT Network is where expansion should continue should future funding become available. The first step in the development of the network was to pull from our initial BRT corridor screening assessment – the 120 corridors evaluated as part of the top five recommended corridors – and utilize the Top 30 corridors identified to develop a "core" network. The top 30 corridors – through virtue of their selection process – are previously identified, high-performing transit corridors that jump ahead of other analyzed corridors for their specific strengths in network connectivity, transit supportive land uses, transit propensity, trip length, trip delay and equity.

The second step was to build off of our core network and build out a countywide network for BRT. Staff conducted a gap analysis with four main objectives: 1) consider the existing and planned rail/BRT network, 2) identify gaps in service coverage area, 3) connect future BRT corridors to one another and the Metro rail network, and 4) leverage corridors identified and screened through the project study. Staff examined local city plans,

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Council of Governments studies, and other regional transportation plans to identify locally preferred transit corridors to assure alignment between our proposed corridors and those our local partners may have already identified. The second step of the process also involved removing duplicate service – identifying parallel BRT corridors near one another – with priority given to the corridor with the higher opportunity to construct.

Finally, our third step was to solicit input on the network from our local agency partners – including our study TAC, as well as through individual meetings with local agencies and key stakeholders. The third step allowed staff to receive direct feedback from our local partners and make changes where necessary to align Metro's vision for the future of BRT in LA County with that of our local partners.

FIGURE 18: BRT NETWORK

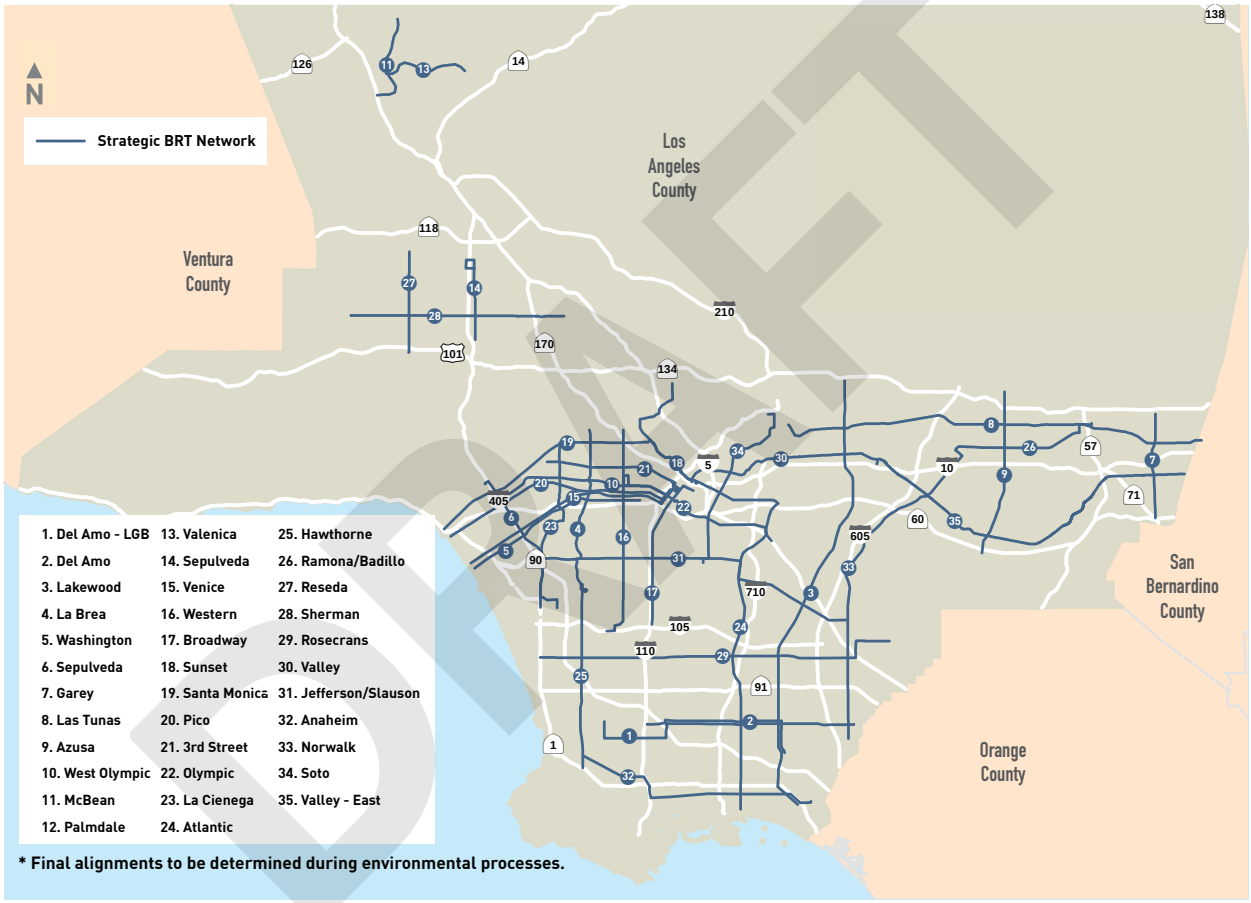

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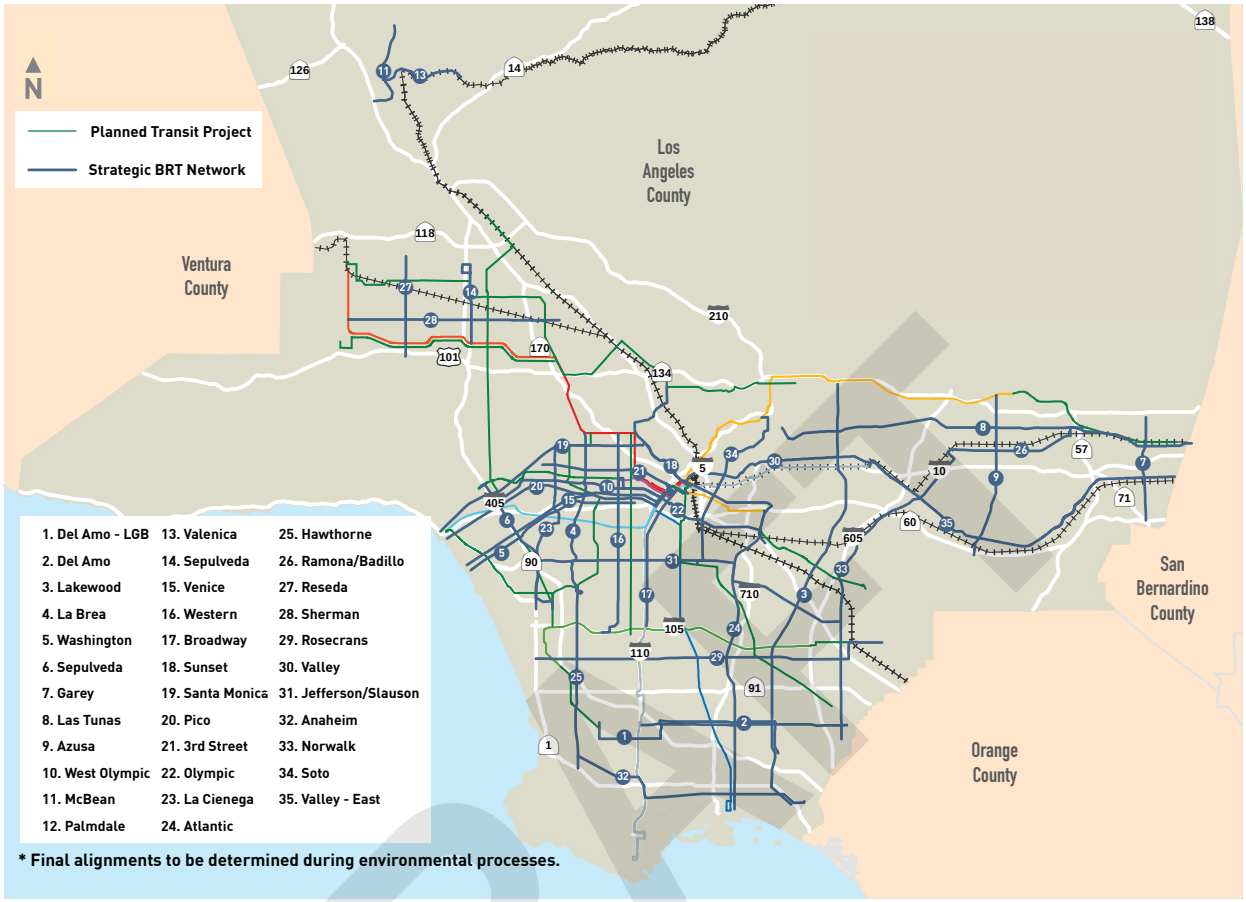
FIGURE 19: BRT NETWORK & THE EXISTING/PLANNED TRANSIT



Conclusion

Metro is making unprecedented investments in our LA County mobility system, including specific investments in BRT. The work completed through the BRT Vision & Principles study establishes the necessary foundation to guide those BRT investments into the foreseeable future. The completion of this work is timely and necessary, particularly as Metro is embarked on three early potential BRT projects, all in some level of study, and with more to follow.

Coordination with the Metro BRT mobility corridor teams has been a continuous feature of this study. Accordingly, BRT projects that are currently in some level of study, as of this writing, are expected to meet the BRT standards established in this document. Future BRT projects will similarly be held to those BRT standards as will any public agency seeking to use Measure M Countywide BRT program funds to develop a BRT project.

The design guideline manual, referenced briefly in this report and available as an accompaniment to this report, will provide the necessary interim guidance for BRT planning work. Next steps for the design guideline manual will be to adapt that work to specific design criteria. This will ensure that as BRT projects move through design and construction phases that the design guidelines are incorporated into the project.

The study identified a top five BRT corridors recommended for future project implementation. These BRT corridors offer the requisite characteristics for successful BRT service. Metro staff will present this top five list to the Metro Board for consideration, recommending that one of these corridors be taken into project development in the near-term. With Board concurrence on a specific corridor, staff will return to the Board at a later date with recommended programming actions and next steps. This will necessarily involve more detailed corridor level analysis, conceptual design work and public engagement with corridor communities and stakeholders.

Finally, periodic updates to the standards, design guidelines and design criteria will be undertaken as necessary to stay current with emerging technologies and best practices.

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Appendix

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Key Transit Terms

TERM	DEFINITION
iPEMS	Metro's online roadway (freeways and arterials) performance monitoring tool to support local agency and sub-regional operations and planning efforts. iPeMs uses HERE real-time crowd-source data and provides real-time continuous speed data every minute.
ITS	Technical innovations that apply communications and information processing to improve the efficiency and safety of ground transportation systems.
Headway	The time that passes between the departure of one bus and the arrival of another.
LRTP	Metro's plan to assess future population increases projected for the county and what such increases will mean for future mobility needs. The plan recommends what can be done within anticipated revenues, as well as what could be done if additional revenues became available. The 2009 LRTP is an update to the 2001 Long Range Transportation Plan for future transportation investments in LA County through 2040.
MTBF	Mean time between failure, or inherent failures of a mechanical or electronic system during normal system operation.
POP	Proof of payment for transit services, such as TAP, reduced fare, low-income fare, or annual fare cards.
Right-of-way	Right-of-way is a type of easement granted or reserved for use by an operator of a transportation project, such as for a BRT running way or station. Ownership of the right-of-way stays with the original owner.
Running way	A transportation corridor dedicated for exclusive or preferential use by public transit vehicles, including rail vehicles, buses, carpools and vanpools.
TAP	Transit pass, a plastic card with an embedded smart card chip, is designed to apply fare payments at fareboxes, ticket vending machines and other participating agencies.
TOC	TOCs include land use planning and community development policies that maximize access to transit as a key organizing principle and acknowledge mobility as an integral part of the urban fabric.
TNC	Transportation Network Companies provide prearranged transportation services for compensation using an online-enabled application or platform (such as smart phone apps) to connect drivers using their personal vehicles with passengers.
TSP	Transit signal priority refers to the functioning relationship between active signals along a corridor. A common cycle length is established for all intersections in the coordinated system. By maintaining a constant relationship between the signals at all times, there is a greater likelihood that mobility will be improved. This does not mean that the signals will provide a green light at the same time for the entire length of a corridor; rather, that each signal will quite literally be synchronized with the entire system, allowing for more efficient mobility.

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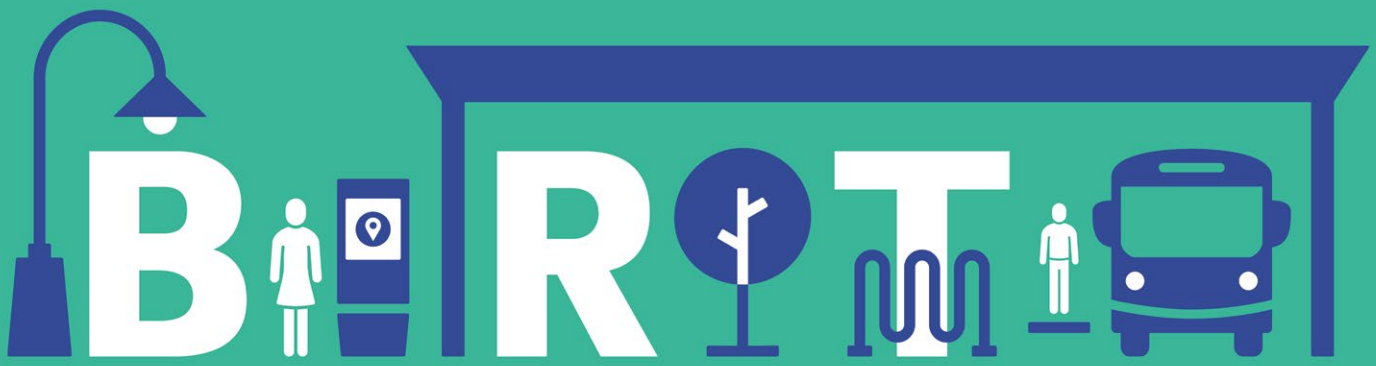
Los Angeles County
Metropolitan Transportation Authority



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BUS RAPID TRANSIT DESIGN GUIDELINES

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BRT Design Guidelines Introduction

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1 Los Angeles County BRT Design Guidelines

Objectives of the BRT Design Guidelines
Section 1 – Operating Characteristics
Section 2 – Stations and Platforms
Section 3 – Running Ways
Section 4 – Intelligent Transportation Systems (ITS)
Section 5 – Branding Design Elements
Section 6 – Transit-oriented Communities (TOC)

2 How to Use the Guidelines

3 An Integrated Set of Guidelines for Los Angeles County's BRT System

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1 Los Angeles County BRT Design Guidelines Introduction

As the largest public transportation agency in LA County, as well as the manager of county revenues dedicated to public transportation, Metro is committed to the goal of achieving world class bus system performance and service. Consistent with this goal, Metro has completed a BRT Vision and Principles Study to develop a comprehensive, regional approach to Bus Rapid Transit (BRT) planning, design and operation.

Metro is making unprecedented investments in our LA County mobility system and this includes specific investments in BRT. With our BRT system poised to expand, there is a strong need to define BRT standards, operating characteristics, design guidelines and performance measures, to ensure a consistent and high-quality passenger experience.

BRT is a bus-based transit service that is flexible and cost-effective, yet can provide faster, more reliable and more convenient service than traditional bus service. BRT is able to achieve these efficiencies through a mix of operational, infrastructure and technological improvements. With the right mix of improvements, BRT can deliver accessible, rail-like service on city streets at a fraction of the cost.

The BRT design guidelines contained herein build upon lessons learned from Metro's existing BRT and rail systems, and draw on best practices from BRT systems across North America and around the world. The intent of the design guidelines is to assist and guide Metro and other municipal transit operators in the planning, design, operation and monitoring of an efficient and effective BRT system.

Development of the BRT design guidelines was also informed by the Metro Strategic Plan (Vision 2028) and in close coordination with concurrent Metro efforts including the 2020 Long Range Transportation Plan (LRTP) and the NextGen study. Also taken into consideration were three near-term Metro planning projects: North Hollywood to Pasadena BRT, North San Fernando Valley BRT, and the Vermont Transit Corridor.

Objectives of the BRT Design Guidelines

The Guidelines address six critical and interconnected aspects of Bus Rapid Transit: General Operating Characteristics, the design of BRT Running Ways, Stations, and Intelligent Transportation Systems (ITS), Branding and integration with Transit Oriented Communities (TOC). The design guidelines also identify creative, adaptable and innovative BRT improvements and solutions, promote BRT as an investment in communities, facilitate safe pedestrian and bicycle connections to the BRT network and encourage holistic planning efforts that support and promote Transit Oriented Communities.

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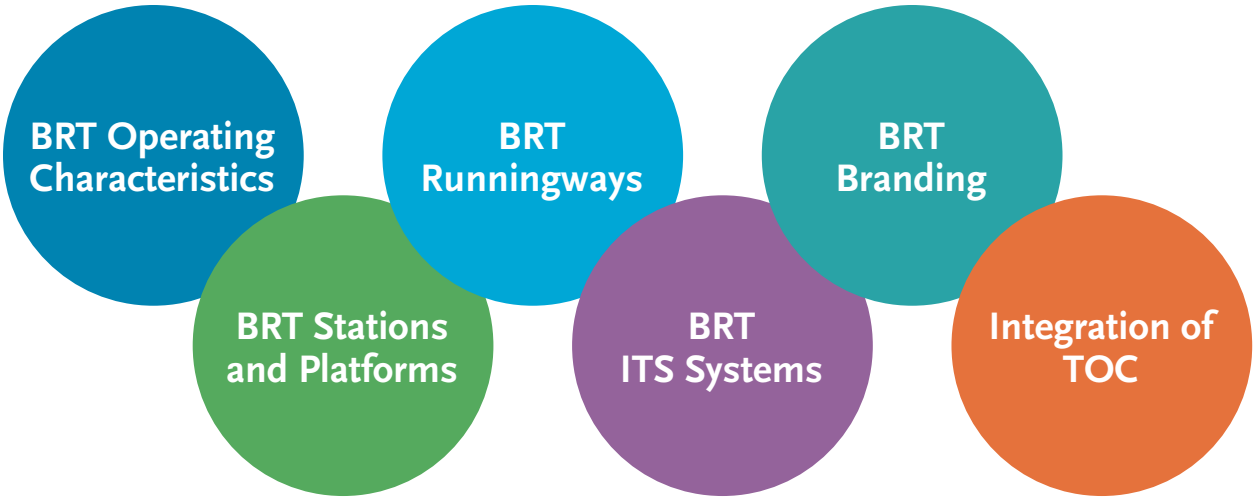
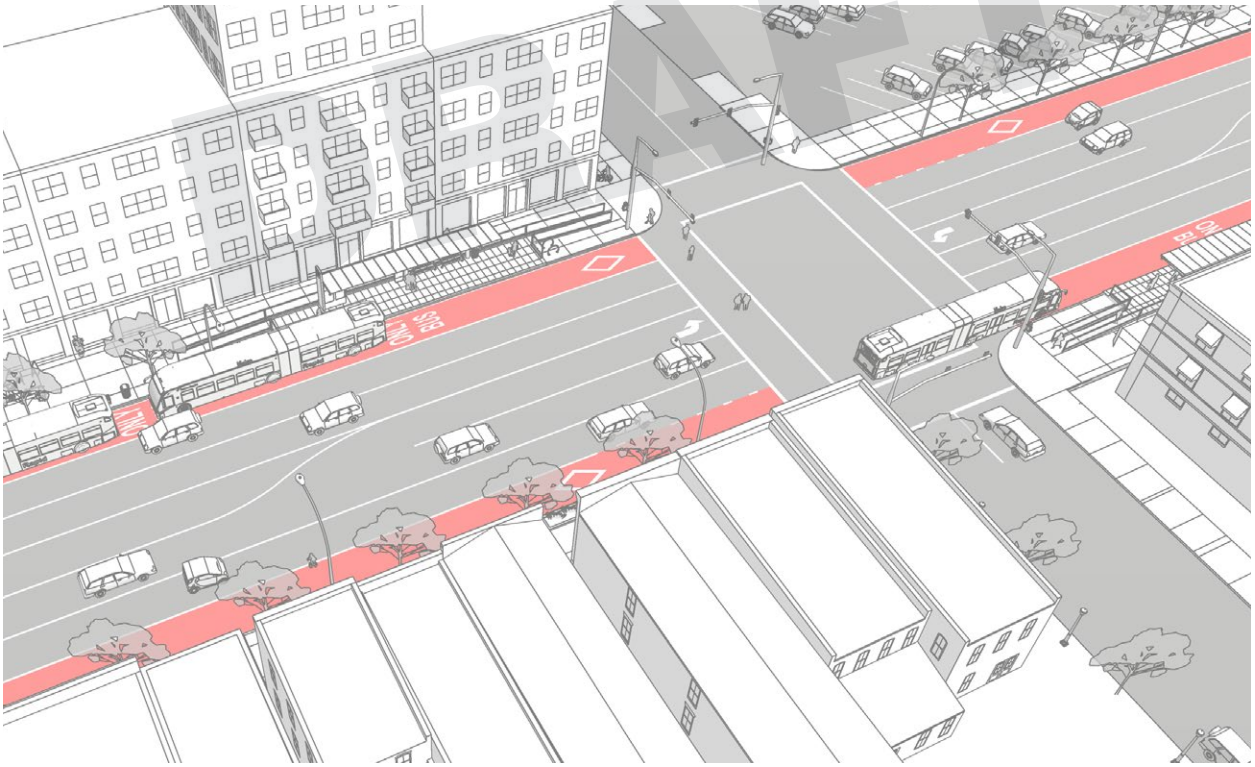


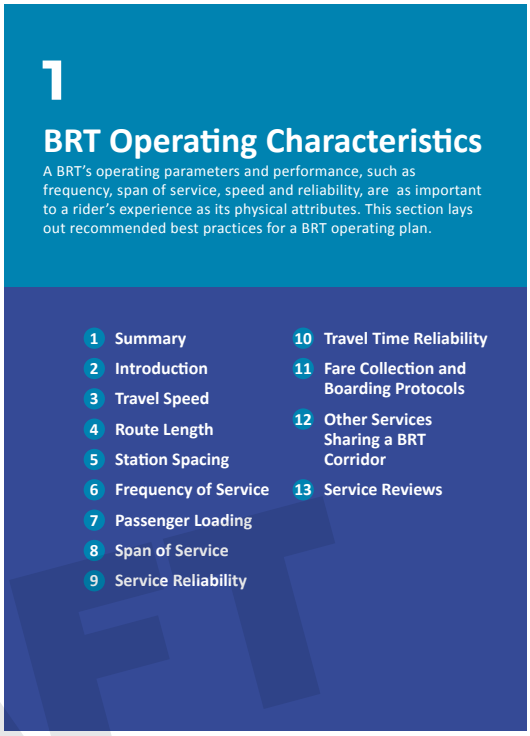
The passenger experience, safety, operational and capital requirements and cost-effectiveness were considered when developing these guidelines. The design guidelines are flexible enough to address potential site-specific constraints and/or applicable local ordinances. They will be used by Metro in updating its existing BRT Design Criteria Manual, and by municipal transit agencies wishing to implement new BRT lines under Measure M's BRT Program, ushering in the county's next iteration of BRT services.



The following pages highlight the contents, key guiding principles and major themes from each chapter of the design guidelines.

Section 1 – Operating Characteristics

A BRT's operating parameters and performance, such as frequency, span of service, travel time, and reliability are as important to a rider's experience as its physical attributes. The Operating Characteristics section establishes guidelines and reviews best pratices for a BRT operating plan in LA County, and is oriented around four primary considerations: Context-Sensitivity, Station Spacing, Speed, and Frequencies and Spans.



Context-sensitive Guidelines

The operating plans presented are designed for the urban and suburban settings found throughout LA County, with variations designed to accommodate particular operating contexts. The guidelines also offer flexibility when implementing two styles of BRT - "Full BRT" which features a greater investment in dedicated BRT running ways (at least 50% of the route), and "BRT Lite" which achieves speed advantages through more tactical measures such as shorter dedicated lane segments, peak-hour transit-only lanes, and queue jumpers.

Station Spacing

BRT service must balance the need to stop frequently enough to serve transit-supportive land uses and key activity centers with the goal of reducing travel times by limiting stops. As a result, the station spacing requirements analysed the average station spacing found in the Metro Rapid network and increased it to bring it more in line with industy standards for BRT. The guidelines set minimum and maximum average stop spacing distances for dense urban, other urban, suburban, and regional contexts. In general, BRT stations will be spaced roughly 1 mile apart.

Speed

The guidelines recommend that BRT services in LA County achieve minimum end-to-end average speeds (including stops) of 18 mph for Full BRT and 15 mph for BRT Lite. Where unique demand densities, congestion, or right-of-way constraints impact those speeds, the serice should make speed improvements relative to local service of 25% for Full BRT and 15% for BRT Lite. The metrics were designed to address the goals established in Metro's Vision 2028 plan.

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Frequencies and Spans

In order to achieve the goal of providing a "rail-like" experience on BRT, the design guidelines establish headways similar to those found on the county's light rail network. The recommended peak-period maximum headways for BRT are:

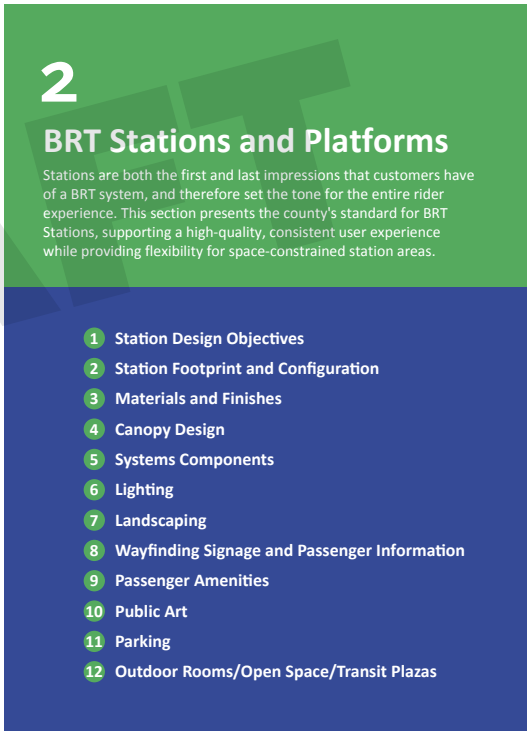
> 10-minutes for Full BRT

> 12-minutes for BRT Lite

Service span recommendations are also consistent with Light Rail Transit (LRT), running from 4:00 am to 2:00 am on both weekdays and weekends. In certain suburban contexts that do not connect to the Metro Rail network, service may end at 12:00 am.

In addition to these four considerations, the Operating Characteristics establish guidelines for travel time reliability, fare collection and boarding protocals, and considerations where BRT service shares a corridor with other transit service, all with a view to making BRT in LA County a safe, convenient, attractive and cost-effective mode choice.

Section 2 – Stations and Platforms



Although one of the goals of BRT service is to operate frequently enough that riders do not have to wait long at stations, high-quality station design provides a consistent user experience for passengers and will support positive perceptions of the county's BRT network as a whole. The Stations and Platforms section provides guidelines for the station footprint and configuration, shelter design, materials and finishes, and integration of other components such as lighting, landscaping, wayfinding, and passenger amenities.

The Stations and Platforms section provides a combination of elements of continuity (those that are present at all stations) and elements of variability (those that are dependent on context) to satisfy four goals:

> Enhance the passenger experience

> Establish a high-quality baseline set of elements

> Provide for seamless integration into right of way

> Use a kit-of-parts approach

Major aspects of the station placement and design will be determined primarily by the running way configuration selected for a route (e.g. side versus center running), as well as by available right of way. However, the guidelines also consider approximately two dozen potential components that can be incorporated into stations and platforms. For example, all station platforms will include a ramp or sloped walkway, a canopy/shelter, schedules and wayfinding information, public art and real-time arrival signs. Other elements (such as bike racks or mobile device charging infrastructure) may be deployed as-needed or to enhance stations depending on their particular context.

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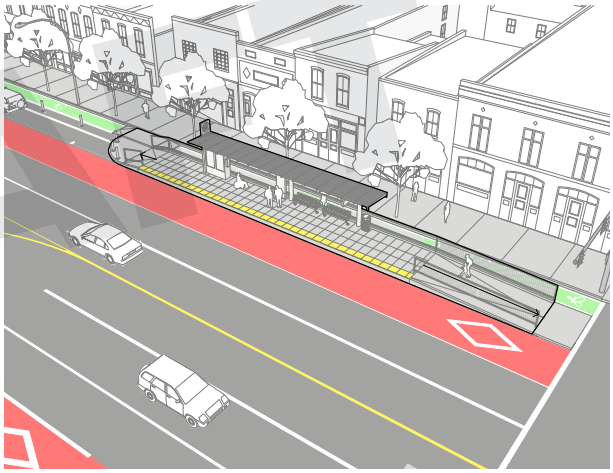
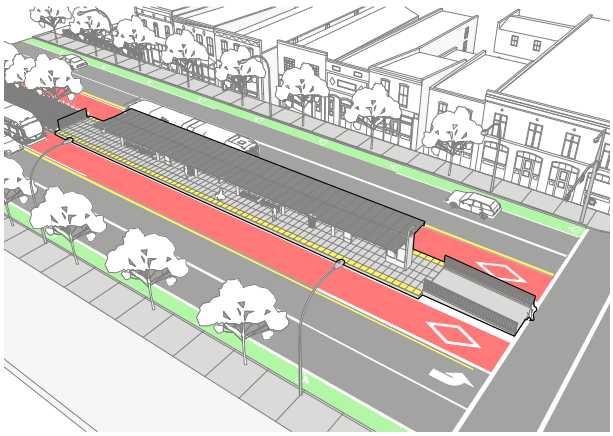
Station Example

Side Running – Bulbout Attached Station



Side Running – Bulbout Detached Station

Center Running – Side/Side Staggered Station



Center Running – Center Island Station

Section 3 – Running Ways

In order to support service reliability and provide the reduced travel times that are consistent with BRT's goals and Metro's Vision 2028 goals, running ways are an essential BRT component. The Running Ways chapter establishes that BRT routes should:

1. Be distinguishable from regular bus service
2. Achieve the highest quality service at the lowest practical cost
3. Make efficient use of existing infrastructure

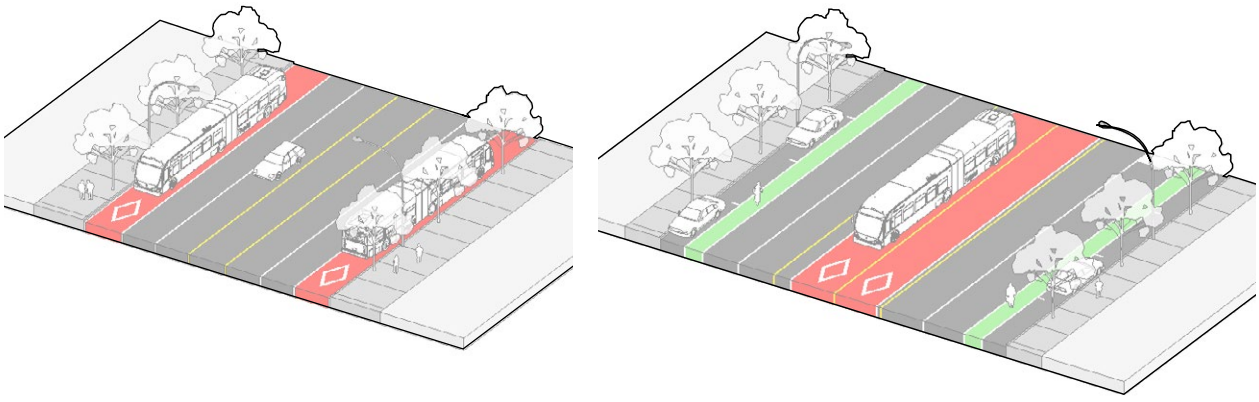
The guidelines establish three primary running way configurations: curb running, where the lane is immediately adjacent to the sidewalk/curb; side running, where the running way is separated from the curb by parking and/or bike lanes; and center running, where stations and the running ways are situated in the middle of the roadway.

Each configuration is best suited to particular contexts depending on the availability of roadway space, configuration of existing parking and/or bike lanes, adjacent land uses, travel time goals, and cost.

The running ways chapter also identifies unique opportunities for collaboration with local jurisdictions. For example, queue jumpers are a feature that allow buses to bypass traffic at interesections, and that can be incorporated where conditions do not permit a dedicated lane. Running ways can also be coordinated with improvements to the pedestrian environment, bicycle network, and sustainability efforts like green streets initiatives.

3
BRT Running Ways
This chapter provides guidance for the evaluation and development of future BRT corridors, dependent on local conditions. The guidelines are meant to improve the transit experience, and to provide fast, dependable and safe movement of passengers.

1. General Guidelines
2. Running Way Placement Considerations
3. Roadway Geometrics
4. Intersection Geometrics
5. Gates
6. Pavement Sections
7. Street Signing and Striping
8. Green Streets and Landscaping
9. Traffic Operations
10. Utility Considerations
11. Betterments



Running Way Configurations

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Section 4 – Intelligent Transportation Systems (ITS)

Technology and data play an increasing role in defining how, when, and why individuals interact with mobility options. Due to the wide range of technologies available, this section provides clarity on the elements that are required for delivery of a high-quality BRT service, as well as those elements that may only be needed under specific circumstances.

ITS treatments apply to roadside elements, stations, vehicles, and to the transit network's control center, operations, and data systems. The ITS chapter provides recommended approaches for successfully using technology to enhance BRT services and safety.

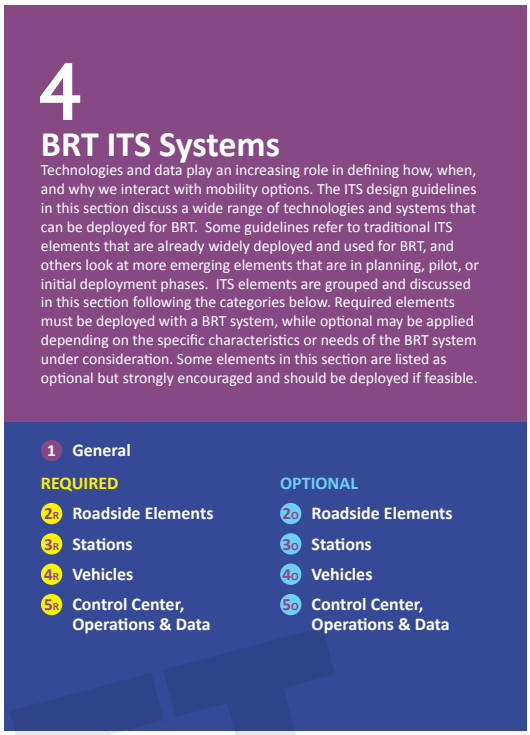
Metro has long incorporated data and technology into its operations, and therefore the ITS guidelines for BRT are designed to integrate existing technology into BRT infrastuctre and limit or avoid hardware that is unique to BRT.

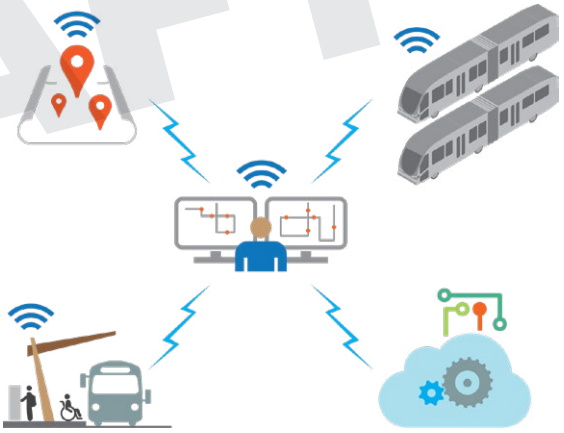
At the same time, the guidelines also identify where BRT can be used as a pilot for new ITS functions, as the rapid pace of change in technology can be more easily applied to a fleet that is smaller compared to local bus service.

Technology onboard a BRT vehicle includes fare validation and payment, passenger loading and count information, vehicle tracking, headway management, and other equipment to provide reliable transit service.

Because ITS is dependent on roadside infrastructure in addition to vehicles, it provides uniquely valuable opportunities for collaboaration with and across local jurisdictions. Metro's role in providing service throughout LA County positions the agency well for supporting these efforts to integrate items like signal prioritization.

ITS features will also be incorporated throughout BRT stations, and can include real-time passenger information, interactive digital displays, video analyitics, active lighting, and emergency/security features.





BRT Employs Integrated Technology

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Section 5 – Branding Design Elements

Metro is an industry leader in visual communications and branding. The agency works continuously to improve and coordinate the ways in which the Metro brand is communicated to the public through avenues such as marketing and advertising, community outreach strategies and materials, and station and vehicle design. Local jurisdictions seeking to implement a new line of BRT service can look to Metro standards as best practices for an agency as a whole.

For new lines of BRT service, branding will largely follow existing Metro guidelines and standards in order to build upon the foundation set by past coordination and ensure consistency with the rest of the Metro system.

Existing Metro policies and guidelines that inform BRT branding include:

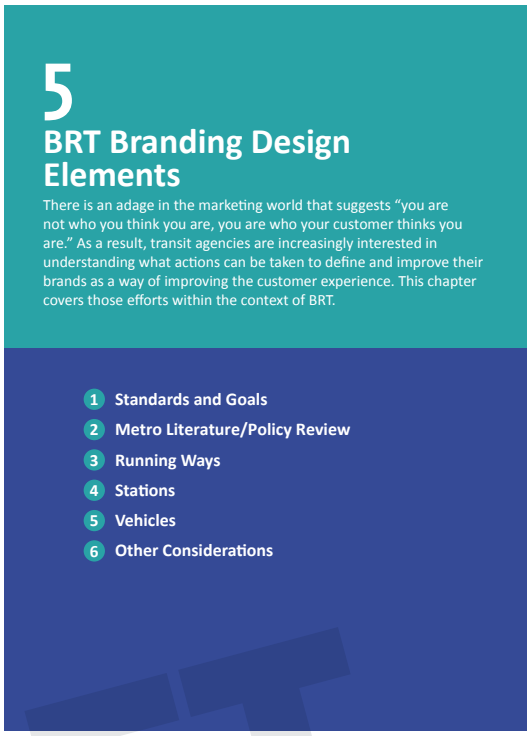
> Systemwide Station Design Standards

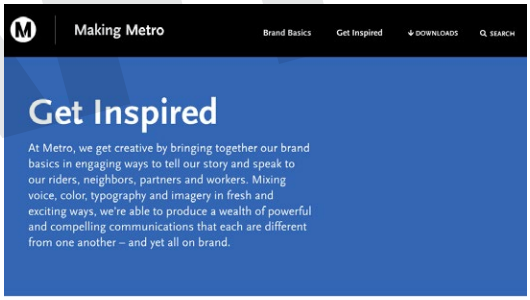
> Rail Design Criteria

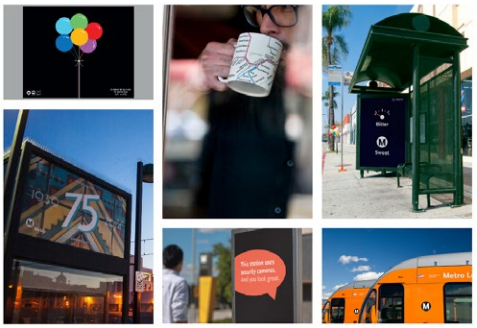
> Metro Brand Guidelines and Specs

Building on these standards, the section examines how BRT service expands the scope of branding. For example, the ways in which BRT running ways are painted and/or labelled requires coordination with local jurisdictions. Metro will need to consider which elements of these designs will be consistent across jurisdictions, and which elements may vary according to local context.

At the station level, Metro projects will follow the agency's "kit-of-parts" approach, but local jurisdictions designing their own system may look to incorporate greater variation to establish a unique BRT brand. As vehicles are selected for BRT service, agencies need to consider how taglines, colors, route numbers or letters, and name badges are displayed on the vehicle body and in its head sign. Finally, this section expolores how branding applies to elements of the customer experience that are not directly tied to transportation itself, such as the location and amount of advertising encountered, or the languages used and types of announcements played over public address systems.







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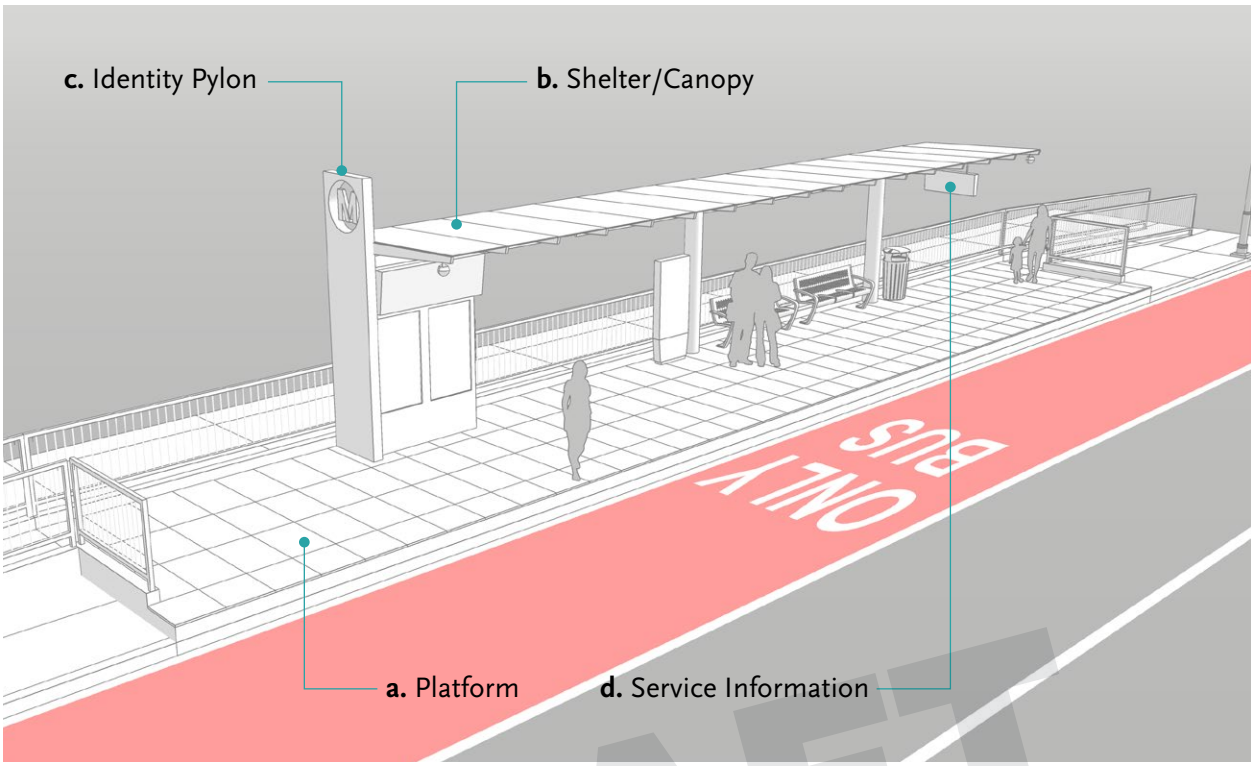

Branding Opportunities at BRT Stations

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Section 6 – Transit-oriented Communities (TOC)

Transit-oriented communities enable residents to drive less and take transit more. Metro's Transit Oriented Communities Policy is an evolving effort to support and refine a holistic planning framework that supports the overall goal of TOCs with activities that are either led by Metro, or are coordinated with local jurisdictions and community partners.

TOC activities range widely, from transfer considerations between modes and First/Last Mile planning, to larger-scale joint development projects. This section incorporates the latest policy guidance from Metro's TOC group and connects it to the context of BRT.

Examples of required TOC elements for BRT planning include:

> Corridor Evaluation and Station Location – Potential new BRT corridors and the locations of their stations will be evaluated according to Metro's TOC Policy and Implementation Framework.

6

BRT Planning and Integration Into Transit-oriented Communities

Existing policies related to transit-oriented communities help in evaluating the opportunities and constraints of transit-supportive planning efforts related to BRT and define a vision for integrating TOC principles into the planning of the Countywide BRT network.

1. TOC Design Objectives
2. Policy Context
3. BRT Required and Supporting Elements

> Transfer Considerations – Informed by Metro's Transfers Design Guide, designed to improve the experience of the 64% of riders who transfer at least once during their trip.

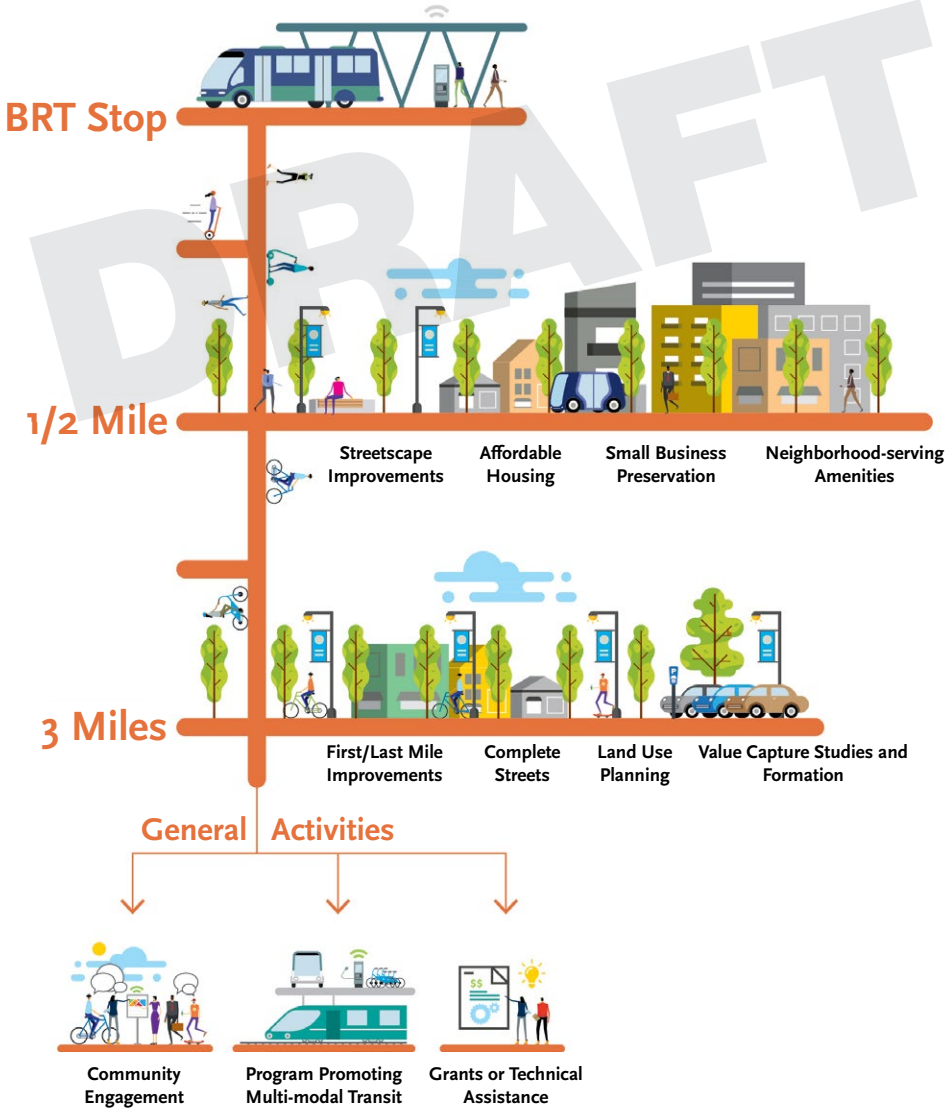
> First/Last Mile (FLM) Planning – A foundational element of TOCs, FLM Planning improves the safety and accessibility of transit by focusing on the space between the transit station and the rider's beginning or end point. FLM amenities can be implemented throughout a BRT station's catchment area and are often focused closer to the station.

Supporting TOC elements for BRT planning are those items which are less likely to be included within the scope of BRT projects, or are not controlled solely by Metro and therefore require additional coordination with local jurisdictions. They include:

> Managing Mobility Access – Includes new mobility considerations such as curb management for ride-hail services (such as Via, Uber, and Lyft) and dedicated micromobility parking for scooters.

> Urban Heat Island/Urban Greening Plans – Efforts to mitigate the impacts of urbanization and climate change through sustainable infrastructure outside of the station boundary.

> Joint Development – Efforts to build transit-oriented development are unlikely to occur solely in relation to a BRT line, but may require where BRT intersects another major transit line or key activity center.



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2 How to Use the Guidelines

For ease of use, each chapter of the BRT Design Guidelines follows a similar structure. Each chapter begins with an introduction that provides the general approach or design philosophy applied to each subject area. While BRT planners and designers will likely focus on the chapter(s) relating to their specific areas of expertise (such as Station Design or Intelligent Transportation Systems), all planners and designers are encouraged to read the introductory sections of each chapter, and skim their contents, as good BRT design relies on a tight integration of components. It is suggested that this be done periodically as the design progresses as part of a multidisciplinary review process, to identify and correct areas where design elements may not be integrating as intended.

Following the introduction and general material, each chapter provides guidance on the individual sub-components in each area, such as canopies, platforms, or lighting in the Stations chapter. Each section follows a similar layout as shown on the next page.

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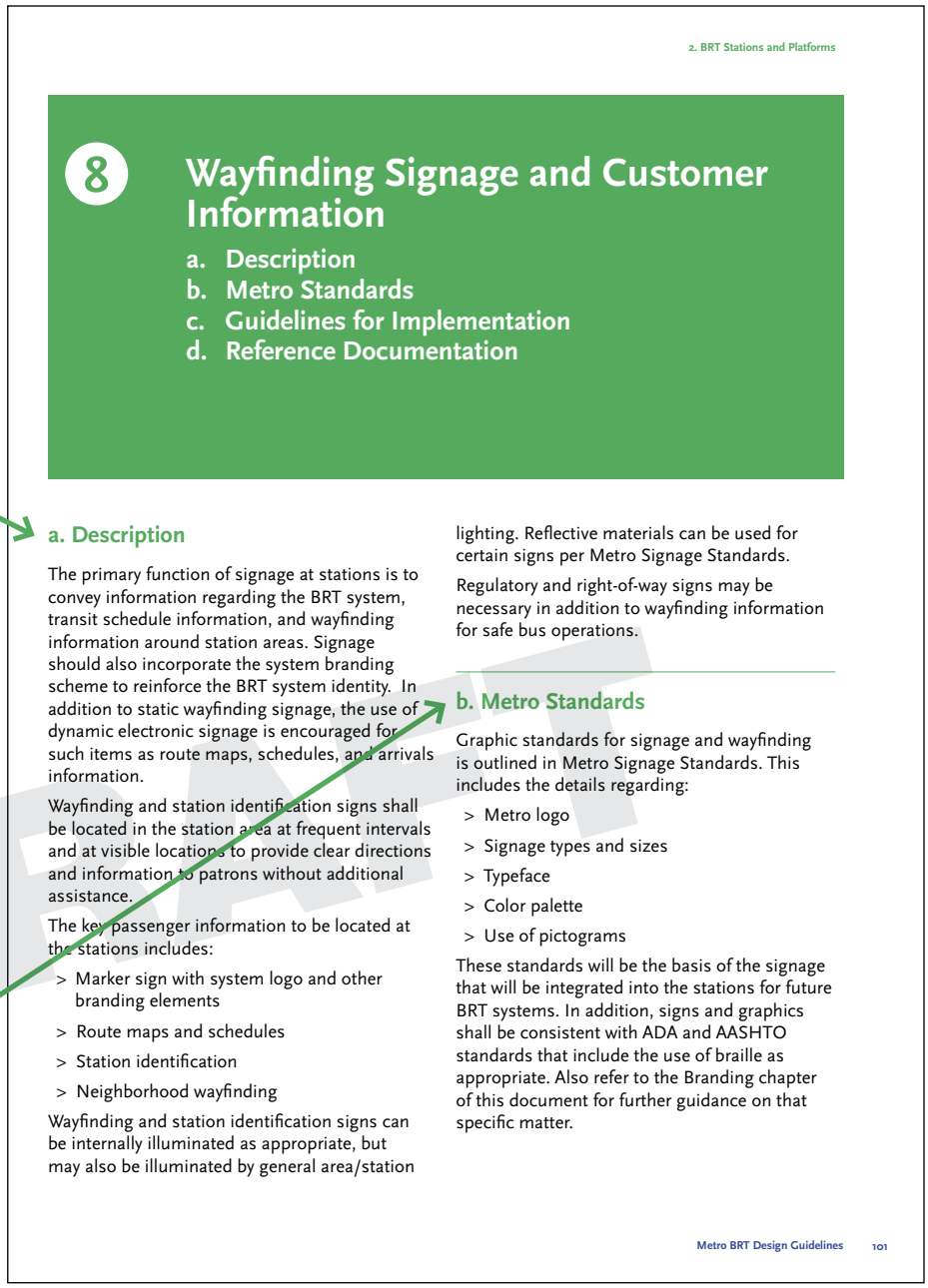
a. Description

This provides a general definition of the sub-component, its intended function(s), and general guiding principles for its design.

b. Metro Standards

This section summarizes existing design standards to be followed, originating either from the current BRT standard-setting effort, or previously developed applicable standards by Metro, such as the Metro Rail Design Criteria.



2. BRT Stations and Platforms

8 Wayfinding Signage and Customer Information

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

The primary function of signage at stations is to convey information regarding the BRT system, transit schedule information, and wayfinding information around station areas. Signage should also incorporate the system branding scheme to reinforce the BRT system identity. In addition to static wayfinding signage, the use of dynamic electronic signage is encouraged for such items as route maps, schedules, and arrivals information.

Wayfinding and station identification signs shall be located in the station area at frequent intervals and at visible locations to provide clear directions and information to patrons without additional assistance.

The key passenger information to be located at the stations includes:

- Marker sign with system logo and other branding elements
- Route maps and schedules
- Station identification
- Neighborhood wayfinding

Wayfinding and station identification signs can be internally illuminated as appropriate, but may also be illuminated by general area/station lighting. Reflective materials can be used for certain signs per Metro Signage Standards.

Regulatory and right-of-way signs may be necessary in addition to wayfinding information for safe bus operations.

b. Metro Standards

Graphic standards for signage and wayfinding is outlined in Metro Signage Standards. This includes the details regarding:

- Metro logo
- Signage types and sizes
- Typeface
- Color palette
- Use of pictograms

These standards will be the basis of the signage that will be integrated into the stations for future BRT systems. In addition, signs and graphics shall be consistent with ADA and AASHTO standards that include the use of braille as appropriate. Also refer to the Branding chapter of this document for further guidance on that specific matter.

Metro BRT Design Guidelines 101

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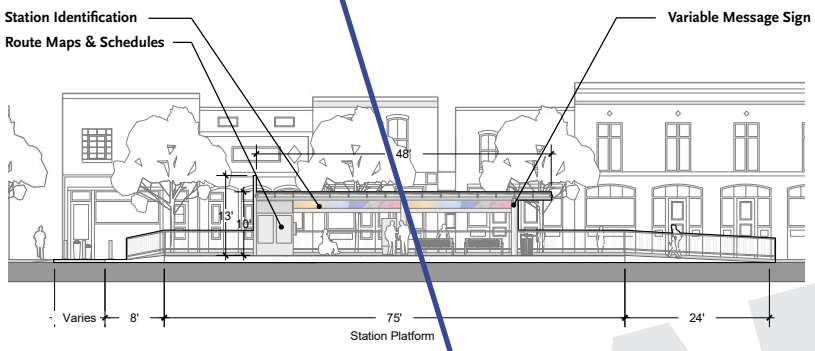
c. Guidelines for Implementation

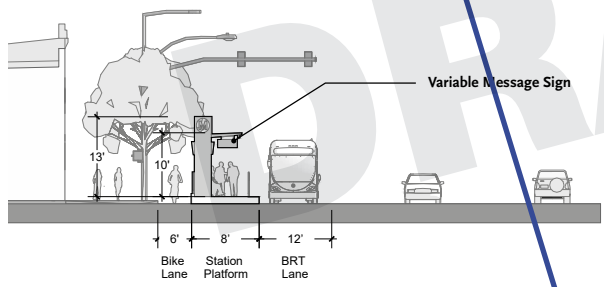
Locations of wayfinding signage and other customer information shall follow in general the exhibit below, however must be carefully considered and optimized for ergonomics, spatial composition, and sight lines – Metro Arts & Design shall review and approve all such placements as a component of an overall review of the signage and environmental graphic design program.

d. Reference Documentation

> Chapter 2.0 Graphic Standards
> Chapter 4.0 Bus Stops and Stations
> Chapter 10.0 Materials and Fabrication
> Chapter 13.0 Digital



S1 / Front Elevation, Location of signage



S1 / Side Elevation, Location of signage

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d. Reference Documentation

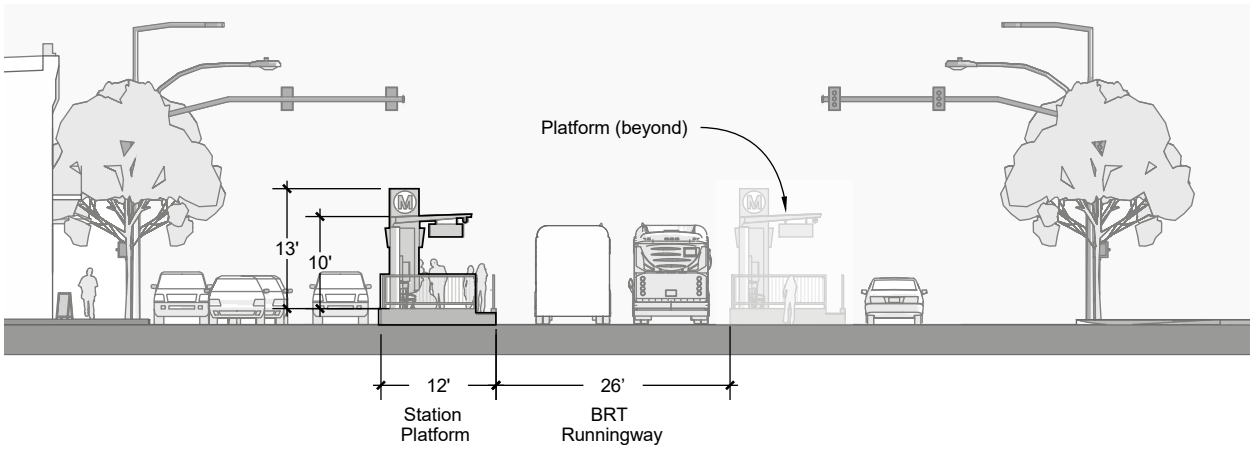
If needed, this section provides further reference to Metro or industry standards, such as ADA requirements, building codes and the like. These may appear in each section or be collected for the entire chapter, as appropriate.

c. Guidelines for Implementation

This section provides the detailed design guidelines that are either required or recommended to meet Metro's BRT standards. This includes items such as recommended dimensions for running ways and platforms, material specifications, and/or functional requirements. Often, illustrations are used to further clarify the requirements. The section may also present Opportunities and Challenges, which capture lessons learned from past BRT projects in LA County, across North America and around the world. As appropriate for subjects where more than a single agency may be responsible for implementation, Roles and Responsibilities are discussed.

3 An Integrated Set of Guidelines for LA County's BRT System

With their focus on an integrated set of BRT elements – Operations, Stations, Running Ways, Intelligent Transportation Systems, Branding and Transit-oriented Communities – that together define a high-quality service, the county's new BRT Design Guidelines set the stage for the next iteration of Measure M-funded BRT services.



1

BRT Operating Characteristics

A BRT's operating parameters and performance, such as frequency, span of service, speed and reliability, are as important to a rider's experience as its physical attributes. This section lays out recommended best practices for a BRT operating plan.

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1 Summary
2 Introduction
3 Travel Speed
4 Route Length
5 Station Spacing
6 Frequency of Service
7 Passenger Loading
8 Span of Service
9 Service Reliability
10 Travel Time Reliability
11 Fare Collection and Boarding Protocols
12 Other Services Sharing a BRT Corridor
13 Service Reviews

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1 Summary

The table below summarizes the major operating recommendations.

		BRT CLASS & OPERATING CONTEXT			
Service Parameter	**Existing Metro BRT Standard**	DENSE URBAN	OTHER URBAN	SUBURBAN	REGIONAL
Route Length					
Minimum	N/A	6 miles	10 miles	10 miles	20 miles
Maximum [1]	N/A	Full BRT: 21 miles BRT Lite: 18 miles		Full BRT: 27 miles BRT Lite: 20 miles	45 miles
Ratio: Average Trip Length to Route Length	N/A	30% or greater			
Station Spacing					
Maximum Average Spacing	1.25 miles	0.75 miles	1.0 miles	1.25 miles	Based on market
Minimum Average Spacing	N/A	0.5 miles	0.75 miles	1.0 miles	1.25 miles
Minimum Distance Between Adjacent Stations	N/A	0.2 miles	0.25 miles	0.35 miles	1.0 miles
Travel Speed					
Average Speed	N/A	15 mph	Full BRT: 18 mph BRT Lite: 15 mph		30 mph
Alternative: Speed improvement over local	N/A	Full BRT: 25% faster than local bus BRT Lite: 15% faster than local bus			
Posted Speed Limit along Route [2]	N/A	25 mph or greater	30 mph or greater		50 mph or greater
Minimum Frequency of Service					
Peak Periods	12 minutes	Full BRT: 10 minutes BRT Lite: 12 minutes		12 minutes	Based on Market
Off Peak Periods	30 minutes	15 minutes		15 minutes	Based on Market
Passenger Loading Standards [3]					
Peak Periods	1.4	1.4			
Off Peak Periods	1.3	1.3			
Weekday Span of Service	4:00 am to 2:00 am (Light Rail Transit)	4:00 am to 2:00 am (4:00 am to 12:00am if no connection to Metro rail)			Based on Market
Service Reliability [4]	N/A	1 minute			
On-Time Performance	80% Systemwide Average	Full BRT: 80% BRT Lite: 75%			
Excess Wait Time	N/A	1 minute			
Travel Time Reliability [5]	N/A	Less than 2.7			

Notes:

1. Dependent on level of protection from general traffic - the higher end of the range is for systems approaching Metro LRT levels of traffic protection
2. Lower speed limits may be possible with lighter signal density (e.g. 2 signals/mile) and/or higher station spacings
3. Expressed as the maximum average ratio of passengers to vehicle size and frequency by direction for a one-hour period, which should not be exceeded for at least 95% of all hourly periods
4. Expressed as how much time the average passenger has to wait for a bus in excess of the waiting time they would experience if the buses were perfectly regular in their arrivals
5. Expressed as the ratio of travel time variability (standard deviation) to the average travel time

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2 Introduction

a. Design Guidelines
b. BRT as a Service Type within the Regional Network
c. Operating Context
d. Demand Density

a. Design Guidelines

The guidelines in this chapter are intended to clarify Bus Rapid Transit (BRT) operating characteristics, particularly in regard to:

> Metro transit service types within the regional network

> Service design (including service frequency, loading standards, and span of service)

> Service performance evaluation, and

> Service change process.

The operations guidelines for BRT do not supersede, replace or otherwise supplant the most recent adopted Metro Transit Service Policy, or those of any other municipal transit agency implementing BRT. The guidelines are intended as recommendations to be considered for adoption into existing service policies, based on best practices in the BRT industry.

The guidelines also offer flexibility when implementing two styles of BRT - "Full BRT" which features a greater investment in dedicated BRT running ways (at least 50% of the route), and "BRT Lite" which achieves speed advantages through more tactical measures such as shorter dedicated lane segments, peak-hour transit-only lanes, and queue jumpers.

While many factors exert an influence over individual operating design guidelines, there are three factors that have an overarching effect:

The Role of BRT Within a Network: that is, the market that BRT service caters to relative to local and other high-capacity, high-speed services in a region;

Operating Context: the nature of the communities within which BRT operates, in terms of demographics, land use types and densities, and trip lengths, and

Demand Density: the range of passenger loads that BRT routes will likely be called upon to serve.

Each of these is briefly described and referred to within the operating design guidelines which follow.

b. BRT as a Service Type within the Regional Network

BRT has already been established as a distinct 'service type' within the regional transit network, which also includes the following fixed-route service types: Heavy Rail (rail rapid transit), Light Rail, BRT, Rapid, Local, Limited, Express and Shuttle[6]. It is particularly important to bear in mind the functional characteristics of BRT relative to its 'adjacent' service types in the network typology, light rail and rapid bus (including the existing Metro Rapid type and future evolution

[6] It is understood that the branding and typing of Metro Rapid may change as a result of the NextGen Project. The result of this examination is not assumed to change the distinctiveness of BRT relative to local services.

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of this mode per the parallel NextGen project). The guidance in this document is based on the following assumptions about the role of BRT in the regional network:

> For network design purposes, BRT should be considered to be a high-capacity, high-speed service together with light rail transit and heavy rail transit
> BRT would be functionally distinct from Metro Rapid and future "hybrid" service recommended by the NextGen study, with more widely-spaced stations and higher average speed[6]
> The most prevalent context for BRT route placement in the urban and suburban areas would be within or adjacent to an arterial highway
> BRT should not have a local service function; in urban and suburban areas, parallel or adjacent local bus service would provide this function, and
> BRT would serve an intermediate level of demand between Metro Rapid and light rail (see Demand Density section), while providing service characteristics and a rider experience similar to light rail

c. Operating Context

In 1977, the regional transportation planning agency for greater Quebec, Canada, established a useful characterization[7] of three contexts or zones within a metropolitan area:

There is an *urban zone* characterized by:

> Centers of attraction throughout the zone
> A strong and continuous population density
> A high volume of trips made entirely within the zone itself.

There is a *suburban zone* characterized by:

> Fewer major attraction centers than the urban zone
> A moderate and relatively continuous population density
> Many trips made outside the suburban zone
> An average travel time much longer than for trips made within the urban zone.

There is a *regional zone* characterized by:

> A low level of trip attraction within the zone
> A low population density
> Many trips made outside the regional zone, and
> Very long travel times.

These remain useful distinctions that apply to LA County, and from subsequent observations can be expanded upon as follows:

> The *urban zone* has the highest ratio of trip attractions (e.g. jobs) to productions (e.g. residents), and is almost fully developed. Open spaces are clearly purposed (e.g. parks, recreational areas, or institutional grounds). An urban zone will usually contain at least one central business district and/or other significant zones of high density; these are usually distinct enough to warrant separate design treatment[8] as dense urban and other urban.
> The *suburban zone* contains much of a metropolitan area's single-family housing stock. Most land will be developed, but there may be both tracts of undeveloped land and concentrations of retail and other activity centers.
> The *regional zone* will contain substantial amounts of open or undeveloped land, and development will tend to cluster around distinct nodes.

Other service planning frameworks have made use of categories of geographical context or markets as necessary to fit service design guidance or principles. For instance, the Metropolitan Council of greater Minneapolis-St. Paul uses the broadly similar notion of 'transit market areas':

[7] Commission de Transport de la Communauté Urbaine de Québec, "Normalisation des Services Phase I: Developpement des Normes de Service'", May 1977. Translation by D. W. Allen

[8] As in Chapter 4 of Transit Cooperative Research Program Report 118 (TCRP 118), "Bus Rapid Transit System Practitioner's Guide".

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"Transit Market Areas are a tool used to guide transit planning decisions. They help ensure that the types and levels of transit service provided, in particular fixed-route bus service, match the expected demand in a given area. For example, transit service in a suburban community where the automobile is the most convenient mode for the majority of trips might focus on the work commute, providing express bus service to downtown. Transit service in a dense urban core neighborhood might need to accommodate a broader variety of transit service needs that can be met by providing frequent, all-day service to a variety of destinations."

The above frameworks have been used as a starting point to consider the types of markets that BRT may be called upon to serve in LA County. The following contexts are used in this document, with the associated understandings as to the relationship of BRT to local bus services, and the most appropriate levels of BRT service – Full or Lite:

- *Dense urban*, including the central business districts of major cities and other significant zones of high density. Full BRT is often justified due to strong demand, although dedicated full- time lanes may be challenging due to right-of-way constraints. BRT services are assumed to be overlaid or closely parallel to local bus services with more closely-spaced stations.
- *Other urban*, covering the remainder of the urban context. BRT services may be Full BRT or BRT Lite, and are assumed to be closely parallel to local bus services and have more closely- spaced stations.
- *Suburban*. BRT services will most likely be BRT Lite, since the density of demand may not justify significant investments in Full BRT infrastructure, and are assumed to be generally parallel to local bus services with more closely-spaced stations.
- *Regional*. Arterial-running BRT service is typically not justified in low-density areas. In these environments, if BRT services are warranted, they will likely be long- distance commuter-oriented routes using shared freeway infrastructure - HOV, Toll and/ or Managed Lanes. They are not presumed to have a strong relationship to any local transit services which may be offered, except for feeder routes oriented towards BRT stations.

It should be noted that a given BRT corridor may encounter more than a single urban context. A BRT corridor may feature a mix of operating parameters to best respond to the conditions in different segments, such as different station spacings or frequencies in dense urban and suburban segments of the same route.

d. Demand Density

When planning a BRT service, the expected demand profile along the route is a fundamental parameter that influences both the proposed service plan (in simple terms, higher demand will require a greater level of service) and determines the cost-effectiveness of BRT capital investments (the higher the demand, the more that riders will benefit from BRT investments). The demand profile can also serve as a check in determining whether BRT is the appropriate mode for a corridor; too low a demand will make BRT less cost-effective, while too much demand may exceed a BRT's maximum capacity, indicating that a different mode such as light rail transit may be warranted.

In measuring demand, it is more helpful to consider a proposed BRT route's likely passenger traffic density (PTD) as a basis than to focus on estimated peak hour peak demand at the maximum load point, which can be more difficult to estimate in a corridor's planning stages. PTD is the ratio of total passenger-miles traveled (PMT) on a route for a calendar year to the route's length in miles. As such it can usefully be compared across routes and modes, both within a network and among routes or networks worldwide. PTD is a better indicator of operating economy than boardings per mile of route, because average trip lengths can vary considerably. Whenever available demand forecasts include both route length and PMT, PTD can be determined and used as a general benchmark.

9 Several US transit agencies operate services generally regarded as BRT, but do not report them to NTD separately from other fixed-route bus services.

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Every transit line has a PTD value, and Figure 1 shows the distribution of PTD values across three groups of services:

> LACMTA's directly operated local bus routes;

> the combined service types of Metro Rapid (i.e. Metro's 700-series routes), BRT, light rail, and heavy rail transit (collectively labeled as "LACMTA High-Capacity Routes" in the figure);

> the systems reported to FTA's National Transit Database (NTD) as 'Rapid Bus', providing a nationwide average for comparison[9].

Table 1 shows the estimated[10] PTDs for LACMTA's High-Capacity transit (both rail and bus), including the Metro Rapid bus routes. Key 'takeaways' from the table and figure include:

> The median PTD for Metro Rapid routes (323,200) is not significantly higher than for local routes (267,800);

> Only one of the Metro Rapid routes (720) has a PTD higher than half that of the two BRT services (G and J Lines);

> Many of the 'Rapid Bus' systems reported to NTD cluster in the range of 625,000 to 850,000 in terms of PTD. Only one Metro Rapid route and four local LACMTA routes fall in this range,

> The highest NTD-reported 'Rapid Bus' operation is MBTA's Silver Line in Boston, at about 2.5 million; both the G and J Lines in greater Los Angeles are at about 1.7 million.

> In terms of PTD, LACMTA's light rail lines range between 3.4 million (C Line) and 8.4 million (E Line).

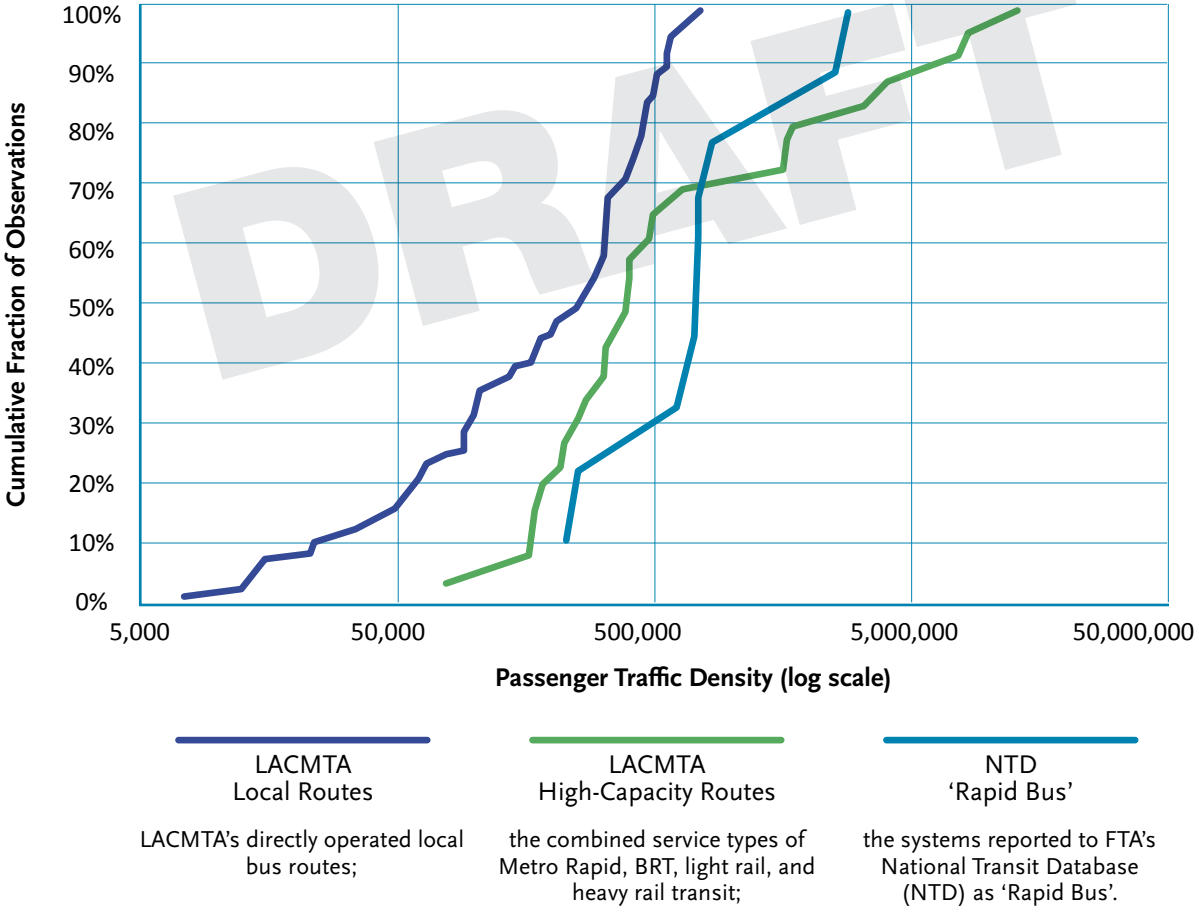

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Figure 1. Cumulative Distributions of Route versus Passenger Traffic Density[10]

10 For High-Capacity Routes, derived from 2018 passenger-miles on LACMTA's ridership information website; for Metro Rapid, estimated by IBI Group from data available from LACMTA's website for October 2018.

Route	Estimated PTD (passenger-miles per year per route-mile)
802 - B Line rail rapid transit	13,017,040
806 - E Line LRT	8,421,156
801 - A Line LRT	7,518,142
804 - L Line LRT	4,524,759
803 - C Line LRT	3,364,513
910 -J Line BRT	1,747,665
901 - G Line BRT	1,627,246
720 - Santa Monica - Commerce via Wilshire-Whittier Bls	1,659,047
754 - Hollywood-Athens via Vermont Av	653,045
733 - Downtown LA-Santa Monica via Venice Bl	510,829
734 - Sylmar-West Los Angeles via SSepulveda Bl	483,392
780 - Pasadena-Washington/Fairfax via Colorado-Hollywood-Fairfax	418,626
757 - Hollywood - Crenshaw Station via Western Av	407,593
744 - Northridge-Pacoima via Van Nuys-Ventura-Reseda Bls	397,609
770 - Downtown LA - El Monte Sta Via Garvey - Chavez Avs	358,027
710 - Wilshire Ctr - South Bay Galleria Via Crenshaw Bl	326,839
794 - Downtown LA - Sylmar Sta via San Fernando Rd	323,193
745 - Downtown LA - Harbor Freeway Station via Broadway	275,320
728 - Downtown LA - Century City via West Olympic Bl	258,427
705 - W Hollywood - Vernon via La Cienega Bl - Vernon Av	229,317
762 - Pasadena - Artesia Station via Atlantic Bl	221,661
750 - Warner Ctr - Universal/Studio City via Ventura Bl	185,891
760 - Downtown LA - Long Beach GL Sta via Long Beach Bl	177,892
788 - Metro Valley - Westside Express	175,263
751 - Cypress Park - Huntington Park via Soto St	166,796
740 - Expo/Crenshaw Sta - South Bay Galleria via Hawthorne	79,175

Table 1. Passenger Traffic Densities for Rapid and Metro Rapid Services[10]

The PTD data above suggests some general guidelines that may be used when first defining a new BRT service, based on both conditions in LA County and a comparison to systems around the country. It appears that the form of BRT envisioned for LA County may be most economically efficient between a PTD of 600,000 and 3 million annual passengers per route-mile. Below 600,000, services such as the present Metro Rapid overlay routes or rationalized 'next generation' local bus routes are likely to be more efficient. Above 3 million, light rail is likely to be competitive or superior in terms of cost-efficiency, and above 4.5 million, BRT as envisioned may not even be able to provide the necessary capacity (in the sense defined by the Transit Capacity and Quality of Service Manual (TCQSM)) in an urban context without more than one BRT lane in each direction This is intended as a general guideline; to be considered alongside local factors that may influence choice of technology.

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3 Travel Speed

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

The average operating speed (end-to-end speed including stops) which can be attained by BRT services is determined by a number of factors, most importantly: the maximum authorized speed (MAS); the distances between stations; bus dwell times at stations; the number of traffic signals per mile; the degree of separation from general vehicular traffic; and where bus operations are subject to general traffic congestion, the extent of that congestion, and the mitigation offered by signal priority. On highways, the MAS for most practical purposes is the prevailing posted speed limit. Selecting a route with lower speed limits may limit the station spacing that can be supported, especially if there is a high traffic signal density. Therefore these factors should not be considered in isolation.[11]

b. Key Considerations

When designing a BRT service to attain a target speed, designers have the following major mechanisms available:

- The length of full-time or part-time dedicated lanes (see Chapter 7.3 Running Ways)
- The geometry of the dedicated lane, particularly lane widths. To support the target speed, the minimum recommended lane widths are 12 feet for side running lanes, and 13 feet for center running lanes that are next to each other. Chapter 3 provides further details.
- Other transit-friendly traffic engineering treatments, such as queue jumpers, or reducing left-turns or crossing movements across a running way (also covered in Chapter 7.3)
- Transit signal priority systems (Chapter 7.4 Intelligent Transportation Systems)
- The selection of a corridor with lower traffic signal density and/or higher speed limits
- Station spacing (Section 5 below)
- Boarding protocols to reduce station dwell time (Section 11 below)

c. Guidelines for Implementation

It is recommended that BRT services in LA County are designed to achieve the following minimum end-to-end average speeds, inclusive of dwell-times:

- 18 mph for Full BRT
- 15 mph for BRT Lite
- 30 mph for Regional BRT

It is recognized that some corridors may have demand densities that merit BRT but may have congestion, right-of-way or other constraints that make the above speeds challenging. In such cases, an alternative recommendation is that the

[11] For extensive discussions and treatments of these inter-relationships, the reader is referred to: Chapter 5 of Transit Capacity Research Program Report 118 (TCRP 118), Bus Rapid Transit Practitioner's Guide, and to Chapter X of the third edition of the Transit Capacity and Quality of Service Manual.

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BRT service should provide a noticeable speed improvement to any underlying local service, as follows:

> For Full BRT, a 25% average speed improvement

> For BRT-Lite, a 15% average speed improvement

While 18 mph is the general overall goal for BRT average operating speed, and Metro's Vision 2028 goal for its Rapid bus routes (or future equivalents from the NextGen study), in two operating contexts alternative values are more practical for forming guidance on speed

> In the dense urban context, where both stations and traffic signals tend to be more closely spaced, 15 mph is a more realistic expectation for an average speed. Most sections of US BRT systems operating in this context average less than 15 mph, often as little as 10-12 mph.

> In the regional context, bus services tend to be *express* or *limited-stop* services, more analogous to commuter rail systems than to light rail transit or BRT in urban contexts. To maintain reasonable competitiveness with automobile travel, a design average operating speed of 30 mph, roughly the median average speed of North American commuter rail, is more appropriate.

With design average operating speeds in mind for each operating context, guidance can be offered as to the MAS that should be prevalent in a route section, depending on the average distance between stations in the section and the average distance between traffic signals. The more closely spaced signals and stations are, the more time per mile is lost in bus acceleration and deceleration, sometimes to the extent that buses never actually reach the speed limit.

Figure 2 illustrates the speed limits below which a BRT service in a dense urban context would likely

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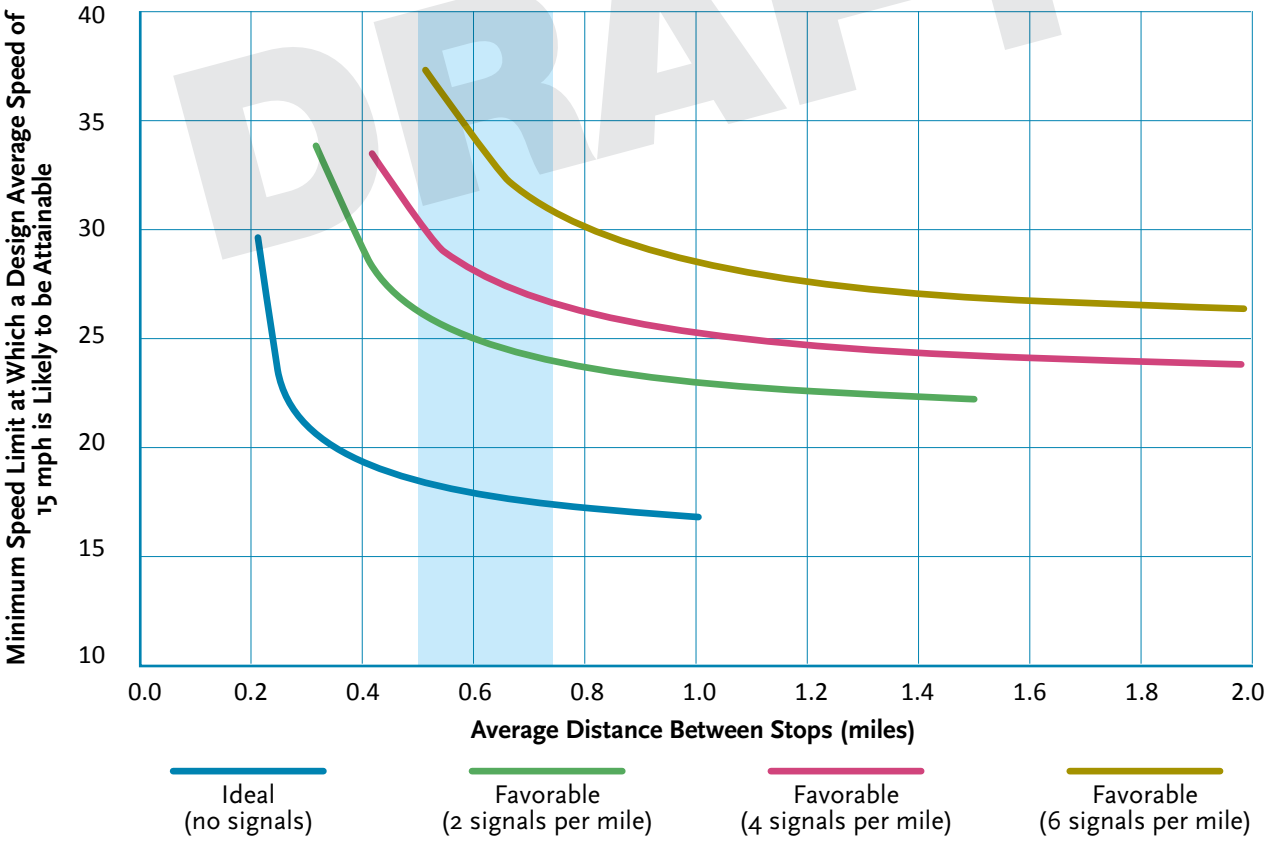

Figure 2. Speed and Spacing Considerations in the Dense Urban Context
Source: IBI Group research based on transit agency published information, the National Transit Database, and direct observations

not be able to meet a design average operating speed of 15 mph in terms of the average distance between stations, assuming that all stops are made. Values are shown for an ideal 'straight line' alignment with no traffic signals, and for a favorable, but not ideal, alignment on an exclusive lane on an arterial roadway with an average of 2, 4, and 6 traffic signals per mile. This figure also shows the range between the recommended minimum and maximum station spacings for this operating context from Table 4. The conditions needed to attain the design speed may not be in reach for some routings in dense urban areas, as is confirmed by the average operating speeds on corresponding sections of BRT projects implemented to date.

To put the BRT in an environment where it is possible to achieve an average operating speed of 15 mph in dense urban areas, it is recommended that routes with a posted speed limit less than 25 mph not be considered for BRT in dense urban areas unless unavoidable, and that routes with the fewest traffic signals per mile be preferred, provided that the route is not taken out of line to avoid them. To compensate for average speed losses in this context, station spacing should be targeted for the upper end of the recommended range.

Figure 3 illustrates the speed limits below which a BRT service in a less dense urban or suburban context would likely not be able to meet a design average operating speed of 18 mph in terms of the average distance between stations, assuming that all stops are made. Values are

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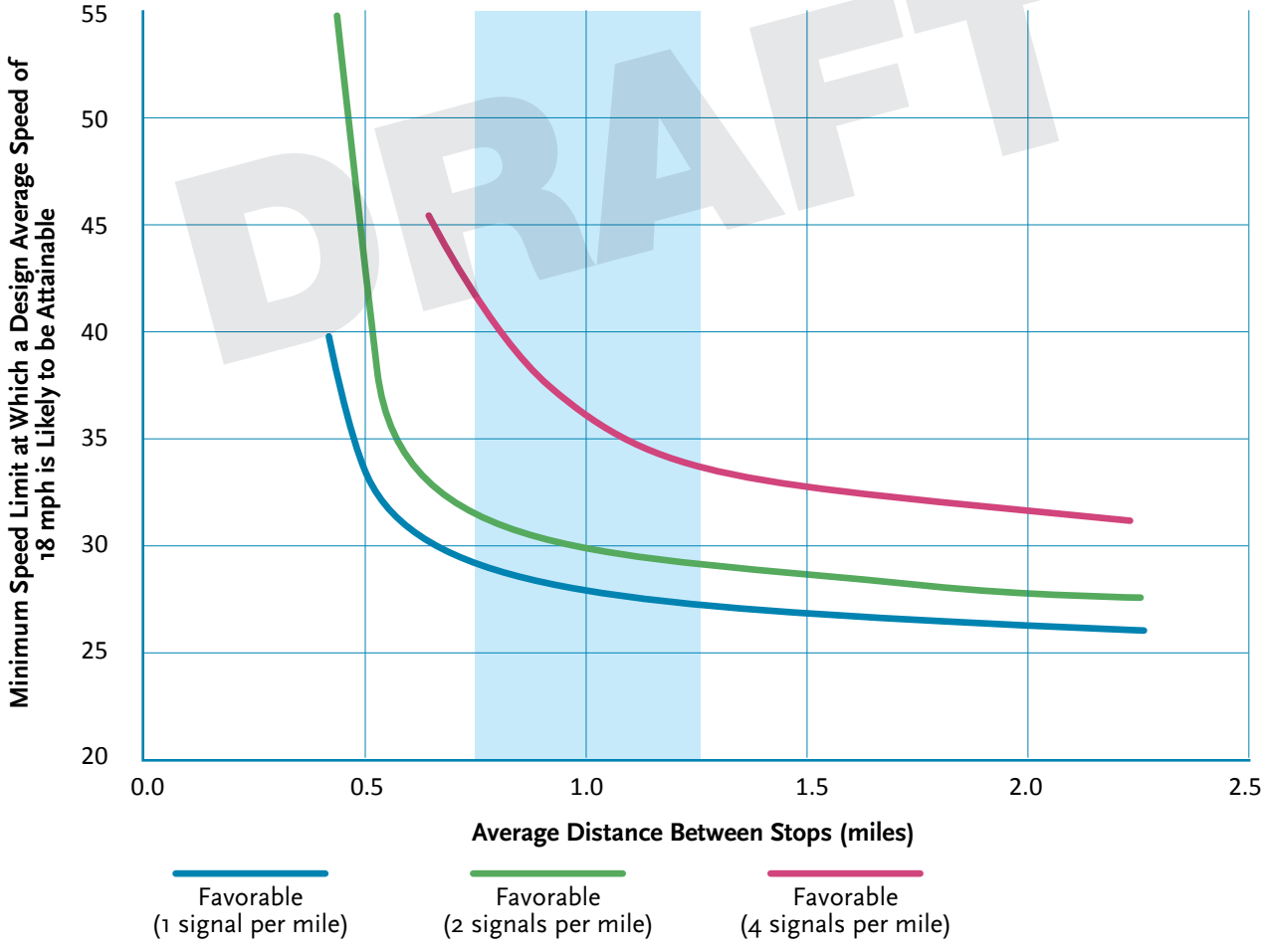

Figure 3. Speed and Spacing Considerations in the Urban Other and Suburban Contexts
Source: IBI Group research based on transit agency published information, the National Transit Database, and direct observations

shown for favorable, but not ideal, alignments on an exclusive lane on an arterial roadway with an average of 1, 2, and 4 traffic signals per mile. Values above 55 mph are not shown because urban transit buses are generally not well suited for higher speeds, and few arterials have speed limits this high.

This figure also shows the ranges between the recommended minimum and maximum station spacings for these operating contexts from Table 4. The conditions needed to attain the design speed may not be in reach for some routings, as is confirmed by the average operating speeds on corresponding sections of BRT projects implemented on arterials to date.

To put the BRT in an environment where it is possible to achieve an average operating speed of 18 mph in Other Urban and Suburban areas, it is recommended that routes with a posted speed limit less than 30 mph not be considered for BRT outside dense urban areas unless unavoidable. Routes with the fewest traffic signals per mile are preferred outside of dense urban areas, provided that the route is not taken out of line to avoid them.

To compensate for average speed losses in this context, station spacing should be targeted for the upper ends of the recommended ranges.

Figure 4 illustrates the speed limits below which a BRT service in a regional context would likely not be able to meet a design average operating speed of 30 mph in terms of the average distance between stations, assuming that all stops are made. Values are shown for a freeway alignment under uncongested conditions with dedicated lanes and on-line stations (ramp off, ramp on) and a less favorable case representing for which buses would leave and re-enter the freeway, the most prevalent arrangement for buses now operating on freeways in the US. Because a regional context might be served by over-the-road highway coaches, values are shown up to the 65 mph California default speed limit.

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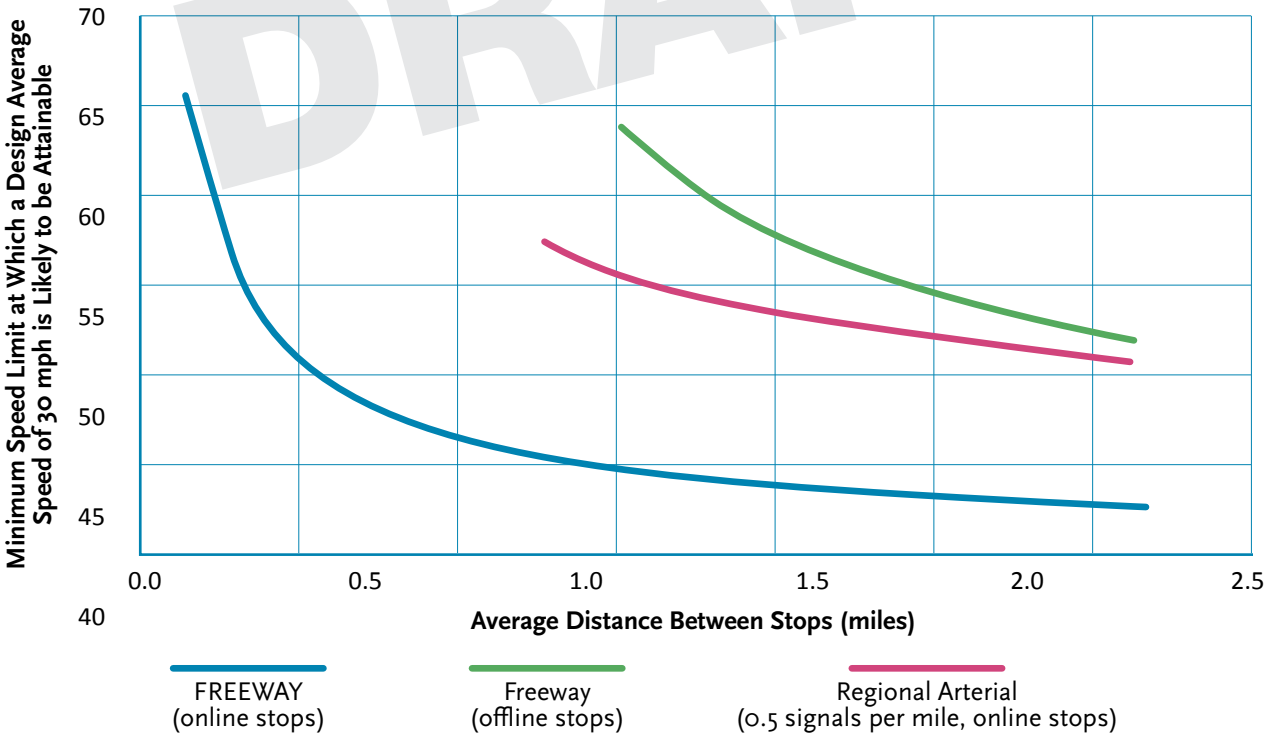

Figure 4. Speed and Spacing Considerations in the Regional Context
Source: IBI Group research based on transit agency published information, the National Transit Database, and direct observations

A design speed of 30 mph is unlikely to be attainable on signalized arterials in the regional context with an average separation of less than eight miles, unless the highway has a posted speed limit over 50 mph and is not congested. In the case of a very high-performance arterial generally paralleling a freeway, at very long station spacings the arterial may be able to offer an alternative routing to a freeway if inline stations are not possible on the freeway. In general, 'rapid' BRT should be freeway-based in the regional context, and inline stations are preferable if an average distance between stations of less than five miles is planned. If the buses are to operate in mixed traffic on congested highway sections, the average congested operating speed can be taken into consideration for station spacing purposes by considering the congested speed as the 'minimum speed limit' in Figure 4.

Based on the relationships shown in Figures 2 to 4, it is recommended that the BRT route planning process seriously consider the trade-off between average operating speed and station spacing in each corridor, and unless the average speed goals are modified, aim towards the maximum station spacings. This relies on the assumption that in the urban and suburban contexts, a parallel local bus service will be in place to meet the needs of customers for whom short walking access distances are important.

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4 Route Length

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

The guidance in this section is intended to apply only to free-standing BRT routes rather than branched systems or hybrids of BRT and services that might operate more like local buses. A route to which these standards apply will have a distinct route identification or branding as 'BRT' between two distinct termini. It will be shown in its entirety on system route maps of high-capacity or 'rapid' service, without branching or having to indicate changes in the class of service. In common understanding, it will 'stand alone' from any other BRT routes, and may come to be referred to as a 'Line'. This does not preclude having a 'short-turn' provision as part of the service plan for a BRT route (as Metro's G Line does, with some buses only operating as far as Canoga Station).

b. Key Considerations

In laying out the length of a route, BRT service planners should consider:

> Economies of scale – short routes may not justify the capital investments required to build and operate a high-quality BRT

> The nature of the market – a key hallmark of BRT service is speed, and this feature tends to cater to travelers with longer trip lengths; a short route may not realize significant travel time advantages compared to a local bus or shuttle

> Serving a high number of destinations and attractions – a BRT typically serves corridors with a high number of activity centers, dense residential and employment areas, and regional and multimodal transportation hubs; a short route may simply not serve a sufficient number of these to be effective

> Reliability – long routes can suffer reliability issues, as there are more chances to hit pockets of congestion, and schedule-recovery times on long routes may be compromised by congestion or incidents

> Segments of thinner demand – long routes can be more prone to segments where demand is lower, particularly if a route is extended into less densely-developed suburban areas

c. Guidelines for Implementation

Minimum Length

For both Full BRT and BRT-Lite, It is recommended that:

> free-standing BRT routes in dense urban areas be not less than 6 miles in length;

> Routes should be no shorter than 10 miles for other urban and suburban areas, and 20 miles for regional routes.

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For shorter corridor lengths, serious location-specific consideration should be given to the nature of the passenger demand to determine whether alternative treatments (e.g. a branch of another BRT route, a change to existing local services, a point-to-point shuttle, or improvements to 'first mile/last mile' accessibility) would be more effective and/or more cost-effective. This guidance should not be interpreted to apply to branches of a trunk BRT route, or to possible extensions of a BRT route operating in a local mode.

The rationale for the above recommendations starts with a consideration of economies-of-scale. The investment required for BRT is generally understood as being less than that required for rail systems. However any route with more infrastructure than that required for local bus service will incur a certain 'overhead' that may lead to diseconomies of scale for shorter routes. Further, the travel time benefits of BRT will be difficult to achieve if route lengths, and therefore trips, are short.

Even local bus services will exhibit operating cost diseconomies at short lengths, as layover time becomes a higher fraction of total revenue service hours.

Anecdotally, the shortest free-standing route of more than 80 on greater Boston's MBTA bus network in 2014 was 2.45 miles long, and the shortest route of Spokane Transit Authority's 36 routes in 2017 was 1.19 miles long.

BRT routes worldwide are more difficult to categorize as free-standing or not based on available data. Table 2 lists instances which are believed to be the shortest such routes in North America, Europe, and Australasia. All 3 operate in dense urban downtown environments, where the high ridership levels would tend to counteract the lost economies-of-scale of short lines. Since these densities are generally not present in Los Angeles Counties, short lines like these would likely not be cost-effective here.

Moving beyond the anecdotal, Luigi Moccia of the Consiglio Nazionale delle Ricerche in Italy has explored the economics of BRT versus route length for a service scenario similar to those envisioned for LA County, using the most recent formulation of a model[12] to which IBI Group staff have contributed. Moccia's results suggest that significant diseconomies of scale will be present at a route length of 2 km (1.25 miles) and that these will have substantially abated as route lengths approach 8 km (5 miles). The principal reasons for this are the need for schedule recovery and layover time, which decrease as a fraction of total cycle time as route length increases.

Route	length in miles	Opening Year
Hampshire County Council Eclipse (Gosport - Fareham)	2.8	2012
Nîmes T1 (Centre-ville - Caissargues)	2.8	2012
Strasbourg ligne G (Gare Centrale -Espace européen de l'entreprise)	3.2	2013

Table 2. Short Free-Standing BRT Routes

12 L. Moccia, D. W. Allen, and E. C. Bruun. "A technology selection and design model of a semi-rapid transit line", Public Transport, 10:455–497, 2018.

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Maximum Length

Table 3 shows the ranges of recommended maximum BRT route lengths, depending on the likely portions of the route in different operating contexts, and for three general classes of BRT treatment of highway crossings. The guidance in this document is focused on the latter two classes, operating at grade in arterial roadways.

Predominant Highway Crossing Treatment	'Lean' Mix of Contexts (5% dense urban, 20% other urban, 75% suburban)	'Rich' Mix of Contexts (30% dense urban, 65% other urban, 5% suburban)
Full BRT - extensive pre-emption or grade separation (generally comparable to LACMTA light rail) – 75-minute travel time budget	27 miles	21 miles
Full BRT - Exclusive lanes with traffic signal control – 60-minute travel time budget	25 miles	20 miles
Full BRT and BRT-Lite - Primarily dedicated lanes, with traffic signal control - 60-minute travel time budget	20 miles	18 miles

Table 3. Guidance for Maximum BRT Route Lengths

If information on the corridor's demand is known, some additional guidance can be offered. The required information would be an estimated projected load profile for the corridor, from which the overall average trip length could be estimated, as well as the passenger traffic density (PTD) along the route. It is recommended that:

> The ratio of the average trip length should not be less than 30 percent of a free-standing route's end-to-end length. Lower ratios (for instance a 2.5-mile average trip on a 10-mile route) may indicate that the route would have more of a local nature than is well suited for a BRT route operating in conjunction with a parallel local service.

> A route should not be extended so that PTD falls below 600,000 for much of its length, a level below which the investment in BRT may well not be warranted. Overall, PTD for the entire route should be at least 1.25 million.

Absent corridor-specific demand characteristics, the guidance on this topic which can be offered is relatively limited. Anecdotally, Metro's light rail services and free-standing BRT route (G Line) range in length between 15 and 31 miles, and the 'VelociRFTA' exurban BRT in Colorado extends for 40 miles.

Without demand information, operational factors become the primary consideration, and these are better expressed in terms of running time than distance. One-way trip times on the aforementioned LACMTA services are 75 minutes or less, more or less in line with rapid transit nationwide. To maintain reliable operations, a specific route should have an allowance for 'schedule recovery' and a reasonable break allowance. This 75-minute budget is appropriate for a very high-performance BRT at ten-minute headways with highway crossing treatments comparable to LACMTA's LRT and some busways: many crossings are pre-empted or physically separated. For a surface-running BRT route on a ten-minute headway, where most major highway crossings are controlled by traffic signals, the one-way travel time should not exceed 60 minutes in order to be confident of reliable operation.

In the regional context, a travel time budget typical of Metrolink trips might be applicable, perhaps 90 minutes from a terminus at which much of the travel is concentrated. At a 30 mph design average speed, this would correspond to 45 miles.

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5 Station Spacing

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

The average distance between BRT stations is strongly linked to both a passenger's access time to or from the BRT service, and her or his in-vehicle travel time. For any particular route section, there is a range of minimum and maximum average inter- station distances that can represent a good balance between these considerations. Minimum and maximum averages are used to account for cases where strong, closely-spaced trip generators may warrant closer spacing. Generally, these ranges can be established by operating context as previously defined.

b. Key Considerations

In assessing locations for BRT stations, a BRT designer should consider:

> The layout of the underlying street grid, looking for locations at key intersections to support transit transfers and first/last mile connections

> Access to major concentrations of residential, employment, educational, health, shopping, cultural or recreational uses or centers

> General topography, locating stations in areas that are not arduous for pedestrians and bicyclists to reach

> The presence of concentrations of mobility-challenged populations, such as seniors' centers, or centers serving those with mobility impairments

> The presence of a good supporting network of first/last mile amenities, or the potential to add them (Chapter 7.6 provides further first/last mile guidelines)

> Adequate space to accommodate a BRT station footprint (Chapter 7.2 provides further station site layout guidelines)

> Potential to support nearby community and economic activity (Chapter 7.6 discusses this in more detail in the context of transit-oriented communities)

> The overall spacing of stations, as further discussed below

Operational Context	Minimum Average Stop Spacing (miles)	Maximum Average Stop Spacing (miles)	Minimum Distance Between Adjacent Stops (miles)
Dense Urban	0.5	0.75	0.2
Other Urban	0.75	1.0	0.25
Suburban	1.0	1.25	0.35
Regional	1.25	Based on market	1.0

Table 4. Station Spacing Guidelines

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c. Guidelines for Implementation

For a Full or Lite BRT service in LA County, the overall recommendation for station spacing ranges between 0.5 and 1.25 miles, depending on the nature of the surrounding development and street grid. Since much of the county features a grid with major arterials spaced 1 mile apart, an average station spacing of 1 mile across a full BRT rule may be considered a good rule-of-thumb for the county.

Nevertheless, the 1-mile guide is not a one-size-fits-all recommendation. In any given BRT route segment, the average spacing should vary according to conditions. It is recommended that the minimum and maximum station spacings in Table 4 be established for BRT route sections in their respective operating contexts.

For the regional context, the minimum spacing is a value below which even an ideal application (online stations on a freeway with a speed limit of 65 mph) would be unlikely to attain an average operating speed of 30 mph. The recommended minimum distance between stations for the regional context is based on the shortest observed inter-station spacings on North American commuter rail systems, the functional equivalent of a regional BRT service.

For the urban and suburban contexts, these recommendations are informed by the observed station spacings from implemented rapid transit routes worldwide, ranging from local services in dedicated lanes to fully grade-separated rapid transit. These can be considered to be representative of how the interplay of the underlying considerations of speed and access has been resolved in practice.

The above recommendations were informed by consideration of local conditions and practice in LA County, as well as national and international experience with similar high-capacity services.

Figure 5 shows the cumulative distributions of average station spacing for 209 urban transit routes classified as follows:

- *'Urban Rapid Transit'*, 65 fully grade-separated rail rapid transit routes, within the two urban contexts defined herein. These are relatively tightly clustered around 0.5 miles
- *'Urban Semirapid Transit'*, 12 LRT or BRT routes in the dense or other urban contexts, clustered around 0.4 miles
- *'Urban LocalPlus'*, 16 streetcar or 'BRT Lite' bus routes which do not have a parallel local service, clustered around 0.35 miles
- *'Suburban Rapid and Semirapid Transit'*, 14 routes in the suburban context, centered around 0.9 miles
- *'Blended Rapid Transit'*, 48 fully grade-separated routes which cover both the urban and suburban contexts; centered around 1.1 miles, and
- *'Blended Semirapid Transit'*, 54 LRT and BRT services covering both the urban and suburban contexts, centered around 0.8 miles.

The distinction between 'rapid transit' (on an exclusive right-of-way entirely separated from highway crossings) and 'semirapid transit' (not separated from highway crossings and not necessarily entirely in an exclusive right-of-way) was introduced by Prof. Vukan Vuchic[13], and has been built upon by others. In the urban and suburban operational contexts defined above, the BRT vision is expected to fall into the 'semirapid transit' class. The inclusion of data for rail-based systems greatly expands the number of observations, and it has been shown[14] that the underlying relationship between station spacing and average speed does not differ substantially between rail and bus technologies.

A further recommendation for locating individual stations and for adding stations after the corridor is operating, adapted from one developed for the VIVA BRT system in York Region, Ontario,

[13] Vuchic, Vukan R. 2007. "Transit System Performance: Capacity, Productivity, Efficiency and Utilization." Chapter 4 in Urban Transit: Systems and Technology. Hoboken, N.J.: Wiley, 149-201.

[14] Allen, D., Bruun, E.C, and Givoni, M., "Choosing the Right Public Transport Solution Based on Performance of Components" Transport, 33(4): 1017-1029

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is considered appropriate for the urban and suburban operating contexts:

"In terms of spacing, an additional vivastation on an existing Viva route should only be considered if:

> the additional vivastation is located at least 750 metres (about 2,500 feet) from the nearest adjacent vivastation on any Viva route serving the proposed additional station;

> It will not reduce the average route-wide distance between vivastations on any route the additional vivastation serves to less than 1,000 metres (about 3,300 feet);

> In terms of ridership, a new 'infill' vivastation on an existing route should attract more new riders than it discourages as a result of the additional travel time, and should be expected to attract at least 300 new boardings per weekday (i.e. the estimate of new boardings must not include shifts from adjacent vivastations)".

The principle of establishing a target increase in ridership to support addition of a new station, adapted to Los Angeles experience, is suggested for future adoption.

Based on the characteristics of the observed systems with the shortest average spacings, corresponding values for the urban and suburban contexts have been included in Table 4. Metro's 2016 Transit Service Policies and Standards identifies a maximum average spacing of 6,600 feet (or 1.25 miles), citing the need to both 'achieve the highest bus speeds' and to 'provide access to major activity centers and

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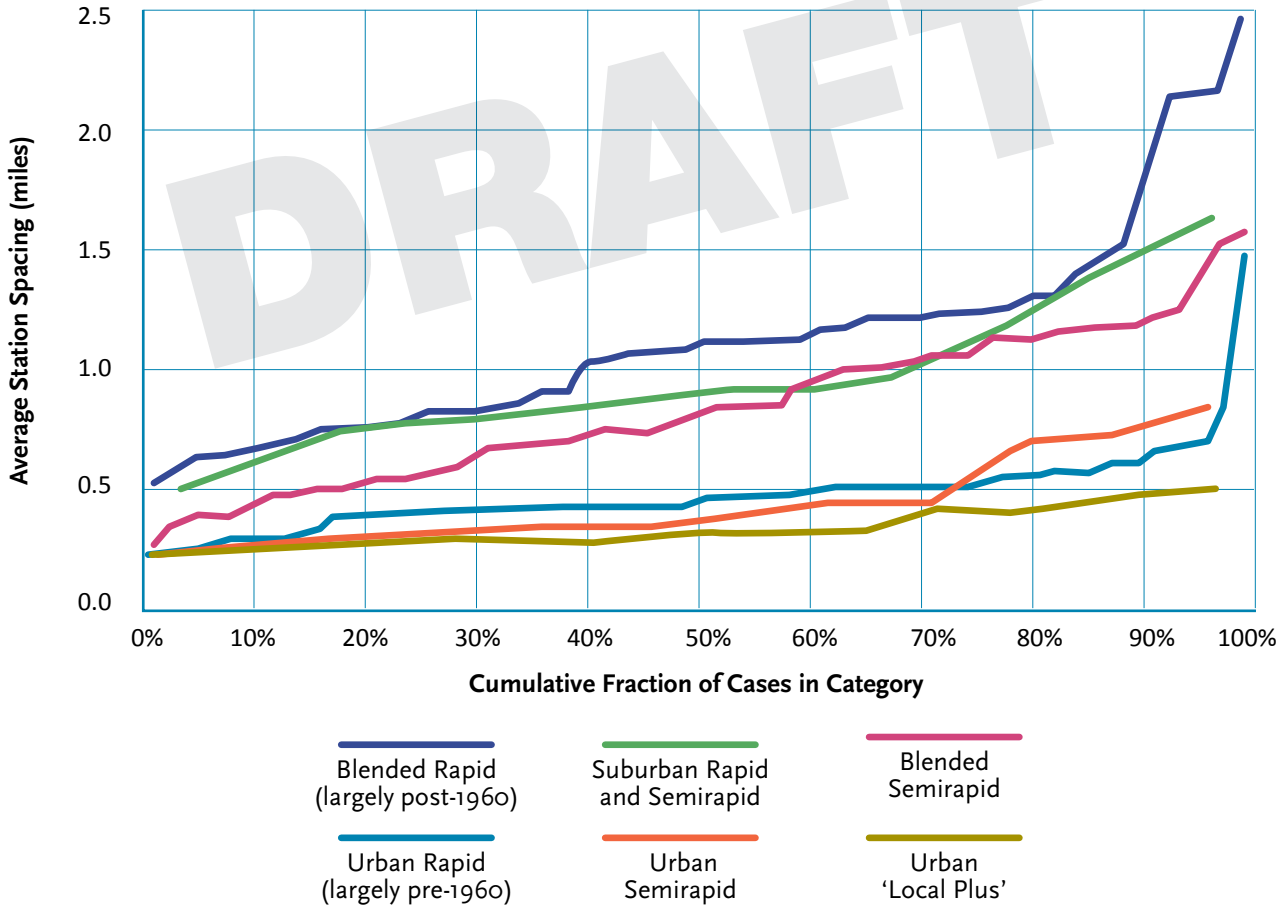

Figure 5. Distributions of Average Station Spacing
Source: IBI Group research based on transit agency published information, the National Transit Database, and direct observations

transfer points'. Based on the suburban systems observed, a slightly closer maximum spacing that corresponds to about the 80th percentile of these observations will accomplish this more effectively for the suburban context. Similarly, it is appropriate to establish different guidance for the urban contexts.

In the regional context, the absence of continuity in development patterns precludes setting a meaningful maximum average station spacing. Placement of stations in the regional context will be strongly determined by the specific locations to be served, but may also depend on the role of park-and-ride (P&R) in accessing the stations. Many commuter rail systems have substantial P&R access, and this is also true of the Roaring Fork Transportation Authority's 'VelociRFTA' regional/exurban BRT in Colorado.

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6 Frequency of Service

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

LACMTA's 2016 Transit Service Policies & Standards document establishes 'policy' headways (scheduled intervals between vehicles on a route in the same direction). These establish a maximum headway (or minimum frequency) for service during the weekday peak periods and for all other times and days of service. Adherence to passenger loading standards, and the Metro Vision 2028 goal of providing high-quality mobility options that enable people to spend less time traveling, will often result in a service of any type offering more frequent service at various times of day on specific routes, depending on passenger traffic volume. This will be particularly true of a BRT route operating at a passenger traffic density appropriate for BRT. The distinction between the maximum 'policy' standard (grounded in the need to balance passenger convenience and cost-effectiveness) and the service levels that might be considered likely or appropriate for a branded BRT service for planning purposes is important to bear in mind.

b. Key Considerations

When determining the frequency or headway of a BRT service, a service planner must strike a balance between the following considerations:

- Shorter headways are more expensive to operate than longer headways
- Shorter headways provide shorter wait times for passengers and higher capacity on the route
- During peak periods, or potentially for a good part of the day on high-demand routes, longer headways can cause a route to exceed its passenger loading standards (see Section 7 below) – headways should always be adjusted to avoid this outcome
- In off-peak periods or on BRT routes with lower demand, the passenger demand may not justify a high headway; however too-long of a headway may deter riders, and is not in keeping with the image of BRT as a premium, rail-like transit service. Therefore maximum or "policy" headways should be established, as discussed below

c. Guidelines for Implementation

The recommended peak-period maximum headways for BRT are:

- 10 minutes for Full BRT
- 12 minutes for BRT-Lite

Off-peak headways should not exceed 15 minutes except on all-night ("owl") service.

[15] Especially Nantes and Strasbourg in France, where BRT routes have been added to a light rail network with comparable status in terms of branding and mapping.

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Transit Service Type	Weekday Peak	Off-Peak
Light Rail	12 minutes	20 minutes
BRT	12 minutes	30 minutes

Table 5. Maximum ('Policy') Headways from 2016 Transit Service Policies and Standards

The recommendations track with both existing Metro policy and national BRT experience. LACMTA's 2016 Transit Service Policies & Policies document establishes the maximum headways shown in Table 5. For stand-alone BRT services as defined under 'Demand Density', it would be reasonable to expect a BRT service to at least match these standards for light rail transit. Based on comparisons with other cities in the US and overseas[15], BRT services appear to be offered at 20-25 percent higher frequencies than LRT in peak periods, which would point towards a 10-minute standard for the peak hours, and 15 minutes for off-peak. Perhaps not coincidentally, 10 minutes is the US Federal Transit Administration's guidance for considering a project to be 'BRT' in the agency's 'New Starts' funding process.

Therefore, it is recommended that for a stand-alone BRT route, the maximum headways are 10 minutes in the peak, and 15 minutes in the off-peak. Rather than try to prescribe a standard for branched routes, which may have different levels of demand, it is recommended that an off-peak headway of 15 minutes is established for any route section carrying two or more services identified or branded as BRT. It is further recommended that if a BRT route divides into two or more branches, the peak period maximum headway for any such branch is established as 20 minutes, and the maximum off-peak headway for such a branch be 30 minutes.

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7 Passenger Loading

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

Passenger loading standards seek to strike a balance between system cost-effectiveness, passenger comfort , safety and dwell times. LACMTA's 2016 Transit Service Policies & Standards document establishes passenger loading standards to express "the maximum average ratio of passengers to vehicle size and frequency by direction for a one-hour period [which] should not be exceeded for at least 95% of all hourly periods."

b. Key Considerations

Since passenger loading is essentially a function of passenger demand and frequency of service, similar considerations as discussed for frequency must be balanced:

> Shorter headways are more expensive to operate than longer headways

> Shorter headways will reduce passenger loading, leading to a more comfortable and safer passenger experience, particularly for passengers making longer trips, which is a target market for BRT

> Shorter headways will also help to reduce dwell time at stations, since a heavily loaded bus will need more time for passenger boarding and alighting.

c. Guidelines for Implementation

The above standards from Metro's 2016 document are based on studies of LACMTA's peers, and are appropriate for both Full BRT and BRT-Lite in the frequency ranges defined. One change to the standard (shown in Table 6) is recommended for BRT:

> That the standards for a frequency of 1-10 minutes (1.4 passengers per seat in the peak, 1.3 off-peak) be applied to BRT in peak periods even in cases where it may be scheduled to operate less frequently than every 10 minutes

Research into passenger comfort suggests that passengers are willing to accept more crowded conditions for very short trips, as likely happens more often in the most congested parts of a BRT corridor. With very frequent service, customers who are averse to the most crowded conditions may also have better opportunities to wait for

Standard	Basis	Weekday AM and PM Peaks	Other Times
Current	Frequency 1-10 minutes	1.40	1.30
Recommended BRT	All frequencies	1.40	1.30

Table 6. Existing and Recommended Passenger Loading Standards

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a less crowded bus. In the future, any available new research and guidelines regarding passenger comfort with regard to safe physical distancing practices also should be considered here.

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8 Span of Service

a. Description
b. Key Considerations
c. Guidelines for Implementation

a. Description

LACMTA's 2016 Transit Service Policies & Standards document sets out standards for span of service (time span over which trips will be operating on a route) for various service types both weekdays and weekends.

b. Key Considerations

When laying out the hours of operation for a BRT, the service planner will need to consider:

> Passenger convenience – a service which operates over an extended period will be more attractive to riders as it offers more trip flexibility and can accommodate more shift-workers

> Cost-effectiveness – if the demand profile does not warrant late-night or early morning service, BRT will not operate cost-effectively during those periods

> Transfers with other lines – consistent spans of service reduce the chance that a passenger will be "stranded" in the middle of their trip

c. Guidelines for Implementation

For both Full BRT and BRT-Lite, it is recommended that for stand-alone BRT services service spans in the urban and suburban contexts be established to be at least the same as the present standard for LRT, namely 4:00 am to 2:00 am on both weekdays and weekends.

This would assure that stand-alone BRT routes shown on a 'rapid'-class route map will create consistent expectations for all such routes, and would also maintain continuity with the adopted standard for the 'Metro Liner' service sub-type. An exception is made in the case of suburban routes that will not connect with the rail network - in this case a window of 4:00am to 12:00am is generally recommended; a later start-time may be used if there is a demonstrated lack of demand for 4:00am service.

If a decision is made to operate branched BRT routes, it is recommend that:

> the trunk portion of the route have the same span of service as a free-standing BRT route, and

> the span of service on any branch be no less than the present standard for the 'Metro Rapid' service type, i.e. 5:00 am to 9:00 pm on weekdays, and 6:00 am to 8:00 pm on weekends. Spans applicable to a branch are also appropriate for extended BRT routes operating in local mode and scheduled at half or less of the frequency of the trunk BRT route in the peak periods.

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Given that the purpose of BRT services in the regional context can vary greatly from corridor to corridor, and that these likely would not be paralleled by local bus service, it is not possible to suggest a span of service for them. The span of service for a new regional BRT should be based on the intended market for the service.

Peak-Period Bus Lanes. If a BRT corridor uses peak-period dedicated lanes, their hours of operations should be set based on congestion levels in the corridor, generally 7:00 am to 9:00 am and 4:00 pm to 7:00 pm.

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9 Service Reliability

a. Description
b. Guidelines for Implementation

a. Description

As articulated in the *Transit Capacity and Quality of Service Manual (TCQSM)* framework, service reliability is a distinct service attribute from travel time reliability. Service reliability, in the sense that buses run regularly, is an important part of how customers evaluate transit service. In contrast to travel time reliability, service reliability relates to the reliability of the service at a station in comparison to scheduled times, or for frequent services to the variability of headways. Service reliability is associated directly with customer waiting time at stations.

b. Guidelines for Implementation

For both Full BRT and BRT-Lite, it is recommended that service reliability is measured in two complementary ways – Metro's existing In-Service On-Time Performance (ISOTP) and Transport for London's (TfL) Excess Wait Time (EWT) LACMTA's 2016 Transit Service Policies & Standards establishes ISOTP based on considering a bus to be on time if it departs no more than one minute early or five minutes late at all time-points along a route. If a route uses headway-based scheduling (where buses are operated to keep a consistent headway rather than adhering to fixed timepoints), then the measurement will be early or late relative to the target headway rather than a fixed schedule.

The present ISOTP target is set at 80%, and there is an overall expectation that ninety percent of lines should achieve this standard at least ninety percent of the time. This aggregate measure cannot readily be assessed for a single route, percent on-time is not readily interpretable by customers, and particularly for frequent services, ISOTP may not represent the passenger experience so much as the operator's. For instance, if every bus on a ten- minute service is exactly ten minutes late, on-time performance is zero, but passengers will likely not notice the difference. An assessment based on on-time performance may be subject to change over time if the definition of 'on time' or the target levels change.

It is therefore recommended that in addition to ISOTP, BRT routes are evaluated in terms of Excess Wait Time a measure employed by TfL for high-frequency bus routes. EWT is recommended as a representative statistic because it has an intuitively understandable definition: how much time the average passenger has to wait for a bus in excess of the waiting time she or he would experience if the buses were perfectly regular in their arrivals.

The EWT is determined by the formula

$$EWT = 0.5\ H\ C^2$$

Where

- EWT is the excess wait time in minutes;
- H is the scheduled service headway in minutes; and

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> C is the coefficient of variation of the headway, the ratio of the standard deviation of the headway to the average headway value.

The initial recommended standard for EWT is one (1) minute, the same as TfL's own standard for high-frequency bus services. As experience with this measure is accumulated, the standard may be adjusted, perhaps taking the form of a fraction of the scheduled headway.

EWT can be evaluated at any station or combination of stations, over any day or time period available.

It is recommended that the EWT is evaluated quarterly for each operational BRT route, on the basis of all stations on the route weighted by the number of passenger boardings, formed on the basis of each block of time which has a specific scheduled headway.

EWT can be evaluated at any stop or combination of stops, over any day or time period available.

It is recommended that the EWT is evaluated quarterly for each operational BRT route, on the basis of all stops on the route weighted by the number of passenger boardings, formed on the basis of each block of time which has a specific scheduled headway.

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10 Travel Time Reliability

a. Description
b. Guidelines for Implementation

a. Description

Travel time reliability assesses how confident a customer can be of traveling within the average (or scheduled) time required for his or her trip. If travel times are more variable, the customer will experience more schedule inconvenience time, having to accept arrival (on average) at the destination earlier than required, in order to provide a margin of safety against being late. LACMTA's service standards, like those for many other transit systems, do not include one for travel time reliability.

b. Guidelines for Implementation

It is recommended to measure travel time reliability according to the 3rd Edition of the *TCQSM*, which uses the coefficient of variation of travel time - that is, the ratio of the standard deviation (spread) of travel time to the average travel time along a route. The TCQSM does not establish a quality standard for this measure. However, the literature on travel demand[16,17,18] supports the notion that passengers see a minute of standard deviation of travel time as at least the same, if not higher, than the effect of an extra minute of travel time.

It is recommended that travel time variability is evaluated over a route, or even between timepoints, using the ratio of the standard deviation of the travel time over a route (in seconds) to a reference travel time variability TTRref given by:

$$TTR_{ref} = 0.0368\overline{TT} + 0.765\sqrt{\overline{TT}}$$

Where TT is the average travel time in seconds.

Over a calendar operating quarter, for each class of operating day (weekdays, Saturdays, Sunday/holidays) and major time period within those classes, this ratio should not exceed 2.70. Lower ratios, perhaps as low as 1.40, may occur if BRT routes have major portions of grade-separated exclusive right-of-way without traffic signals.

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[16] Bates, J., J. Polak, P. Jones, and A. Cook, "The Valuation of Reliability for Personal Travel", Transportation Research Part E: Logistics and Transportation Review, Vol. 37, No. 2, 2001, pp. 191-229.

[17] Beaud, M, Blayak, T, and Stephan, M, "Value of Travel Time Reliability: Two Alternative Measures", 11th Meeting of the EURO Working Group on Transportation, 2012.

[18] Currie, G., Douglas, N', and Kearns, I., "An Assessment of Alternative Bus Reliability Indicators", Australasian Transport Research Forum (ATRF), Perth, WA 2012.

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11 Fare Collection and Boarding Protocols

a. Description
b. Guidelines for Implementation

a. Description

How a passenger boards the BRT vehicle and pays his/her fare is an important part of the user experience. Simplifying the procedure not only results in a better experience for the customer, it also speeds the boarding process, which reduces dwell times and boosts system speed.

All-door boarding is one of the most effective ways to reduce dwell times. In all-door boarding, non-cash customers may board using any door.

The LA County BRT Standards (2008-2014) call for all-door boarding at all stations. The sole exception is that up to 10% of Full BRT and 20% of BRT Lite stations can be exempted from all-door boarding if off-board fare payment is used. The Standards also call for dwell times of 2 seconds per boarding for Full BRT, and 2.5 seconds per boarding for BRT Lite; these thresholds are very difficult to achieve without all-door boarding, underscoring its importance to BRT performance.

b. Guidelines for Implementation

It is recommended that both Full BRT and BRT Lite offer all-door boarding for non-cash customers at all stations. Up to 10% of Full BRT stations and 20% of BRT-Lite stations may be exempted if they offer off-board fare collection.

While all-door boarding can be implemented on systems with on-board fare collection, off- board fare payment at high-volume stations is encouraged as another effective way to reduce dwell times.

There are two basic systems for collecting fares off the BRT vehicle – barrier and barrier-free. A barrier system is employed on Metro Rail, and has several advantages, including the creation of clear fare-paid zones, which enhances system security. However, it is anticipated that many BRTs in LA County will be implemented as predominately curb- or side-running systems where stations are adjacent to or integrated with sidewalks. At center-running stations, the fact that BRTs have low platforms - at or near curb heights - makes barriers ineffective since riders can easily bypass them. It is difficult to create fare-paid zones with such stations, therefore a barrier-free system is acceptable. These are also known as "proof-of- payment" systems where a customer is required to carry a fare card (e.g. a TAP card), ticket or other media that shows that a fare has been paid.

Use of the TAP card system is mandatory for Metro-implemented BRT and highly recommended for BRTs implemented by Municipal Transit Agencies, to allow for seamless transfers and a common BRT and Metro Rail rider experience.

Proof-of-payment systems rely on fare enforcement via random checks by roving inspectors. Therefore, it is recommended to implement a fare inspection system in accordance with overall agency policy.

If off-board fare collection is used, then a fare confirmation/activation/validation machine should be placed at each door.

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12 Other Services Sharing a BRT Corridor

a. Description
b. Guidelines for Implementation

a. Description

In the urban and suburban contexts, it is assumed that BRT services would usually be paralleled by local bus services making more frequent stops, and/or interface with other routes or patterns of service. This section suggests "rules of the road" for transit services sharing a corridor or interfacing with BRT services.

b. Guidelines for Implementation

Parallel Local Services

Where BRT services are in an exclusive median running way, parallel local services operating in the running way will interfere with, and cause delays to, the BRT service. Mitigation measures to preserve BRT speed and reliability include:

- Routing local buses in curb lanes in critical segments
- Reducing/rationalizing local bus stops
- Building passing lanes
- Lengthening stations to allow multiple buses
- Adding bays so that local buses can make way for BRT vehicles
- Adopting operating "rules of the road" to give BRT buses priority over local buses

Where BRT operates in a curbside dedicated lane (and service may therefore be adversely affected by right turning vehicles or other highway users) the local services can share the dedicated lane if provisions are made for them to pull into an offline position bus bay for the stop, so that BRT buses can pass them while they are stopped. In this situation, once local buses have completed their stop activities, they should be expected to yield to BRT buses. Transferring passengers would need to walk along the curb to move between the local stops and BRT stations in the same direction of travel.

In route segments where BRT services may need to operate in mixed traffic, BRT stations may be shared with local services when local circumstances warrant, such as when curb space is limited and/or total bus volumes are low.

Skip-Stop/Express Services

In the urban and suburban contexts, BRT services should be scheduled to make all stops. This maintains consistency with the other service types in the 'rapid' group (light rail and rapid transit).

The station spacing guidance in this document has been formed with a view to achieving goal average speeds with an 'all stations' service.

Express services have been operated on busways with two lanes in each direction (as on CTfastrak in Hartford, CT), or with passing provisions at stations (as on Pittsburgh's West busway). Even in these wider busway configurations, TCRP 118 recommends that "a basic all-day 'all

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stop' service" be provided. TCRP 118 further recommends that "BRT routes on city streets should have a single stopping pattern".

Skip-stopping (operating two or more service patterns on one corridor so that customers may need to transfer between services to make some trips) has been used to try to increase the effective speed and capacity of rapid transit services, most notably on the Chicago Transit Authority's (CTA) elevated rail lines, where the practice resulted in passenger confusion and burdensome wait times, causing a ridership decline - and a rebound when the practice was discontinued.

It has also been employed by local bus operations on downtown streets. For buses, skip-stopping requires buses to pass each other easily. Conditions most favorable to this include low general traffic volumes, and where there is a dedicated bus lane, provisions for bus stop 'pockets' for the use of general traffic lanes by buses.

The take-away is that skip-stop operations, whether BRT or rail, are complicated and confusing to passengers. They should be avoided unless there is a strong compelling reason in the density of demand patterns to warrant their use.

Feeders and Circulators

Feeder and circulator routes for which the routings are parallel to a BRT service and are on the same arterial should be treated in the same way as parallel local services. Transfers between BRT and feeders or circulators may be effected by moving along the curb or crossing arterial lanes. If the vehicles operated in feeder or circulator routes are interoperable with BRT vehicles, consideration may be given to sharing an exclusive BRT runningway, provided that the feeder or circulator route operation in the runningway does not extend farther than between two adjacent BRT stations, and it does not make any intermediate stops between the adjacent BRT stations.

For feeder or circulator routes, which operate across the BRT route, curbside stops for the feeder or circulators are appropriate, located so as to keep walking distances between these services and the BRT short. For instance, although 'farside' bus stops near intersections may be a preferred solution in most cases, a 'nearside' stop for a feeder or circulator might be considered if it would improve the average connection. Walking routes for the connections should be located in crosswalks or other protected locations.

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13 Service Reviews

a. Description
b. Guidelines for Implementation

a. Description

Service Review refers to a regularly recurring formal performance review of a route against established benchmarks, so that corrective actions can be taken.

b. Guidelines for Implementation

The guidance on service reviews in Metro's 2016 Transit Service Policies and Standards is up-to- date relative to industry norms and remains appropriate for the BRT service type. No change is recommended to this guidance in terms of frequency of review, correction strategies, or the service change process. It is recommended that the key performance indicators (KPIs) for BRT are expanded to include:

- Annual operating and maintenance cost per person-mile traveled (PMT), to adjust out differences in average trip length between or among routes.
- Passenger traffic density (PTD), defined as the ratio of the annual PMT to the one-way route length. This 'dimensionless' measure is readily comparable among routes, modes, or even entire networks.
- Average vehicle occupancy per gross square-foot-mile of revenue operation. This is the ratio of PMT to the product of revenue vehicle miles operated times the gross square foot area (length times width) of the average vehicle operated in service.
- Productivity as measured by the ratio of PMT to the product of revenue vehicle hours operated times the gross square foot area (length times width) of the average vehicle operated in service. This both corrects for differences in average trip lengths (as compared to boardings per vehicle-hour) and adjusts for vehicle size, facilitating comparisons among modes and networks.

The advantages of adding these measures are: a) that they incorporate person-miles traveled rather than boardings, which is a more accurate way of measuring the amount of passenger transportation actually provided, and b) that they can be consistently determined on a route or network basis and used to objectively compare entire modes within a system or to make comparisons between systems. If these measures prove to be helpful, they could be added to measures compiled for other modes, or incorporated in the next update of the route performance index (RPI). By way of example, Figure 6 shows how an occupancy measure based on linear meters of vehicle (the range of vehicle widths is usually not very large) can be used to compare the results of multiple systems and support development of a performance benchmark.

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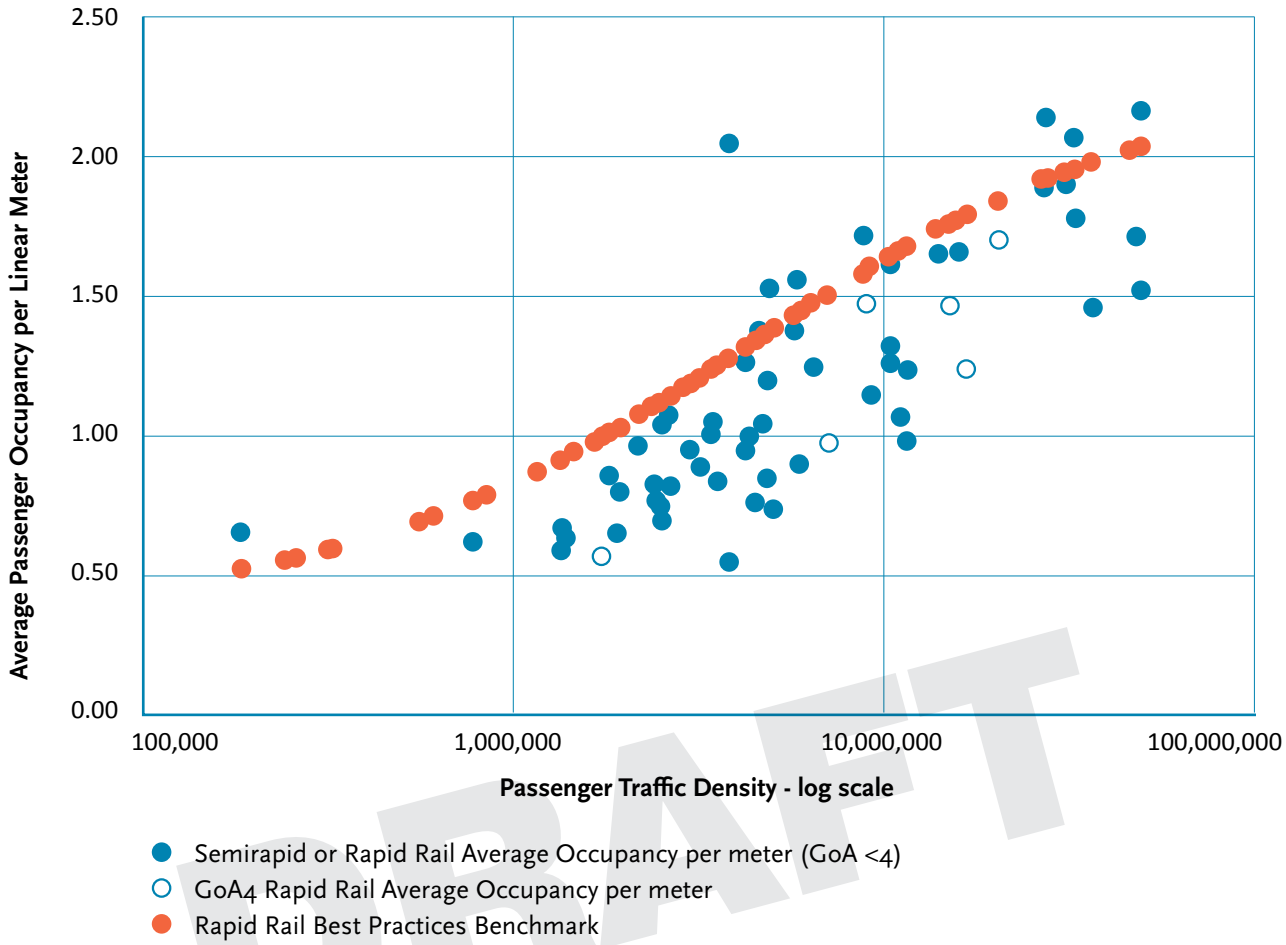

Figure 6. Example Cross-System Relationship between Performance Indicators

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Table 7 summarizes the recommended BRT performance indicators, including both the new ones discussed above as well as existing measures that have been adapted to BRT. The pages following the table provide more detailed definitions and formulas tor the measures.

Category of KPI	Specific KPI	Description	Benchmark	Data Accumulation	Start KPI Measurement	Method of Measurement	BRT Goals: Our BRT will provide an attractive, convenient and reliable mode choice that is a safe, secure, inviting and comfortable experience for all users for the entire trip.	Our BRT will fulfill a distinct role that enhances and integrates with existing mobility services.	Our BRT will connect people to where they need and want to go.	Our BRT will consistently operate at high-performance levels allowing users to by-pass congestion	Our BRT will provide excellent infrastructure, vehicles, amenities and customer service	Our BRT will consider community needs and enhance quality of life	Our BRT will align design standards and service needs to maximize benefits
Ridership	2.1 Ridership	Daily Passenger Boardings by Route by Time Period (daily, peak, off-peak, weekend)	NA -route-specific - each route to be compared to itself over time	Continuous	Start monthly tracking within three months	APC Data/Fare System Data	●		●				
	2.2 Ridership Trends	% Change in Boardings by Average Day by Typical Day Year over Year		Periodic	Start quarterly tracking within six months	APC Data/Fare System Data	●		●				
	2.3 Passenger-Miles Traveled	Daily Passenger-Miles Traveled (PMT) by Route by Time Period (daily, peak, off-peak, weekend)		Continuous	Start monthly tracking within three months	APC Data/CAD/AVL Data	●		●				
Customer Satisfaction	2.4 Customer Satisfaction Ratings	Ordinal scale ratings (e.g. 1-5, 1-7) on service attributes	Existing agency standard	Periodic	Start at 18 months and update every two years	Periodic passenger survey		●			●		●
	2.5 Customer Service Feedback	Number of Positive & Negative Feedback Responses		Continuous	Start quarterly tracking within six months	Customer Call-Ins, emails, & App Responses		●			●		●
Service Reliability	2.6 On-Time Performance	% On-Time (1 min early/5 min late) by Timepoint By Period (daily, peak, off-peak, weekend)	"Full BRT - 80% or higher BRT Lite - 75% or higher"	Continuous	Start monthly tracking within three months	CAD/AVL Data	●						
	2.7 Excess Wait Time	Amount of Time a Passenger has to Wait Beyond what they should Expect to Wait if Buses Ran as Scheduled, by timepoint, weekday peaks by direction	1 minute or lower	Continuous	Start monthly tracking within three months	APC Data/CAD/AVL Data	●			●			●
Performance	2.8 Travel Time	Bus Travel Time Absolute (including dwell) by Segment (timepoint to timepoint) and Direction by Period (daily, peak, off-peak, weekend) Bus Travel Time Ratio to Baseline/Reference Time"	NA -route-specific - each route to be compared to itself over time 2.4 or lower	Continuous	Start monthly tracking within three months	CAD/AVL Data				●			
	2.9 Travel Time Reliability	Variability in Travel Time by Segment (timepoint-to-timepoint) and direction in weekday AM and PM peak periods	2.7 or lower	Continuous	Start monthly tracking within three months	CAD/AVL Data - Post Process				●			●
	2.10 Productivity	PMT per revenue vehicle hour-square-foot	"Full BRT - 0.5 or higher BRT Lite - 0.4 or higher"	Continuous	Annually on a calendar year basis	APC Data and CAD/AVL Data - Post Process with NTD reporting							●
Access	2.11 Mode of Access	% of Access by Mode to BRT Stations by Station	NA	Static	Start at 18 months and update every two years	Customer Survey		●			●	●	●

Table 7. BRT Performance Measures

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Ridership

Ridership – defined here as total daily passenger boardings – is a fundamental measure of the success of a new BRT line. This data is routinely collected and is required to be reported to the FTA's National Transit Database (NTD).

Ridership should be collected and reported on a quarterly basis. Ridership should be reported for each route in each direction for the following as averaged over the quarter: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification into peak and off peak should align with regional planning and reporting practices. Additionally, ridership data should be collected at a station level periodically.

Ridership Trends

This Key Performance Indicator (KPI) uses the same data as Ridership above, however the focus when reporting is the percentage change since the last reporting period, to focus on trends.

Passenger-miles Traveled

Passenger-miles traveled (PMT) is a key statistic for assessing the amount of transportation provided by a facility of service. It is required to be reported to the FTA's NTD in addition to passenger boardings, in part because powerful indicators of efficiency or productivity can be derived from it, such as average bus occupancy (PMT per revenue vehicle-mile), passenger traffic density (PMT per mile of route) and operating costs per PMT.

With Automated Passenger Counter (APC) technology, PMT can be established at a basic unit of station-to-station, and as desired be compiled: by segments (e.g. timepoint-to-timepoint[1]); by routes, systemwide by mode; or in the aggregate across all modes operated. APC technology also enables the separation of the results by day or week or time of day. PMT has the same meaning and interpretation in all these contexts.

PMT should be collected and reported on a quarterly basis. PMT should be reported for each route in each direction for the following as averaged over the quarter: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification into peak and off peak should be align with regional planning and reporting practices.

Customer Satisfaction Ratings

BRT offers a blend of performance characteristics and passenger amenities that together make for a distinctive passenger experience. Periodic rider satisfaction surveys should be conducted to assess the overall popularity of the service as well as passenger feedback on distinct performance and amenities – e.g. system speed or station comfort.

At a minimum, this should be done at the time of an "after" study, to understand the effects of the new BRT service relative to baseline "before" conditions. Preferably, the BRT survey is also periodically conducted as part of larger passenger satisfaction survey efforts.

Customer Service Feedback

Another indicator of passenger satisfaction is a tally of both positive and negative comments received by the agency on the BRT service. Since this data is continuously collected as comments are received, it can serve to supplement relatively infrequent passenger surveys.

On-time Performance (OTP)

OTP should be reported on a monthly basis beginning with a BRT route's second full calendar quarter of operations. On-time percentages should be compiled for each BRT route in both directions for the following as averaged over the month: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification of trips into peak and off peak should be made in the same way as for the travel time KPI (see below). It is recommended that OTP be recorded both for each departure from each timepoint (except as noted below) in each direction and on a route-wide basis (by

1 Timepoints are designated timed waypoints along a route, used to aid in schedule adherence.

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direction) using the arithmetic mean of the OTP percentages of each timepoint in each direction.

It is recommended that the definition of 'on time' be no more than one minute in advance of scheduled departure (or arrival for the terminal) and less than five minutes late relative to timetable schedule. If a route uses headway-based scheduling (where buses are operated to keep a consistent headway rather than adhering to fixed timepoints), then the measurement will be early or late relative to the target headway rather than a fixed schedule.

Excess Wait Time

Excess wait time (EWT) is a passenger-centric measure of the difference between the average wait time which passengers experience with the service as operated, and the wait time they would experience if the route operated exactly on schedule. The *Transit Capacity and Quality of Service Manual (TCQSM)* (3rd edition, Transportation Research Board) recognizes this measure in addition to OTP as a measure of service reliability, stating that: "when departures are not perfectly reliable, the average waiting time is longer than the average headway and is related to the spread in the headway distribution". For very frequent service, as would be characteristic of peak-period BRT route service, it is reasonable to assume that passengers arrive at a relatively constant rate independent of the timetable times, so that the EWT measure at a point I along the route for a given time period when the headway H is constant can be expressed as:

$EWT_i = (H/2)\,(1 + (\sigma/\mu)^2)$ where

μ is the average headway operated over the time period at point *i*

and

σ is the standard deviation of the observed headways operated over the period at point *i*.

Because the BRT demand will be heaviest in peak hours, when the headways will be shortest, EWT should be evaluated by direction for the weekday AM and PM peak periods on a monthly basis[2]. It is further recommended that EWT be evaluated at each timepoint to compile a route-wide statistic. The identification of the peak periods should align with regional planning and reporting practices in the same way as for PMT. Peak period operations may be constituted of one or more 'time slices' *j* in which a specific headway H*ij* is scheduled at a timepoint *i*. The EWT value for an entire peak period for one operating weekday would be averaged across all timepoints and time slices.

The monthly reported value of EWT would be the average for all the normal operating weekdays (i.e. excluding holidays) in a calendar month. As reported by TCQSM, industry operating experience with EWT has shown that meaningful seasonality may be observed, which may be helpful for service planning purposes. Visibility of the underlying data by timepoint may also aid in identifying spatial 'hot spots' along a route where discontinuities in EWT occur and could be targets for remedial treatments. While the focus on consistent measurement should be the peak periods, as they are the highest-ridership times and most likely to suffer reliability issues due to congestion, periodic measurement of excess wait time in off-peak periods may be used to identify and remediate temporal 'hot-spots' too.

Travel Time (Absolute and Relative to a Baseline/Reference Travel Time)

Travel time is a principal measure for assessing the performance of a BRT route, because a fundamental motivation for bus rapid transit is to improve this attribute of service. APC technology enables accurate measurement of bus travel time for each bus trip between stations and can identify time spent at stations (dwell time). These times can be compiled: by segments (e.g. timepoint-to-timepoint) or along entire routes. The technology also enables the separation of the results by day or week or time of day.

Travel time should be reported on a monthly basis[2]. Travel times should be recorded for each trip on each BRT route, as measured from

2 Many transit operators have management 'dashboards' or other tools that can display these data on a daily or even near-real time basis. Such tools may be warranted for purposes other than assessing the overall performance of a route.

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departure from the originating terminal (e.g. bus departure as determined by the APC) and arrival at the destination terminal (e.g. door opening at the terminal as determined by the APC). These times should be compiled for each BRT route in both directions for the following as averaged over the month: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification into peak and off peak should be made on the basis of the clock time at a user-specified mid-route timepoint, with the definitions of weekday peak and off-peak chosen to align with regional planning and reporting practices in the same way as for PMT.

The above is an absolute measure of the travel time in a corridor and is useful in a before and after study for comparing BRT performance to any previously-existing local services. It is also useful as an ongoing measure to spot and correct any negative trends in travel time along a route. However, since each route will be different in length, number of stations, underlying congestion and other factors, it does not provide information with which to compare corridors.

For this reason, it is also recommended to conduct periodic, recurring (monthly if practicable) evaluations of bus travel time relative to a fixed reference time that depends only on the number of timetable stations per mile along the route. Because the travel time will already be reported, forming this ratio is a simple matter of dividing by a fixed reference time for each route, that would only change if the route were modified or stations were added or deleted. The proposed reference time Tref in minutes takes the form:

$$T_{ref} = \frac{60}{55} + e^{(-0.763 - 0.011S - 0.946\ln(S) - 0.216S^{-1})}$$

where S is a station-to-station segment's length, or a timepoint-to-timepoint segment's average station spacing, or an entire route's average station spacing, all expressed in miles. In essence, the reference time establishes the shortest likely travel time over a straight and level route without traffic signals or other traffic and with a maximum speed limit of 55 mph.

The travel time ratio to the reference minimum should be reported on a quarterly basis (or monthly if practical) beginning with a BRT route's second quarter of operations. These ratios should be compiled for each BRT route in both directions for the following as averaged over the quarter or month: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification into peak and off peak should be made on the same basis as for travel time.

Travel Time Reliability

As articulated in the *TCQSM* framework, travel time reliability is a distinct service attribute from service reliability, which is covered by other proposed KPIs. Travel time reliability measures how certain a customer can be of traveling within the average or planned time required for his or her trip. If travel times are more variable, the customer will experience more schedule inconvenience time[3], where she or he accepts arrival (on average) at the destination earlier than required, in order to provide a margin of safety against being late.

Through accurate measurement of bus travel time, APC technology makes it possible to process these data to form the standard deviation of travel time for any set of N bus trips as:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

where μ is the average travel time KPI value for the same group of N trips; and x_i is the travel time of each trip *i* included in *N*.

These standard deviations can be compiled: by segments (e.g. timepoint-to-timepoint) or along entire routes. The APC technology for also enables the separation of the results by day or week or time of day.

Travel time variability should be reported on a monthly basis. Travel times should be as

3 Furth, Peter G., and Muller, Theo J., "Service Reliability and Hidden Waiting Time: Insights from AVL Data", Transportation Research Record, 2006, Aspects of this work have been brought into the TCQSM framework.

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recorded for the travel time KPI, with standard deviations being processed after the travel times are captured. The standard deviations should be compiled for each BRT route in both directions for the following as averaged over the month: weekdays total, weekdays peak, weekdays off-peak, Saturdays, Sundays/holidays. The classification into peak and off peak should be made in exactly the same way as for the travel time KPI.

Productivity

Measuring route productivity is useful in assessing whether an agency's bus and BRT resources are being deployed effectively in the network, and may indicate where a BRT vehicle may be better redeployed on a more productive route.

The recommended measure of productivity is annual PMT per Revenue-square-foot-hour of service, or PMT/(VRH x A), where A is the floor-area in square feet of the average vehicle operating on the BRT route. This statistic should be reported annually on a calendar year basis. The underlying data VRH and PMT are already being compiled for the annual reports to FTA's National Transit Database (NTD). This KPI should be used to compare a route to itself over time, and can also be directly compared with results for other routes and other modes.

Modes of Access

The modes of access used by customers to reach the BRT route should be assessed bi-annually. Given the value of this information for general planning purposes, it is suggested that a fairly rich set of modes be defined, ideally a proven set in common use by the Southern California Association of Governments (SCAG), or already in use by Metro. It is recommended that this be obtained by an on-board survey of BRT passengers and that means be provided to also code or obtain the station at which each passenger boarded, the date, the time and the direction of travel.

Mode of access can be expected to be a relatively stable characteristic for each station beyond the first six months or so of operation and to vary among routes. In a sense, this is not so much a performance characteristic as an indicator of the route's nature and function. It may also prove useful in identifying First/Last Mile (FLM) improvements.

Significant changes are likely to be associated with changes to the transit and/or FLM network, such as a new connection with rapid transit, light rail, or other BRT services, or because of major changes in land use in station vicinities. Because a survey can be relatively expensive to administer, it is recommended that the survey be conducted every two years. Because there is effectively no way to establish a 'before' condition, it is suggested that the two-year cycle be common to all BRT routes and that the first such survey for each new route be conducted on the next two-year cycle following its sixth month of operation. This will enable system-wide trends to be tested across multiple routes.

There may be economies of scale to be achieved by combining this survey with others, such as for customer satisfaction.

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BRT Stations and Platforms

Stations are both the first and last impressions that customers have of a BRT system, and therefore set the tone for the entire rider experience. This section presents the LA County standard for BRT Stations, supporting a high-quality, consistent user experience while providing flexibility for space-constrained station areas.

1. Station Design Objectives
2. Station Footprint and Configuration
3. Materials and Finishes
4. Canopy Design
5. Systems Components
6. Lighting
7. Landscaping
8. Wayfinding Signage and Passenger Information
9. Passenger Amenities
10. Public Art
11. Parking
12. Outdoor Rooms/Open Space/Transit Plazas

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1 Station Design Objectives

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Opportunities and Challenges
e. Reference Documentation

a. Description

A key attribute to a Bus Rapid Transit system is that the passenger experience is "rail like". BRT stations fulfill several functions. They provide access to the transit service, create a comfortable and safe environment for passengers and provide transit information to customers.

The objective of the Metro BRT Stations Guidelines is to establish a baseline set of elements to be included in the design of BRT stations. The integration of the elements at station locations can facilitate an enhanced experience for passengers. It can do the following:

- Attract new riders
- Promote visibility and facilitate the branding of the system
- Provide protection from weather
- Ensure accessibility for all, including persons with limited mobility
- Provide route and wayfinding information
- Ensure that stations are integrated seamlessly into communities and contribute to urban design
- Facilitate convenient, safe transfers to other services, routes and modes

The BRT stations should be a substantial facility that shall include many of the following attributes:

- Shelter
- Opportunities for advance fare collection
- Distinctive architectural character
- Route and wayfinding information
- Lighting and security elements

Stations can also include facilities for additional functions listed below:

- Level boarding
- Seating
- Bike racks or storage
- Personal mobility device areas
- Additional shelters & canopies
- Leaning rails
- Enhanced plazas and landscaped areas

Factors to consider in determining additional amenities to provide at each station are:

- Existing and future passenger demand
- Ridership
- Transit service plans
- Capital cost
- Operating and maintenance cost
- Available right-of-way
- Compatibility of surrounding development plans and land use policies.

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The guidelines in this section supplement and lay the groundwork for updating the Metro BRT Design Criteria (2008-2014) by providing guidelines for the implementation of BRT on future corridors in addition to outlining the goals and the vision of the BRT system as a whole.

b. Metro Standards

There are several guidelines that relate to transit facilities. These include:

- Metro BRT Design Criteria (2008-2014)
- Metro Transfers Design Guide
- Metro Signage Standards
- Metro Systemwide Station Design Standards Policy
- Metro Rail Design Criteria
- Metro Rail Architectural Standard/ Directive Drawings

c. Guidelines for Implementation

Iconic Design

An iconic station design fulfills both a functional and aesthetic need. In a diverse urban streetscape condition, it is important that the station design be distinguished from competing street elements, yet complementary to its surrounding environment so that it is clearly identifiable. The iconic design elements of BRT stations should respond to a diverse range of street front conditions, including mixed use commercial/ residential, public parks and plazas, undeveloped or low-density commercial sites, as well as areas of cultural or civic significance.

An easily recognizable design for BRT systems should distinguish the system from surrounding conditions within the built environment, as well as from other transportation service options along the corridor. This is accomplished by presenting a visually distinctive service, designed with the consideration of passenger amenities that go beyond standard bus stops.

Branding

The station shall utilize branded elements consistent with Metro's Brand Standards and Signage Standards, with the goal of optimizing clarity, legibility, and ease of use by the customer. These elements of consistency shall be designed and incorporated to complement the station architecture, while at the same time creating a distinctive and memorable visual impact that signifies the enhanced level of service. Partnering municipal transit agencies will require integrated branding that also clearly indicates their service, and the balance of these elements will require careful consideration from the standpoint of spatial hierarchy and visual logic. For this reason it is highly advisable that the project team enlist the services of a professional Environmental Graphic Design consulting firm to facilitate the creation of a cohesive graphic identity. Metro Arts & Design shall be provided opportunities for coordination and review of this design effort at all stages of the process.

Site Specific Context

BRT systems incorporate numerous station locations and, at times, multiple corridors or routes, all while typically utilizing one primary shelter typology. Concepts surrounding a site-specific design response should highlight the flexibility of the station design. Site specificity for BRT station design should include design elements which are apt to respond to varied site conditions, including but not limited to microclimate, shading conditions, site slope, existing utilities, driveways, local stakeholder concerns and the programmatic constraints of adjacent sites.

Passenger Experience

One of the key goals for future BRT transit corridors in LA County is to provide passengers with streamlined high quality transit service, and amenities on par with rail service where possible. There are many transportation options available to potential passengers. As one of those many transportation options, Bus Rapid Transit has to compete with the flexibility and

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personal comfort of travel in a single occupancy vehicle, the speed and capacity of rail service, and the ubiquity of local bus service. The role of station design in this endeavor is to create a high-quality user environment that can attract potential passengers who would otherwise travel via automobile.

Safety and Security

Safety and security are enhanced when associated with placemaking and openness. These components of Crime Prevention Through Environmental Design (CPTED) are the foundation of establishing a sense of 'place' at the stations. When passengers are provided an environment where they feel confident in their safety and their personal sense of security, it enhances the sense of ownership of their community station. This further enhances the station's placemaking potential within their community. Features such as enhanced lighting in the station areas, security cameras integrated into shelter design and high visibility at stations and at pedestrian crossings shall be incorporated into the design of stations.

Placemaking

In order to foster an environment where BRT passengers feel safe and have a sense of ownership, it is critical that the station design be responsive to placemaking. Consideration should be given to providing the necessary allowances and clearances for comfortable patron inhabitation. Clean, safe, and appropriately-sized space on platforms allow passengers, even for short durations, to establish personal space and to create a momentary link to the welfare of stations. Areas for design consideration should include seating (individual versus group), the various forms of station waiting areas (either planned or impromptu), ease and comfort of ticketing activities, and passenger orientation both to and from stations.

As an element of variability, artwork incorporated into the design of the station is an excellent way to create a unique and memorable environment within the more structure system identity. Artwork can be integrated into the shelter in a variety of ways, depending on the station typology, and will act as identifying landmarks.

Sustainability

Typical BRT station amenities do not include major mechanical systems to measure sustainable energy efficiencies, but several sustainable practices should be considered in the design of the stations.

Photovoltaics integrated into the design of canopies shall be considered. Considerations for the inclusion of photovoltaics at stations include:

- Station orientation
- Solar access
- Predesign Canopy roof for the inclusion of solar array

Additional sustainability components that shall be considered:

- Use of low albedo, durable materials
- Use of light colored and/or permeable paving
- Energy efficient LED light fixtures
- Heat-resilient systems
- Use of bio-swales as a low impact development feature.

Innovation

BRT is a flexible mode that can be used in a wide range of urban transport applications. As such the design of elements should be designed in a manner that allows for the integration of new technologies as they emerge.

Kit of Parts Approach

The station amenities will be designed using a kit of part approach. Stations elements as described below will be utilized at stations to establish a minimum requirement of Baseline of amenities for platforms. At locations where warranted by considerations such as higher ridership or where space allows, enhanced amenities shall be provided. Components of the kit of parts are design to be modular in nature. This allows for items such as the shelter to be utilized in different size configuration as side platforms and median platforms.

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Baseline

> Marker
> Shelter/Canopy
> Integrated Lighting
> Litter Receptacle

Enhanced

> Bike Racks
> Windscreen
> Seating
> Leaning Rails

d. Opportunities and Challenges

Opportunities

> More people walking makes everyone safer.
> Going places on foot or by transit increases the opportunity for interactions between people.
> A visible transit system with highly visible stations creates a sense of neighborhood pride.
> More foot traffic creates marketing opportunities for existing businesses.
> More efficient transit service through improved boarding and wayfinding

Challenges

> Variations in site characteristics for stations: length and width of platforms.
> Variations in alignment types: side running or center median running.
> Station area vehicle requirements should be consistent.
> Variations in vehicle fleets from multiple operators: should be able to access any platform or layover facility.
> Space availability for side running.
> Turning movements conflicting with curb operations.

e. Reference Documentation

BRT transit facilities shall be designed in accordance with the most current applicable codes. Local codes shall have precedent over Standards and Guidelines that cannot be enforced by Authorities Having Jurisdiction. These include but are not limited to the following:

> California Building Code (2010 California Building Code title 24 Part 2),
> National Fire Protection Association (NFPA) 130,
> American Association of State Highway and Transportation (AASHTO),
> National Electric Code (NEC),
> International Fire Code (IFC),
> Americans with Disabilities Act Accessibility Guidelines (ADAAG),
> Transit Street Design Guide (NACTO)
> California Access Compliance (DSA),
> California Accessibility Reference Manual (CARM),
> California Transportation Department of Transportation (Caltrans) Standards,
> City Standards (Authority Having Jurisdiction), building and zoning permits
> Occupational Safety and Health standards (OSHA) 29FR Part 1910,
> California Public Utilities Commission (CPUC)

Where BRT facilities are not covered or found within a code, the best practice shall be implemented with approval from Metro.

Design Criteria and Guidelines

> Metro BRT Design Criteria, 2014
> LA Metro Transfer Design Guidelines- Improving Connections for a Seamless Trip, March 2018

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2 Station Footprint and Configuration

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

Station Typologies

This section discusses the range of station typologies and presents guidelines for how they are to be configured along the running way. The configuration of the station types will be largely determined by the placement of the running way for the BRT systems within the roadway. Generally the running way will be placed adjacent to the curb or side running or may be located within a center median of the roadway. Considerations for placement of the guideway can be found in chapter 7.3 BRT Running Ways, section 2.

The type of running way will have a direct impact on the station typology that will be utilized. BRT Stations will be configured into two main types:

> **Side Running Station** will be utilized when the BRT operates in a curbside or side running guideway

> **Median Running Station** will be utilized when the running way is located within the center of the roadway.

Side Running

Platforms that are integrated into the side of roadways can have several configurations. Factors that impact the footprint of the platform area and placement of amenities include:

> The width of the existing boulevard available.

> An adjacent parking lane that can be utilized for the platform area

> A bike lane that is included in the roadway.

> Possible conflicts with adjacent building entrances or driveways.

Additional consideration on the placement of Stations can be found in chapter 7.6 BRT Planning and Integration Into transit-oriented communities.

In general, the platform footprint shall be 12ft by 75ft. This provides an area of 900 sq. ft. for utilization of station amenities. A platform length of 75 shall be considered as a minimum when the station is not shared with other services. Where operation needs are warranted a 100 ft long platform can be utilized. The platform height at the loading edge can range from curb- height to level-boarding, which is 14 inches above the busway surface.

All station furnishing shall be placed to provide the maximum amount of unobstructed clear space at the platforms. The minimum clear space at platforms shall include:

> 96 inches (8ft) x 60 inches (5ft) at the accessible door for boarding

> 60 inches (5ft) x 60 inches (5ft) at all other doors

The typical configurations of stations for side running conditions shall be:

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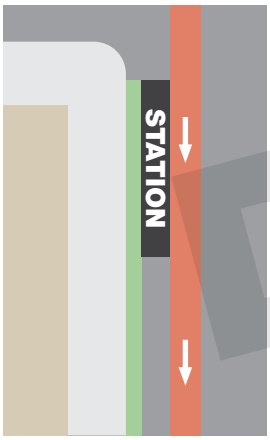
> **Type S1-Bulbout detached** - This configuration shall have a platform that is separated from the adjacent sidewalk boulevard with a bike lane (if present) that passes behind the platform.

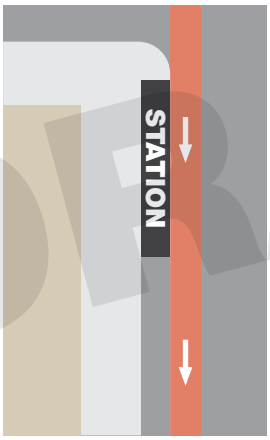
> **Type S2-Bulbout attached** - This configuration shall have a platform that is 12ft wide by 75ft in length. This shall be achieved by projecting into a parking lane. This configuration shall be integrated into an adjacent sidewalk allowing for pedestrian flow through traffic behind the stations.

> **Type S3-Integrated** - This configuration of platform shall be used when a minimum width of 15ft is available including both sidewalk and landscaped area in an existing boulevard and placing the platform in a parking lane is not possible. Within the 15ft boulevard, the platform dimensions shall be 12ft x 75ft. This scenario is considered a constrained space and the placement of platform canopies shall be 8ft from the edge of the platform to allow for adequate clearance for boarding and alighting and for pedestrian flow through traffic behind the shelters.

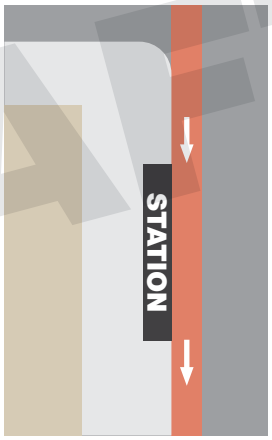
> **Type S4** - Constrained - Similar to the 15ft integrated platform, this configuration is for constrained spaces. This configuration is expected to be utilized in very narrow right-of- way. The platform footprint shall be 8ft x 75 ft. The placement of the canopy and station amenities shall be at the back of the platform. Placement of the canopy and amenities can be adjusted to avoid any conflicts with building entrances or features.



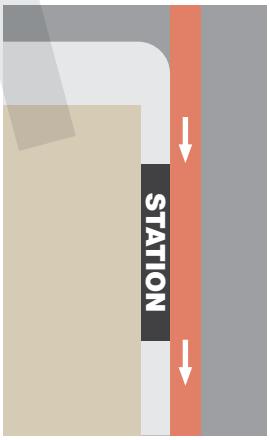
Side Running
Type S1-Bulbout detached



Side Running
Type S2-Bulbout attached



Side Running
Type S3-Integrated



Side Running
Type S4

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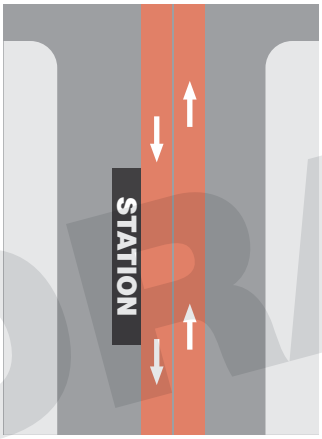
Median Running

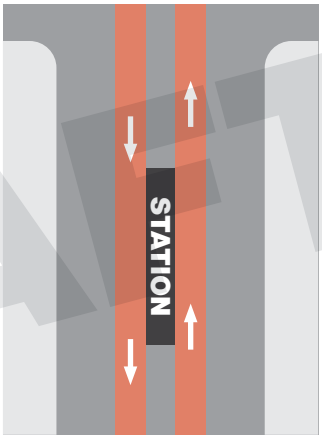
Median running is when the station is located at the center of the roadway. There are two possible configurations. The first is side/side staggered, where two right-side platforms are placed on either side of the running way across the intersection from each other. The second is a center island configuration. Should a center island configuration platform be selected, a contraflow or crossover operation of buses is not acceptable. The preferred operation mode shall include a 5 door bus where boarding and alighting can occur on the left or right side of the buses.

> **Type M1-Side/Side Staggered** - A side/side staggered configuration of platforms with dimensions of 12ft x 150ft for a platform area of 1800 sq ft. Each platform shall be located on the far side of an intersection in the direction of travel. Access to the platform will be from the intersection crosswalk.

> **Type M2-Center Island** - The center island platform shall be 16ft x 150ft for a total area of 2400 sq ft. Platforms can be located on either side of an intersection, and will be evaluated based on physical constraints at each location or operational efficiency. Access to the platform shall be from the intersection crossing.



Median Running
Type M1-Side/Side Staggered



Median Running
Type M2-Center Island

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b. Metro Standards

In general, stations shall be accessed at the ends of the platforms. Platform lengths shall be 75ft for side configuration stations. This shall allow for a single, 60ft, articulated bus. Median running stations shall have a platform length of 150ft. This shall allow for two 60ft articulated bus to berth at the platform edge.

Platform cross slopes shall be 1:48 maximum and shall be sloped towards the busway.

Platform width shall be a minimum of 12ft to allow for stations which include canopies, benches and passenger queueing areas, ADA clear floor space, and accessible routes.

Platforms in constrained spaces shall be a minimum of 8ft wide. Station amenities shall be placed on the platform to not encroach into a 5ft wide clear space from the platform edge.

c. Guidelines for Implementation

As a general guideline, the side running stations shall be integrated based on the Type S1-4 descriptions mentioned.

Approach walkways should be designed to have a slope of less than 5% slope. Main platform should be less than 2% slope.

Key considerations for each station typology and variations are described in the following sections.

Type S1-Detached Bulb-Out with Bike Lane

> If present, a bike lane shall separate the sidewalk and platform

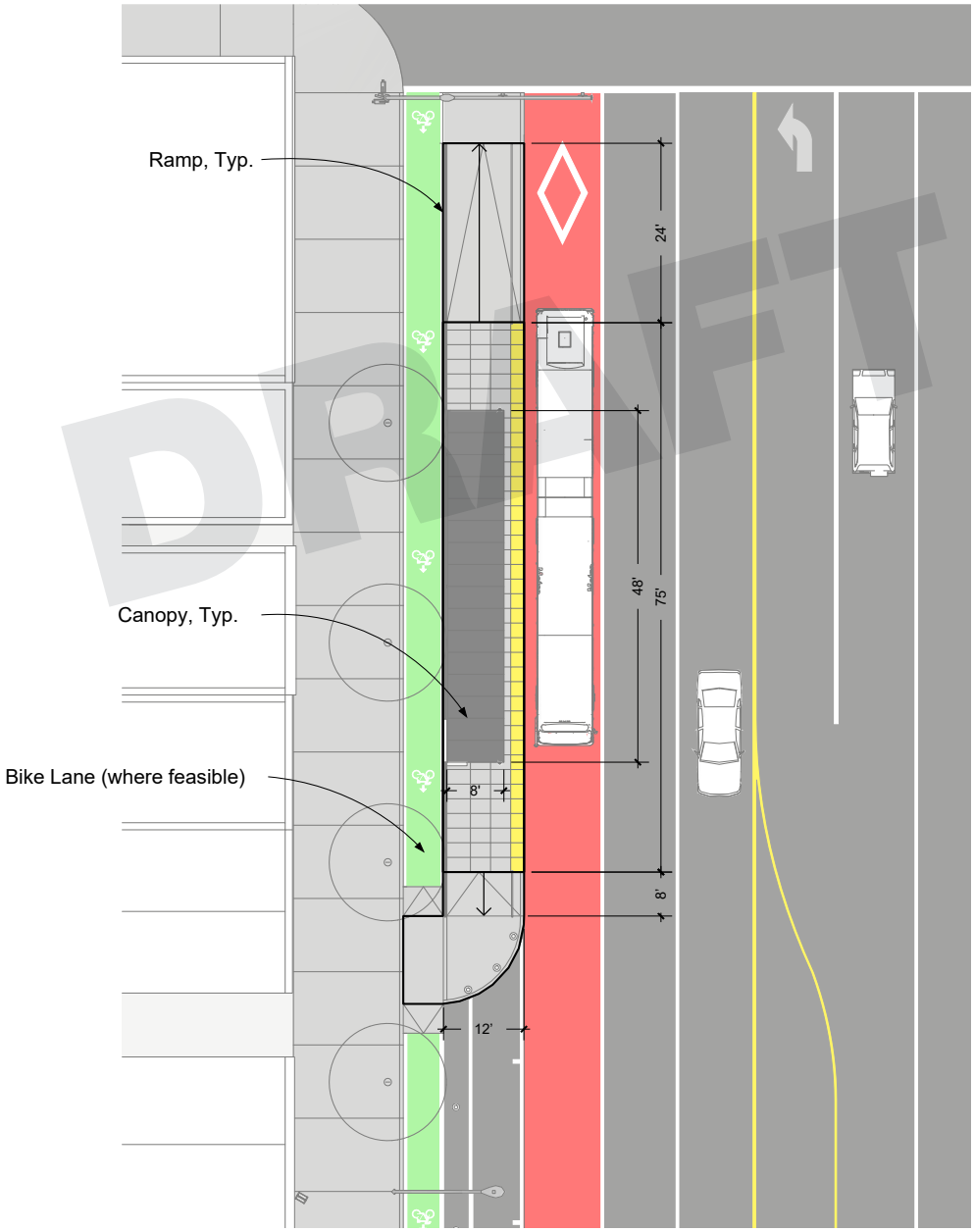
> 12ft wide X 75ft long platform for boarding and alighting

> Up to 125ft total length area when including approach walkways

> Canopy located to the back of the platform to maximize clear area from platform edge

> 150 sq.ft. coverage for canopy

> Baseline amenities as described in section 1, c at the platforms



Plan of S1 / Bulbout Detached Station

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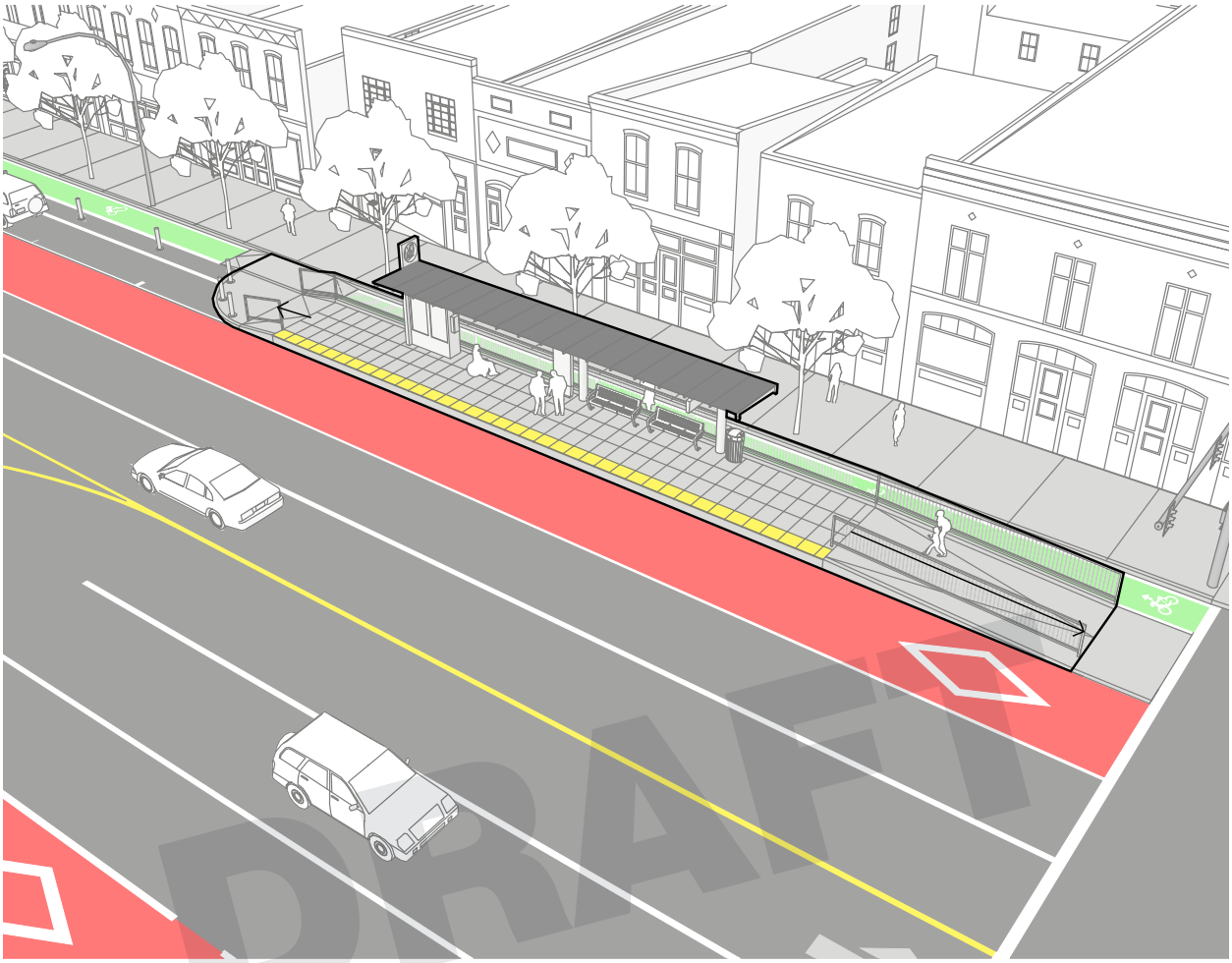

S1 / Aerial view

S1 / Ground-level view

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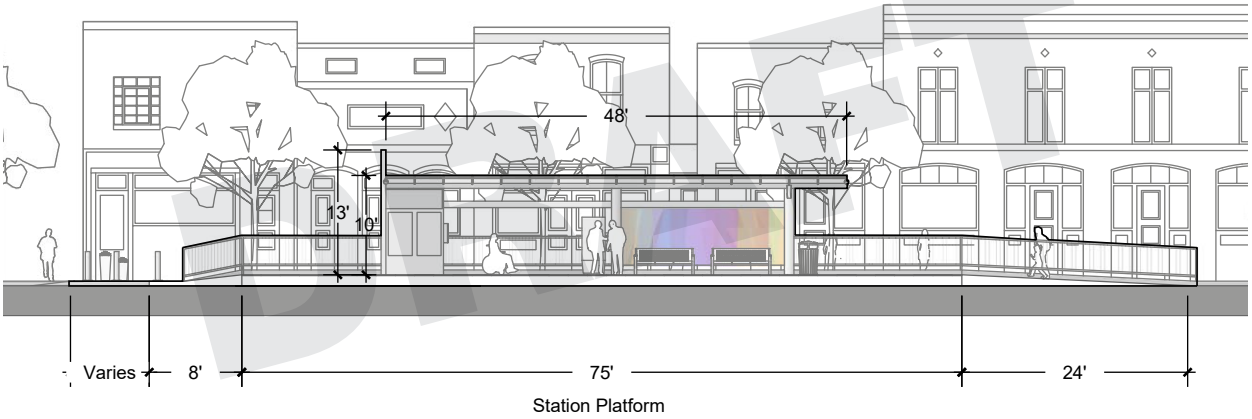
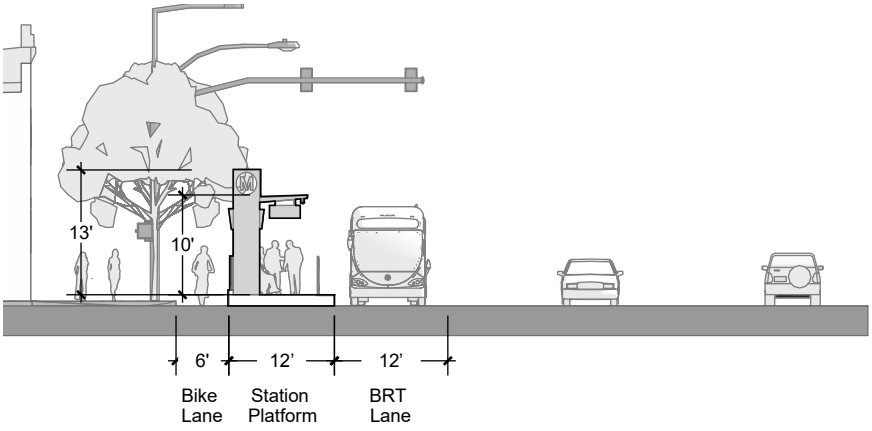
S1 / Front Elevation - Art Panel Style 1



S1 / Front Elevation - Art Panel Style 2



S1 / Side Section

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Type S2 Attached Bulb-Out

> The station projects into a roadway with existing parallel parking and is directly adjacent to the sidewalk

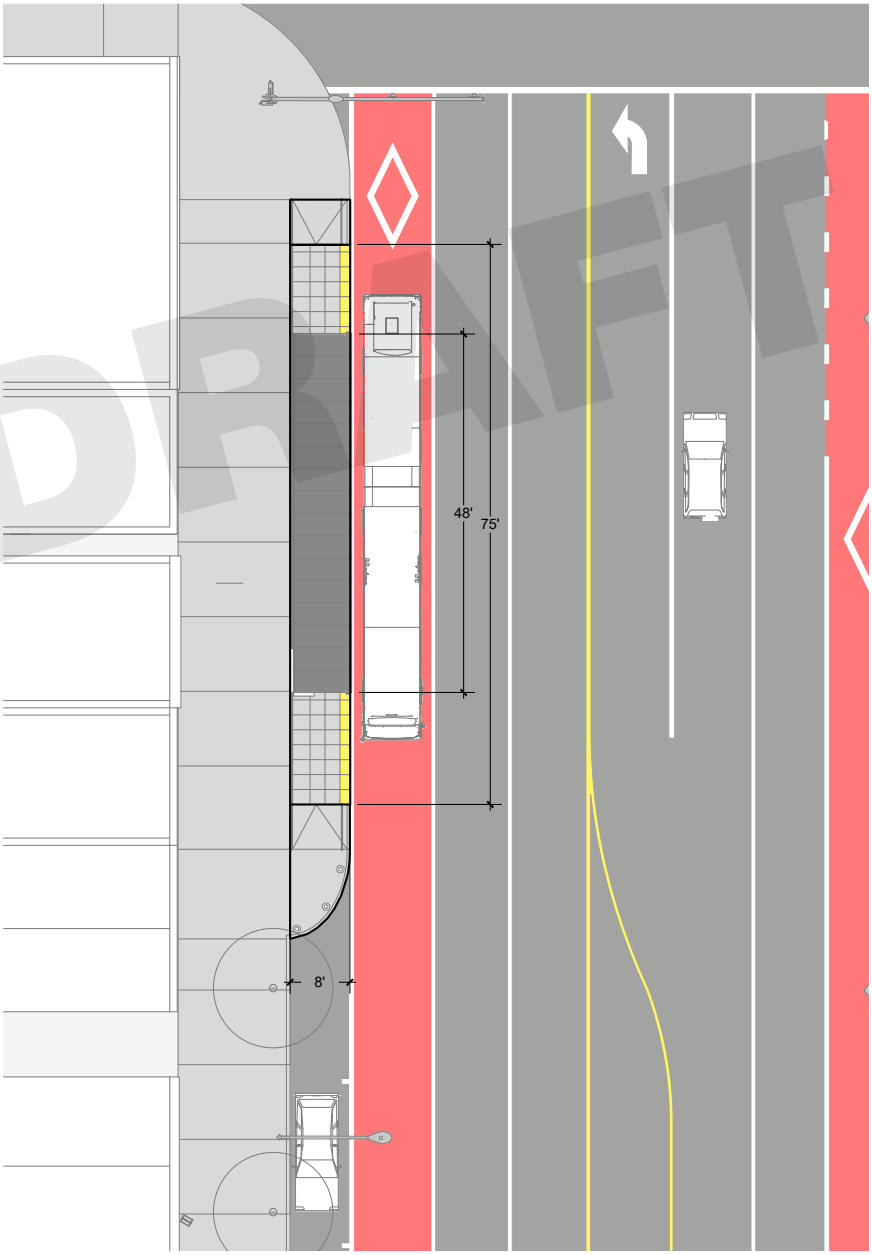
> 8ft wide X 75ft long platform for boarding and alighting

> Canopy columns placed at 8ft from the platform edge

> Up to 125ft total length when including approach walkways

> A protection railing may be needed at the back of the platform if the platform height is different than the adjacent sidewalk

> Sloped walkways with slopes not exceeding 1:20 shall be used for the approach to the platform



Plan of S2 / Bulbout Attached Station

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S2 / Aerial view

S2 / Ground-level view

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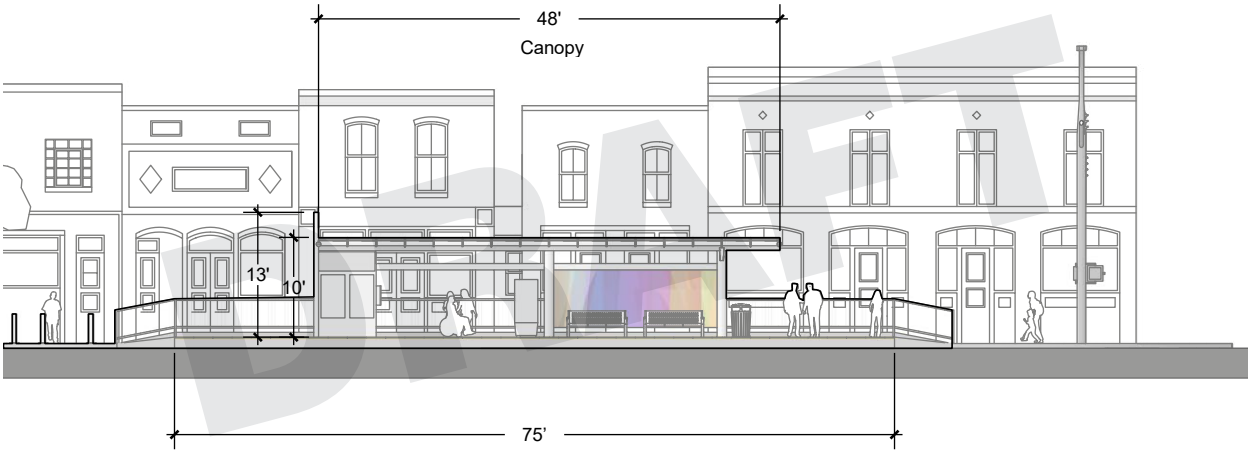
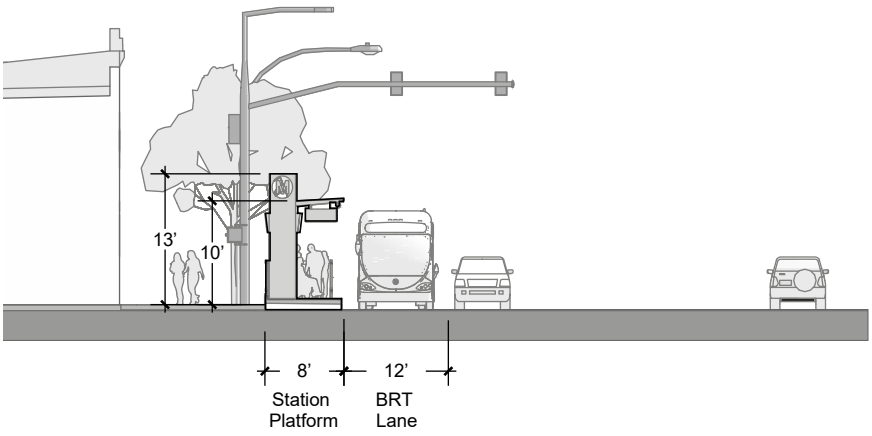
S2 / Front Elevation - Art Panel Style 1



S2 / Front Elevation - Art Panel Style 2



S2 / Side Section

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Type S3 Integrated within the Sidewalk

> The station is integrated into a boulevard where the available width is a minimum of 15ft or greater

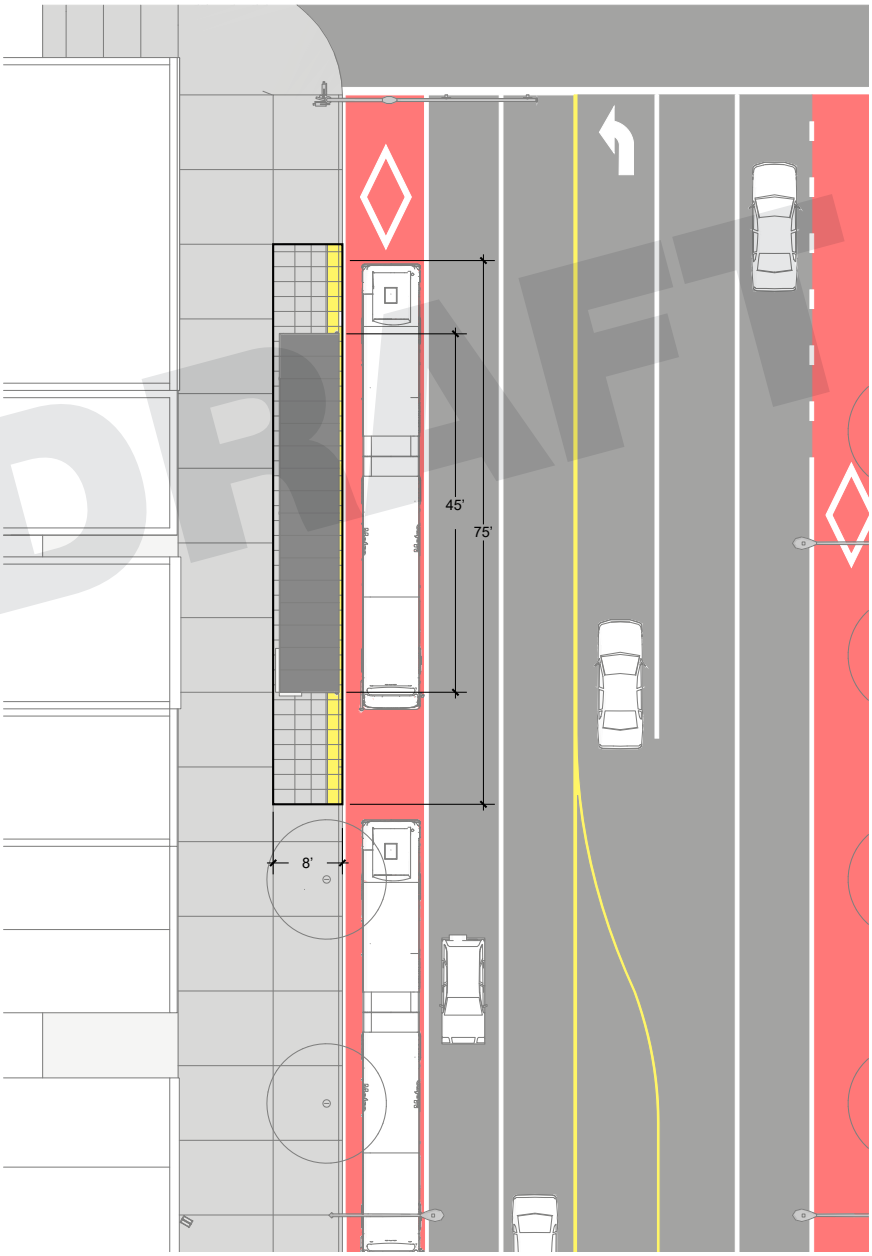
> 8ft wide X 75ft long platform for boarding and alighting

> Canopy columns placed at 8ft from the platform edge

> Canopy roof cantilever will extend to within 2ft of the platform loading edge

> Station amenities placed to not encroach into pedestrian clear zones.

> Minimum of 5ft clear from the platform edge



Plan of S3 / Integrated Station

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S3 / Aerial view

S3 / Ground-level view

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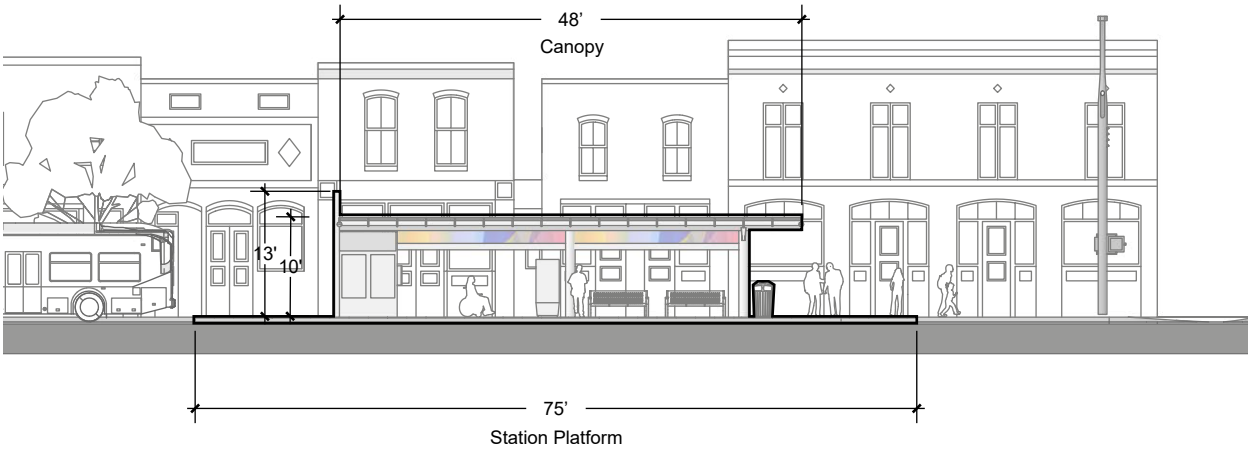
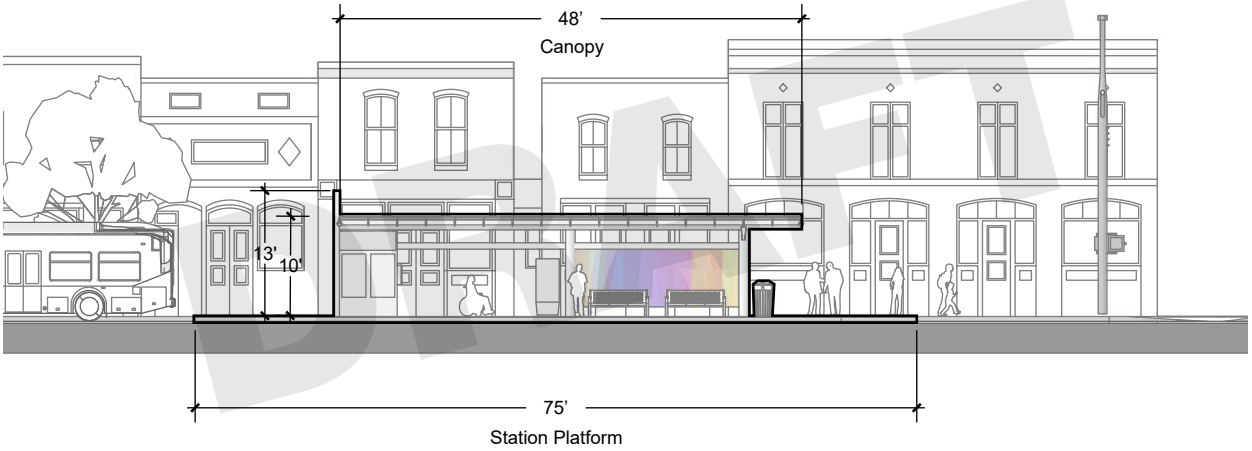
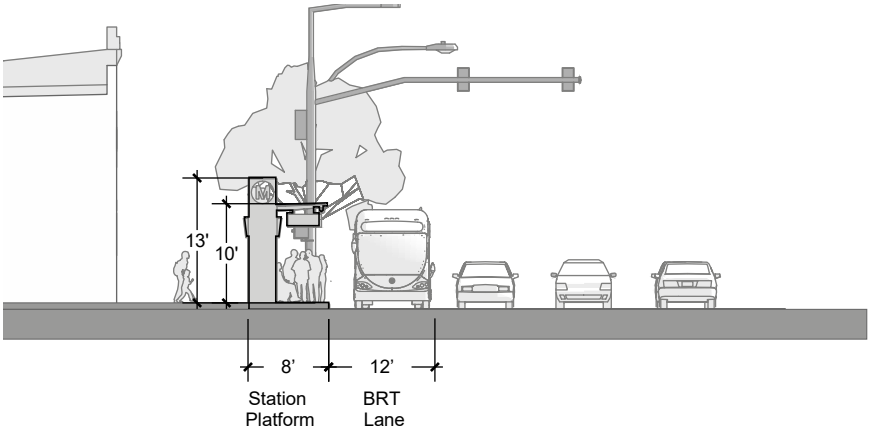


S3 / Front Elevation - Art Panel Style 1



S3 / Front Elevation - Art Panel Style 2



S3 / Side Section

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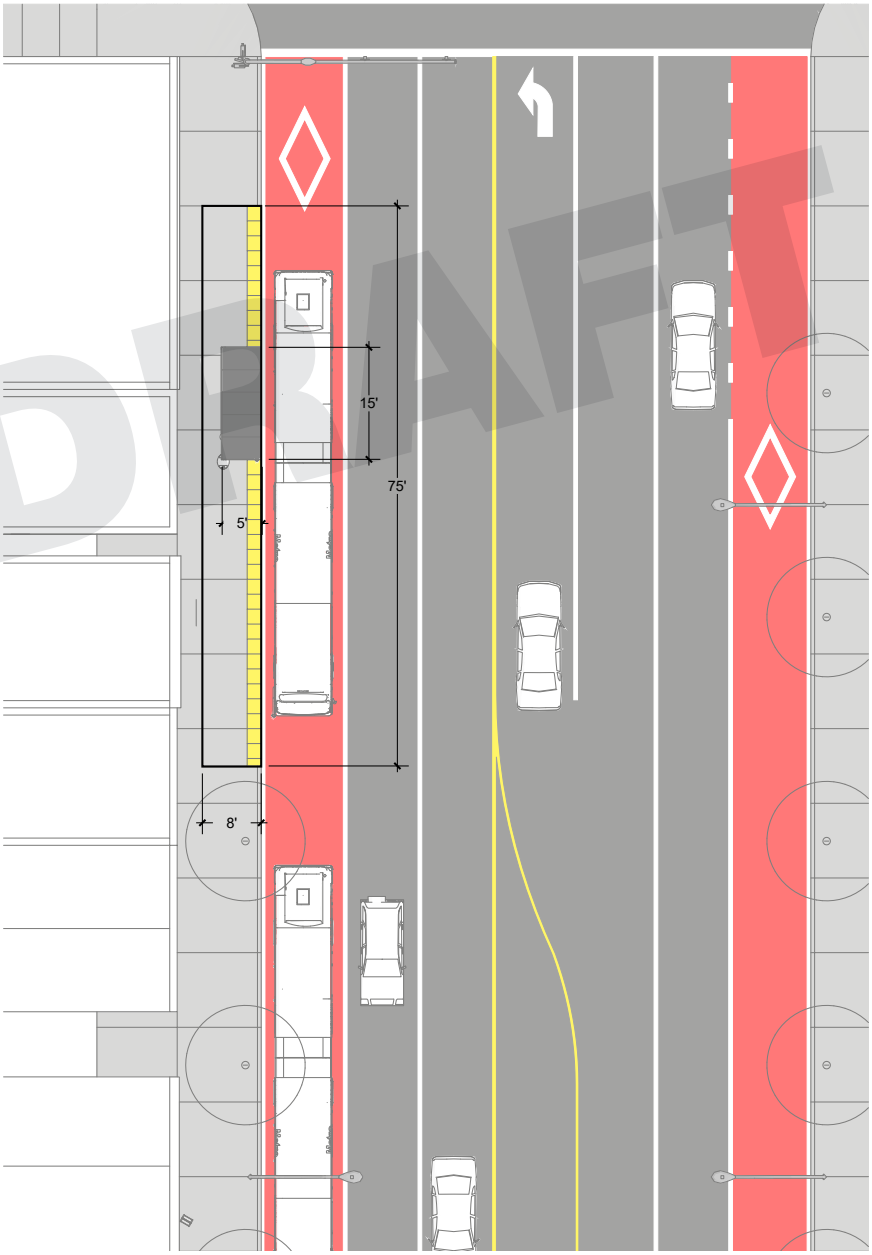
Type S4 Constrained

- > The station is integrated into a boulevard in constrained conditions with the boulevard available width; minimum of 8ft and up to 15ft wide
- > 8ft wide X 75ft long platform for boarding and alighting
- > Canopy columns placed at 5ft from the platform edge
- > Canopy roof cantilever will extend to within 2ft of the platform loading edge
- > Station amenities placed to not encroach into pedestrian clear zones
- > Minimum of 5ft clear from the platform edge
- > Lean rail in lieu of seating areas
- > Litter/recycling receptacle



Plan of S4 / Integrated Constrained Station

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S4 / Aerial view

S4 / Ground-level view

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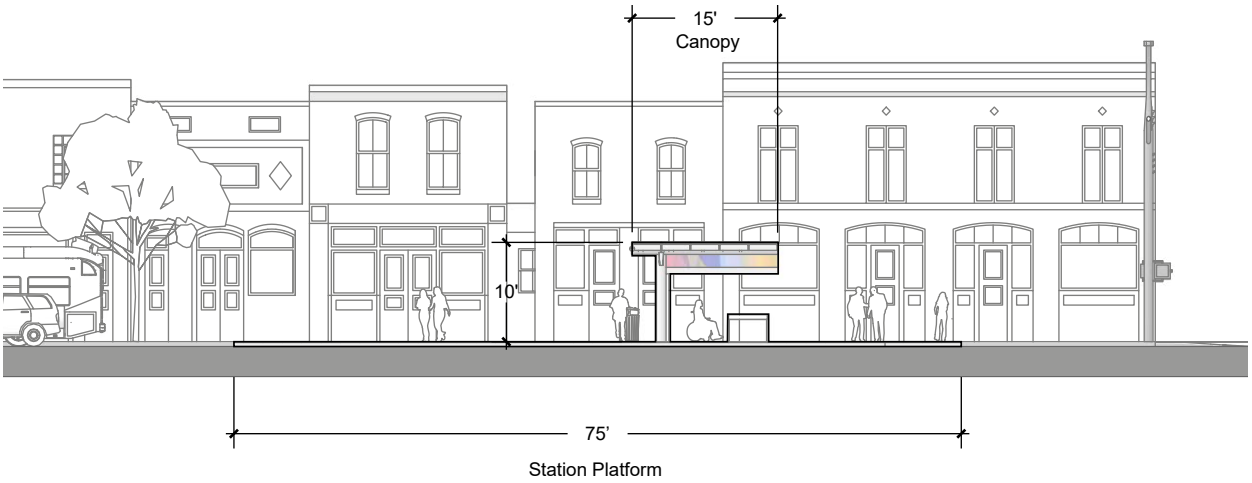
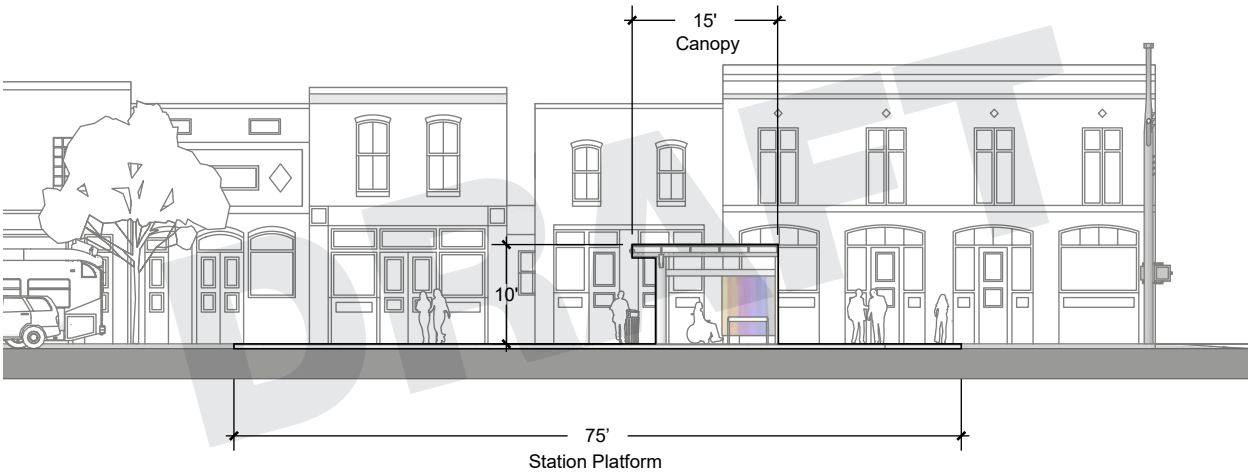


S4 / Front Elevation - Art Panel Style 1



S4 / Front Elevation - Art Panel Style 2

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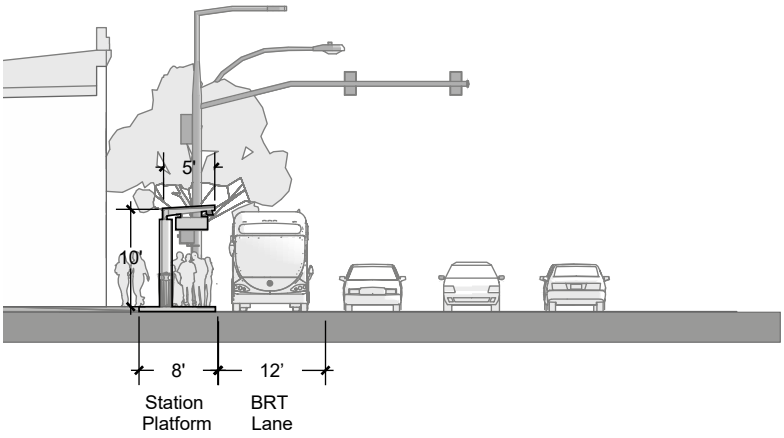
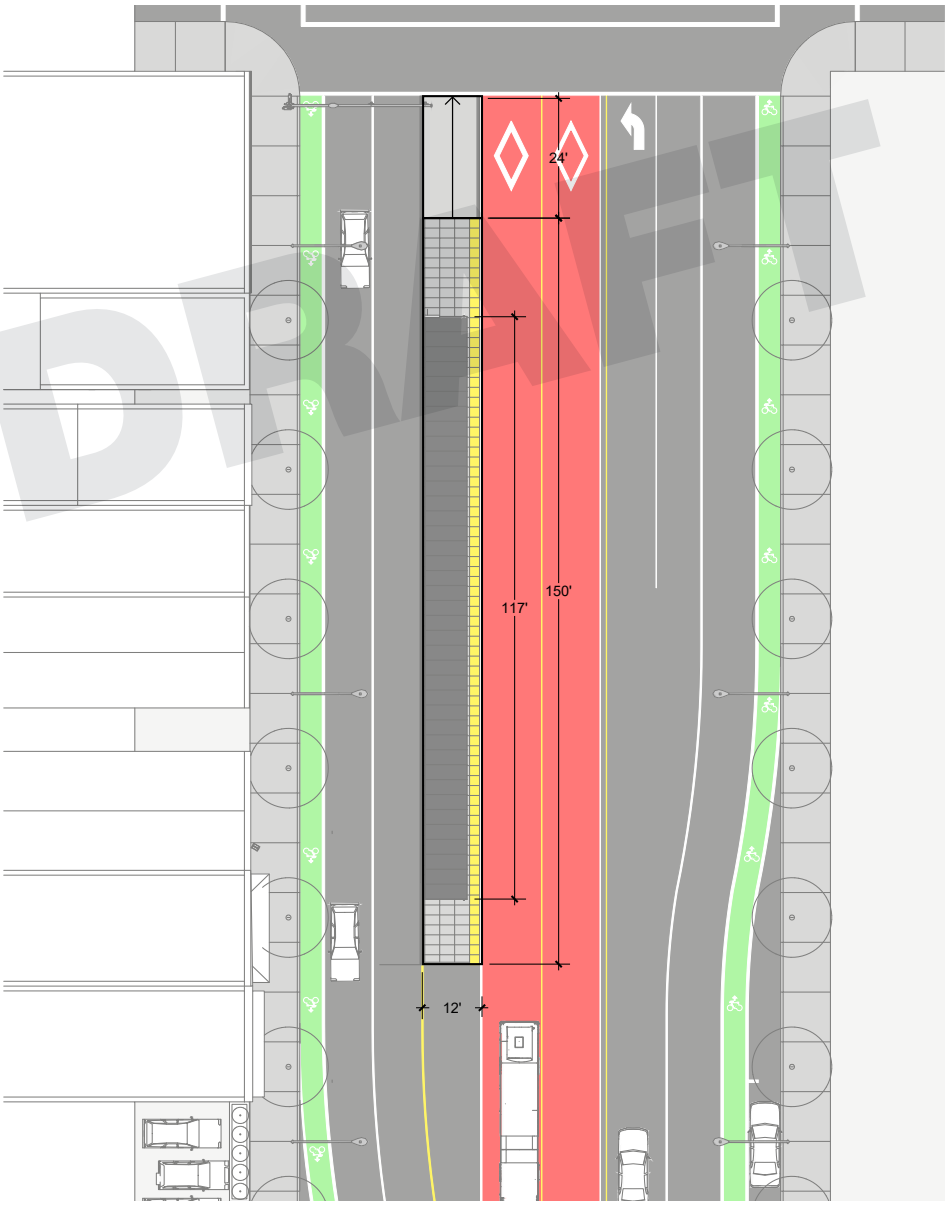


S4 / Side Section

Type M1-Median Running Side/Side Staggered

- The station is integrated into the center of a roadway when dedicated bus lanes are used and there is sufficient space within the roadway median to accommodate station
- 12ft wide X 150ft long platform for boarding and alighting is provided
- Up to 200ft total length of station when including approach walkways
- Sloped walkways not exceeding 1:20 shall be used for the approach to the platform
- Canopy columns placed at 11ft from the platform edge
- Provide a 42 inch tall continuous metal protection rail at the back edge of platform.
- A continuous overhead canopy shall be used to provide protection over 60% of the platform length
- Canopy roof cantilever will extend to within 2ft of the platform loading edge
- Station amenities placed to not encroach into pedestrian clear zones
- Minimum of 5ft clear from the platform loading edge



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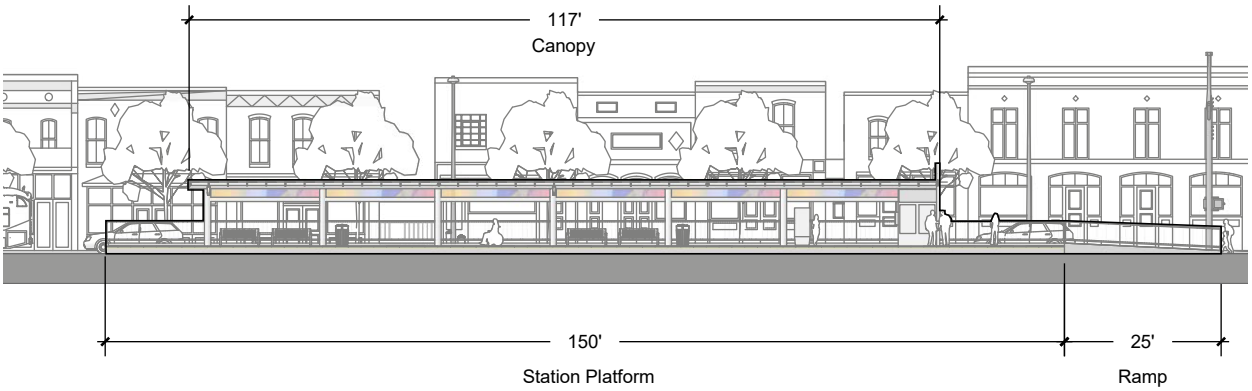
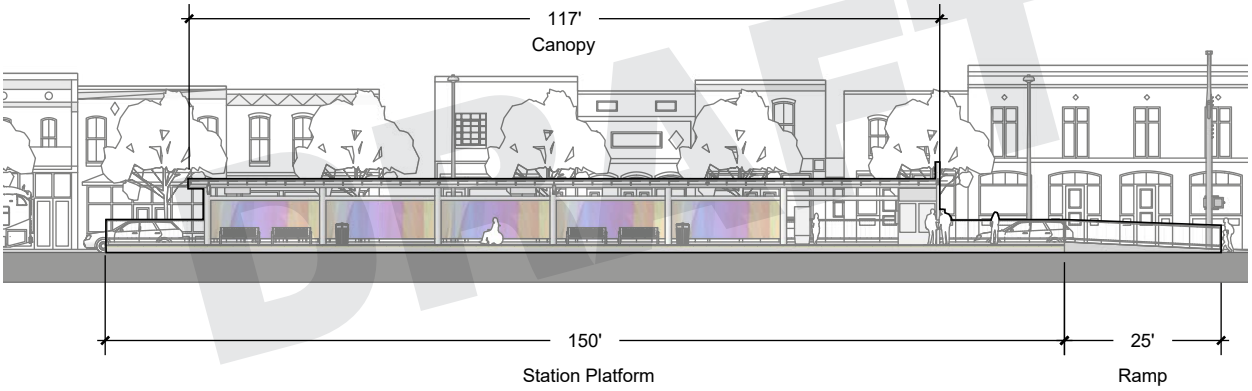
Plan of M1-Side/Side Staggered station

M1 / Aerial view

M1 / Ground-level view



M1 / Front Elevation - Art Panel Style 1



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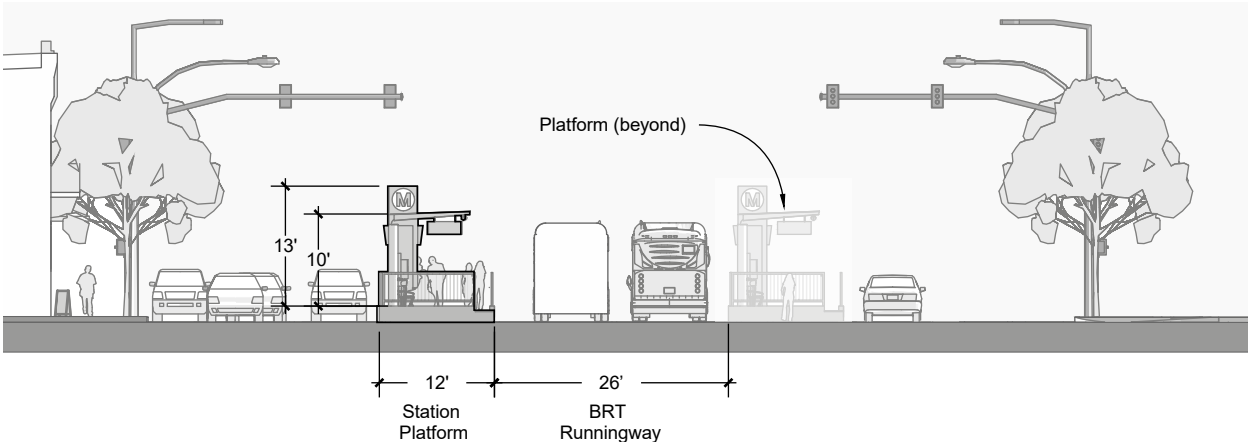
M1 / Front Elevation - Art Panel Style 2



M1 / Side Section

Type M2-Median Running Center Platform Configuration

> The station is integrated into the center of a roadway when dedicated bus lanes are used

> 16ft wide X 150ft long platform for boarding and alighting is provided

> Up to 200ft total length of station when including approach walkways

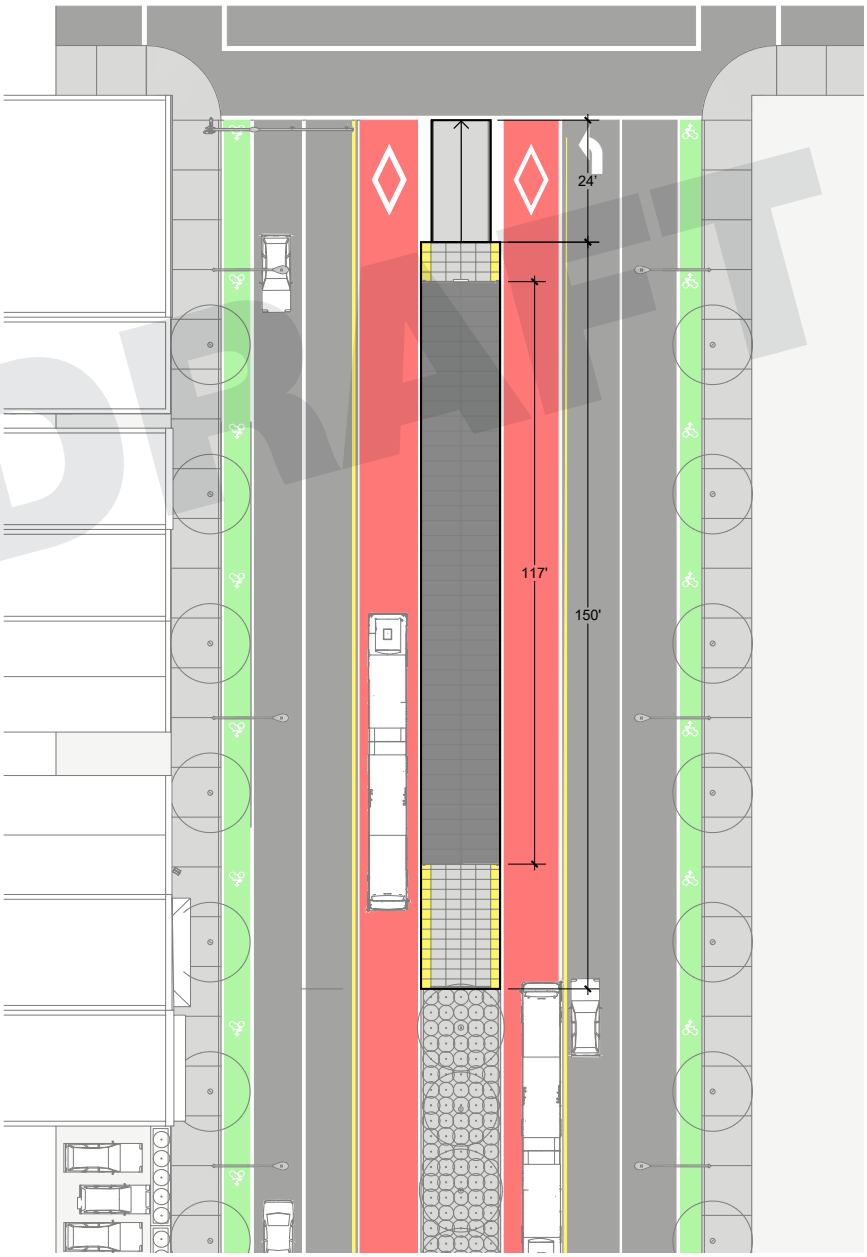
> Sloped walkways not exceeding 1:20 shall be used for the approach to the platform

> Canopy columns placed at 11ft from the platform edge

> Canopy roof cantilever will extend to within 2ft of the platform loading edge

> Station amenities placed to not encroach into pedestrian clear zones.

> Minimum of 5ft clear from the platform loading edge



Plan of M2 / Center iIsland Station

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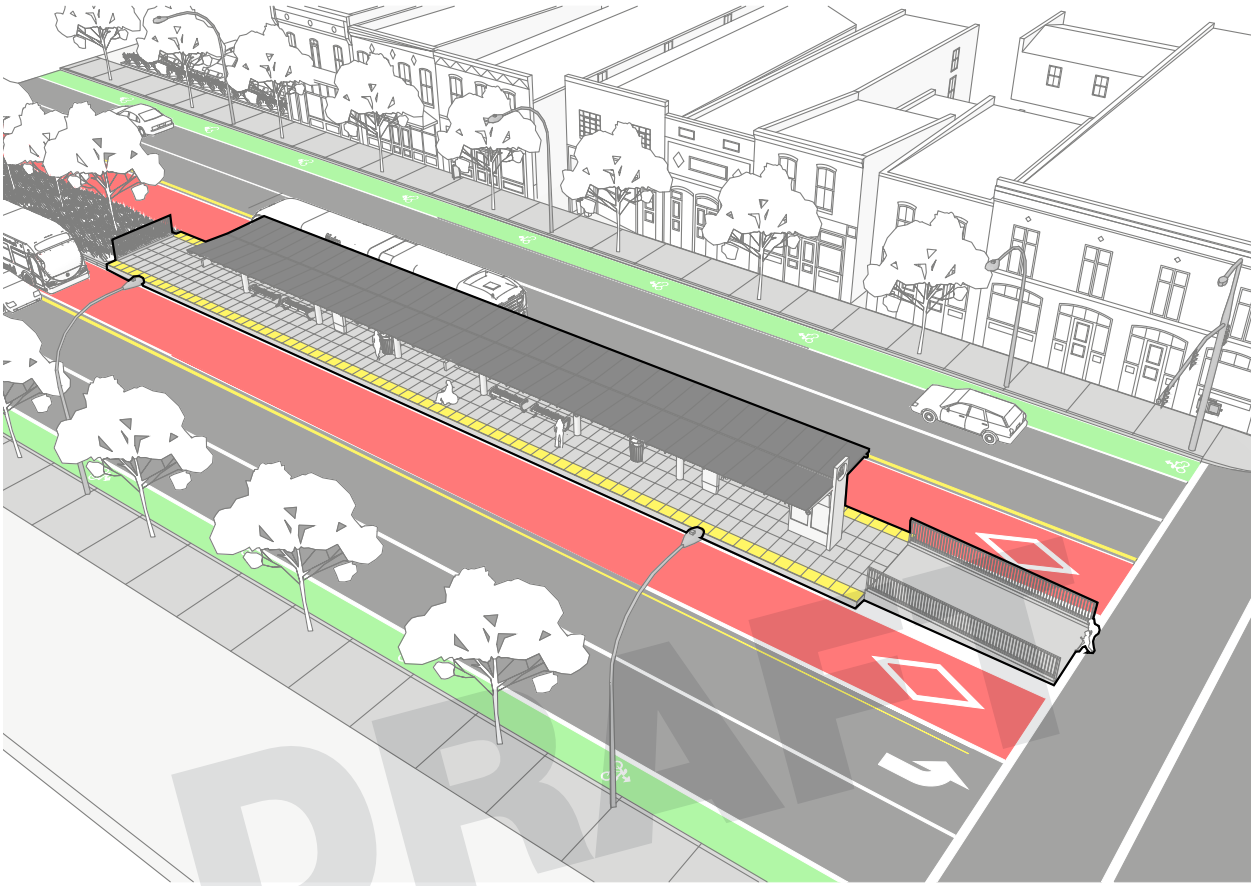
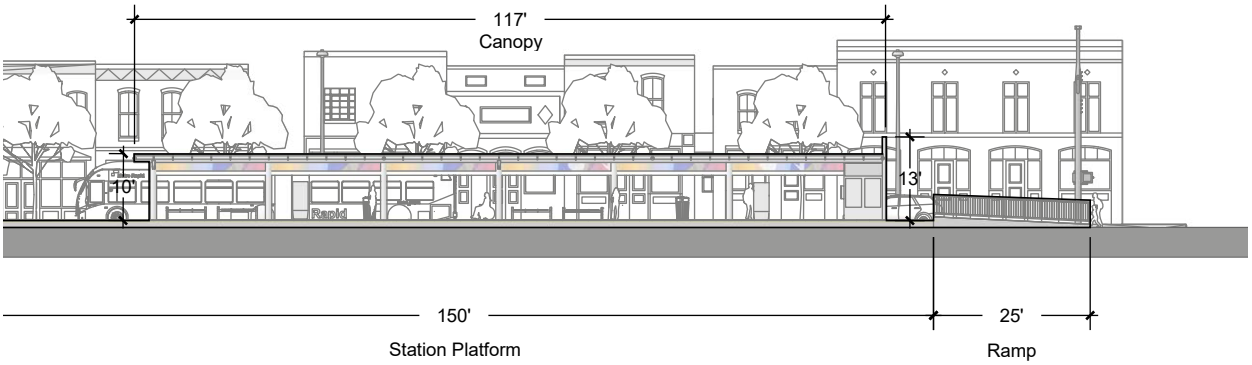
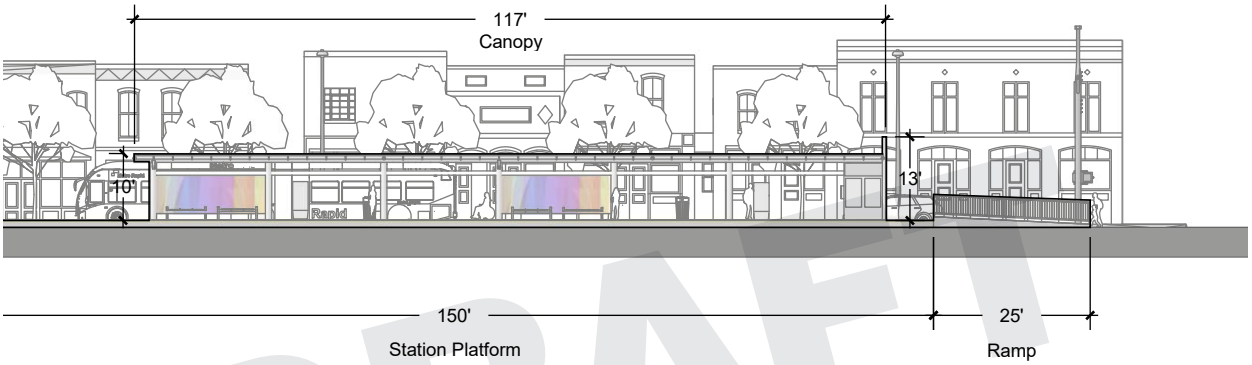


M2 / Aerial view

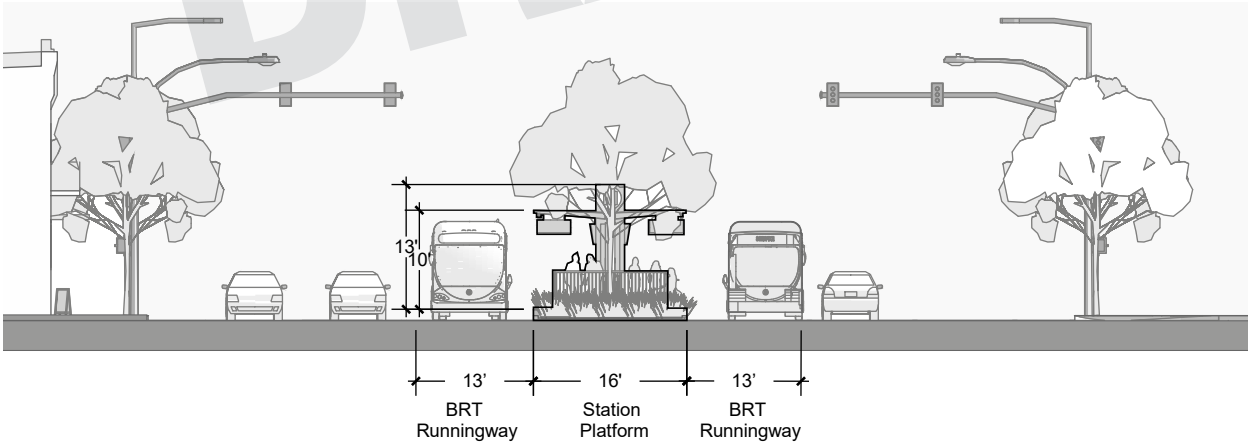
M2 / Ground-level view



M2 / Front Elevation - Art Panel Style 1



M2 / Front Elevation - Art Panel Style 2



M2 / Side Section

d. Reference Documentation

Design Criteria and Guidelines

> Metro BRT Design Criteria-Section 6 Architectural, December 09, 2014

> LA Metro Transfer Design Guidelines-Improving Connections for a Seamless Trip, March 201

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3 Materials and Finishes

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

Material finishes and the use of color are important components in the station design. They can simplify maintenance, increase the durability of station components, and reinforce the station architectural character and brand identity.

The material selection finishes and color shall be applied consistently to all the stations on an individual BRT corridor.

> Canopy Structural systems Stainless steel brushed finish.

> Glazing-Low iron, clear class with a linear ceramic fritting. Fritting shall provide 60%-80% opacity depending on the micro-climate of the region.

> Hand rails and protection guardrails shall be stainless steel.

> Station furnishings such as benches, litter receptacles and lean rails shall be stainless steel.

b. Metro Standards

Material selection and finishes shall be selected to provide for long service life. The materials must maintain their good appearance throughout the useful life and be colorfast.

c. Guidelines for Implementation

High Quality

Materials for station elements shall be selected based on performance over their life cycle. The materials shall reflect the design excellence conveyed by the architectural character of the stations.

Durable

Provide for long and economical service life by using materials with wear, strength and weathering qualities consistent with their initial and replacement cost. Materials shall be selected and used in a way that discourages vandalism, and that are difficult to deface, damage or remove.

Low Maintenance

Materials and components selected shall be resistant to vandalism. Reduce maintenance costs by using materials that, if damaged, are easily repaired or replaced with minimal interference with the operations of the BRT system.

Colors

The most important role for colors is to reinforce the system branding. Specific colors shall be

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selected to aid legibility in a variety of high illumination levels, with sufficient contrast to provide visual interest. The use of color at stations shall be applied consistently throughout the corridor to reinforce the identity of the BRT systems. Painted surfaces shall be avoided in the touch-zone.

Surface Treatments

Platforms and ramps shall be cast-in-place concrete. The platform area will be defined by the edge of the platform closest to the bus lane will have a 24 inch wide tactile warning edge in Federal Yellow, immediately behind the curb. Consideration shall be given to having a different color or texture at the loading locations to improve accessible wayfinding.

d. Reference Documentation

> Metro BRT Design Criteria-Section 6-Architectural, December 09, 2014, Section 6.6 Materials

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4 Canopy Design

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

An overhead canopy that provides weather protection adds to a comfortable customer environment. For the BRT system, weather protection will be provided by the use of an overhead canopy that shall shelter from the sun and rain. The overhead canopies consist of glass roof panels with a fritted pattern that provide 80% opacity. The structural framing system for the canopy shall be finished stainless steel.

Weather Protection

The area of coverage providing weather protection shall be 60% of the platform footprint. The canopy consists of stainless steel structural metal framing with tempered and laminated glazing as the roof material.

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Perspective view of the shelter

b. Metro Standards

Metro is developing new guidelines related to LRT stations. BRT Stations shall be designed to provide an architectural character similar to the design of LRT Stations.

c. Guidelines for Implementation

Shelter Types

The standard configuration of shelter will include a canopy cantilevered in one direction for side running stations types S1-S4 and the median station type M1. The center island station, M2 will have a canopy that is cantilevered in both directions.

Roof area will provide approximately 60% of overhead weather protection relative to the platform area. The canopy will be arranged to provide a continuous roof area. The roof material will be fritted glass with 60%-80% opacity depending on the micro-climate of the region. Columns will be located on a center grid line and spaced at 20ft. The columns will be round in shape and approximately 12 inches in diameter. Conduit runs for lighting and other systems components will be concealed within the column and not visible to the public.

Modular Components

The canopy components, parts and systems should be standardized so that they may be applied across various station typologies. The use of a consistent palette of materials, structural framing, finishes and colors as elements of continuity will allow for the flexibility to adapt the canopy design to stations throughout the corridor while creating a consistent character of the station architecture. Standardization of components will also be a key to the maintainability of stations elements. Reduce the number of differing sizes or elements for:

- Glazing
- Metal guardrails or handrails
- Seating
- Litter receptacles
- Light fixtures

d. Reference Documentation

- Metro BRT Design Criteria-Section 6 Architectural, December 09, 2014

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5 Systems Components

a. Description
b. Metro Standards
c. Guidelines for Implementation

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a. Description

Safety and security equipment and passenger information systems are essential components to providing an enhanced passenger experience when using the BRT systems. Many components of these systems are located at passenger stations. This equipment shall be integrated into the design of the stations to appear as part of the station architecture.

> Reduce visual clutter
> Enhace the character of the station architecture
> Maximize free space on the platform
> Maintain clear sight-lines through the station

Consideration shall be given to locating system components on platforms and to integrating the equipment into the overall design of the canopy and marker structures. The approach shall be to integrate panels and control boxes into a designated cabinet that will form part of the canopy or marker design. Conduit runs for system components shall be integrated into the design and not be visible to the public.

Please review the stations section of Chapter 7.4 BRT ITS Systems chapter of this document for further guidance.

b. Metro Standards

Systems elements will be implemented following various relevant standards for BRT such as headway, lighting, on-time performance, etc. Please refer to the Chapter 7.4 BRT IT Systems of this document for further precision regarding relevant standards.

c. Guidelines for Implementation

Integration of Equipment within the Systems Cabinet

Systems equipment panels will be located within a systems cabinet enclosure that will form part of the canopy or marker design.

The following equipment shall be contained within an equipment enclosure:

> Platform electrical panel
> Communications panels
> Public address equipment
> Lighting control devices
> Lighting control panelboards
> CCTV control panelboard

On the exterior of the systems cabinet enclosure:

- Display frames for route maps and schedules if digital displays are not provided
- Validation equipment, if needed, mounted to the exterior surface
- Emergency call box

System control enclosures shall also be able to accommodate future equipment needs.

Traveler Information Systems

The Variable Message Signs (VMS) shall be integrated to the design of the canopy structure. The VMS shall be suspended from the canopy outriggers. They shall be double sided and placed in a location that is visible for the full extent of the platforms. Clearance from the top of the platform to the underside of the VMS shall be 9ft.

Spacing shall be as follow:

- 75ft platforms - Include one real-time sign per direction of travel.
- 150ft platform- Include two real-time signs per direction of travel. The distance between the VMS signs shall be a minimum of 80ft.

Security Devices

Security equipment that shall be included at the stations includes Closed Circuit Television (CCTV) Cameras and Emergency call boxes.

CCTV cameras shall be placed on the underside of the canopy. Two cameras shall be placed on each side of the canopy roof.

The Metro call point shall be integrated into the systems cabinet adjacent to the barrier free waiting area.

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6 Lighting

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

Providing adequate illumination level at stations is essential to the attractiveness, safety and security of the BRT station. Lighting at stations should complement the canopy architectural character and surrounding station elements:

> Provide lighting to all areas of the platform , including ramps and approaches.

> Lighting levels shall be uniform and minimize glare.

> Avoid light trespass which could negatively affect adjacent land uses.

> Provide enhanced illumination levels at ticket vending machines and at the platform edge

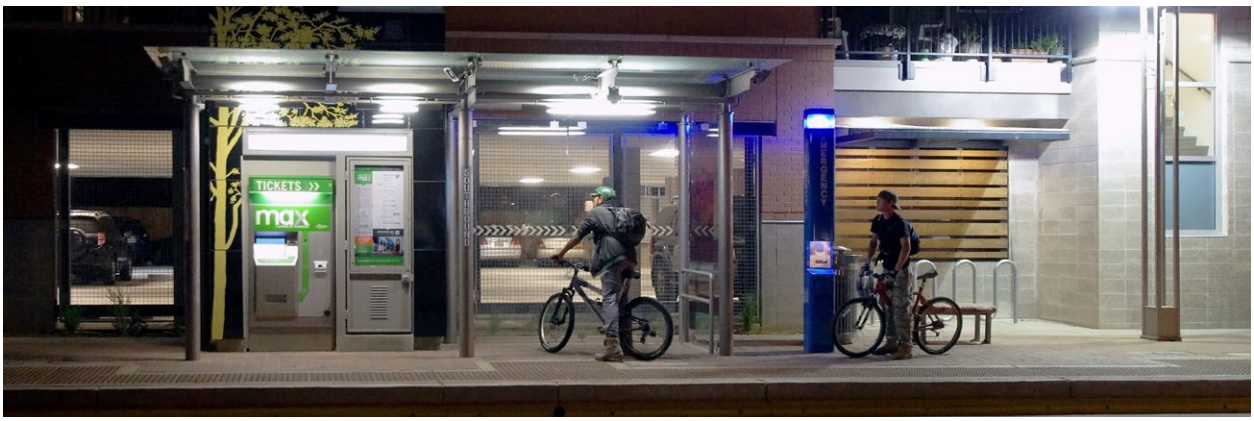
> Use lighting to enhance the architectural character of the shelter design including arworks.

> A "standard" integrated approach to lighting layout within the canopy.

Also see security section in the Systems Chapter of this document for further guidance regarding lighting.

b. Metro Standards

Lighting shall be LED linear fixtures that are waterproof and vandal-resistant. Lighting fixtures shall be designed for ease of maintenance and be easily serviceable by system maintenance equipment.



MAX BRT shelter lighting and platform area lighting. Fort Collins, CO

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c. Guidelines for Implementation

Integration of Canopy Lighting

> Lighting at the stations shall be integrated into the underside of the canopy roof and project down to the platform surface.

> Lighting levels at the stations shall be 5 foot candles.

Platform Lighting

> The platform area will be illuminated from the lighting that is integrated into the underside within the outrigger supports of the canopy.

> Should additional illumination be required in the station area, lower height light poles of a complementary character to the station architecture shall be located in the appropriate locations within the station area. These areas could include at the back of platform in line with canopy columns or adjacent to the platform along approaches to the station.

> The poles shall be placed at the back of platforms to not obstruct pedestrian flow.

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d. Reference Documentation

> Metro BRT Design Criteria-Section 6 Architectural, December 09, 2014

7 Landscaping

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

Providing landscaping and streetscape improvements should be considered as an enhancement to the public realm along the corridor of the transitway. Special textured pavements and planting pockets shall be utilized to enhance the appearance of the corridor and to guide pedestrian movements to or around the boarding area. In parternship with city authorities, street trees can also be utilized to enhance the visual appearance in the corridor and to provide shade in the platform area.

In urban areas and areas with narrow sidewalks, landscaping options are limited due to constrained spaces. In these conditions, the station footprint shall be integrated into a sidewalk boulevard and have minimal amenities located at the platform.

The inclusion of landscaping as an enhancement to the streetscape will generally be in areas beyond the platform footprint. Consideration should be given to coordinating the platform design with streetscape improvement projects completed by others. This could include the inclusion of street trees that provide opportunities for shade adjacent to stations.

b. Metro Standards

Landscaping at stations shall be designed in conformance with local landscape ordinance or published standards of the agency having jurisdiction or with the criteria established in Metro BRT Design Criteria where the criteria exceed local or agency standards.

Perspective view of side running transitway showing streetscape

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c. Guidelines for Implementation

The key objective to the integration of landscaping in the station area is to enhance the streetscape environment while maintaining compatibility with the BRT system:

> Maintain a clean busway to prevent contamination of debris ensuring positive drainage and safe bus operations.

> A cone of vision, as specified by the City of Los Angeles or local codes of jurisdiction shall be maintained so as to not obstruct the view of the bus operator.

> Low landscaping such as shrubs and ground cover shall not encroach into busways, walkways, bikeways or pedestrian circulation areas.

> Plant material shall be selected to minimize maintenance requirements.

> The landscape palette shall also be selected based on station specific microclimate and should consist of primarily drought tolerant native species.

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d. Reference for Documentation

> Metro BRT Design Criteria-Section 6 Architectural 6.5 Landscaping and Irrigation, December 09, 2014

8 Wayfinding Signage and Customer Information

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

The primary function of signage at stations is to convey information regarding the BRT system, transit schedule information, and wayfinding information around station areas. Signage should also incorporate the system branding scheme to reinforce the BRT system identity. In addition to static wayfinding signage, the use of dynamic electronic signage is encouraged for such items as route maps, schedules, and arrivals information.

Wayfinding and station identification signs shall be located in the station area at frequent intervals and at visible locations to provide clear directions and information to patrons without additional assistance.

The key passenger information to be located at the stations includes:

> Marker sign with system logo and other branding elements
> Route maps and schedules
> Station identification
> Neighborhood wayfinding

Wayfinding and station identification signs can be internally illuminated as appropriate, but may also be illuminated by general area/station lighting. Reflective materials can be used for certain signs per Metro Signage Standards.

Regulatory and right-of-way signs may be necessary in addition to wayfinding information for safe bus operations.

b. Metro Standards

Graphic standards for signage and wayfinding is outlined in Metro Signage Standards. This includes the details regarding:

> Metro logo
> Signage types and sizes
> Typeface
> Color palette
> Use of pictograms

These standards will be the basis of the signage that will be integrated into the stations for future BRT systems. In addition, signs and graphics shall be consistent with ADA and AASHTO standards that include the use of braille as appropriate. Also refer to the Branding chapter of this document for further guidance on that specific matter.

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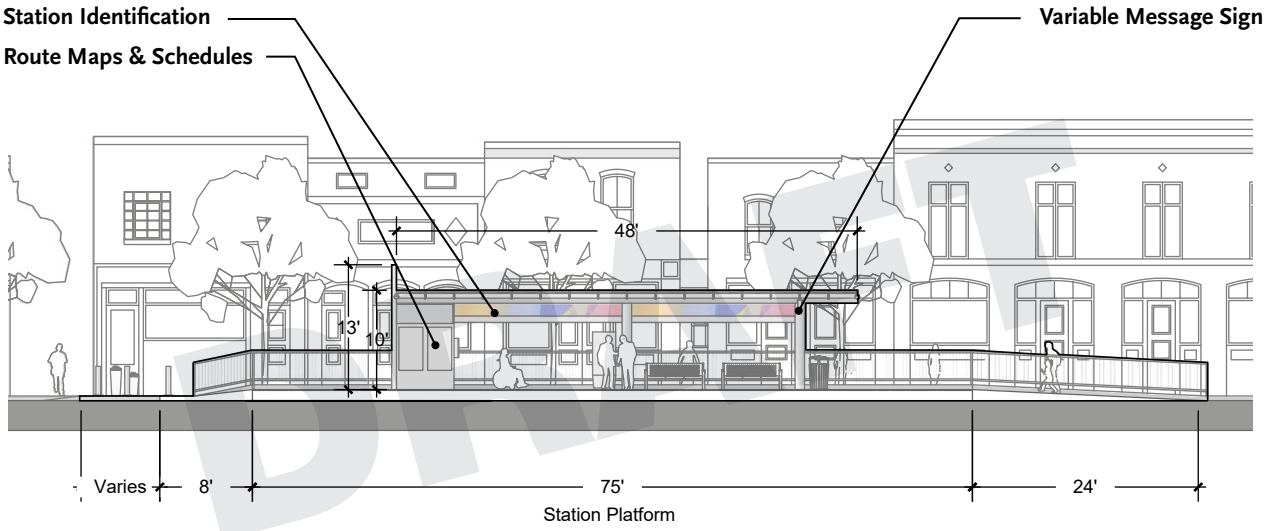
c. Guidelines for Implementation

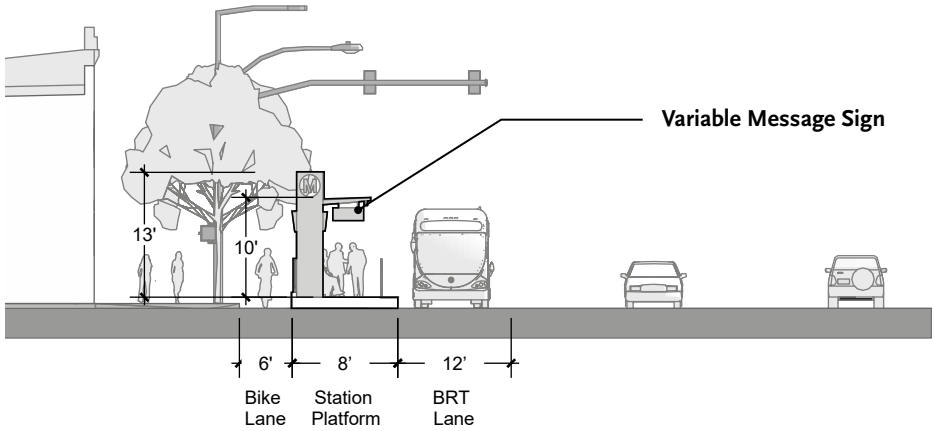
Locations of wayfinding signage and other customer information shall follow in general the exhibit below, however must be carefully considered and optimized for ergonomics, spatial composition, and sight lines – Metro Arts & Design shall review and approve all such placements as a component of an overall review of the signage and environmental graphic design program.

d. Reference Documentation

> Chapter 2.0 Graphic Standards
> Chapter 4.0 Bus Stops and Stations
> Chapter 10.0 Materials and Fabrication
> Chapter 13.0 Digital



S1 / Front Elevation, Location of signage



S1 / Side Elevation, Location of signage

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9 Passenger Amenities

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

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a. Description

Passenger amenities are a key component and they include:

> Benches
> Litter & Recycling Receptacles
> Bike Accommodations
> Leaning Rails
> Passenger WiFi and Personal Device Charging Systems (on buses)

The amenities shall be placed at stations to not encroach into pedestrian clear zones.

b. Metro Standards

Refer to Metro design criteria and standards for items such as bench and litter receptacles.

c. Guidelines for Implementation

Enhanced

> Bike Racks
> Digital information Panel
> Landscaping

Baseline:

> Marker
> Shelter/Canopy
> Integrated LED Lighting
> Litter Receptacle
> Windscreen
> Seating
> Leaning Rails

Benches:

Seating shall be distributed to two or more locations along platform. At least one covered seating arrangement is desirable. Arrangement to optimize usage of space and not to interfere with:

> Travel way
> Queuing areas or emergency exits
> Pedestrian travel ways
> Movement for patrons with disabilities

Benches shall be provided within the canopy covered area:

> At the rear of canopy
> Adjacent to canopy columns

In areas where space is limited such as at side running constrained stations, benches can be

located to leverage existing tree canopies to the extent possible to provide shade for passengers.

Litter & Recycling Receptacle:

Litter and recycling receptacles shall conform to Metro standard type and shall be bolted down to reduce vandalism. Liners shall conform with Metro standard liner sizes. Receptacles shall be provided at stations in locations that:

> Do not interfere with passenger travel ways

> Are easily accessible for patron use

> Are adjacent to canopy columns or seating areas

Bicycle Accommodations:

Bicycle accommodations on BRT systems can be a feature attracting ridership. Where space allows, bike racks shall be installed in close proximity to the platform areas. Bike racks shall not be placed on platforms where passenger boarding and alighting occurs. Special attention should be given to providing convenient and safe access to and through stations for passengers with bicycles. Bicycle parking should be provided at station areas since on-vehicle storage may be limited. Metro currently utilizes buses with exterior carrier racks. For this reason, when space is available, bicycle racks shall be provided within the area of the stops.

> Considerations for Location of Bicycle Racks:

- Located adjacent to the station but not in the fare paid area of the platform
- Direct access from bicycle lanes
- Placed not to impede access route for pedestrians
- Located in a well-lit area
- Designed with a 5 ft. of clearance from the rack to allow for easy access

Leaning Rails:

Leaning rails can be provided for the comfort of patrons. Leaning rails shall be encouraged where short headways are expected, or for stops with high volume and limited space. Leaning rails shall be stand-alone fixtures located on the platform to be in line with shelter columns.

WiFi:

Passenger convenience items such as WiFi and personal device charging systems shall be provided on buses in lieu of being provided at platforms or integrated into the canopy design.

d. Reference for Documentation

> Metro Rail Design Criteria

> Metro BRT Design Criteria-Section 6 Architectural, December 09, 2014

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10 Public Art

a. Description
b. Metro Standards
c. Guidelines for Implementation
d. Reference Documentation

a. Description

The inclusion of public art is a key component of the station design that will have an impact on the image of the BRT system. As an element of variability, public art is a design feature that will define the look and feel of each station within the continuous kit-of-parts approach. Each artwork will be integrated, site-responsive and connect the transit station within the broader community context. Public art will enhance the customer experience, discourage vandalism, add to the perception of a clean and safe station environment and serve as local landmarks.

b. Metro Standards

Metro standards require integrated artwork to be high quality, site specific, require minimal maintenance and conform to Metro Art Guidelines for Materials and Finishes.

c. Guidelines for Implementation

Site-responsive artworks will be be incorporated into each BRT station. Locations will vary based on the station typologies and will be selected to maximize impact for passengers and the surrounding community. Integrated lighting will ensure artworks are visible during the day and at night.

d. Reference Documentation

> Metro BRT Design Criteria-Section 6 Architectural 6.2 Artwork, December 09, 2014

Art integrated into glazing at shelter

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11 Parking

a. Description
b. Guidelines for Implementation
c. Reference Documentation

a. Description

The goal of high-quality, reliable transit service is to provide an alternative to driving, and parking lots adjacent to transit stations are costly to build, operate, and maintain. The BRT lines currently in development by Metro will operate in built-up areas where the acquisition of land is prohibitively expensive and the cost of which is not supported by project budgets. Further, park-and-ride facilities can lead to community concerns regarding traffic and visual blight. Parking as a land use choice adjacent to transit is therefore generally discouraged.

Nevertheless, there may be cases, such as at end-of-line stations in outlying areas with minimal connecting or first-last mile services, where parking may support transit patrons.

b. Guidelines for Implementation

In general, building new dedicated transit parking should be avoided in built-up urban areas. If parking demand is identified in such areas, agencies may explore partnering with local jurisdictions, other agencies such as Caltrans, or private property owners to facilitate shared parking agreements.

In suburban areas or terminal stations, if there is a documented demand, parking should be integrated into larger mixed-use developments or strategic mobility hubs.

BRT lines that run sufficiently long distances between cities or major destinations or operate on freeways may warrant limited parking at terminal stations.

Where parking may be necessary, identify partnerships with nearby garage owners/operators to reduce project costs and fully utilize existing infrastructure.

Price parking to ensure availability and use transit validation to reserve spaces for transit patrons.

Work with local authorities to remove parking minimums at new developments near BRT stations.

Parking minimums adjacent to BRT stations can increase the costs of housing and redirect budgets from uses that provide greater benefit to the public or that are more economically productive.

c. Reference Documentation

> Metro Parking Policies/Guidelines

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12 Outdoor Rooms/Open Space/ Transit Plazas

a. Description
b. Guidelines for Implementation
c. Reference Documentation

a. Description

Given that most transit riders begin and end their journey by walking or rolling to a station or stop, increased transit ridership can greatly enhance street life. A concept that can contribute to this is the consideration of BRT stations as "outdoor rooms," where the station furniture can be looked upon as pieces of an expanded urban plaza that serves as a marker for community identity, hopefully producing a synergistic effect where combined Metro and city dollars are greater than the sum of their parts.

Transit plazas—especially those located at terminal/transfer stations or key activity centers—are also crucial spaces for integrating BRT projects into communities and other infrastructure.

Transit plazas can be catalytic for building community support, providing public space, and encouraging activity that makes transit adjacency inviting such as sidewalk café tables.

b. Guidelines for Implementation

Planners should seek designs that coordinate and balance the operational and safety needs of transit, collaborative projects with property owners and input and guidance from community based organizations.

Where space allows at terminal stations and major transfer locations, design transit plazas to support transit-oriented communities by creating a sense of place around transit.

On sidewalks that are either excessively narrow or excessively wide, the concept of an outdoor room can serve to integrate the bus station/ stop into the larger community fabric through thoughtful arrangement of station furniture.

Providing additional amenities can encourage local businesses to support street activation through pop-up events, sidewalk cafes, or discounts to transit riders.

Maintain clear and legible walking paths through the outdoor room to the boarding area. The concept of outdoor rooms, carried to extremes, can serve to detract from the BRT station to the detriment of its access and wayfinding objectives.

c. Reference Documentation

> Metro Systemwide Station Design Criteria
> Metro Transfers Design Guide

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3
BRT Running Ways

This chapter provides guidance for the evaluation and development of future BRT corridors, dependent on local conditions. The guidelines are meant to improve the transit experience, and to provide fast, dependable and safe movement of passengers.

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1. General Guidelines
2. Running Way Placement Considerations
3. Roadway Geometrics
4. Intersection Geometrics
5. Gates
6. Pavement Sections
7. Street Signing and Striping
8. Green Streets and Landscaping
9. Traffic Operations
10. Utility Considerations
11. Betterments

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DRAFT

1 General Guidelines

a. Description
b. Goals and Issues Addressed
c. Standards
d. Guidelines for Implementation
e. Reference Documentation

Figure 1. BRT running way

a. Description

This chapter provides guidance on the design of running ways for Bus Rapid Transit (BRT) service. The characteristics of a BRT running way can vary considerably, from BRT vehicles operating on existing streets in mixed-flow to exclusive and grade separated structures. The design criteria presented in this chapter includes minimum requirements, which ensure a consistent baseline quality of service for a BRT route. It also includes recommendations to provide enhanced operations or better rider experience. Where practical, recommended design criteria values should be utilized. In constrained conditions, or where recommended values would result in unreasonable costs or impacts, minimum values may be used.

b. Goals and Issues Addressed

The goal of this document is to provide clear guidance on the design of BRT running ways, and ensure that BRT routes are distinguishable from regular bus service. BRT running ways should also strike a balance between achieving the highest quality service, efficient use of existing infrastructure, and lowest practical cost.

c. Metro Standards

Dedicated lanes are a key differentiating factor that allows Bus Rapid Transit to deliver a level of quality and reliability of service that is superior to standard bus service. Dedicated lanes should be implemented wherever feasible along a BRT route. If right-of-way is required or adjacent properties would be impacted, dedicated lanes may not be feasible and BRT vehicles may need to travel in mixed flow on those segments. In order to be classified as Full-BRT or BRT-Lite service, the following standards must be met:

> *BRT-Lite:* 10% of the corridor on dedicated lanes at all times, and 20% of the corridor on dedicated lanes during peak hours. If the 10% all-day standard cannot be met, then 40% of the corridor must have dedicated lanes during peak hours.

> *Full-BRT:* 50% of the corridor on dedicated lanes at all times.

> *Target:* Dedicated lanes 100% of the corridor, remove conflicting left turns and consolidate conflicting driveways.

d. Guidelines for Implementation

- The following guidelines are meant to present a menu of options for designers to consider in the unique context of each project.
- It may make sense to combine multiple running way alignment alternatives, or use modified versions of the running way elements to cater to the needs and goals of each individual project.

e. Reference Documentation

The following materials were consulted in the development of the guidelines for BRT running ways:

> Metro BRT Design Criteria (2008-2014)

> AASHTO A Policy on Geometric Design of Highways and Streets (The Green Book)

> AASHTO Guide for Geometric Design of Transit Facilities on Highways and Streets

> Manual on Uniform Traffic Control Design (MUTCD)

> Work Area Traffic Control Handbook (WATCH)

> National Association of City Transportation Officials (NACTO) Transit Street Design Guide

> "BRT: Bus Rapid Transit Service Design Guidelines" VTA Transit. Sustainability Policy 1-101, Santa Clara Valley Transportation Authority

> American Public Transportation Association (APTA) Bus Transit System Standards

> The Standard Specifications for Public Works Construction ("SSPWC")

> All applicable City Standard Plans

> Americans with Disabilities Act Accessibility Guidelines (ADAAG) Standards and Requirements

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2 Running Way Placement Considerations

a. Curb Running
b. Side Running
c. Center Running
d. Grade Separations
e. Managed Lanes

A BRT running way is a travel lane dedicated for use by BRT vehicles. BRT running ways located within a roadway can be located along the curb, in the outside travel lane when on-street parking and/or bicycle lanes are located along the curb, or in the center of the street to the left of general traffic. BRT running ways can also be located on wide freeway shoulders or along a guideway that is completely separated from general traffic. These different types of running ways are described in this section, along with opportunities and challenges associated with the type of running way and guidelines for implementation.

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a. Curb Running

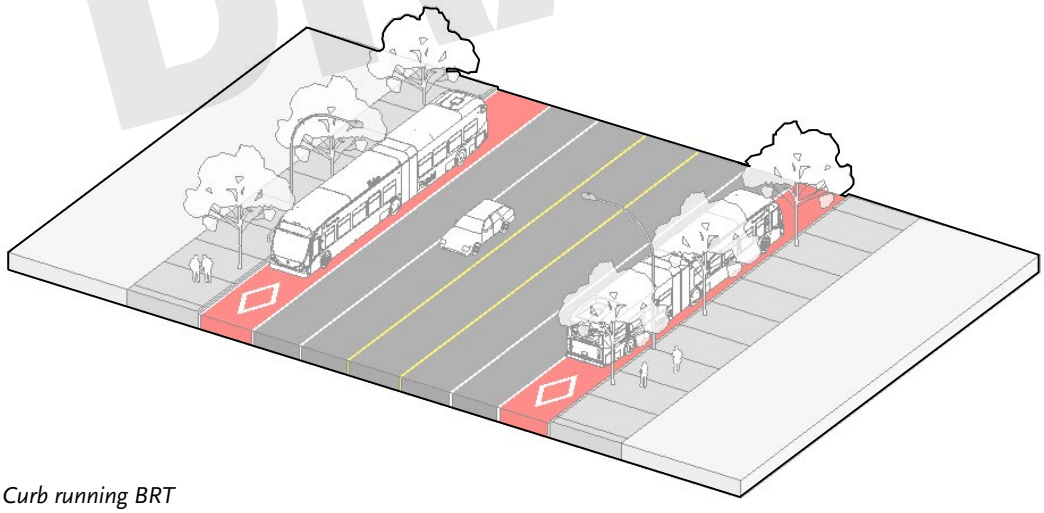

Figure 2. Curb running BRT

Description

This section discusses the curb running BRT alignment. In the curb running alignment, the bus lane is positioned on the far right, adjacent to the curb. Right turns for general traffic may be restricted, or limited to intersections only. To minimize the rerouting of right turning vehicles, non-transit vehicles may be permitted to enter the bus lane for short distances to make right turns, provided that they do not impede BRT vehicles. A curb running BRT lane can be restricted to bus traffic at all times, or during specified times of the day, depending on the frequency of transit service and underlying transit demand. Curb running bus lanes must be clearly signed and marked to communicate permitted and restricted uses.

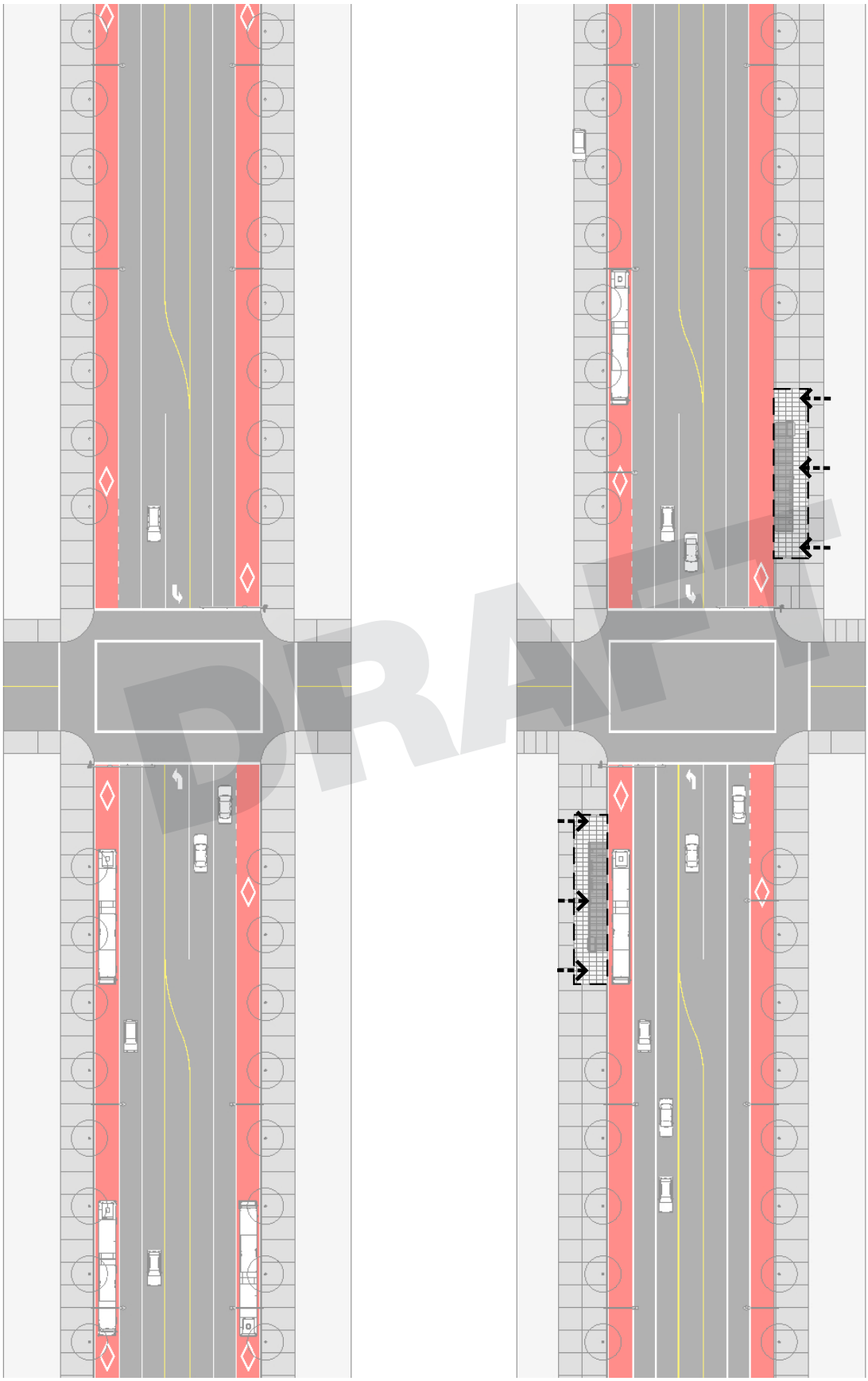

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Figure 3. Curb running BRT cross section and intersection configuration with and without stations.

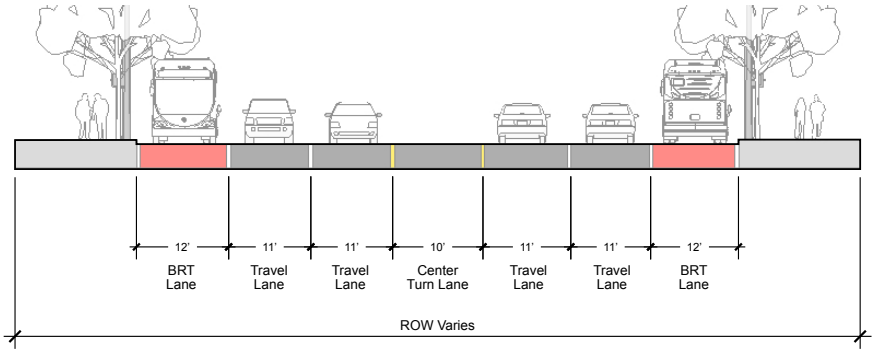

Figure 4. Typical lane widths for curb running BRT.

Guidelines for Implementation

- Curb running lanes are preferred where:
  - > There is insufficient right-of-way to build median stations.
  - > The bus lane may be limited to time of day use and used for parking, deliveries, bicycles or general traffic during off peak periods.
  - > Diversion of left turning traffic may be prohibitively disruptive.
  - > Opportunities to share the bus lane with taxis, HOVs, TNCs or bicycles are desirable.
- Curb running lanes may not be the best fit where:
  - > There are a large number of private driveways along the corridor, such as where the primary land use along the street is single family residential.
  - > There are high volumes of right turn movements at intersections with no right turn pocket and limited right-of-way available to install a right-turn pocket. The impact to intersection operations should be evaluated by a traffic engineer.
  - > Driveways that provide access to commercial properties are in conflict with proposed station locations.
- By definition, the curb running BRT lane is against the curb, meaning there is no bike lane/parking/travel lane to the right of the BRT lane.
- The recommended minimum standard is that curb running BRT lanes are at least 12 feet wide, because they will experience less friction than narrower lanes, which will support higher travel speeds and faster travel times. Space within the roadway right-of-way must be balanced between transit, general vehicles, bicycles and pedestrians, and there may be instances where BRT may need to be less than 12 feet wide. Where BRT lanes less than 12 feet wide are proposed, design exceptions may be made for overriding considerations but every effort should be made to keep the length of these design exceptions to a minimum.

Opportunities and Challenges

Opportunities

- > Where roadway widening is not required, curb running lanes involve the least amount of infrastructure modification, and cause the least disruption during construction.
- > Stations can be accommodated outside of the roadway, taking up less roadway space, and can sometimes be combined with the sidewalk in constrained spaces.
- > This is the typical alignment for most bus lines, so operationally it will be more familiar for drivers and pedestrians accessing stations.
- > Curb running lanes can be used by NextGen and local buses, and provide an additional benefit to other bus transit services.
- > There is no conflict between left turn vehicles and BRT.

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> Curb running BRT does not preclude left turn movements at unsignalized locations like center or median running configurations.

Challenges

> The curb running BRT lane uses the curbside lane and is more prone to delays caused by other vehicles picking up/dropping off passengers, commercial vehicles unloading, vehicles parking or breaking down, other local bus lines, etc. The speed and safety of the BRT is sacrificed when the bus must avoid these obstacles. If high levels of activity along the curb can not be avoided, other BRT running way placements should be considered if feasible.

> Even vehicles that are not misusing the BRT lane will cross the BRT lane to enter/exit driveways, streets, and alleys, reducing the improvements to travel time for the BRT. Delays to the BRT are more significant in areas with high volumes of right turning vehicles, particularly when coupled with high volumes of pedestrian crossings.

> Enforcement may be required to ensure compliance with the BRT lane restrictions. Coordinate with local cities regarding their enforcement plans when selecting a running way configuration.

> Installation of curb running BRT in areas with on-street parking may require the removal of parking spaces. Parking lanes are not wide enough to be replaced by a BRT lane, and may require roadway widening and narrowing of sidewalks if the existing curb-to-curb width can not be reconfigured to meet capacity demands from all modes.

> Bicyclists typically travel in the outside lane. If a curb running BRT lane replaces a Class II bike lane with a shared bike and bus lane, potential changes to the bicycle network and connectivity should be considered.

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b. Side Running

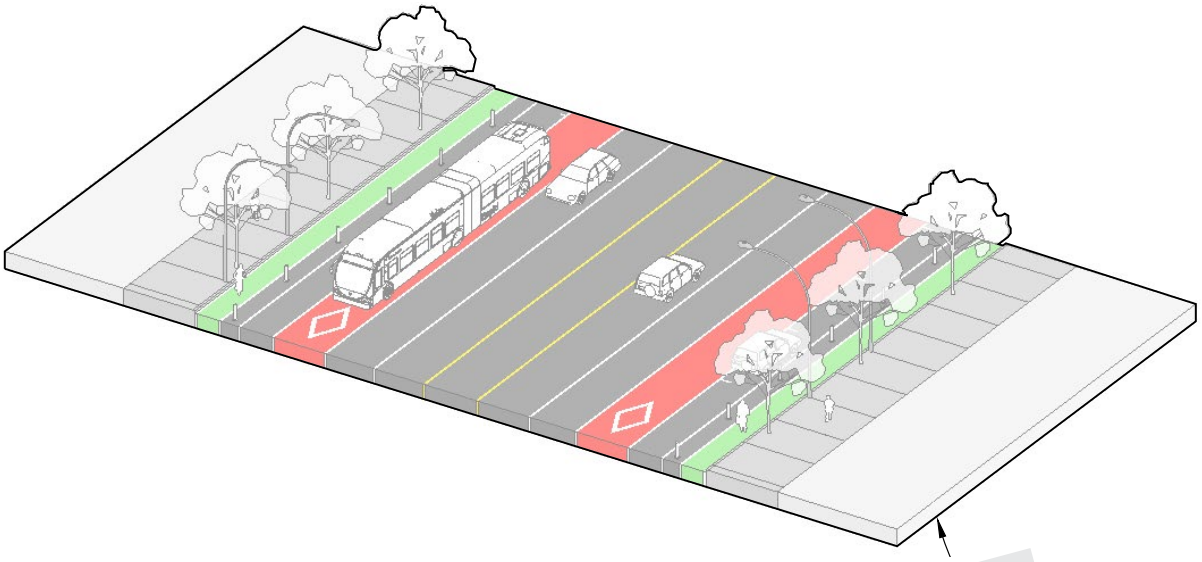

Figure 5. Side running BRT lanes with on-street parking and bike lanes.

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Description

In the side running BRT alignment, the curb lane is used for on-street parking or right turns, and the bus lane is to the left of the curb lane. Unlike curb running bus lanes, side running allows on-street parking, delivery zones, and right turn lanes to remain in place. Side running configurations provide an opportunity for stations to be located on curb extensions, which is beneficial in areas where sidewalks are narrow and constrained.

Similar to curb running lanes, side running BRT provides different road users (taxis, ride share, HOV and bicycles) with better access to stations compared to median running lanes. However, general vehicle traffic will be able to regularly cross the BRT lane to access the parking and turn lanes, and the increase in weaving movements may affect transit operations. Most side running bus lane applications involve assigning an existing travel lane to bus use, which may result in impacts to traffic.

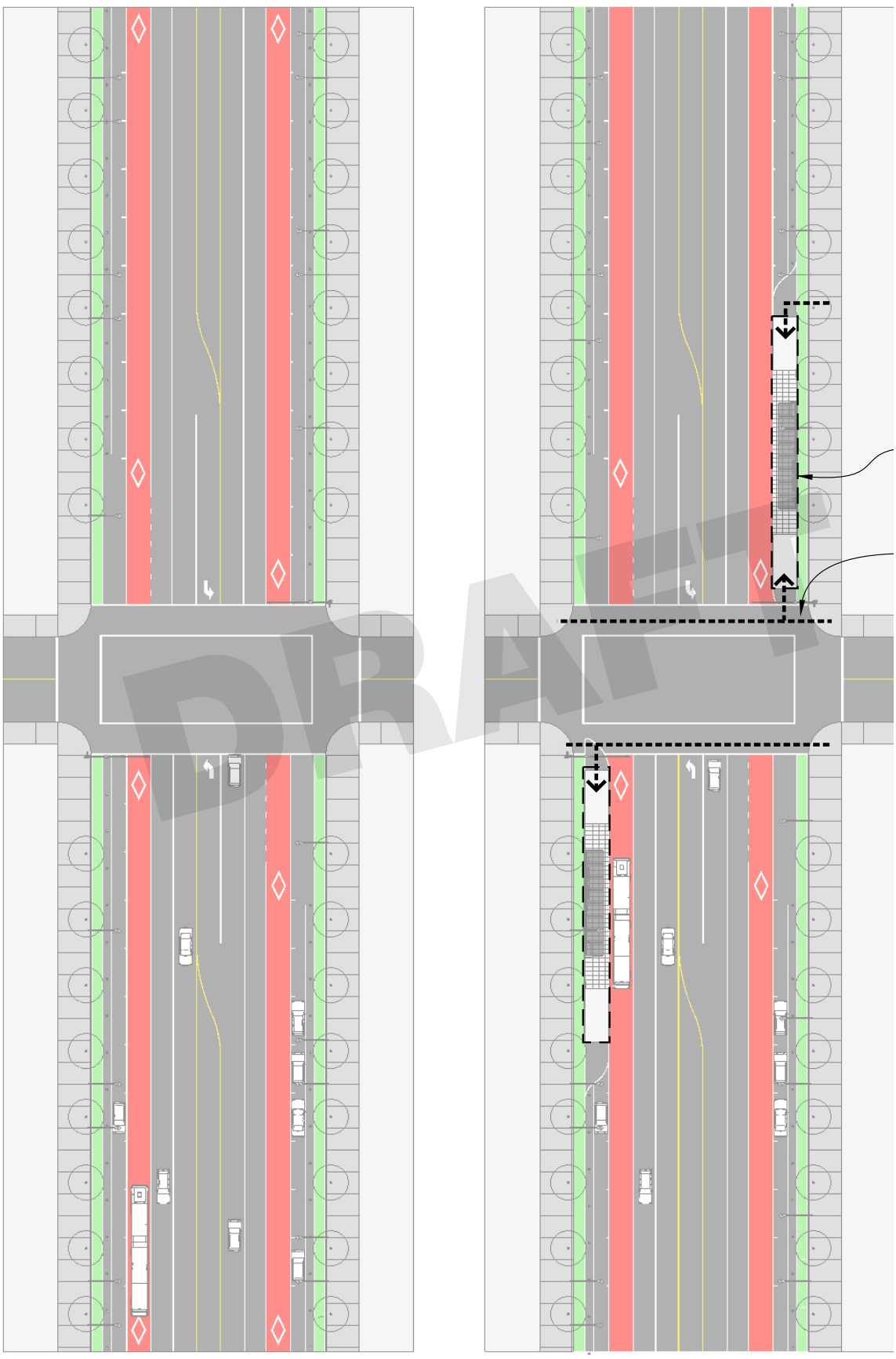

Figure 6. Side running BRT cross section and intersection configuration with and without stations.

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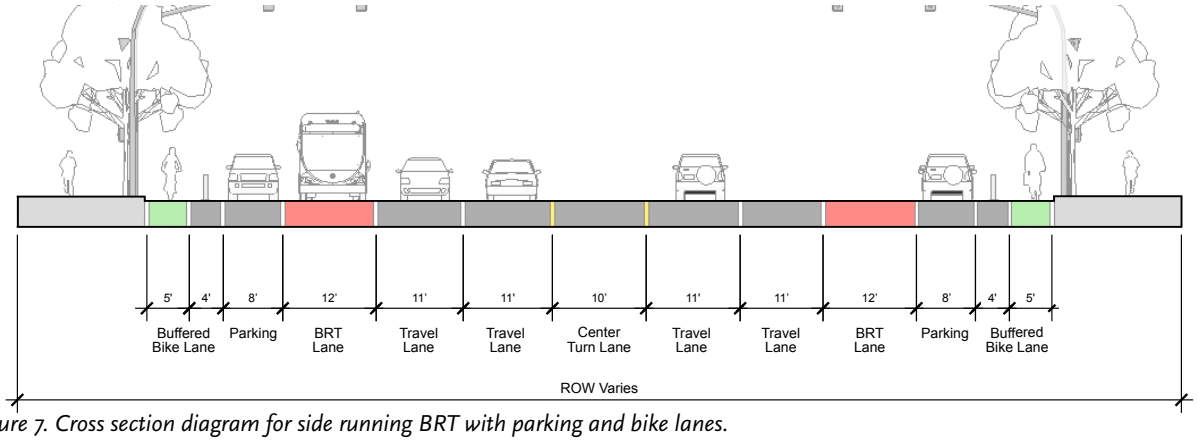

Figure 7. Cross section diagram for side running BRT with parking and bike lanes.

Guidelines for Implementation

- Side running lanes are preferred where:
  - > There is insufficient right-of-way to build median stations and sidewalk space is also constrained.
  - > Diversion of left turning traffic may be prohibitively disruptive.
  - > There are large volumes of right turn movements.
  - > Opportunities to share the bus lane with taxis, HOVs, or bicycles are desirable.
- Side running lanes may not be the best fit where:
  - > There is insufficient roadway capacity to convert an existing traffic lane to BRT.
  - > There are a large number of private driveways along the corridor, such as on a street where the primary land use is single family residential.
  - > Driveways that provide access to commercial properties are in conflict with proposed station locations.
- Parking and or bike lanes may be between the curb and the BRT lane. The bike lane and parking lane positions in relation to one another can be switched depending on the situation.

Opportunities and Challenges

Opportunities

> If there is a bike lane and parking, this can provide width for a station with little offset through the intersection.

> Stations will be near the sidewalk, so transit riders do not have to cross the street to a center station.

> The side running BRT alignment is able to accommodate parking and/or bike lanes, if the right-of-way and roadway capacity is available.

> There is no left turn conflict with the buses.

> Side running BRT, similar to curb running BRT, does not preclude left turn movements at unsignalized locations like center or median running BRT.

> If funding is available, curb extensions can be installed to reduce crosswalk distances and enhance the pedestrian environment.

Challenges

> Vehicles will need to cross the BRT lane to turn right into driveways, parking lanes and right turn lanes.

> Pedestrian access to stations will need to be carefully planned to ensure ease of access. (See Chapter 7.2 BRT Station/Platform for further guidance.)

> Side running stations with a bike lane located between the sidewalk and the platform can be harder to maintain than other configurations. Coordinate with local cities regarding their maintenance and enforcement plans when selecting materials and running way configurations.

> If conversion of the BRT to rail is anticipated, center or median running BRT may be a better fit.

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c. Center Running

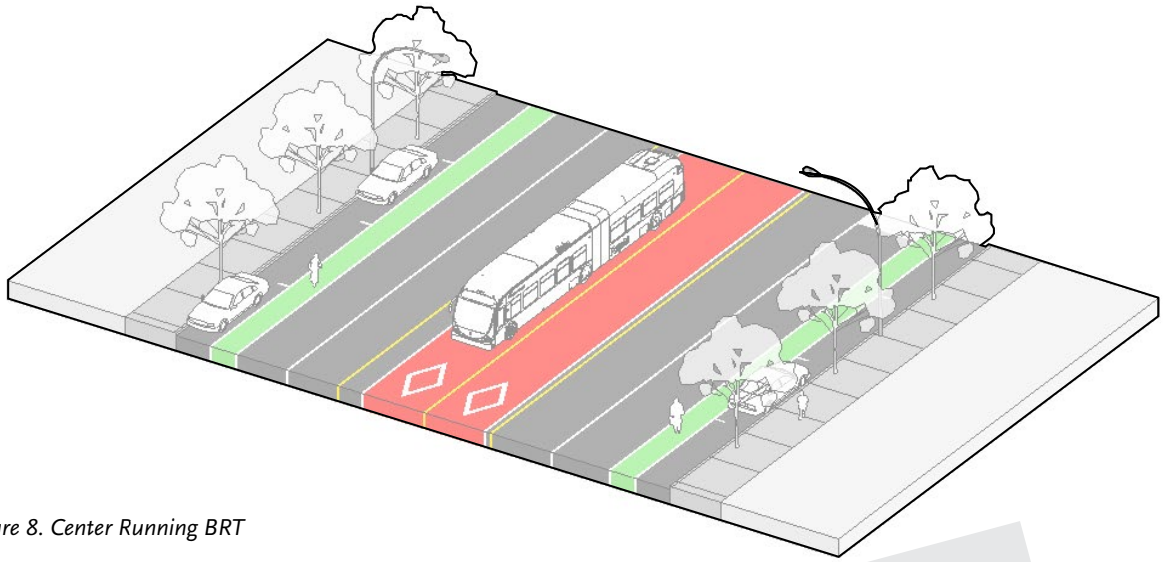

Figure 8. Center Running BRT

Description

This section discusses the center running BRT alignment. In the center running alignment, the bus lane is the left most lane in each direction. The center lane can be separated from general traffic by a physical median or lane markings. Left turn movements at unsignalized intersections would be prohibited, and a left turn lane can be provided at signalized locations. More complex signal phasing is required to facilitate transit movement for this configuration.

This configuration requires special consideration for vehicles turning left at signalized intersections. Left turn lanes could be located to the right or the left of the BRT lane, depending on conditions at each individual intersections.

If the left turn lane is on the left side of the BRT lane, left turning vehicles would need to cross the bus lane to get to the left turn lane, creating a left turn mixing zone (See Optibus BRT in Leon, Guanajuato, Mexico). Alternatively, the BRT lane could become a combined "Bus and turn lane" at the intersection (See IndyGo Red Line BRT in Indianapolis, Indiana).

Another option is to put the left turn lane on the right side of the BRT lane. This configuration avoids a mixing zone between buses and left turning vehicles. However, the left turn lanes are offset from each other (separated by the BRT lanes) which may require the left turn movements in each direction to occur in separate phases to avoid collisions between the left turning vehicles. The additional signal phases introduce delays to both general traffic and the BRT that can be poorly perceived by riders.

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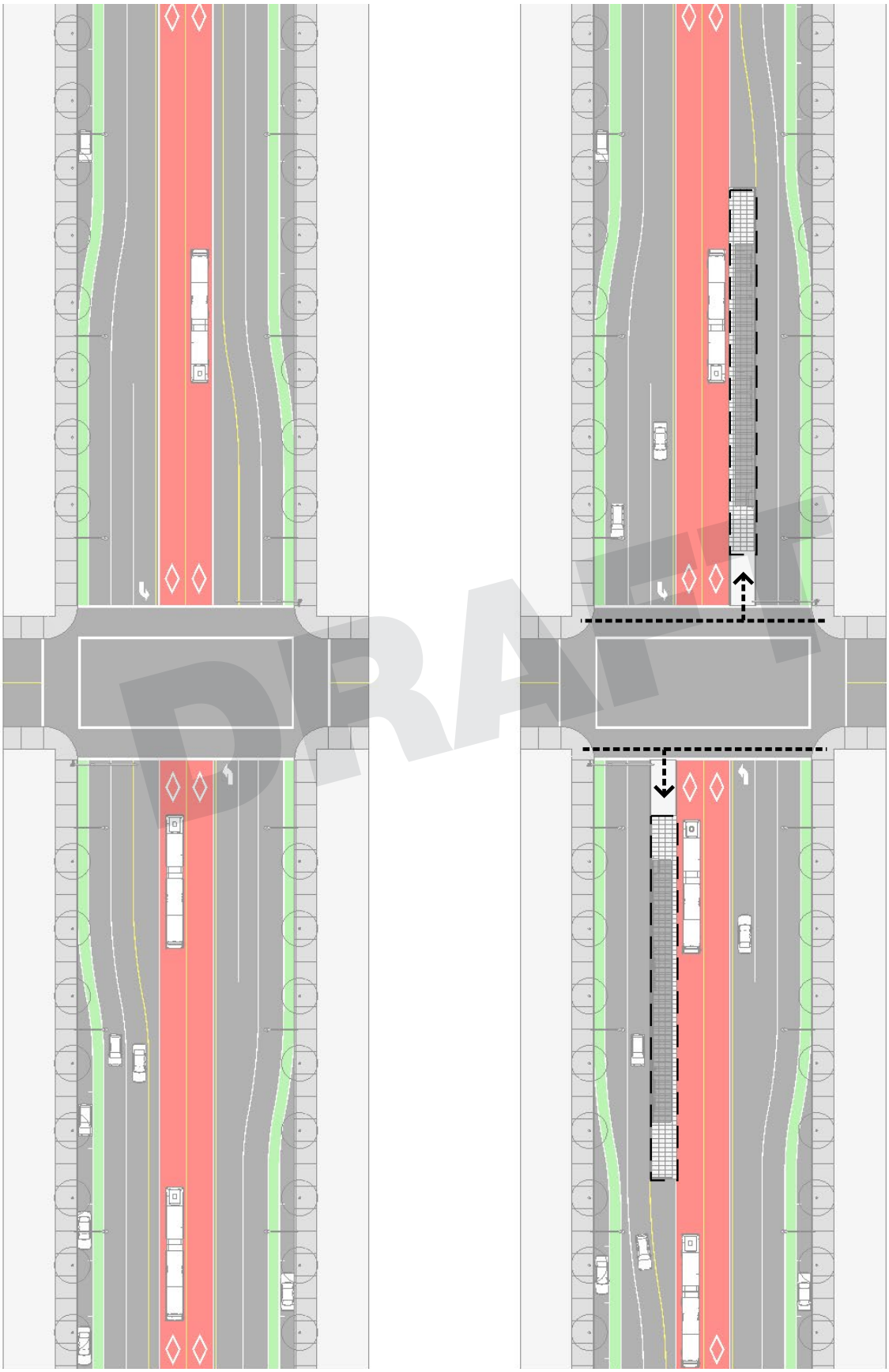

Figure 9. Center running BRT cross section and intersection configuration with and without stations.

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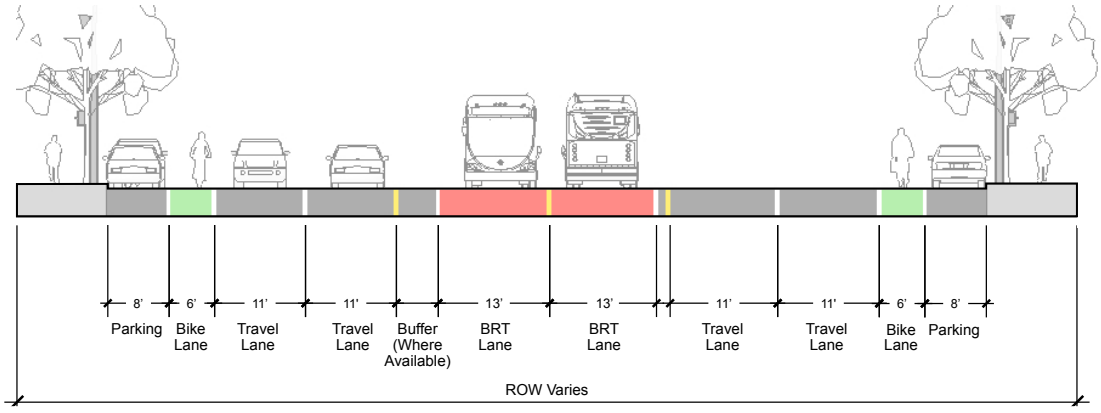

Figure 10. Cross-section of center running lane

Guidelines for Implementation

- Center running lanes are preferred where:
  - > Bus travel speed and reliability are a priority.
  - > There are a large number of private driveways along the corridor.
  - > There are commercial uses at proposed station locations with driveway access close to the intersection, which would preclude a curb or side station.
  - > There are large volumes of right turn movements.
- Center running lanes may not be the best fit where:
  - > Diversion of left turning traffic may be prohibitively disruptive.
  - > There is insufficient right of way to construct center stations.
- It will be important to restrict access to the lanes in the case where the lanes are essentially a center-running BRT guideway, by using clear striping and signage to ensure no turning vehicles mistakenly turn into the guideway.
- Center running bus lanes should be a minimum of 13 feet wide when bus lanes traveling in opposite directions are located adjacent to each other with no buffer in between.

Opportunities and Challenges

Opportunities

> The center running alternative has no conflict with right-turning vehicles at intersections or vehicles entering/exiting driveways or parking lanes.

> This alternative lends itself to conversion to rail.

> There is the possibility to activate TSP with loops in the case where the BRT lanes are essentially a center-running BRT guideway that other vehicles are not allowed to enter.

Challenges

> Center running ways are less likely to be shared by local bus services that will need to stop at intersections where no center running stations may be provided.

> At the stations, additional width will be needed.

> The left turning vehicles inherently have a conflict with the center running BRT.

> Riders have to cross part of the roadway to access center stations, unlike the convenience of having a station near the sidewalk.

> Center running ways may require more infrastructure to accommodate new medians, potential drainage modifications, protected left turn phasing, etc.

> Turning vehicles may mistakenly turn into the guideway.

> Transitions or certain procedures may be needed for buses to enter the guideway (special phasing), maybe in multiple places if one segment of the line begins operating before another.

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d. Grade Separations

Description

This section discusses grade separated guideways, meaning a guideway that is tunneled or elevated. BRT vehicles on grade separated guideways do not experience delays from cross traffic or congestion.

Guidelines for Implementation

- Grade separated guideways provide optimal BRT operations and reliability. Provide the guideway as either an elevated or tunneled structure if dedicated lanes can not be accommodated within the roadway, and funding is available.
- Grade separated guideways should also be considered where collision rates are high and enhanced safety is a priority.

Opportunities and Challenges

Opportunities

> Tunneled guideways have less visual impacts.

> If the BRT route crosses an existing rail system, and the BRT route has a high potential to be converted to rail in the future, then grade separation may be worth the investment, since two rail lines cannot cross each other at grade.

> If there is not enough room on a certain segment to have the BRT lanes at-grade on the roadway, grade separation could be an alternative to right-of-way. Keep in mind however that if the BRT lanes are being elevated because there is no room for them at-grade, maintenance of traffic during construction will also be challenging due to the lack of roadway width.

> Removing at-grade crossings eliminates delay at intersections. After construction is complete, the BRT lane has little impact on general traffic.

> There is improved travel time with the full exclusivity and it is more obvious to drivers that they are not meant to enter the guideway and there are fewer opportunities to do so.

Challenges

> Grade separations can increase a BRT project's capital cost by 50% or more.

> An elevated guideway may require trees to be eliminated.

> Elevated guideways and tunnels have less access points for maintenance and supervisor vehicles.

> A disabled vehicle on a separated guideway can require BRT vehicles to travel along a detour route until the guideway lane is clear. Route deviations can result in longer travel times and unreliable service.

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e. Managed Lanes

Figure 11. BRT managed lanes

Description

This section discusses BRT operation on managed lanes, which are dedicated lanes on a freeway for high-occupancy vehicles, or single-occupant vehicles who pay a toll. These lanes can be located on the shoulder, in the median, or by repurposing an existing travel lane; in LA County, they have been implemented in the median.

Guidelines for Implementation

- The managed lane should be clearly marked with signage and pavement markings. Transit-only segments (such as station entrances and exits) should be demarcated with additional signage, and colored pavement if feasible.
- By utilizing space on an existing freeway facility, a managed lane can be a low cost alternative to a new bus lane.
- The feasibility of installing a managed lane due to potential conflicts with on-ramps and offramps will need to be evaluated.
- If a freeway shoulder is used, the shoulder may need to be reinforced to accommodate regular bus traffic. Drainage, signage and lighting may need to be modified as well.
- Driver training is necessary for the use of shoulder lanes, due to potential conflicts at interchanges, with drivers stalled on the shoulder, or vehicles driving too close to the bus lane.

Opportunities and Challenges

Opportunities

> BRT managed lanes can be a low cost alternative to a new bus lane.

> Potential revenue source by allowing access to private shuttles and buses.

Challenges

> Unauthorized vehicles may enter the managed lane and/or an in-line station to avoid congestion or due to misunderstanding of the use restrictions.

> In-line stations in managed lanes may be constrained by limited right-of-way, and there may be challenges in establishing a pedestrian pathway between the station and the local street system. If in-line stations are not feasible, BRT vehicles would need to exit the freeway to access a station.

> If an inside or outside shoulder is converted to a managed lane, physical improvements such as reinforcement, drainage modification, and relocation of lighting and signage may be necessary.

> Specific regulation may be required to allow transit vehicles to run on shoulders.

> Shoulder lanes are subject to potential conflicts at freeway entrances and exits, with drivers stalled on the shoulder, or vehicles driving too close to the bus lane.

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3 Roadway Geometrics

a. Mixed-flow
b. Queue Jumpers
c. Semi-exclusive Lanes
d. Exclusive Lanes
e. Exclusive Roadways
f. Transitions in Running Way Placement
g. Sidewalks
h. Pedestrian Crossings
i. Bike Facilities
j. Driveways

DRAFT

a. Mixed-flow

Figure 12. Mixed-flow traffic

Description

This section discusses the roadway geometric guidelines for mixed-flow BRT operation. The BRT operates as part of a standard traffic lane and allows for mixed-flow operation with motor vehicles or pedestrians, resulting in higher levels of operating conflicts and lower-speed operations. These alignments are often found in downtown areas where there is a willingness to forgo operating speeds in order to access areas with high population density and many potential riders.

Guidelines for Implementation

- Motor vehicles and bicycles operate with buses in traffic lanes on streets. Pedestrians cross this right-of-way at designated l ocations only.
- Mixed-flow lanes should be considered where congestion levels are low, and limited benefit would be achieved from a dedicated BRT lane.
- Standard placement for the mixed-flow lane shall be with the outside right traffic lane (side/ curb running). This will allow easier access to the stations on the sidewalk side as part of a standard BRT lite system. The bike lane and parking shall be placed to the right of the mixed-flow lane
- Minimum lane width for the mixed-flow lane shall be 12 feet and will contain both BRT and general traffic.

Opportunities and Challenges

Opportunities

> Requires less right-of-way and infrastructure to build, and thus has the lowest capital costs of any BRT option.

> Allows for incrementally implementing BRT and potentially investing in other elements for a BRT-Lite (TSP, etc).

> Intersection delay can be reduced when queue jumpers for TSP is used along the corridor.

> Less construction impacts than exclusive lane.

Challenges

> Mixed-flow lanes are impacted by traffic conditions and have the lowest travel time savings, level of safety, and reliability.

> Mixed-flow lanes have an increase in chances for collisions.

> Delay to buses may also result from turning, queuing, or double-parked vehicles and merging, turning, and/or loading/unloading buses may delay mixed-flow traffic.

> Mixed-flow lanes seem less permanent.

DRAFT

b. Queue Jumpers

Figure 13. Queue jumper

Description

Queue jumpers are used at intersections to allow the BRT to bypass queuing vehicles at intersections. Otherwise, the cumulative delay at intersections can hinder on-time performance and operating speed. Queue jumpers are typically installed at heavily congested intersections.

Guidelines for Implementation

- At intersections with relatively low right turn volumes, BRT vehicles can use an existing right turn lane along with a special signal phase to get a head start in advance of through traffic.
- To avoid getting caught behind right-turn vehicles, queue jumpers can replace a turning lane and allow only buses to move through, or as a dedicated lane between the turn lane and the parallel traffic lanes.
- Standard placement for the queue jumper shall be to the right of the outside through traffic lane. Queue jumpers are used as part of a mixed-flow operation. If there is a right turn lane, the queue jump lane will be placed between the outside through lane and the right turn lane. If there is a bike lane, the queue jump lane will be placed between the outside through lane and the bike lane.
- For a mixed-flow lane at the median, place the queue jumper to the left. If there is a left turn lane, the queue jump lane will be placed between the left turn lane and the inside through lane.
- The queue jumper will be designed to provide a transition between the mixed-flow lanes to the actual queue jumper.
- Minimum lane width for the queue jumper will be 12 feet and will contain only BRT and bus traffic.
- The queue jumper length shall be a minimum of 60 feet, the length of an articulated bus. The queue jumper shall extend up to the length of a right or left turn lane if it is adjacent.
- The signal timing will allow the BRT to enter the standard traffic lanes from the queue jumpers. (Refer to Section 9 Traffic Operations below and to Chapter 7.4 BRT ITS Systems for further guidance.)

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Opportunities and Challenges

Opportunities

> Can reduce intersection delay for the BRT vehicles and shorten route travel time.

> Provides running way improvements at specific intersections in segments where the BRT operates in mixed-flow.

Challenges

> Potential right of way restrictions at intersection to place the queue jumper.

> Limited right-of-way may be available at locations where an existing right turn lane is not present.

> If a queue jump lane will displace a turn lane, there may be impacts to traffic operations.

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c. Semi-exclusive Lanes

Description

Semi-exclusive lanes provide a dedicated travel lane for BRT vehicles that is subject to signal control at crossings. If a semi-exclusive lane is located within an existing roadway or runs parallel to an arterial, crossings occur at intersections from both perpendicular traffic and parallel traffic crossing the BRT lane to either make a right or left turn. If conflicts are able to be eliminated entirely, the guideway would be considered "exclusive" rather than "semi-exclusive."

Semi-exclusive BRT lanes located on an arterial can be located along the curb (curb running), in the outside travel lane if on-street parking and/or bicycle lanes are located along the curb (side running), or to the left of general traffic (center running). Semi-exclusive lanes can also be physically separated from general traffic by raised curb or located on a bus-only guideway.

Operating speeds in semi-exclusive lanes located on an arterial or highway are governed by speed limits for general vehicle traffic. For semi-exclusive lanes that are physically separated from general vehicles where the right-of-way is fenced and automatic gates have been installed at crossings, operating speeds are maximized. If the right-of-way is fenced but gates are not present, higher speeds can be maintained for shorter distances on segments between crossings.

Guidelines for Implementation

- Semi-exclusive lanes can be located within a street, or on a guideway that is physically separated from general traffic. For side or curb running placement, the right turn, bike, and parking lanes will be placed to the right of the BRT lane.
- For center or median running placement, the left turn lane can be placed to the left or the right of the BRT lane.
- Traffic may be allowed in the semi-exclusive lane for right and left turn crossings, where sufficient distance will be provided for crossing distance (Refer to Intersection Geometrics - Left/Right Turns). Traffic may also be allowed to cross the semi- exclusive lane to access driveways and/or on-street parking spaces for side and curb running placement. General vehicles are not permitted to travel in the BRT lane for through movements or to bypass congestion.
- Minimum lane width for a curb or side running semi-exclusive lane shall be 12 feet and the minimum lane width for center running BRT lanes shall be 13 feet.
- The semi-exclusive lane may be separated from parallel traffic between intersections by fencing, barrier (non-mountable) curbs, mountable curbs, striping, and/or lane designation.

Opportunities and Challenges

Opportunities

> Semi-exclusive lanes can improve BRT travel times, particularly in congested areas, making transit more competitive with the automobile.

> BRT in semi-exclusive lanes will operate faster and more reliably than in mixed-flow.

> Semi-exclusive BRT lanes that utilize existing infrastructure are more cost-efficient than new construction of exclusive lanes.

Challenges

> In order to redistribute arterial right-of-way more equitably between bicycles, transit and private vehicles, traffic lanes and/or on-street parking lanes may be converted to dedicated BRT lanes. This will result in less roadway capacity for general traffic or parking spaces.

> Traffic that crosses the semi-exclusive BRT lane to make right and left turn movements will introduce opportunities for conflict.

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d. Exclusive Lanes

Description

Exclusive lanes provide a path of travel for BRT vehicles that is free of conflicts between buses and general vehicle traffic, and therefore also free of delay associated with signal control. Unlike semi-exclusive lanes, exclusive lanes do not have traffic from parallel adjacent streets crossing the bus lanes to make left or right turns.

Operating speeds in exclusive lanes are limited by the physical design of the roadway, such as horizontal curvature, vertical curvature, superelevation and sight distance.

Guidelines for Implementation

- Exclusive lanes are limited to BRT vehicles only. Generally traffic is not permitted to enter or cross exclusive lanes for any reason.
- Minimum lane width for an exclusive lane that is not directly adjacent to another exclusive lane shall be 12 feet.
- If two exclusive lanes are separated by lane markings only, the minimum width of each lane shall be 13 feet.
- The exclusive lane may be separated from parallel traffic by fencing, barrier (non-mountable) curbs, mountable curbs, striping, and/or lane designation.
- Specific signal timing is needed for the BRT to avoid the left turn conflict (Refer to Traffic Operations).

Opportunities and Challenges

Opportunities

> Exclusive lanes allow for the BRT to operate uninterrupted by traffic, and provide high travel time savings, level of safety, and reliability.

> Conflicts between BRT and general traffic are not present.

> Platooning of busses can maximize throughput while maintaining efficiency and reliability.

Challenges

> Right-of-way may not be available for exclusive lanes.

> Grade separation may be required to remove existing at-grade intersections between the BRT lane and the existing roadway network.

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e. Exclusive Roadways

Figure 14. Exclusive BRT roadway

Description

This section discusses the roadway geometric guidelines for exclusive roadways. Exclusive roadways can be fully grade separated from both motor vehicle and pedestrian crossing facilities, or operate in an exclusive right-of-way with at-grade crossings at intersections.

Guidelines for Implementation

- Maximum operating speed for BRT is 55 MPH. Maximum operating speed through intersections is 45 MPH.
- Where the BRT project has the potential of being converted to a light rail facility, the horizontal alignment shall be designed using the latest edition of METRO's Rail Transit Design Criteria and Standards.
  - > Where light rail criteria is not practicable, or where the BRT project does not have the potential of being converted to a light rail facility, the latest edition of Caltrans' Highway Design Manual shall be used.
- Exclusive busways shall have two lanes, each with a width of 14 feet measured from the curb face to the centerline. Where curbs are not required, the lane width shall be 14 feet from edge of pavement to the centerline, with a 3 feet shoulder for an overall pavement width of 34 feet.
- For exclusive roadways on a bridge structure, the width of each lane shall be 15 feet measured from centerline to face of barrier. The distance from the right edge line to the barrier shall be 2 feet. The 4-inch wide white thermoplastic right edge line shall have raised and inverted profile.
- At intersections, exclusive roadways will either be separated from traffic by grade separation or gated crossings.
- Specific signal timing is needed for the intersections where the BRT uses gated crossings (Refer to Gates and Traffic Operations).

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Opportunities and Challenges

Opportunities

> Exclusive roadways allow for the BRT to operate uninterrupted by traffic and provide the highest travel time savings, level of safety, and reliability.

> Exclusive roadways can accommodate the highest peak passenger flows.

> Exclusive roadways provide the best opportunity for conversion to light rail.

Challenges

> Exclusive roadways require significant right-of-way and infrastructure to build, and thus have the highest capital costs of any BRT option. In addition, the necessary right-of-way may not be attainable throughout the corridor.

> Construction impacts are similar to those for light rail transit.

> Require gated crossings at intersections.

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f. Transitions in Running Way Placement

Description

This section discusses the roadway geometric guidelines for transitions in running way placement. There may be some corridor segments where the running way is in the center of the roadway due to applicable conditions and constraints, and other segments on the same line where the running way will serve stations on the sidewalk due to changes in land use, frequency of driveways, or other considerations. The primary consideration for transitions is when the running way location changes from side or curb running to center running and vice versa.

Guidelines for Implementation

- Mixed-flow segments can be used to transition between side or curb running BRT lanes and center running lanes for semi-exclusive and exclusive BRT lanes to allow the bus to navigate from one side of the roadway to the other.
  - > The mixed-flow transition segment should be between two signalized intersections, and long enough to ensure that the bus can safely make the necessary lane changes required.
- If the roadway geometry permits, transitions can occur at a signalized intersection with a signal phase to allow the bus to transition across lanes.

Opportunities and Chellenges

Opportunities

> Transition segments provide greater flexibility in placing the running way in the optimal location based on local conditions.

> If a corridor includes varying land use types or right-of-way widths, there may be some segments where the BRT running way is preferred in the center and other segments where the running way is preferred on the side.

> Transitioning during an exclusive signal phase eliminates conflict points associated with lane changes.

Challenges

> Where a mixed-flow segment is provided for transitions, the bus will be required to make multiple lane changes. In congested conditions, the bus may have limited opportunities to change lanes.

> Each lane change required on a bus route introduces potential conflict points, and increases the risk of collision.

> Some intersections may not be configured to allow the bus to transition during an exclusive signal phase, depending on the lateral movement required, the width of the cross street, and the turning radius of the BRT vehicle.

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g. Sidewalks

Figure 15. Sidewalks and transit.

Description

This section discusses the roadway geometric guidelines for sidewalks that will serve BRT stations. In general, sidewalk modifications are not a part of the running way design, and may be considered as part of station design or first/last mile improvements.

If sidewalk modification is necessary to implement the BRT lanes or station areas, sustainable measures such as low impact development, use of recycled materials, and planted areas within curb extensions should be considered. Sustainability improvements are not required elements of a BRT project, and should be balanced with water conservation efforts, long term maintenance requirements, and compatibility with local goals and policies.

Guidelines for Implementation

- Minimum sidewalk width will be 5 feet, where there is no station. The preferred sidewalk width will be 10 feet or greater.
- ADA requirements must be met for sidewalk desirable widths, areas behind and adjoining driveways, alley openings, and pedestrian ramps.

Refer to Chapter 7.2 BRT Station/Platform for further guidance regarding sidewalk configuration at stations. Also refer to Transit-Oriented Communities chapter for guidance on streetscape and pedestrian infrastructures.

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h. Pedestrian Crossings

Figure 16. Pedestrian crossing.

Description

This section discusses the roadway geometric guidelines for pedestrian crossings. Crosswalks are essential components of the path that pedestrians must travel to get to and from BRT stations. Implementation of dedicated BRT lanes typically involves restriping of the existing roadway, which can include pedestrian crossings.

Guidelines for Implementation

- Pedestrian crossing of the BRT right-of-way will typically be at-grade.
- Pedestrian crossings should be perpendicular to the traffic lanes and 15 feet in width.
- Street improvements that reduce the length of the pedestrian crossing are desirable, because they provide increased visibility of pedestrians, reduce pedestrian crossing time, and can result in better traffic operations.
- At intersections, standard pedestrian signals should be used.
- Where pedestrian crossing are anticipated to occur mid-block, the costs and benefits of a pedestrian signal to stop both traffic and the BRT should be evaluated.
- Sight lines at intersections should be assessed to ensure proper visibility of pedestrians at the intersection.

Opportunities and Challenges

Opportunities

> Can reduce the length of pedestrian crossings with bulbouts.

Challenges

> Pedestrian crossings can reduce the BRT travel times if they are too long or mid-block.

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i. Bike Facilities

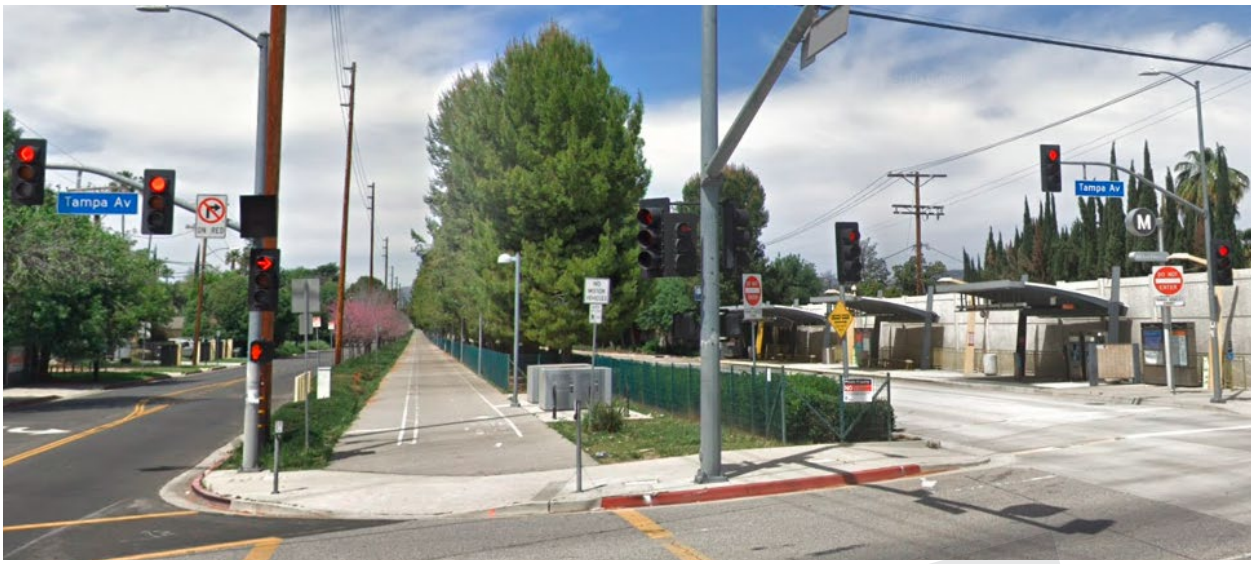

Figure 17. Bike facilities

Description

This section discusses the roadway geometric guidelines for bike facilities.

Guidelines for Implementation

- The bikeway facility width (Class I, II, and IV) shall be a minimum of 4 feet. The width of the bike lane shall be a minimum of 5 feet if adjacent to a general traffic lane or parking lane.
- The maximum bikeway facility width (Class I, II, and IV) shall be 6 feet, with any additional width being used for a buffer.
- A preferred Class IV facility will use a 6-foot bike lane width with a 4-foot wide buffer using a bollard.
- The bike facility can improve separation from the roadway by providing for a vertical element via a raised curb or raised bikeway.
- With minimal Class II bike facility width, the bike lane shall be placed to the left of parking or against the curb if there is no parking.
- With the preferred Class IV bike facility width, the bike facility shall be placed against the curb with parking and traffic lanes to the left.
- Sight lines at intersections should be assessed to ensure proper visibility of pedestrians at the intersection.
- If insufficient right-of-way exists to provide a dedicated bikeway or bike lane, a shared bike and bus lane may be used in side running and curb running alignments.

Refer to Station chapter for further guidance regarding interaction between bike facilities and stations. Also refer to Transit-Oriented Communities chapter for additional guidance on streetscape and pedestrian infrastructure.

Opportunities and Challenges

Opportunities

> Implementing BRT may provide an opportunity to provide new or enhanced bike facilities along new guideway or reconfigured lanes.

> Bicycle facilities provide a first/last mile option.

Challenges

> There may be limited curb to curb width to use a bike facility or protected bike facility.

> There are special treatments for the bike lane at station locations. See Chapter 7.2 BRT

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j. Driveways

Description

This section discusses the interface and potential conflict between driveways and BRT lanes.

Guidelines for Implementation

- Driveways located within 100 feet of a signalized intersection could impact the location of side stations.
- Consolidate driveways that conflict with BRT stations or operations if possible.

Opportunities and Challenges

Opportunities

> Pursue opportunities to consolidate/limit the number of driveways and/or reduce driveway widths of driveway.

Challenges

> Driveways have an impact on side and curb running operation because of traffic crossing the BRT lane.

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4 Intersection Geometrics

a. Left/Right Turns
b. Intersection Lane Offsets
c. Vertical Profiles (Crowns)
d. Concrete Bus Pads
e. Bus Turnouts
f. Contraflow Lanes
g. Ramps
h. Bulbouts
i. Exclusive Roadway and Managed Lanes Entry/Exit

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a. Left/Right Turns

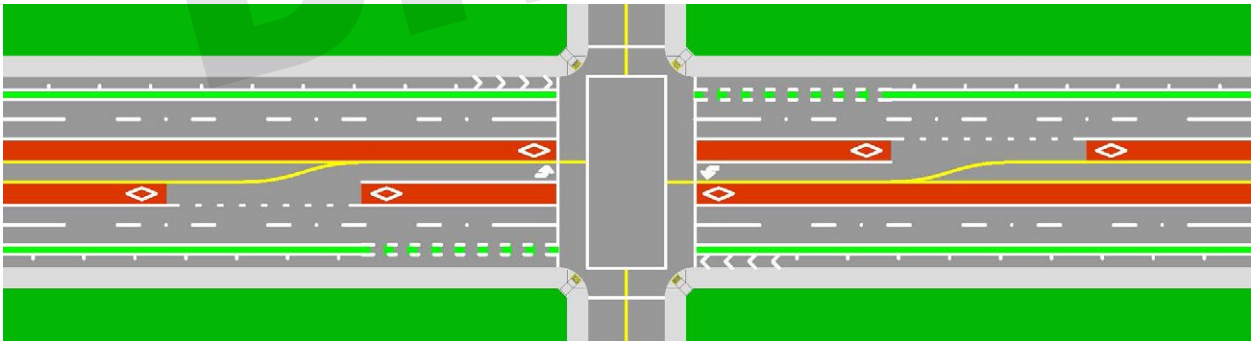

Figure 18. Left turn mixing zones along center running BRT

Description

This section discusses the intersection geometric guidelines for left/right turns for crossings of the BRT. The crossings for left turns occur for median or center running and crossings for right turns occur for side or curb running.

Guidelines for Implementation

- In general, left turns are prohibited to cross the BRT lane at unsignalized locations.
- The base configuration for left turns at signalized locations with center running BRT lanes places the left turn lane to the right of the BRT lane. This may create conflicts for the left turns, and require lead/lag phasing. Lead/lag phasing may also create additional delay for the bus vehicles.
- Left turn crossings are an option for center running lanes where the left turn lane is to the left of the BRT lane.
- A right turn pocket can be added by replacing the parking lane.
- When there is not sufficient space for a right turn pocket, vehicles can be allowed to enter the BRT lane in advance of the intersection to make right turns.
- The length of a dedicated left or right turn pocket is determined by the queue length as determined from the 95th percentile. The minimum length of the pocket shall be 60 feet, enough for an articulated bus in the BRT lane.
- The MUTCD Taper Length Formulas are recommended to be used to determine the length of the mixing zone prior to a left or right turn pocket. Where the speed limit is 40 miles per hour (MPH) or less, the taper length (L) in feet is equal to $WS^2/60$, where W = width of bus lane in feet and S = posted speed limit or anticipated operating speed in MPH. Where the speed is 45 miles per hour (MPH) or more, L=WS. For a segment where the operating speed is 30 MPH and the BRT lane is 12 feet wide, the mixing zone should be 180 feet long. The minimum length of the mixing zone should be 100 feet. In this mixing zone, left or right turning cars may cross the BRT lane to enter the left or right turn pocket.

Opportunities and Challenges

Opportunities

> Left turn crossings can be accomplished with less curb to curb width and can prevent lane offsets for the BRT lane.

Challenges

> The mixing zones are challenges for the BRT lane, as opposed to keeping the BRT separate.

DRAFT

b. Intersection Lane Offsets

Description

This section discusses the intersection geometric guidelines for intersection lane offsets. Lane offsets may be required to accommodate center running ways, particularly if the bus does not provide boarding from both sides of the vehicle.

Guidelines for Implementation

- *Lane offsets should be reduced through intersections as much as possible to provide contiguous lanes. Preferable offset should be kept at or below 2 feet. A maximum offset may be determined using the taper length formula based on speed.*
- *Caution should be used in designing a center running BRT, as significant lane offsets through the intersection may develop from left turn lanes. At a minimum, an additional buffer lane is needed when the left turn lane is not crossing. If the left turn lane is crossing, then an additional buffer lane is not needed and lane offsets are reduced.*

Opportunities and Challenges

Opportunities

> Lane offsets provide channelization and direction for drivers where non-standard lane configuration is required to accommodate BRT running ways.

Challenges

> The need for a lane offset depends on the BRT running way placement, left turn movements, and the available right-of-way. In some instances, lane offsets cannot be avoided.

> Lane offsets vary from standard roadway configuration, and can be confusing to drivers.

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c. Vertical Profile (Crowns)

Description

This section discusses the intersection geometric guidelines for vertical profile (crowns). BRT vehicles that provide low-floor boarding sit low to the ground, and the bottom of the vehicle may come in contact with the roadway surface at changes in grade.

When selecting an alignment for BRT, or if roadway reconstruction through an intersection or along an existing or proposed BRT route is required, the following guidelines should be taken into consideration. If local design standards vary from the recommendations presented in this chapter, the more conservative standard should apply.

Guidelines for Implementation

- Longitudinal grades shall be a maximum of 5%, minimum of 0.3%, and desirable 1%
- Cross-slope shall be 2%
- Maximum grade differential shall be 9% for a crest vertical curve and 6.5% for a sag vertical curve. Crest and sag curves at top and bottom of ramps without parking may exceed these differentials, but must use a vertical curve 20ft in length or more.
- Vertical curves shall have the following minimum vertical curve length (Lmin) as determined by a factor and the algebraic difference in grades (A)
  - Crest Curves – Lmin = 28 A
  - Sag Curves – Lmin = 35 A
  - No vertical curves shall be less than 20 feet.

Opportunities and Challenges

Opportunities

> If roadway reconstruction is planned as part of a BRT project or for a new roadway, there is an opportunity to modify the vertical profile to accommodate all vehicles, including BRT.

Challenges

> For most instances where BRT vehicles will cross streets at grade, the budget may not include regrading of the street to provide a new vertical profile.

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d. Concrete Bus Pads

Description

This section discusses the intersection geometric guidelines for concrete bus pads. Buses weigh considerably more than a standard passenger vehicle, and generate more wear and tear on asphalt surfaces. Concrete bus pads help prevent long-term damage (e.g. gaps, cracks, and ripples) to the roadway surface.

Guidelines for Implementation

- If construction of the BRT requires an existing bus stop to be relocated, a new concrete bus pad should be installed at the location of the relocated bus stop.
- If the construction of the BRT encroaches into an existing bus stop, a new concrete bus pad should be provided at the existing bus stop, in conformance with the local agency's standard.
- For existing bus pad or new bus pads outside of the busway, the thickness of the concrete bus pad shall be designed per geotechnical report recommendations, or per city of Los Angeles Standard Plan S-433-0, or per SPPWC Standard Plan 131 (latest revision), whichever is more stringent. The compressive strength of concrete (f'c) shall be 4,000 psi minimum.
- Bus pads should be designed with a minimum width of 12ft per pad and a minimum length of 90ft. See City of Los Angeles Bureau of Engineering Standard Plan S-433 for further detail.
- Bus pads may warrant a longer length to accommodate multiple bus lines and/or articulated buses.

Opportunities and Challenges

Opportunities

> Concrete bus pads help prevent long-term damage (e.g. gaps, cracks, and ripples) to the roadway surface.

> Where level boarding is required, concrete bus pads are sturdier than asphalt and less prone to changes in elevation due to wear and tear.

Challenges

> Installation of new concrete bus pads can be a significant cost.

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e. Bus Turnouts

Figure 17. Bus turnout

Description

Bus turnouts are a common feature of local bus service, but are not recommended along BRT routes. A bus turnout is not aligned with the normal curb edge, but recessed so that the transit vehicle pulls out of the traffic lane to stop. Bus turnouts can allow through traffic to continue moving while the bus picks up and drops off passengers. However, if a bus must pull out of a turnout and into a general traffic lane, this may result in delays due to the time required for buses to re-enter the main stream of traffic. While the impacts are potentially small at each turnout, the cumulative effect on transit can be significant along the length of a corridor.

Guidelines for Implementation

- Bus turnouts are not recommended for BRT stops, even where the bus operates in mixed flow, due to the potential delays associated with pulling back into general traffic.
- If a bus turnout is necessary due to an unavoidable condition or impact, it should be constructed with a concrete bus pad with minimum width of 12 feet and minimum length of 90 feet.

Opportunities and Challenges

Opportunities

> Bus turnouts should be considered where buses will stop for extended periods of time, such as at route terminus locations.

Challenges

> Bus turnouts can negatively affect transit travel time due to the time required for buses to re-enter the main stream of traffic.

> Bus turnouts reduce the amount of space available to install passenger amenities such as shelters and sidewalks.

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f. Contraflow Lanes

Description

This section discusses the intersection geometric guidelines for contraflow lanes. A contraflow lane travels in the opposite direction of adjacent traffic lanes. They are typically used on streets where general traffic is limited to one direction, but bus transit travels in both directions. Contraflow lanes can be used to create more efficient connections for transit.

Guidelines for Implementation

- Contraflow lanes should be a minimum of 12ft wide.
- Contraflow lanes can be designed similar to a standard bidirectional street, except that travel in one direction is limited to transit only.
- Contraflow lanes should be clearly marked through pavement markings and signage to distinguish them from general traffic lanes. At a minimum, BRT ONLY and directional arrow markings should be applied.
- A double-yellow centerline marking (MUTCD §3D-02) must be applied to separate contraflow traffic from opposing traffic.
- At signalized intersections, install transit-only signals facing the contraflow direction.
- Clearance intervals should be calculated using transit-specific speeds to provide safe movement across intersections.
- Intersection turn management should be designed to accommodate contraflow operation.

Opportunities and Challenges

Opportunities

> Contraflow operation can reduce the length of a transit route that would otherwise require additional turns to travel on conventional streets.

> Running transit in both directions on a one-way street can provide better connections for route transfer and stations easier to locate for passengers.

> Reconfiguration of a street to provide a contraflow lane may provide an opportunity to provide new or enhanced bicycle facilities.

Challenges

> There may be limited right-of-way available to introduce a contraflow lane.

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g. Ramps

Figure 19. Curb ramp

Description

This section discusses the intersection geometric guidelines for ramps. Curb ramps and platform access ramps are a key component of pedestrian access to center or side BRT stations.

Guidelines for Implementation

- If BRT street improvements involve modifications that affect curb ramps, the curb ramps should be replaced in conformance with local City standards.
- Dual curb ramps should be considered at intersections where curb returns are modified as part of BRT Projects and provide direct access to stations. The design of curb cuts and ramps shall be in accordance with the applicable provisions of the Americans with Disabilities Act (ADA), Title 24, California Code of Regulations Part 2, "Regulations for the Accommodation of the Disabled in Public Accommodations" and City of Los Angeles standard plans. Location of ramps and curb cuts in public space shall be obtained from the local governing jurisdiction and shall be in accordance with the ADA and Title 24, Section 2-710(3)(a) and City Standard Plan No. S-442-3.

Opportunities and Challenges

Opportunities

> Provides a smooth surface for pedestrians pushing strollers, bicycles, wheelchairs or other wheeled devices.

> Detectable warning surfaces help to make curb ramps more visible, and also provide tactile feedback for sight-impaired pedestrians.

Challenges

> There may be limited right-of-way available to update older curb ramps to meet current code requirements.

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h. Bulbouts

Figure 17. Bulbout

Description

This section discusses the intersection geometric guidelines for bulbouts. Bulbouts are extensions of curb into the roadway, which permits transit vehicles to dwell at a stop without pulling out of the main stream of traffic, as would be required for a bus bay. Transit vehicles are not required to merge back into traffic, which reduces delay to the bus. Bulbouts provide many benefits including reducing pedestrian crossing distance, slowing drivers at the corner, provides additional sidewalk space, and allows pedestrians and motorists to see each other more clearly.

Guidelines for Implementation

- Bulbouts can be applied at corners where on-street parking exists. If the full street width is utilized for through traffic, bulbouts would not be feasible.
- Bulbouts should also be considered near BRT stations to reduce crossing distance for pedestrians.
- Bulbouts should usually extend the full width of a parking lane, typically 8 feet from the curb. If a bike lane is present, however, the bulbout should be designed to accommodate drainage flows without affecting bicycle travel.
- When bulbouts conflict with the turning movements of trucks and transit vehicles, the width and/or length should be reduced rather than eliminating the bulbout.
- Sight distance and emergency access must be considered when planning to install landscaping elements, street furniture or other amenities on curb bulbouts.
- Bulbouts should be designed to allow stormwater to flow into drainage inlets without ponding.

Opportunities and Challenges

Opportunities

> Bulbouts allow on-street parking and right turn lanes to remain in place.

> Bulbouts establish a station footprint and can provide additional space for station amenities.

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- Bulbouts provide more space for pedestrians and can reduce their crossing distance.
- Bulbout stations allow BRT vehicles to stay in the side lane rather than pulling to the curb for boarding and alighting.

Challenges

- Bulbouts must be designed to accommodate drainage and bicycle lanes (if present).
- Bulbouts can increase the capital cost of the BRT project.

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i. Exclusive Roadway and Managed Lanes Entry/Exit

Description

This section discusses the intersection geometric guidelines for exclusive roadway and managed lanes entry/exit. Where right-of-way for an exclusive guideway is not available, the BRT may share a roadway that is used as a managed lane. Exclusive roadways use variable pricing to reduce traffic congestion, and users pay a toll to travel in the lane. Exclusive roadways are typically separated from general traffic by barriers, bollards, or pavement markings. In the context of this discussion, managed lanes are dedicated lanes on a freeway for exclusive BRT use. These lanes can be located on the shoulder, in the median, or by repurposing an existing travel lane. Taxis, high occupancy vehicles, or other designated vehicles could be permitted to share the managed lanes. Managed lanes in other contexts created by congestion pricing strategies or other methods could also be considered for BRT use as applicable.

Guidelines for Implementation

- BRT access to exclusive lanes or managed lanes will depend on the point of entry and the existing barriers to entry.
- For BRT access at an entry point utilized by other permitted vehicles, consider ways to reduce delays for BRT.
- For BRT access at an entry point not utilized by other permitted vehicles, consider sight distance to safely enter the exclusive or managed lane.
- Design enter and exit points to ensure that non-authorized vehicles do not attempt to follow the BRT vehicle into or out of the exclusive or managed lane.
- Managed lanes located on the shoulder of a freeway may cross entry ramps used by general traffic.
- Ramp meter interrupt technology can be used to create a gap in the entering traffic to allow a BRT vehicle to cross the entrance ramp lane.
- If stations are located on a managed lane, the bus will need adequate length to accelerate to the desired operational speed to merge back into freeway lanes. The AASHTO recommended minimum acceleration lengths for entrance ramps can be used to determine acceleration lengths required between BRT stops and merge areas.

Opportunities and Challenges

Opportunities

> If the conflicts at entry and exit points can be resolved, the use of managed lanes for BRT can provide an opportunity to provide quality service at a lower cost than building an exclusive, bus only lane.

Challenges

> Entry and exit between exclusive or managed lanes and a BRT running way can be complicated if the exclusive or managed lanes are controlled by physical barriers or gates.

> Transitioning from a perpendicular roadway to an exclusive or managed lane may require special lanes to speed up or slow down prior to or after entry, depending on traffic volumes and travel speeds on the exclusive or managed lane.

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5 Gates

a. Description
b. Guidelines for Implementation
c. Challenges and Opportunities

Figure 20. BRT gates

a. Description

This section discusses potential uses for gates for BRT operations and guidance for implementation. Also refer to the System chapter of this document for further guidance on access control.

b. Guidelines for Implementation

- Gates can be used to advise and restrict turning vehicles crossing exclusive BRT running ways that the BRT has right-of-way through an intersection. Typical examples would be in right turn lanes to supplement blank-out No Right Turn signage when the BRT phase is active at a traffic signal, or to block left turns in front of the BRT in center running designs.
- For roadway crossings of exclusive BRT running ways, full gates and flashers, similar to light rail crossings can be utilized.
- Gates can also be used to provide access control onto the exclusive BRT guideway lanes. These are used to block inadvertent or intentional movement of unauthorized vehicles onto the guideway lanes.

c. Opportunities and Challenges

Opportunities

> Gates provide improved safety for the BRT and crossing vehicles.

> Gates improve compliance with turn restrictions.

> Gates allow for higher operating speeds along the BRT running way.

> The use of gates can reduce traffic signal delay at crossings due to the gate systems providing preemption, as opposed to priority handling for the BRT.

> Gates reduce illegal use of the BRT guideway for shortcutting the local streets or to use as a raceway.

> Gates provide a clear indication to drivers that the BRT is not to be entered.

Challenges

> Gates require maintenance to ensure proper operation.

> Signal timing will need to be designed to account for gate activity.

> Gates can introduce delays and lost time into each signal cycle, which can negatively impact BRT operations.

> Right-of-way may be required to install gates and may be a challenge in constrained areas.

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6 Pavement Sections

a. Description
b. Guidelines for Implementation
c. Opportunities and Challenges

a. Description

This section discusses pavement design for BRT projects. Many BRT project do not require new pavement design, but may be considered if roadway widening or rehabilitation is necessary.

b. Guidelines for Implementation

- BRT projects should consider the current in-place pavement along the proposed route as well as the future loads from BRT travel.
- An assessment of the current pavement condition along the route should be conducted with the local agency that operates the roadway. Particular attention should be given to the proposed location of the BRT lanes that will be placed on the existing roadway to determine if it will provide an adequately smooth surface for the BRT operation. Signs of pavement distress such as rutting, cracking, or potholes that may to be addressed prior to operation should be noted.
- During design, consideration should be given to the use of rigid (concrete) pavements in areas where buses will stop, or are likely to brake or begin acceleration due to the high stresses on the pavement due to bus action. Typical areas would be:
  - At and approaching station areas
  - At traffic signals or stop signs
    - 300 feet from the stop bar at major intersections
    - 200 feet from the stop bar at minor intersections
  - At any existing bus stops relocated due to the BRT design.
- Drainage issues should also be considered, both as it affects the longevity of the pavement life, and that the drainage should be designed to avoid large flows along the curb at stations to avoid splash conditions as the buses approach and leave the station.
- Exclusive busway pavement should be a different color than the cross street and adjoining pavements when possible. Generally, this pavement color difference can be accomplished by the busway being Portland cement concrete and the cross street being asphalt concrete. When both the busway and cross street are concrete or asphalt, a color difference can be accomplished by the use of colored concrete or asphalt for the busway, as accepted by Metro and the local jurisdiction.

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c. Opportunities and Challenges

Opportunities

> Pavement rehabilitation can increase safety and reduce the number of subsequent traffic disruptions to make spot improvements.

Challenges

> Concrete bus pads can significantly increase project costs.

> Riding on a poorly paved surface deteriorates the asset and may result in an uncomfortable ride for passengers.

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7 Street Signing and Striping

a. Description
b. Guidelines for Implementation
c. Opportunities and Challenges

a. Description

This section discusses pavement markings and signs to be used along a BRT running way.

b. Guidelines for Implementation

- After consultation with the appropriate local agency or Caltrans, street striping, markings and signage shall be designed to indicate BRT lane usage, turn restrictions, and others as needed for the operation of the BRT.
- Parking restrictions shall also be signed and/or marked with red curb where needed for turn lanes and for stations. All signs and pavement markings shall conform to the latest version of the California Manual of Uniform Traffic Control Devices (CA MUTCD).
- Temporary traffic control during construction in the City of Los Angeles shall conform to the Work Area Traffic Control Handbook (WATCH), and LADOT S-488.0 or site specific worksite traffic control plans as determined at the local agency.

c. Opportunities and Challenges

Opportunities

> Pavement markings and directional signage can help drivers to navigate streets with mixed- flow, semi-exclusive and exclusive BRT lanes.

Challenges

> Insufficient pavement markings and signage can make it unclear to drivers where they are permitted to travel or make turning movements.

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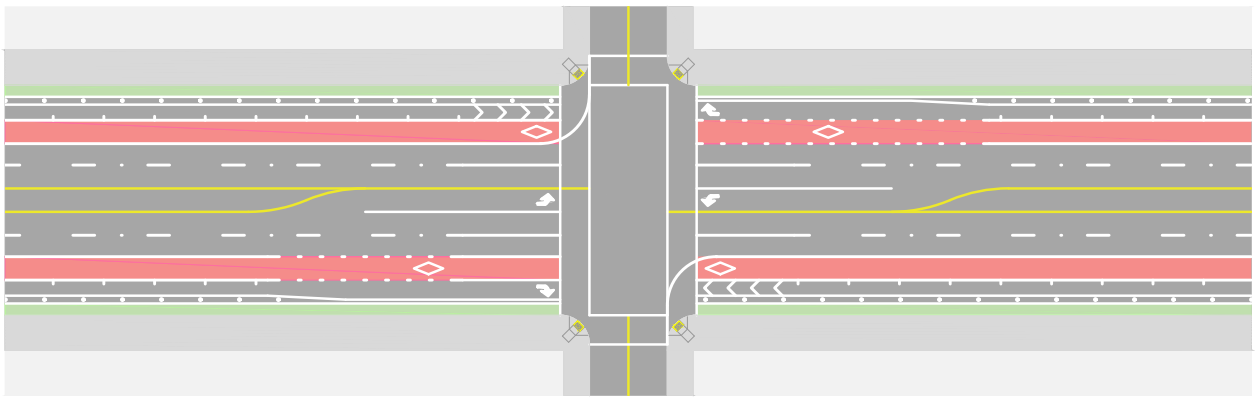

Figure 21. Side Running with Bike Lane

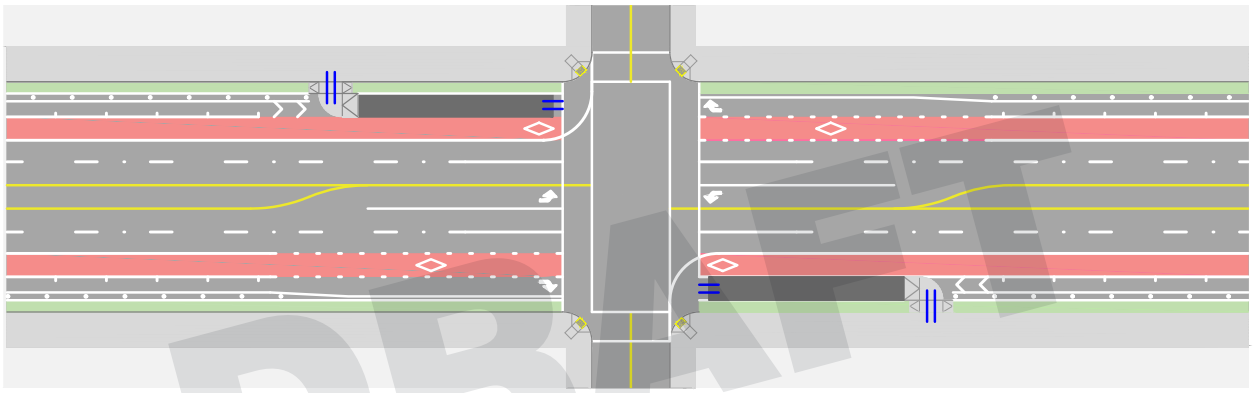

Figure 22. Side Running with Station and Bike Lane

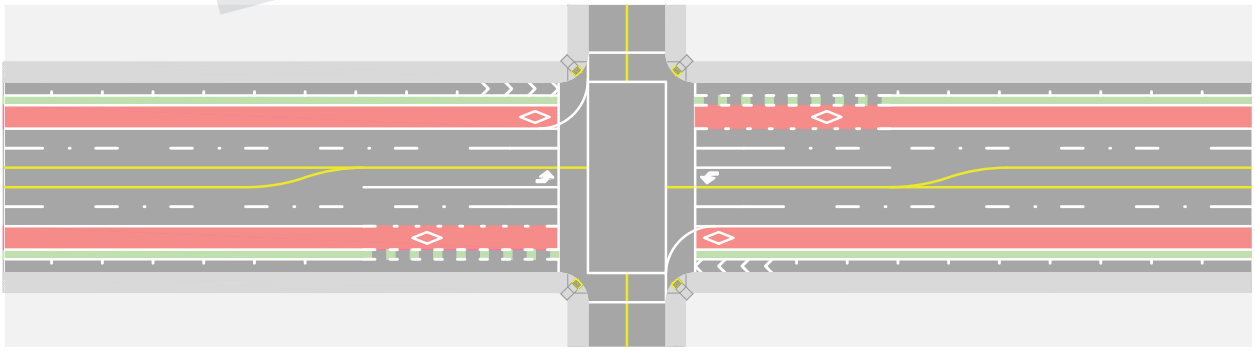

Figure 23. Side Running with Bike Lane – Constrained

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

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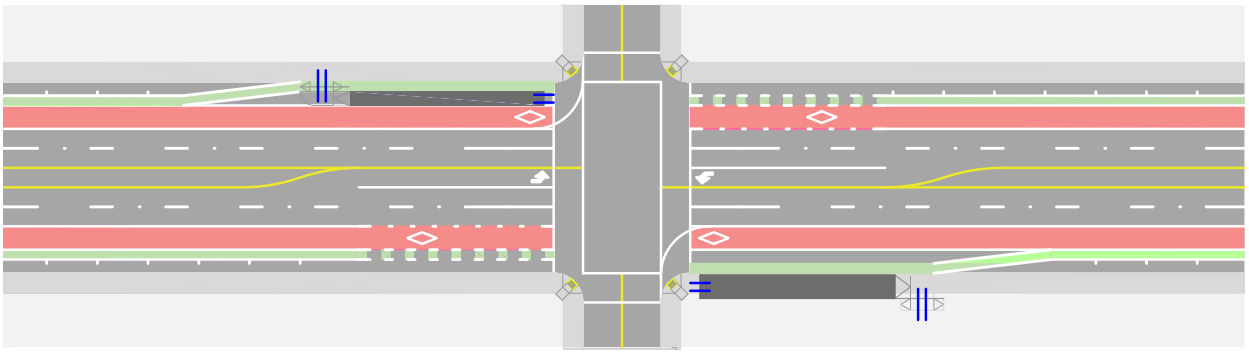

Figure 24. Side Running with Station and Bike Lane – Constrained

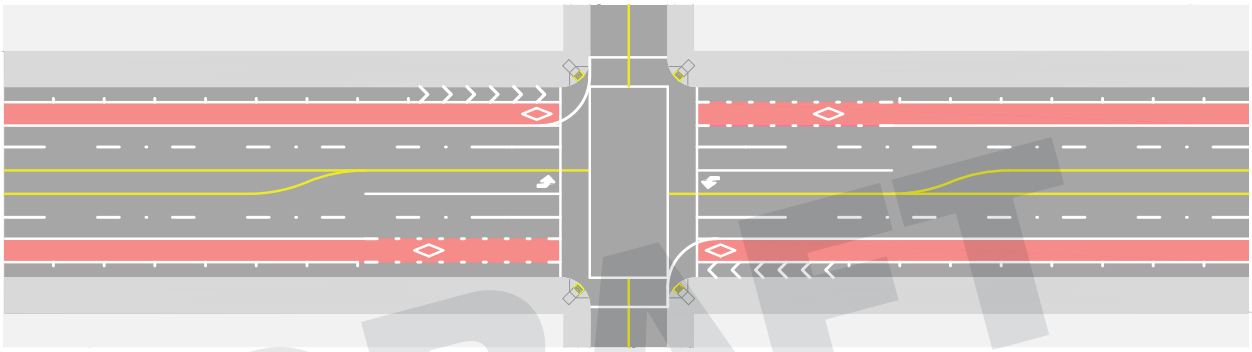

Figure 25. Side Running

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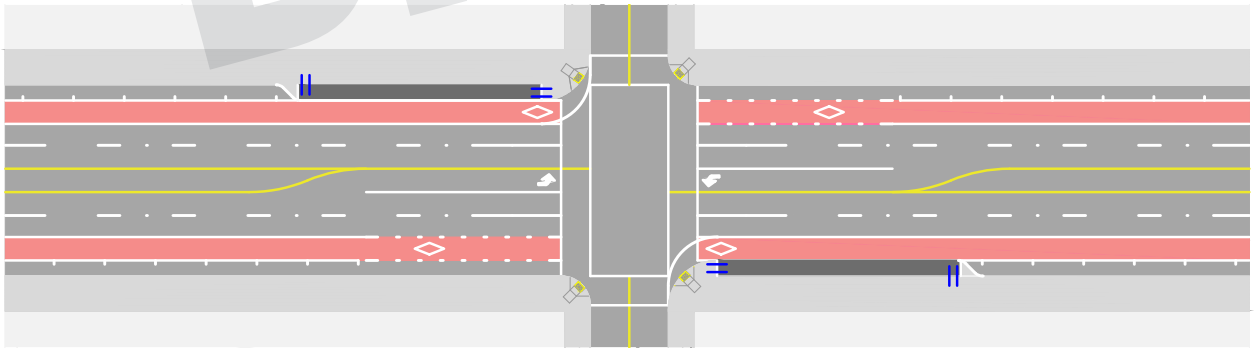

Figure 26. Side Running with Station

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

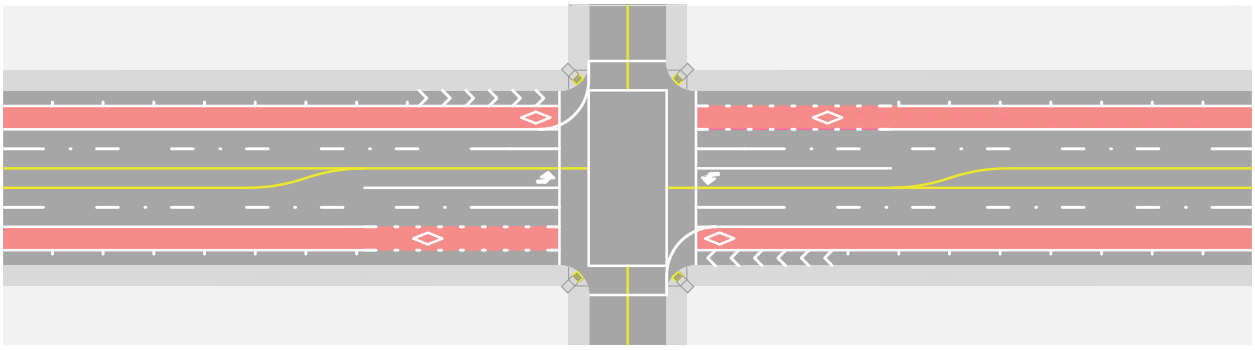

Figure 27. Side Running – Constrained

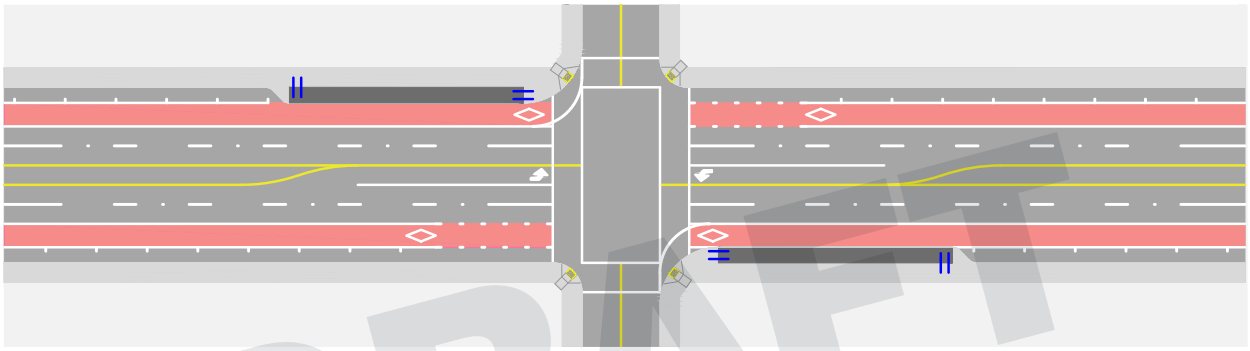

Figure 28. Side Running with Station – Constrained

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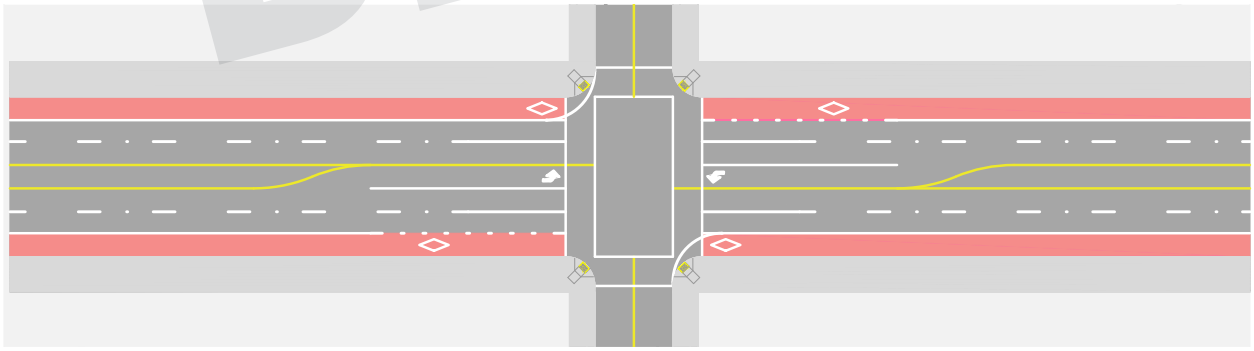

Figure 29. Curb Running

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

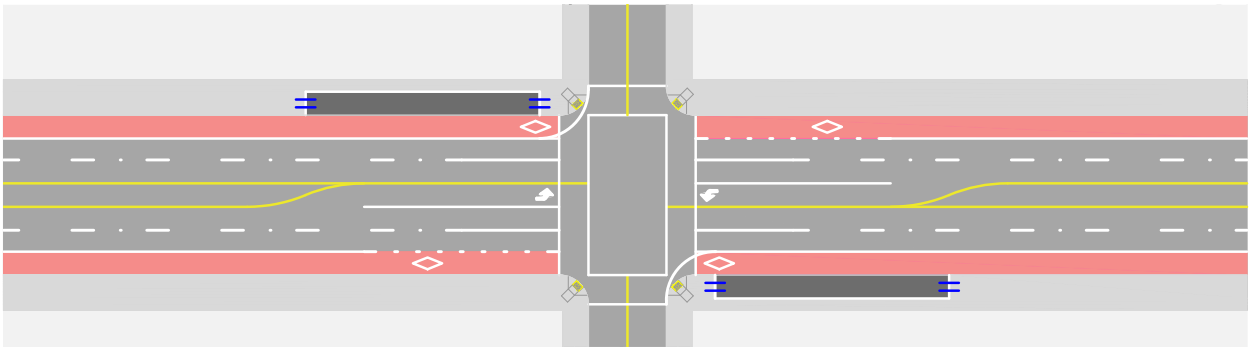

Figure 30. Curb Running with Station

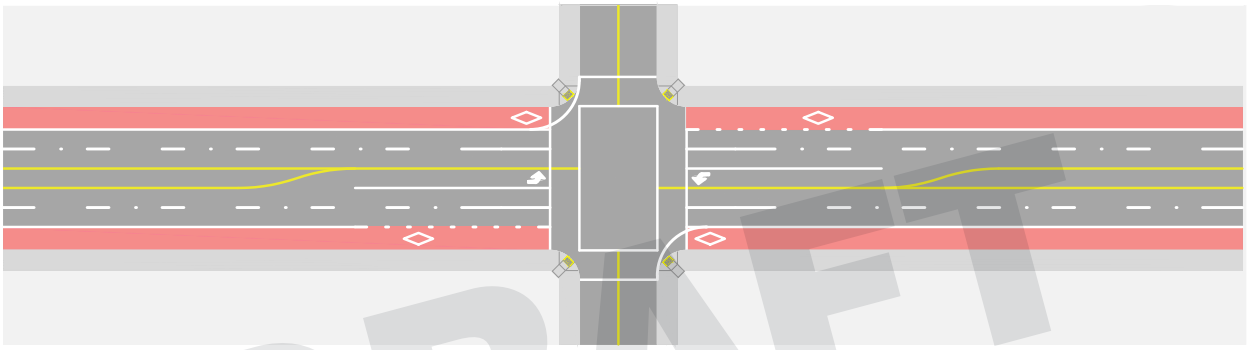

Figure 31. Curb Running – Constrained

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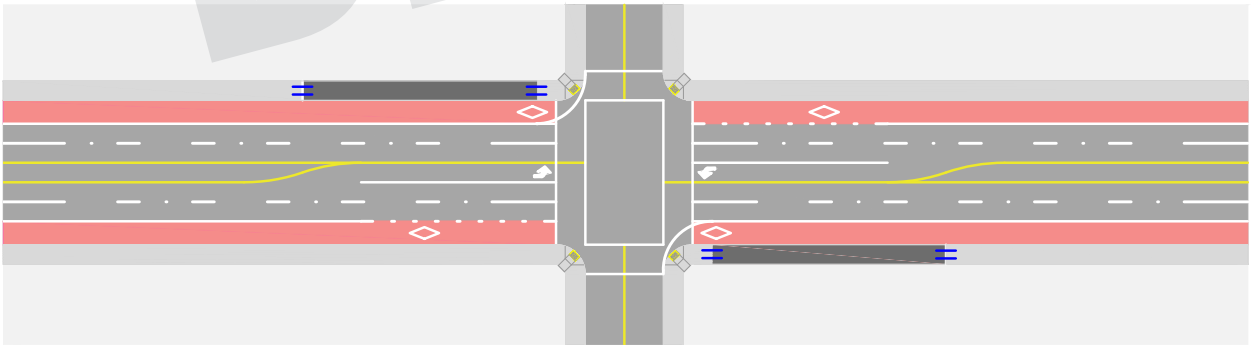

Figure 32. Curb Running with Station – Constrained

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section

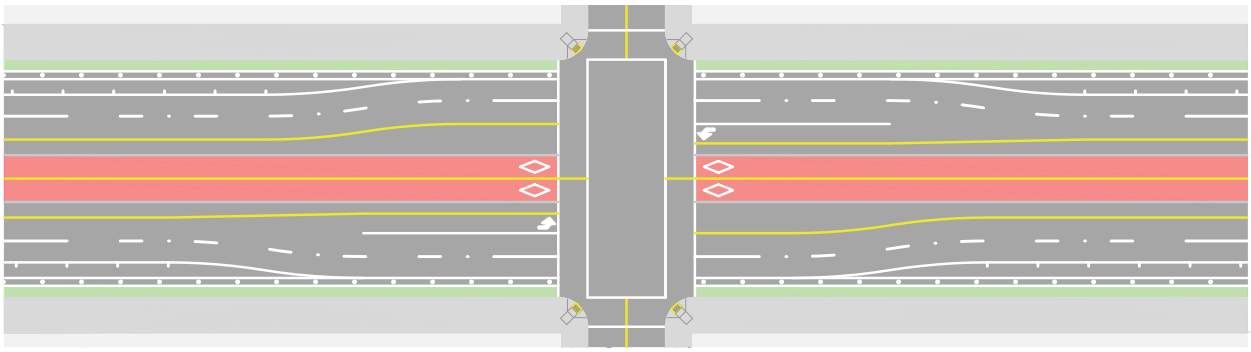

Figure 33. Center Running

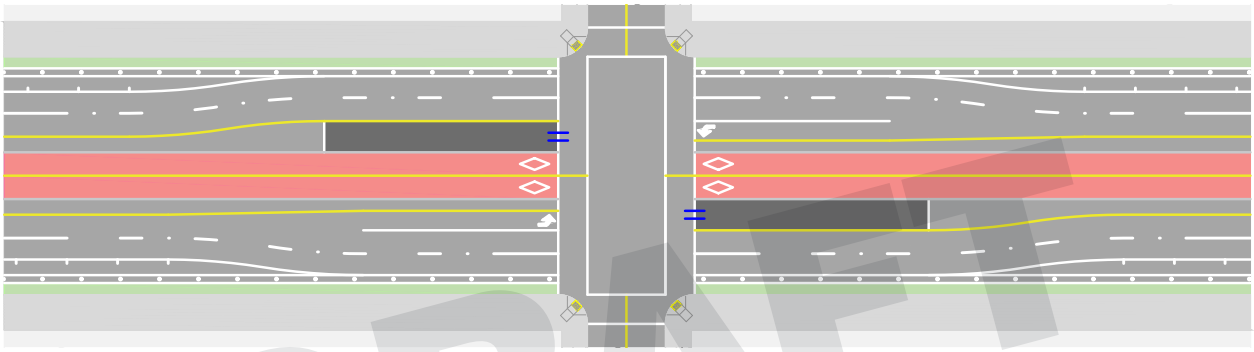

Figure 34. Center Running with Station

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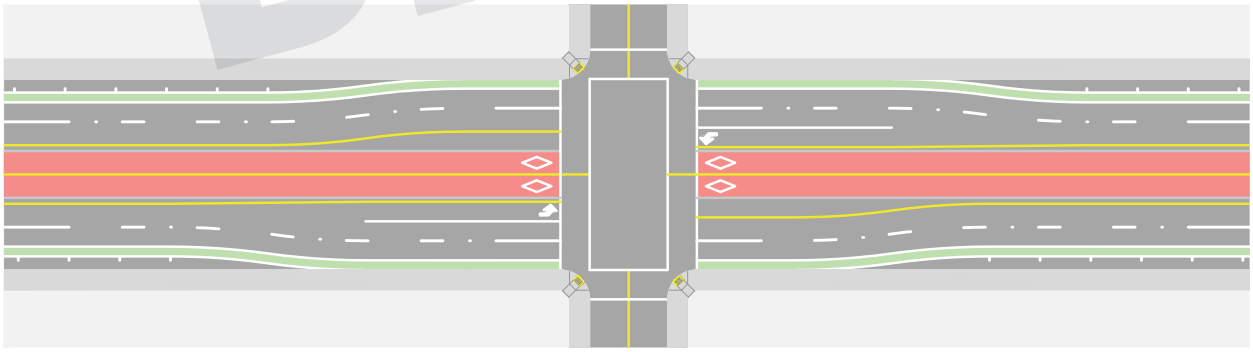

Figure 35. Center Running – Constrained

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

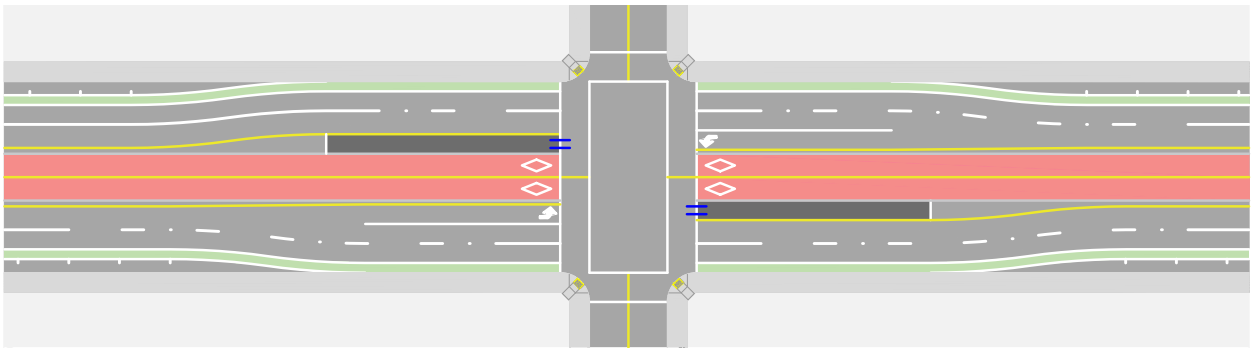

Figure 36. Center Running with Station – Constrained

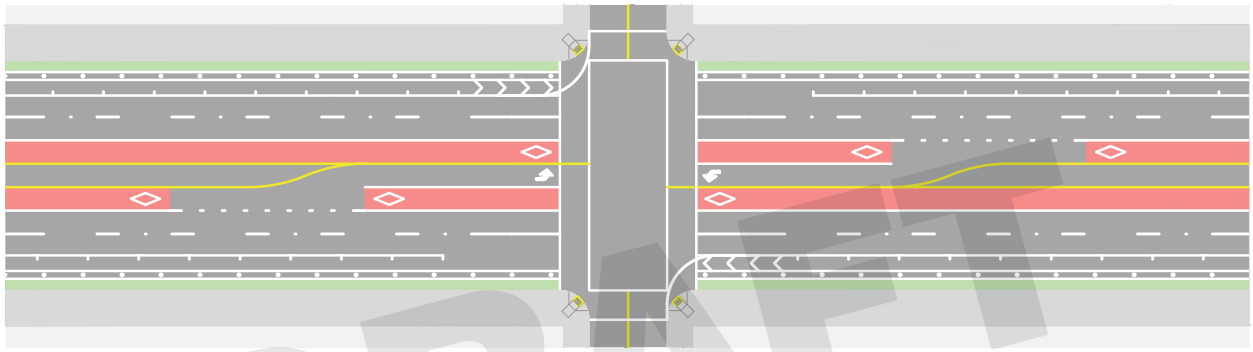

Figure 37. Median Running

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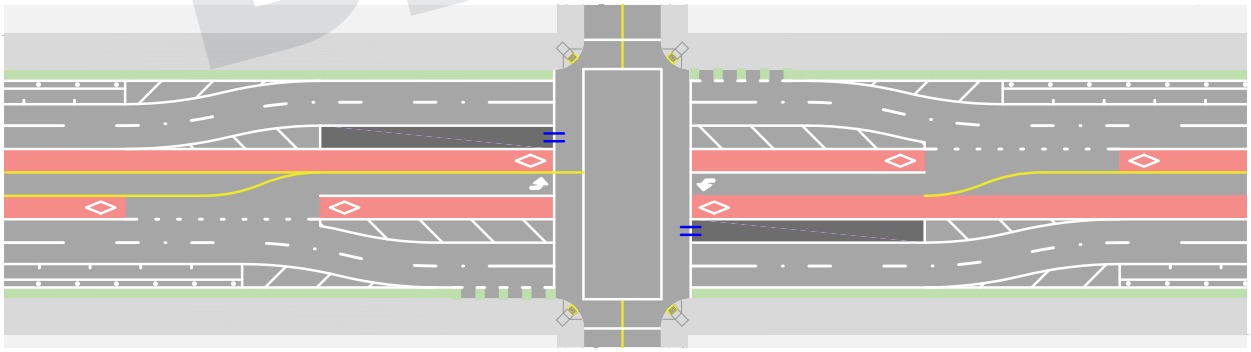

Figure 38. Median Running with Side/Side Staggered Station

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

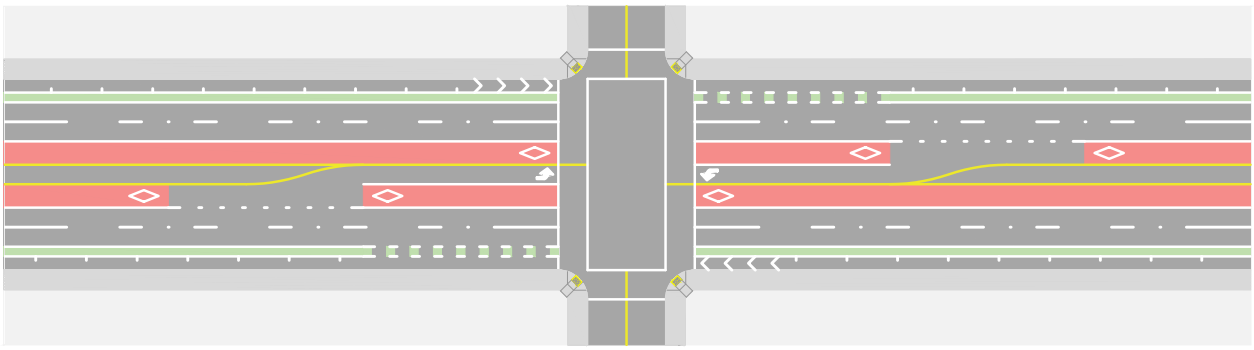

Figure 39. Median Running – Constrained

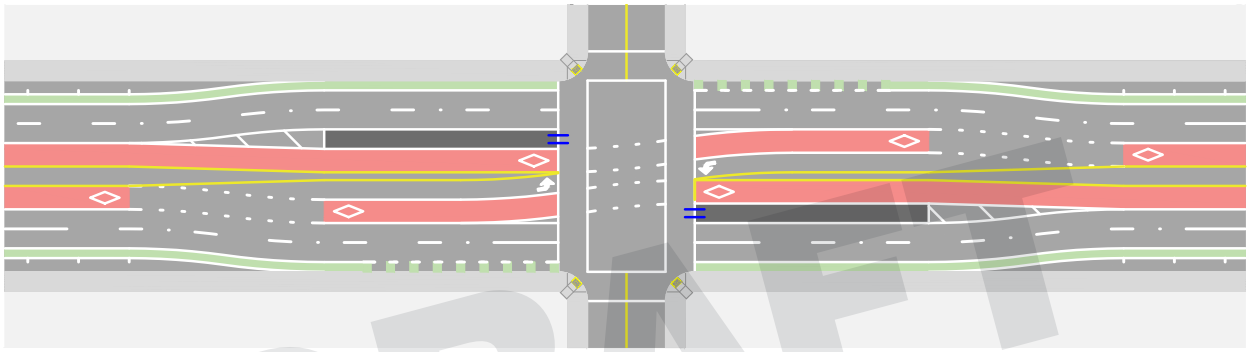

Figure 40. Median Running with Side/Side Staggered Station – Constrained

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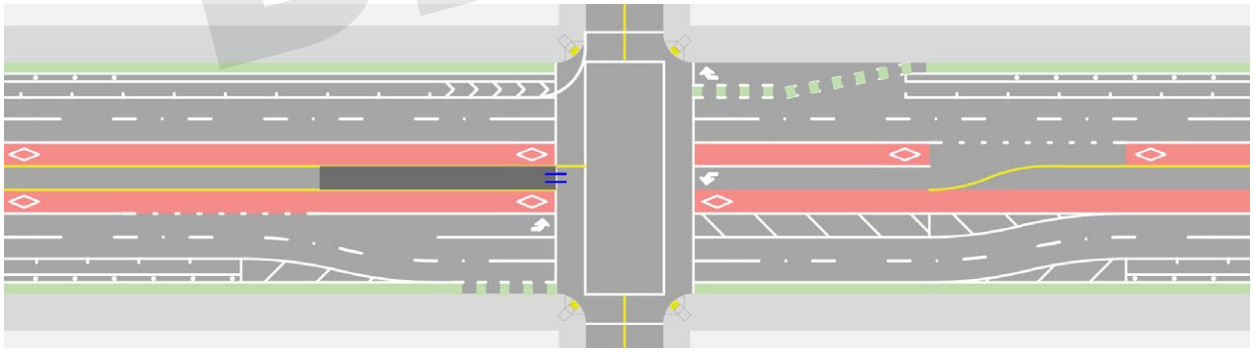

Figure 41. Median Running with Center Island Station

Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

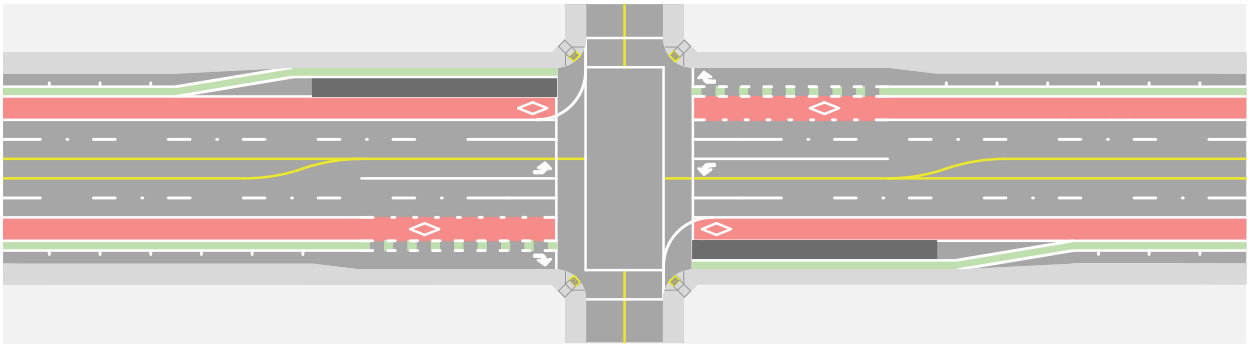

Figure 42. Right Turn Farside/General

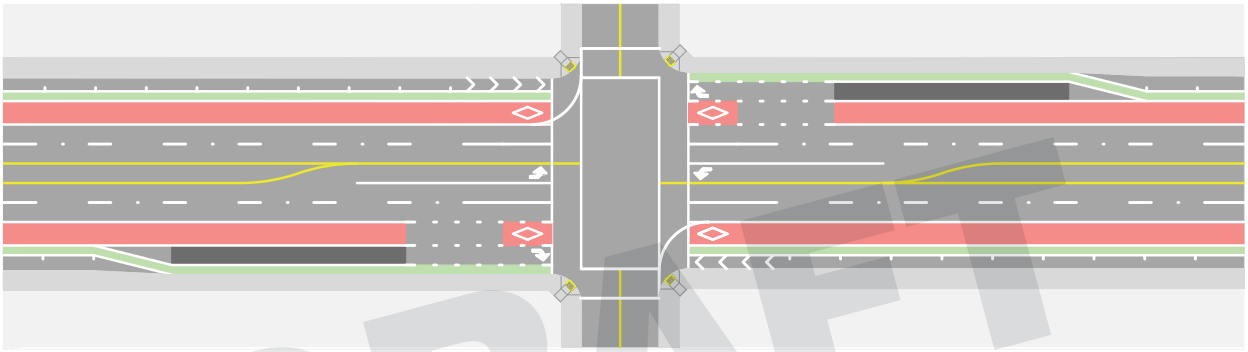

Figure 43. Right Turn Nearside

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Roadway
Station
BRT Lane
Bike Lane
Ped Access to Station

-Dimensions based on Cross Section
-The positions of the parking lane and the bike lane can be switched and should be decided on a case-by-case basis.

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8 Green Streets and Landscaping

a. Description
b. Guidelines for Implementation
c. Opportunities and Challenges

a. Description

This section discusses Green Streets and landscaping elements that should be considered when designing BRT projects, if feasible. Roadway drainage systems are designed to remove water from the surface of the road and convey it into a stormwater management system. Roadway surface runoff typically contains pollutants such as trace metals, tire particulates, and hydrocarbon products from pavement and fuels. Green street elements are designed to capture and treat rainwater where it falls, removing up to 90% of pollutants, instead of moving it through drains and pipes to discharge into surface waters, rivers or streams.

b. Guidelines for Implementation

- Green streets and functional landscaping are not a required component of BRT projects, but can provide environmental and aesthetic benefits and should be implemented wherever feasible.
- Coordinate with the appropriate local jurisdiction to see where green measures may be compatible with local plans and goals for an area or corridor.
- Potential Green Streets and landscaping elements include:
  - > Street trees
  - > Drought-tolerant landscapes
  - > Green Stormwater Infrastructure
    - Biofiltration systems
    - Porous pavement
    - Rain gardens
    - Bio-swales
  - > Low Impact Development (LID) techniques
    - Materials and construction techniques that minimize life-cycle costs, greenhouse gas emissions and waste byproducts.

Also refer to Chapter 7.2 BRT Station/Platform for additional guidance about landscaping at and around stations.

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c. Opportunities and Challenges

Opportunities

> Reduce peak surface runoff flows and reserve capacity in the stormwater conveyance system.

> Replenish groundwater supplies.

> Protect water quality by filtering pollutants.

> Increase the pedestrian environmental quality, aesthetics and livability of a community.

> Additional tree canopy coverage can supplement station shelters, offering transit patrons further shade protection from extreme heat.

Challenges

> Stormwater control measures located in the public right-of-way are subject to additional safety considerations and implementation constraints (tripping and falling hazards, etc.) compared to those located on private property.

> Landscaping plans should be reviewed to ensure tree trunks, limbs and shrubs do not interfere with vehicle driver sight distances.

> Turning radii may not be compatible with emergency response and fire access.

> Bioretention systems may require specialized maintenance.

> There may be conflicts with existing infrastructure or utilities.

Green Streets projects are consistent with Metro's sustainability goals and policies, and should be implemented where feasible within the BRT project footprint according to local jurisdictional requirements.

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9 Traffic Operations

a. Transit Signal Priority
b. Bus Lane Enforcement

a. Transit Signal Priority

Description

This section discusses traffic signal priority (TSP) for BRT operations. There are two basic forms of TSP for BRT operations: passive and active TSP. Also refer to Chapter 7.4 BRT ITS Systems for further guidance about transit lane enforcement.

Guidelines for Implementation

- Passive TSP times the traffic signals to favor the movement of the BRT, rather than other traffic. Other traffic is often also served well by timing the signals to provide preference to the BRT.
  - > This is done by timing the signal just past a station to turn green after the normal dwell time at the station.
  - > The following signals are then timed based on the normal BRT travel time between intersections until the BRT reaches the next station.
  - > The timing of the traffic signals is typically preset by time of day and day of week to adjust for typical station dwell times and traffic conditions along the route.
  - > Depending on the spacing of intersections, and speed of the BRT, it may be difficult to provide good green times for BRT's in both directions at once, in those cases, the higher occupancy direction for the BRT operation should be favored.
- Active TSP provides adjustments to the traffic signal timing to either hold a green light until the BRT passes the signal, or to reduce the side street and left turn green lights to allow the BRT to get an early green. This function works best when the traffic signal are given as much time as possible to adjust the signal timing. This can be done through the use of central control systems, such as the City of LA's "ATSAC" system, or through use of peer to peer communications with Advanced Traffic Controllers.
- Active TSP, when used in conjunction with passive TSP provides the best result because with the signals already timed to provide green signals to the BRT, and thus the active adjustments are smaller and easier to achieve. This allows the BRT to get back into the timed passive TSP timing flow, and has lesser effects on the other traffic and pedestrians.

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- Another approach to providing priority is to use the signal systems preemption functions of the traffic signal controller to either hold the BRT phase green signal, or to make the BRT phase the next phase served upon a request.
  - > The main issue with this system is that in the case of BRT's arriving just a few minutes apart, and from both directions, the side street traffic may be skipped, and pedestrians not served for over 5 minutes or more longer, which would lead to the assumption that the signal is malfunctioning, and pedestrian as well as vehicles violating the signal indications. This may be considered if a time between preemption feature is activated to avoid these long delays.

Opportunities and Challenges

Opportunities

> TSP can reduce route travel time for BRT.

> TSP can be achieved without significant impacts to general traffic in some cases.

Challenges

> Active TSP may result in cycles where the side street signal is skipped, and pedestrians could wait over 5 minutes or longer for a walk sign. These scenarios could lead to drivers or pedestrians violating the signal indications.

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b. Bus Lane Enforcement

Description

This section discusses bus lane enforcement, which includes measures to keep the bus only lane clear of parked or moving vehicles that are not permitted to share the lane. Enforcement can be challenging for a number of reasons. It can be difficult to identify vehicles that are using the bus lane inappropriately, since vehicles may be permitted to enter the lane for brief periods to access driveways, parking lanes, or to make right turns. Enforcement also requires cooperation between the local law enforcement agencies and the BRT operator. It will be essential to partner with the local jurisdiction regarding enforcement, and to ensure that the system is designed to compliment the available resources and priorities of local law enforcement.

Guidelines for Implementation

- It is important that the BRT operator makes enforcement as easy as possible through design and coordination.
- Design features include providing clearly marked running ways using standard signs and markings and that are understandable by the public. This will ensure that the citations issued are upheld in court.
- It may also be necessary to update the municipal code by ordinance to make certain regulations are enforceable.
- A design feature that aids enforcement is to provide a pull-out area along the guideway for offenders to be cited.

Opportunities and Challenges

Opportunities

> Clearly marked BRT exclusive lanes are easier to enforce and the citations are more likely to be held up in court.

> Providing space within a BRT to pull offenders over and issue citations can aid enforcement.

Challenges

> Enforcement of BRT exclusive lanes or guideway may be challenging if officer resources are limited or not prioritized.

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10 Utility Considerations

a. Description
b. Guidelines for Implementation
c. Opportunities and Challenges

a. Description

This section discusses utility interactions with BRT running ways.

b. Guidelines for Implementation

- During preliminary design of BRT routes, it is important to research and observe the location of utilities, with the aim of avoiding relocation as much as is feasible.
- Utilities typically run longitudinally along streets, which may create an impediment to the placement of stations or island in the roadway due to the need to be able to maintain and replace these longitudinal utility lines.
- Designs may require the relocation of these utilities, which may significantly affect the cost for construction of the BRT facility.
- Attention to the location of service access opening ("manholes") will avoid problems later in the need to adjust designs or the utilities, especially where islands will bisect the existing access point.
- All maintenance, support, relocation, restoration, construction or other utility work shall conform to the current design standards, criteria, specifications and practices of the agencies/owners having jurisdiction.
- Utilities to be relocated and/or protected shall be placed in locations according to policies, standards and requirements of the local agency.

c. Opportunities and Challenges

Opportunities

> Avoiding access openings ("manholes") when designing medians and curb extensions can prevent the need to redesign BRT elements or relocate utilities.

Challenges

> Existing utilities may restrict options for running way or station locations, if utility relocation is prohibitively expensive.

> Utility relocation can affect the critical path for project implementation.

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11 Betterments

a. Aesthetic
b. Functional/Operational
c. Sustainability

a. Aesthetic

Description

This section discusses aesthetic betterments for BRT systems, which can include design, art and architecture. Betterments are not part of the BRT project unless paid for by a third party. Betterments may be developed in partnership with the local city, and may be implemented if funding is available. Aesthetic betterments can increase the perceived quality for transit riders and the community, which can lead to additional benefits related to user behavior and ridership. Also refer to the Branding chapter for further guidance on branding and design.

Guidelines for Implementation

- Aesthetic betterments, by definition, are optional and not required for safety or basic operations.
- Aesthetic betterments should be developed in partnership with the local city.
- Aesthetic betterments should be coordinated with the built environment and the community.
- Art is commonly integrated into transit stations to provide a sense of place, to create quality spaces, and to influence how people perceive and connect with the system.
- Public art should provide clear sight lines between waiting transit passengers and transit vehicles.
- Public art installations should not create areas of concealment
- It may be appropriate for some betterments to be implemented by the local city.

Refer to Chapter 7.2, Section 10 for additional guidance on public art. Also refer to Station chapter for further guidance about art at stations.

Opportunities and Challenges

Opportunities

> Aesthetic betterments can clearly differentiate BRT from standard bus service, and contribute to the branding of the BRT system.

> Aesthetic betterments can increase customer loyalty, employee satisfaction and retention, and brand value.

> An attractive and compelling BRT system can help attract new economic development.

> An aesthetically pleasing BRT system may be better received by local residents and business owners.

Challenges

> Funding may not be available for initial capital costs and/or maintenance of aesthetic betterments.

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b. Functional/Operational

Description

This section discusses functional and operational betterments for BRT systems. BRT covers a broad range of design options and can resemble standard bus service or light rail transit, and everything in between. Functional and operational betterments include any measures that reduce trip travel time, by removing friction during boardings and alightings or removing conflicts with vehicles and pedestrians between stations. Betterments can include technical enhancements to fare collection systems, control center management, upgrades to the computer aided dispatch and automated vehicle location (CAD/AVL) system, or signal timing, for example. It can also include physical improvements such as fare paid zones, dedicated lanes, exclusive guideways, Class I bike paths, or grade separated crossings. Betterments should be developed in partnership with the local city, and may be implemented if funding is available. Also refer to System chapter for further guidance on technology components that can support operational betterments of BRT services.

Guidelines for Implementation

- Functional/operational betterments, by definition, are optional and not required for safety or basic operations.
- The feasibility of functional/operational betterments will depend on the existing right of way, existing utilities, existing driveway locations, and potential impacts to traffic and parking.

Opportunities and Challenges

Opportunities

> Functional and operational betterments improve the efficiency of the BRT system.

> Functional and operational betterments may enhance the user experience on the system.

> Functional and operational betterments may have compounding benefits, such as increased safety, reduced total vehicle miles traveled, reduced emissions and reduced noise.

Challenges

> Funding may not be available for initial capital costs and/or maintenance of functional/operational betterments.

> Functional/operational improvements may require the removal of existing public features such as on-street parking, driveways, or sidewalk space.

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c. Sustainability

Description

This section discusses sustainability betterments for BRT systems. In the context of BRT, sustainability refers to avoidance of the depletion of natural resources. Sustainability betterments can include the use of recycled materials during construction, reducing the amount of water and disposable items used by the system, reducing the urban heat island effect, low impact development, Green Streets elements, and enhancements to pedestrian and bicycle infrastructure. Betterments should be developed in partnership with the local city, and may be implemented if funding is available.

If pavement modifications are required as part of the BRT project, the use of cool pavement should be considered. The Green New Deal for Los Angeles includes reducing the urban/rural temperature differential by at least 3 degrees by 2035. Improvements such as planting of shade trees, installing new landscaped parkways, stormwater capture, shade structures and cool pavement can help to achieve this goal.

See Chapter 7.2 BRT Station/Platform for additional guidance on sustainable measures that can be implemented in station areas.

Guidelines for Implementation

- Sustainability betterments, by definition, are optional and not required for safety or basic operations.
- Sustainability betterments should be developed in partnership with the local city, and be consistent with local and regional standards and goals.
- It may be more appropriate for some sustainability betterments to be implemented and maintained by the local jurisdiction.

Opportunities and Challenges

Opportunities

> BRT sustainability betterments may provide an opportunity for cities to meet established sustainability goals and help reduce the urban heat island effect.

> Sustainability betterments typically provide cost savings over the long term.

Challenges

> Funding may not be available for initial capital costs and/or maintenance of sustainability betterments.

> Sustainability betterments may involve emerging micromobility options, and include an element of risk.

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4
BRT ITS Systems

Technologies and data play an increasing role in defining how, when, and why we interact with mobility options. The ITS design guidelines in this section discuss a wide range of technologies and systems that can be deployed for BRT. Some guidelines refer to traditional ITS elements that are already widely deployed and used for BRT, and others look at more emerging elements that are in planning, pilot, or initial deployment phases. ITS elements are grouped and discussed in this section following the categories below. Required elements must be deployed with a BRT system, while optional may be applied depending on the specific characteristics or needs of the BRT system under consideration. Some elements in this section are listed as optional but strongly encouraged and should be deployed if feasible.

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1 General

REQUIRED

2R Roadside Elements

3R Stations

4R Vehicles

5R Control Center, Operations & Data

OPTIONAL

2O Roadside Elements

3O Stations

4O Vehicles

5O Control Center, Operations & Data

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DRAFT

1 General

a. Metro Standards
b. Roadside Elements
c. Stations
d. Vehicles
e. Control Center, Operations & Data

a. Metro Standards

Technologies and data play an increasing role in defining how, when, and why we interact with mobility options. For purposes of these guidelines, the collection of technologies and information systems are described as Intelligent Transportation Systems (ITS) elements. From the perspective of BRT, ITS supports all aspects of a transit trip from planning the trip in the first place, receiving timely and accurate information on the status of the bus system, promoting the progression of the bus in dedicated and shared rights-of-way, enhancing safety, and improving operational efficiency and performance monitoring. An effective BRT system will draw extensively from ITS to provide a distinctive and more convenient transit option when compared with regular fixed route service. In order to accomplish this, BRT systems need to leverage existing technologies deployed for the broader operating fleet, deploy new technologies that enhance customer perception and usefulness, as well as make extensive use of both existing and new technologies to operate more effectively. The ITS design guidelines in this section discuss a wide range of technologies and systems that can be deployed for BRT. Some guidelines refer to traditional ITS elements that are already widely deployed and used for BRT, and others look at more emerging elements that are in planning, pilot, or initial deployment phases.

Table 1 provides a summary of required and optional BRT elements. This table can be used as a shortcut to reference the more detailed guidelines sections. Users of this document not familiar with ITS applications for transit and BRT are recommended to review the general overview section first before proceeding to the more detailed descriptions.

Within Table 1, each element or related functionality is listed in rows and grouped under whether the element is: (a) focused on improving operations, travel times, and reliability; or (b) focused on improving customer information and experience for BRT. For each area a reference is provided for more detailed descriptions that can be reviewed. Each referenced description describes the element, prerequisites, roles and responsibilities, related BRT standards, and basic requirements. For some elements, references and required/optional status may be listed under one or more groupings to the right:

> Roadside/Station – Notes if the element has required or optional components that would be placed at a roadside (e.g. signalized intersection or along a guideway) or at a station.

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> Vehicle – Indicates if the element has key functions or components located on the BRT vehicle.

> Central System – Applies if the element contains functions within the control center, operations, data analytics or non-station specific customer information areas.

Technology Functions Areas of Improvement	Section	Roadside / Station	Vehicles	Central System
IMPROVED OPERATIONS TRAVEL TIMES & RELIABILITY				
Transit Signal Priority (Bus Signal Priority)	2-R a)	■	■	□
CAD-AVL & Vehicle Tracking	4-R a) & 5-R a)		■	■
Fare Payment & Validation	4- R b) & 3-O a)	□	■	■
Schedule & Headways Management & Active Headway Management	4-R c) & 5-R b)		■	■
Voice & Data Communications	4-R d) & 5-R c)		■	■
Passenger Counters	4-R e)		■	
Business Intelligence & Performance Metrics	5-R f)			■
Guideway Control & Management	2-O b)	□	□	□
Access Control	2-O c)	□		
Ramp Meter Interrupt	2-O d)	□		
Transit Lane Enforcement	2-O a)		■	■
Connected Bus	2-O e) & 4-O a)	□	□	
Autonomous Vehicle Control/Driver Assist Systems	4-O b)		■	
Vehicle Health	4-O c)		■	■
Video Live Look-In	5-O a)		■	
Yard Management	5-O c)		■	■
IMPROVED CUSTOMER INFORMATION & EXPERIENCE				
Security Elements	3-R a)	■		
Real-Time Customer & Wayfinding Information & Customer Information	3-R b) & 5-R e)	■		■
Help Points	3-R c)	■		
On-Board WiFi	4-O d)		■	
Arrival Prediction	5-R d)		■	■
Active Lighting Control	3-O b)	□		
Customer WiFi & Charging	3-O c)	□		
Technology Support Elements	3-O d)	□		
Digital Advertising	3-O e)	□		
Supporting Mobility as a Service	5-O b)	□		■

■ **Required** ■ **Optional but Strongly Encouraged** □ **Optional**

Table 1. Summary of Required & Optional BRT ITS Elements

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For some elements, it may be necessary to look-up references under separate categories based on interest. For example, some elements include vehicle and central system elements, and while there is some overlap in the individual descriptions, they consider the particular focus on the vehicle versus central systems. Sometimes the method of implementation may dictate whether or not an element has been indicated as optional or required. For example, Transit Signal Priority must include functions and components for the roadside and the vehicle, but it may also utilize a central system functionality to enhance capabilities. These details are discussed under the individual descriptions. Some elements are listed as options as they only apply when the physical infrastructure and BRT characteristics dictate it. For example, ramp meter interrupt is only applicable when the BRT will either use bypass lanes on freeway ramps or run in the outside shoulder/transit lane under certain operating conditions.

In some cases, the BRT ITS elements required have already been deployed for the broader transit bus fleet(s). However, BRT may recommend some additional or enhanced functions within those areas, so even areas where the agency has deployed systems should be reviewed.

It is crucial that ITS elements be integrated with the broader BRT concept including station design, runningways, and operational concepts in order to be fully effective. Figure 1 provides a high-level system architecture of the ITS elements that relate to BRT development and on-going operations. The full range of ITS design guidelines is discussed on the following pages based on the general area in which it is applied. For ITS elements, there is no distinction between full and lite BRT development levels as the development levels generally apply to both. A full BRT may make broader use of the same concepts and technologies, but this is independent of whether they are required or optional by the standards.

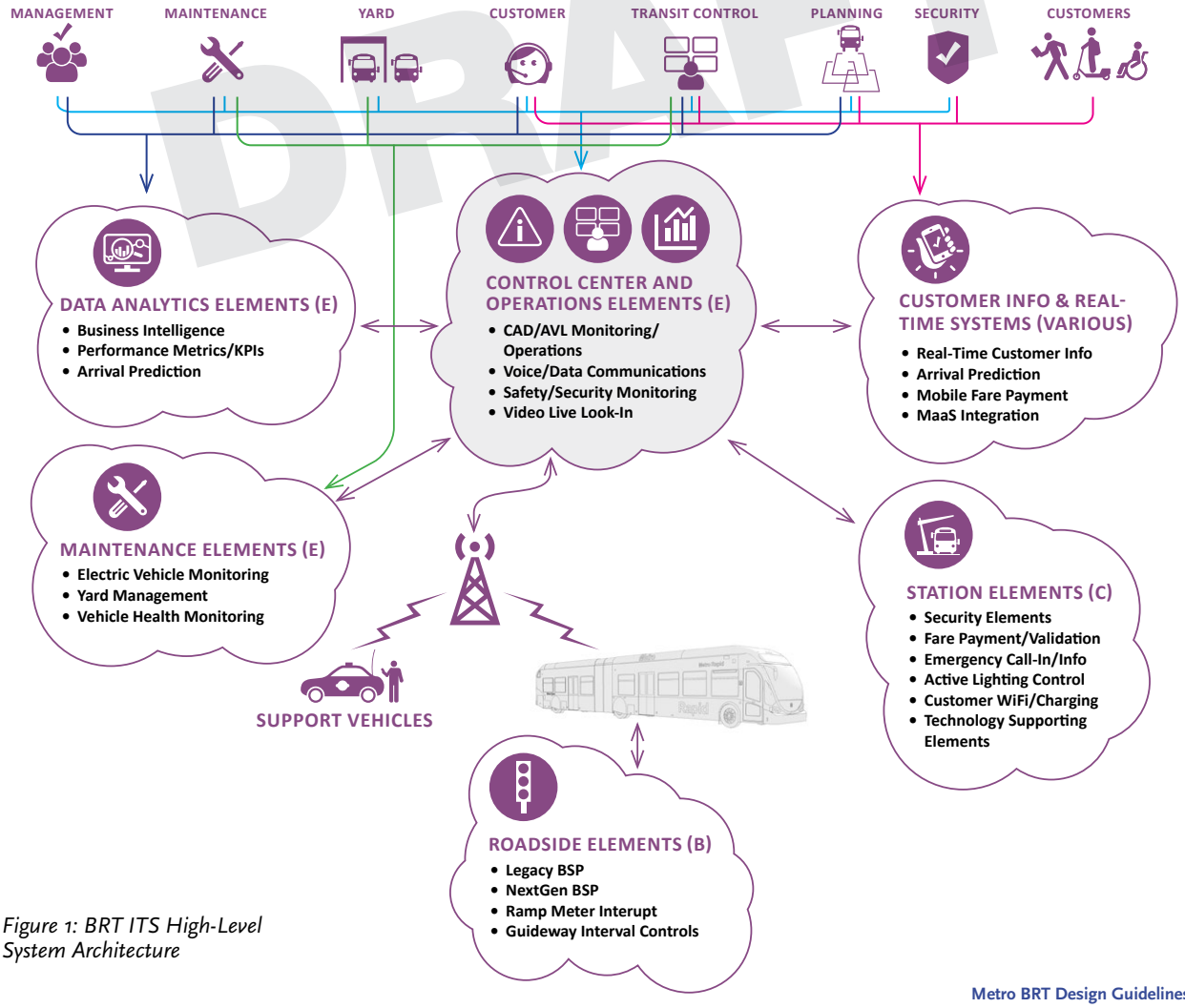

Figure 1: BRT ITS High-Level System Architecture

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b. Roadside Elements

These ITS elements are used to enhance BRT operations and safety in mixed flow, freeways/ expressways, and dedicated runningways. These technologies allow BRT vehicles to communicate and integrate with roadway facilities across a broad range of functional areas.

- *Transit Signal Priority (TSP):* Also referred to as Bus Signal Priority (BSP) - Allows communications between BRT vehicles and traffic signals along the route to allow priority for transit vehicles over other non-emergency vehicular traffic.
- *Guideway Control & Management:* Provides operational guidance, restrictions and guideway flow management to runningways based on type of vehicle, time of day, priority rating, etc.
- *Access Control:* Process during which a transit vehicle gets granted access to a runningway, a transit lane, transit center, shared streets, or other specialized facility.
- *Ramp Meter Interrupt:* Similar to TSP but places a temporary hold on ramp meter lanes in order to allow priority access to transit vehicles either entering via an HOV/transit ramp lane or using an outside shoulder/ transit only lane.
- *Transit Lane Enforcement:* A combination of technology and in person monitoring processes that aim to ensure priority lanes are not being used or occupied by non-priority vehicles.
- *Connected Bus:* The ability of a vehicle to communicate and share information with surrounding roadway infrastructure and technologies using Connected Vehicle standards and protocols.

c. Stations

These ITS elements are deployed to support customers accessing station locations by enhancing available information, safety, and improving overall comfort and customer perceptions. BRT stations should utilize technologies and information that is integrated with the design and layout of stations to provide an enhanced experience beyond that of a typical bus stop. Figure 2 provides a high-level systems architecture and typical layout of ITS station elements and functions.

- *Security Elements:* A set of technology features and functions (such as video surveillance systems, video analytics, emergency blue light phones, smartphone security applications, etc.) that help enhance customer and operator safety, as well as the perception of safety.
- *Real-time Customer and Wayfinding Information:* The ability to provide instantaneous information to customers about schedule, service disruption, next bus arrival prediction, cost, etc. through on-site electronic signage of various types and supporting customer smartphone applications.
- *Active Lighting Control:* System that allows for various advanced lighting management and control, including adjusting lighting based on conditions and time of day, increasing lighting intensity and coverage when security concerns are present, actively changing lighting colors or activation sequences in emergency situations or to provide customer information (e.g. next bus is arriving).
- *Customer WiFi:* Amenity that allows transit customers to connect to the Internet with their mobile devices free of charge.
- *Technology Support Elements:* Allowances within the station design and equipment spaces to support emerging and future technology needs that enhance customer experience or provide for separate revenue generating opportunities (e.g. space for 5G microcell sites, USB power chargers, additional City or agency IT infrastructure, etc.).
- *Digital Advertising:* Multimedia advertising displays set up at transit stations to promote transit services and/or commercial ads.

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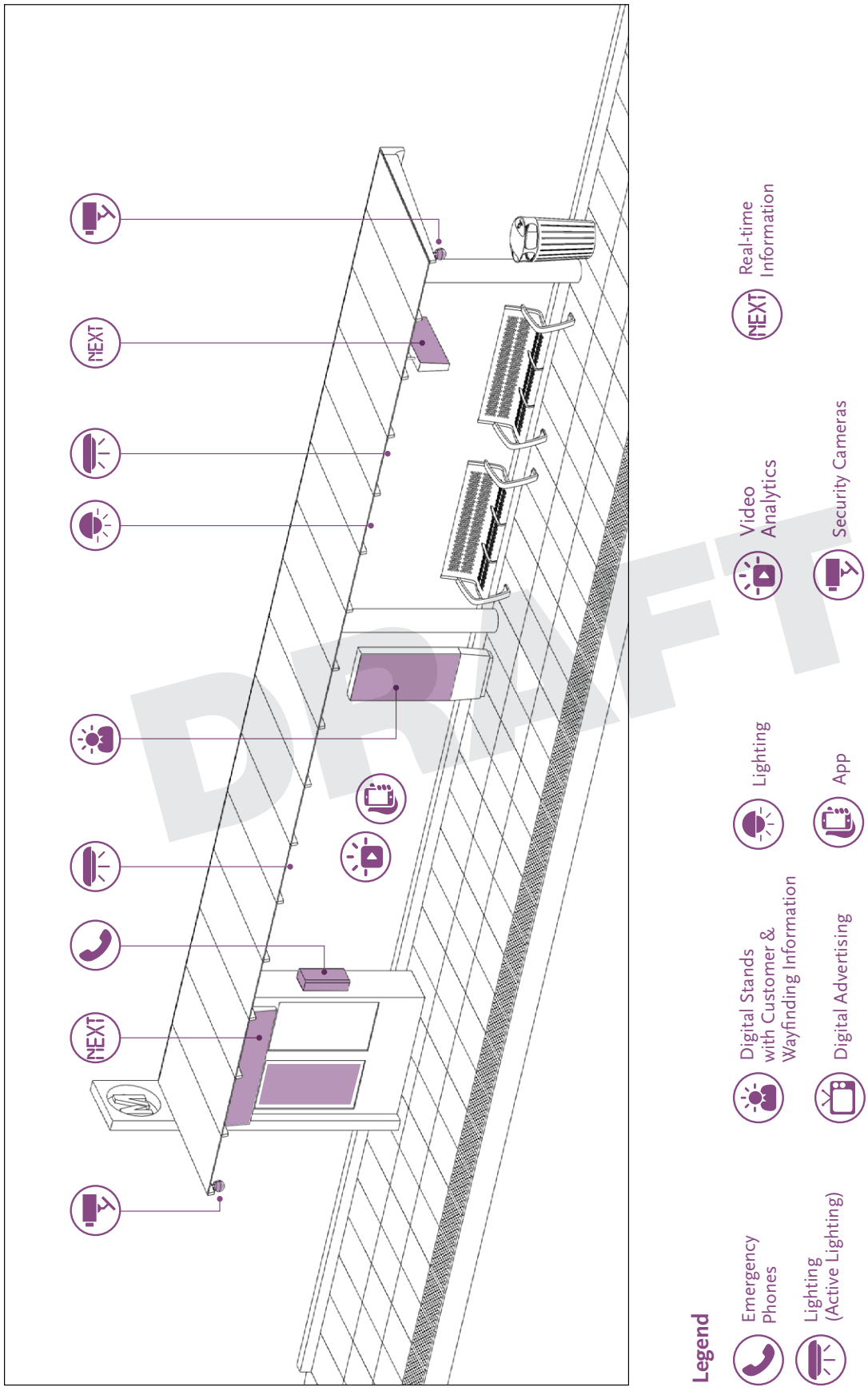

Figure 2: BRT ITS Architecture Overiview and Example Layout

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d. Vehicles

BRT vehicles need to be able to both leverage fleetwide technologies deployed across an agency, as well as support the unique needs of BRT operations. Figure 3 provides a functional overview of various ITS elements that may be supported on a BRT vehicle. It should be noted that most ITS elements and functions must exist on the vehicle and as part of central operations in order to be effective. Some elements may appear as central, vehicle, and/or station-related elements.

> *On-Board Architecture:* Includes on-board systems architecture for the specific devices, programs, and parameters used in transit vehicles support operations, customer information, safety, Bus Signal Priority (BSP), and related needs.

> *Vehicle Tracking:* Functions that allow operators and customers to know where a transit vehicle is located.

> *Fare Payment & Validation:* In-vehicle system that collects fares and/or validate tickets. Includes the location of these devices, and the type of payment that can be processed.

> *Schedule & Headways Management:* Technologies and processes that tracks how transit vehicles arrive at stations on schedule and within target headway ranges, including feedback to operators on their current status relative to schedules or headway.

> *Voice & Data Communications:* On-board components of systems and technologies that support the quick and effective transfer of audio, video and data information between vehicles, operations centers, and customers.

> *Connected Bus:* The ability of a vehicle to communicate and share information with surrounding vehicles, infrastructure, and riders using Connected Vehicle standards and protocols.

> *Autonomous Vehicle Control/Driver-assist Systems:* Programs that assist drivers by supporting some vehicle control functions and providing supplemental warnings about surrounding traffic and safety concerns.

> *Vehicle Health:* Onboard feedback system that informs operations of vehicle status, health, and maintenance needs. This includes electric vehicle health and charge status monitoring.

> *Passenger Counters:* Devices that allow to compile ridership information, and particularly how many board or leave a vehicle at a given station.

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Figure 3: BRT ITS Vehicle Elements and Functions Overview

Note: There is no distinction for ITS functions between Full BRT and BRT Lite.

> *Bus Signal Priority (BSP):* Functions that support intersection signal priority for transit.

e. Control Center, Operations and Data

Like all fleet operations, BRT operations should be supported by effective dispatching, operations and control, and event/emergency response services. These are coordinated out of command and control center often known as the OCC (Operations and Communications Center) or BOC (Bus Operations Center). BRT services should receive a higher level of overall monitoring and supervision than typical fixed route bus services to accommodate higher performance expectations and recover more quickly from service interruptions.

> *CAD/AVL:* Fleet management and tracking system that allows operators to monitor a vehicle's whereabouts and to properly take action in case of service interruption, delaying event or acute demand.

> *Active Headway Management:* Processes that ensure service reliability and equal frequency of service along a route via diverse interventions limiting or increasing access to particular running ways in order to slow down or speed up travel flows.

> *Voice & Data Communications:* The center based component of voice and data communications to support BRT operations; usually including communications between operators, dispatchers, maintenance, field supervisors, and sometimes security personnel or emergency services.

> *Video Live Look-In:* Technologies and systems that allow direct streaming of video and audio content from transit stations and vehicles to an operations or security center.

BRT operations have many data analytics needs in common with typical fixed route services, but there are also unique needs based on specific BRT operations and the expectations of higher levels of service. A BRT operation should be able to use data to proactively respond to service issues and interruptions, and work towards resolving those issues as quickly as possible.

> *Arrival Prediction:* Use of frequent vehicle location information paired with schedule and enhanced prediction algorithms to provide improved arrival prediction.

> *Customer Information:* Catalogue of information available to current and prospective riders, including schedule planning information, status updates, delays and other mobility services available at a given location.

> *Business Intelligence & Performance Metrics:* Analytics datasets that can be used for performance tracking and guide policy decisions.

> *Supporting Mobility as a Service (MaaS):* Technologies and infrastructures that can integrate Mobility as a Service options into the overall offer of public transportation services.

> *Yard Management:* Tools to allow for the management, assignment, pull-in/pull-out of BRT vehicles (particularly where BRT vehicle types are unique and yard space is constrained).

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REQUIRED

2R Roadside Elements

a. Transit Signal Priority

a. Transit Signal Priority

Transit Signal Priority (TSP), also referred to as Bus Signal Priority (BSP), includes methods to provide signal timing preference to transit vehicles and/or movements at signalized intersections used by transit vehicles. The end result is fewer red lights for transit vehicles and/or reduced signal delays along TSP enabled corridors. Figure 4 below shows the main components of TSP systems. There are several different technical approaches to providing TSP along a BRT corridor, including: passive signal priority with signal coordination adjusted for bus movements and speeds, active signal priority where a single bus communicates with a single signal to request and process priority, and corridor-based active signal priority

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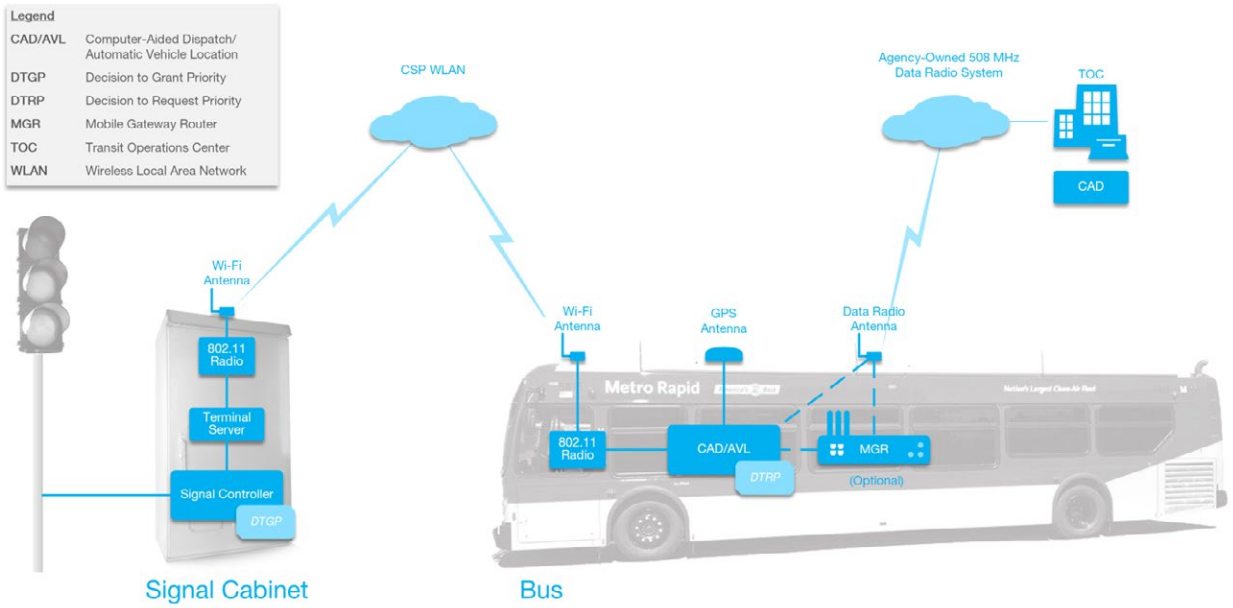

Figure 4: Transit Signal Priority Elements

REQUIRED

where multiple buses and multiple signals are communicating to determine priority requests and processing. TSP can be conditional based on a schedule adherence threshold, or simply configured to provide TSP based on headways and when the last priority request was granted. Various combinations of these approaches commonly exist within single corridors. Throughout the development of these guidelines, a wide range of transit and local agency stakeholders have reiterated the importance of signal priority in assisting BRT in reducing delays, increasing reliability, and establishing a higher level of service when compared with the rest of fixed route transit. Modern TSP approaches offer a broad range of configurability in terms of adjusting for levels of priority and avoiding specific impacts, and usually timing of individual signals can be adjusted to accommodate TSP without significant impacts to overall traffic.

Metro Standards

> *BRT-Lite:* Active signal priority should be implemented at 75% of signals.

> *Full-BRT:* Active signal priority should be implemented at 90% of signals.

> *Target:* Active signal priority should be established for all arriving buses.

Guidelines for Implementation

Pre-requisites

In order to be as effective as possible, there are several prerequisites for TSP, including:

- Reliable real-time communications from traffic signals to a central signal control or monitoring system for reporting and operations purposes.
- Frequent vehicle location updates from BRT vehicles to the TSP system; every second or less for BRT to signal communications, or every 7 seconds or less for cloud-based or corridor center-to-center systems.
- Agreements with the agencies managing signals to provide some level of reasonable priority to BRT vehicles along a corridor. Actual settings for TSP can vary from intersection to intersection but the maximum allowed extension or early green should generally be at minimum 10% or more of the typical signal cycle length.

Roles and Responsibilities

Most of the responsibilities for TSP will fall to the local agency controlling the signals and the transit operations agency. In some cases this may also include Caltrans, or involve partnerships between various transit operators (e.g. Metro and municipal partners). In general, responsibilities include:

- *Transit agency* – Providing for needed signal system and communications upgrades to BRT corridors, and on-going operational support budget for maintenance and monitoring. Also providing necessary equipment and supporting communications from the BRT vehicles to the TSP system, systems for placing TSP requests to the signals, and data analytics tools for managing TSP performance.
- *Local agency* – Typically, implementing or overseeing implementation of TSP improvements to signal systems and communications, supporting TSP configurations in signal timing, implementing timing adjustments, monitoring signal operations, and repairing signal related TSP equipment. In some cases, the transit agency takes on a larger more collaborative or supportive role (particularly if the local agency is small or resource constrained).
- *Contractor* – Often a consultant is hired to support the identification of TSP equipment and suggesting TSP configurations, as well as supporting initial implementation testing and oversight.

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REQUIRED

Requirements

Functional

- Track BRT (every 1 to 7 seconds depending on system) vehicles to determine location, schedule status (if conditional TSP is used), and headways/bunching. Note: It is not recommended to use on-board passenger loads as part of the TSP request process, as vehicles may be approaching a heavy boarding or transfer location and arrival at that location is just as time critical as moving on-board passengers.
- Provide real-time communications from signals and between signals to a central signal management system for monitoring purposes.
- Enable the latest bench tested or proven TSP functionality within the signal controller logic. It is assumed that signal controllers will be upgraded to the latest standards possible to support TSP.
- Support a corridor-based or cloud-based TSP solution where possible as the latest emerging approach for TSP.
- Provide a TSP performance monitoring and metrics generation tool (will vary by specific solution) that can be accessed by the transit operators and signal agencies.

Physical

- Support each of the three current/emerging TSP architectures in the LA Region as appropriate to the BRT corridor in question:
  - *RFID – Legacy ATSAC based solution* – Largely utilized for legacy Rapid services this system uses a transponder on the bus paired with detection loops and specialized ATSAC signal controller logic to provide TSP. Schedules for the buses must be upload to the signal system in order for it to operate properly.
  - *WiFi – Legacy Countywide-based solution* – Currently in deployment and utilized for some BRT corridors, this approach uses 802.11b/g WiFi communications with a defined communications/data protocol to place the TSP requests to signals. This approach supports several signal controller types. It is important to ensure that the WiFi coverage is comprehensive along the TSP corridor and that interference is not an issue. It is assumed that upgrades will occur over time to this approach to support newer WiFi standards such as 802.11n or 802.11ac.
  - *Cloud-based TSP as a Service (sometimes referred to as BSPaaS)* – Recommend approach for LA Metro Next Gen BRT, this approach uses frequent vehicle location updates communicated to cloud-based logic that then sends requests and TSP processing communications to the signal system. This can take more of a center-to-center process approach, or it can be framed to support individual buses locating position to the cloud and communications to individual signals. Communications latency can be a concern. Also, connected vehicle applications can be overlaid to support TSP as well.
- Even where communications from the BRT vehicle is near-continuous, dedicated lanes and guideways will require backup detection methods to allow non-BRT vehicles (e.g. maintenance vehicles) to be detected and processed properly by signals.

Other Recommendations

The specifics of TSP will vary from location to location, but it should be part of any BRT deployment in the county. The level of potential signal delay on a corridor should be reviewed to consider what impacts TSP may have, and it should be anticipated that TSP functionality cannot reduce signal related delays by more than 20%. The concept of providing priority to BRT and vehicles carrying more people than SOVs is sound and will continue to improve over time. However, the time savings of TSP are frequently difficult to identify as they are rendered invisible under other factors that impact transit travel

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REQUIRED

times and delays in a varying fashion. TSP should be generally monitored based on the number of red signals encountered by BRT vehicles with it enabled vs. disabled rather than the on-time performance results.

Where BRT operates in a dedicated median runningway, it is recommended that advanced signal controller logic, peer-to-peer logic, or signal interval control be used to reduce signal related delay. These approaches take advantage of the dedicated runningway conditions to provide estimated time of arrival to the signal system and adjust timing well in advance of the BRT arriving at an intersection (allowing more sophisticated TSP actions).

Opportunities and Challenges

The following concepts and trends promise to have a significant impact on TSP approaches and effectiveness:

Cloud-based Solutions

The power and flexibility of cloud based computing and communications solutions offers to simplify TSP implementation and lower costs. A cloud- based TSP computing algorithm can receive frequent BRT vehicle position updates and process signal information provided by the signal/signal systems. This allows for more sophisticated adjustments of signal timing and BRT vehicle speeds to increase effectiveness and lower impacts.

Bus Interval and Signal Control

Building on a cloud-based approach, bus interval and signal control seeks to manage bus headways through providing speed notifications to operators or controlling BRT speeds in dedicated runningways. Operators still maintain override and directional control of the vehicle. Intervals are placed within the signal timing of the corridor to provide optimal windows for BRT passage from station to station with lower chances of red lights, and active TSP functionality makes minor adjustments where vehicles are slightly off from the planned intervals.

Automated and Connected Vehicles

Automated and connected vehicle functionality will increase vehicle safety and provide a broader range of options for TSP. Ultimately, when a wide range of the vehicles on the roadways are connected and autonomous, then prioritization of BRT traffic over other traffic can be accomplished through virtual lanes and systemwide prioritization of traffic flows by types.

Other Related Elements

The following concepts and trends promise to have a significant impact on TSP approaches and effectiveness:

- Operating Characteristics - Service Parameters and Strategies
- Running Way Design - Traffic Operations

Reference Documentation

The following documents may prove useful as references for TSP consideration in the county:

- LA Metro Next Gen BSP Study
- Metro BRT Design Guidelines

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REQUIRED

3R Stations

a. Security Elements
b. Real-time Customer & Wayfinding Information
c. Help Points

Typical BRT Station / Source: IBI Group

Security Camera / Source: IBI Group

a. Security Elements

Security elements at stations include equipment that supports individuals' safety from vehicles, and from criminal acts. It entails primarily the ability to see and be seen. It helps promote the perception of safety for transit customers, and can lower agency risks and liability. It includes lighting, surveillance cameras, and communication systems such as emergency phones. It also relates to the use of safety mobile applications such as the LA Metro Transit Watch application. The guidelines described below are applicable to other transit service infrastructures, and not only to Bus Rapid Transit.

REQUIRED

Metro Standards

- *BRT-Lite:* 75% of all stations should be equipped with security cameras and provide adequate lighting.
- *Full-BRT:* 90% of stations should be equipped with security cameras and provide adequate lighting.
- *Target:* 100% of stations should be equipped with security cameras and provide adequate lighting.

Guidelines for Implementation

Pre-requisites

- *Cameras:* Power and High-Speed/High-Bandwidth communication as well as a video monitoring system application. There needs to be on-site storage or supporting remote storage solution.
- *Lighting:* Refer to the Stations chapter for guidance about lighting design.
- *Emergency Phones:* Phone line or supporting communication system associated with a physical address. It also needs an ADA compliant mounting location. It also requires a call/dispatch center to receive communications. The system also requires either solar/battery or wired power.
- *Mobile Application:* Security/Customer response center to receive and process messages and requests.

Roles and Responsibilities

- *Cameras:* The transit agency needs to provide a security/surveillance operation center for monitoring video and alerts as well as supporting staff to review historical data and maintain camera equipment and systems.
- *Lighting:* On station and platform lighting monitoring and maintenance should be addressed by transit agency or subcontracted third party. Issues with surrounding public lighting should be monitored by the transit agency or subcontractor and handled by the appropriate local jurisdiction.
- *Emergency Phones:* Emergency phones should be maintained by the transit agency or subcontractor and calls from the phone should be directed to the agency transit safety/security operations center. Calls identified as an emergency should be relayed to the appropriate emergency dispatch center.
- *Mobile Application:* The mobile application should be maintained by the transit agency or subcontractor and messages from the application should be directed to the agency transit safety/security operations center. Messages identified as an emergency should be relayed to the appropriate emergency dispatch center. Customer issues and complaints can be directed to Customer Service.

Requirements

Functional

- *Cameras:*
  - *Coverage:* For platform, coverage should include the platform itself, the approaches to the platform, the boarding/alighting area. Continuous coverage should be applied to ticketing machines and emergency phone areas. Ideally, camera coverage would also include parking lots, walkways, dedicated guideways, and all right-of-way areas surrounding the stations.
  - *Resolution:* Resolution should be high definition 1080p or better.
  - *Storage:* General on-site or remote storage for all cameras should meet or exceed 30 days (after 30 days compressed).
  - *Video Analytics:* Consideration should be given for applying video analytics for camera views that cover the platform and boarding areas. Video analytics would be used to identify abnormal behavior or conditions to alert transit operations and security staff to focus on a particular camera feed or situation. Due to emergent privacy concerns, facial recognition is not recommended at this time.
- *Lighting:* Refer to Section 7.2 Stations/ Platforms Lighting Design Guidelines.

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REQUIRED

- *Emergency Phones:*
  - > *User-friendliness:* The emergency phones should support hands-free operations and may include direct connection to both information and emergency services.
- *Mobile Application:* The application should allow for easy and rapid access to security alerts, particularly if integrated with other transit information features. It should use symbols and language consistent with local transit communities. It should provide an accessible form to submit incident report, and the ability to receive alerts. Consideration should also be given to integrate geolocation.

Physical

- *Cameras:* Devices should be integrated with the shelter kit-of-parts and station design so they are visible but do not adversely impact the aesthetics of the site. Typical views and sight lines of cameras should be modeled for various station layouts. Individual cameras should be Ethernet/IP and POE. A mixture or PTZ and fixed-field view cameras may be utilized. Camera mounting locations and enclosures should consider glare throughout the day and device security and environmental protection needs.
- *Lighting:* Refer to Section 7.2 Stations/ Platforms Lighting Design Guidelines.
- *Emergency Phones:* Phones need to be mounted following ADA compliance requirements, and be wheelchair accessible. They can either be mounted separately or attached to other station elements. However, they need to be clearly visible and identifiable (such as the blue light system). See Figure 5 for installation details.
- *Mobile Application:* The application should be compatible on both Apple and Android devices.

Other Recommendations

In the case of pre-paid fare zones, designing secure pre-paid areas may be effective at limiting criminal activities and loitering.

Homelessness and loitering being a common issue at stations, security features are essential to make sure customers are safe and feel comfortable using BRT. Stations should be open and limit blind spots and opportunities for hiding. If motion-activated lighting is implemented, the system must be sensitive enough to detect most noises and movement.

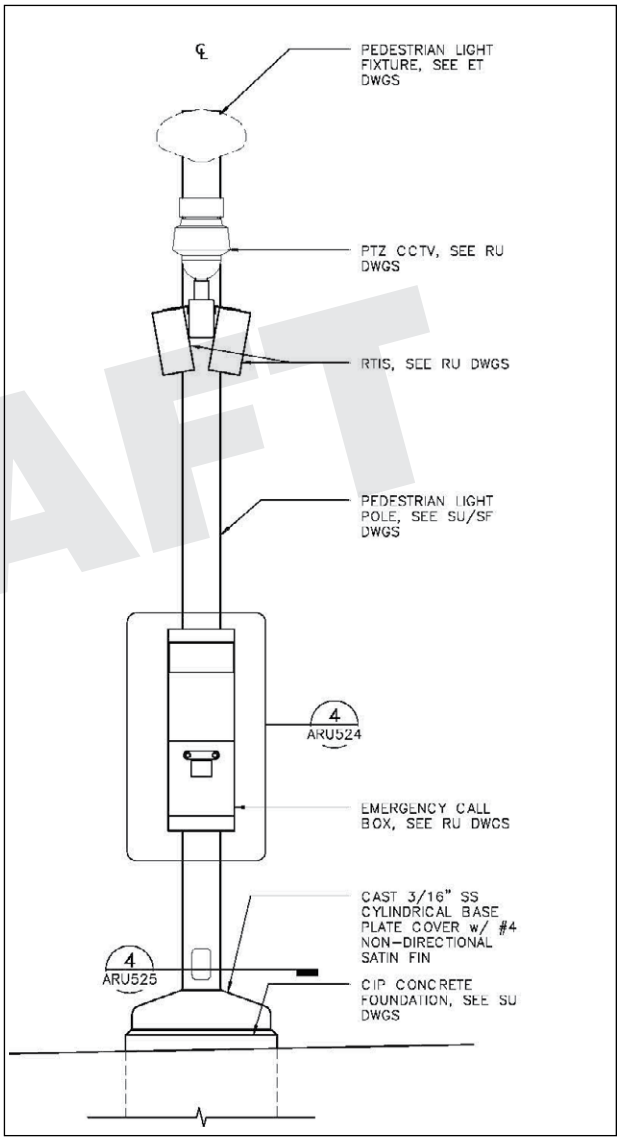

Figure 5: Installation Guidelines for Emergency Phones

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Opportunities and Challenges

Video Analytics

Recent improvements to video technology now allow for a wide range of data collection/analysis, safety/alerts, and operations monitoring, providing major advancement for safety and curbside management at stations. Video analytics can be a useful way to identify out-of-the-ordinary situations or incidents and make more efficient use of staff monitoring video feeds.

Security features should be context specific, be mindful of neighbors and take into consideration light pollution when planning for light installations.

Accessibility

Potential challenges exist in the accessibility of emergency phones and other hardware in instances where transit stations are busy and subsequently have high pedestrian volumes.

Other Related Elements

> Stations/Platforms - Lighting

> Stations/Platforms - Systems Components

> Stations/Platforms - Station Footprint and Placement

> Stations/Platforms - Shelter Design

> Integration of Transit-oriented Communities - Public Realm/Open Space

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REQUIRED

Real-time Customer & Wayfinding Information / Source: IBI Group

b. Real-time Customer & Wayfinding Information

Real-time customer information refers to the ability to provide up-to-date information to riders regarding service, schedules, arrival predictions, and service alerts. Posted schedules cannot deliver critical information regarding transit delays, therefore real-time bus arrival information is critical. While most users carry mobile devices, real-time information dissemination provided by transportation agencies on fixed equipment at the station provide consistent and accurate information to customers, easily and with equity. Station displays can also provide wayfinding information to customers, supporting multi-modal trips and first/last mile connections. Customer information and wayfinding panels are a requirement at all BRT stations. The methods of providing real-time customer information can vary, but BRT stations will typically include some mix of the following:

> Basic LED displays showing routes, arrival predictions for the next few buses, information about other travel services available, digital id, and significant service alerts.

> Multimedia LCD displays that provide service information, arrival predictions, more detailed service alerts and pending changes or announcements, information about other travel services available, digital id, as well as potential advertising or other information of customer interest (e.g. local news, community info, etc.).

> Low power electronic displays with static schedule information, information about other travel services available, digital id, and service announcements replacing the static posted schedules.

Depending on the transit agency guidelines and approaches, audio announcements are usually triggered by hitting a button located in an accessible area. Some BRT lines also support public address systems for real-time updates from operations centers. Finally, all BRT systems should support external announcements from the vehicle indicating route, direction, and end destination.

Metro has instituted an agreement with the third party provider that will provide advertising on rail station multi-media LCD displays, as well as provide real-time service information and updates.

This display is in addition to the traditional LED displays indicating next train arrivals and updates. The multi-media display is managed and maintained by the third party with Metro provided transit data feeds mixed with other third party data feeds. A similar approach could be used for BRT stations, but consideration has to be given for the jurisdiction in which BRT stations reside and any current advertising agreements that could be impacted.

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REQUIRED

Metro has deployed LCD multimedia displays at rail stations via an agreement with a third party that mixes real-time transit information with advertising and related information

Metro Standards

> *BRT-Lite:* 75% of all stations should provide real-time information.

> *Full-BRT:* 90% of stations should provide real-time information.

> *Target:* 100% of stations should provide real-time information.

Guidelines for Implementation

Pre-requisites

- Shelter and station designs that support high-visibility for customer information displays, provide vandal protection for equipment, and support relatively easy access to equipment for maintenance.
- Wired or wireless communications to the stations.
- Source systems providing the data feeds and management for real-time customer information.

Roles and Responsibilities

- *Transit Agency* - The transit agency is primarily responsible for providing accurate and timely data to customer information displays, monitoring systems, and maintaining systems and equipment.
- *Contractor* - Contractors may be used to monitor and maintain customer information displays through a simple contracting arrangement or an advertising agreement.

Requirements

Functional

- Provide static schedule or headway information.
- Provide real-time arrival prediction with updates every 30 seconds or less.
- Provide service alerts for detours, delays, service cancellations, special service, and other related items.
- Provide communications connectivity from source data systems to customer information displays at BRT stations.
- Information provided via station based customer information should be consistent with information provided through other outlets such as smartphone applications.
- A common back office or cloud-based solution should be implemented that supports the passing of customer information to a wide range of sign types that may evolve over time. This system should be a common source for supporting NTCIP compliant signs, and support templates that can be modified to support various types of electronic displays and information feeds. Interfaces to customer information signs should be vendor agnostic.

Physical

- Video screens or VMS must be mounted in a space visible and accessible to the greatest number of customers at any given time. Consideration must be given to impeding pedestrian circulation.
- Sufficient power to run variable message signs or screens as well as communications infrastructure.
- Adequate space to mount hardware and appropriate vandal protection for the mounting location. As a general rule, the enclosure should be able to survive a strike by a person swinging a baseball bat.

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REQUIRED

- Communications WiFi or LAN infrastructure.
- Location of seating must be addressed in designing optimal placement of video screens.
- Where BRT platforms are integrated into larger transit stations, special BRT customer information displays should be provided at or near BRT platforms and BRT information integrated with broader information systems at the transit station.

Other Recommendations

As previously mentioned, Metro has initiated over the summer of 2019 the deployment of digital displays along the Blue Line.

Real-time customer information should be provided on similar displays at major BRT stops and transit stations. A consistent deployment of real time information infrastructure will serve to reinforce BRT branding; therefore the design of digital displays currently deployed along the Blue Line should be retained if possible. There should be minimal interruption to information display from advertising, or an integration of basic arrival updates onto the advertising slides. Displays should be visible and accessible from customer waiting areas. Consider developing displays using transit data; real-time arrival and departure, as well as schedule information, from LA SAFE's 511 system.

Real-time bus arrival times can be displayed using VMS signs; however the recommended approach is to invest in full screen digital displays where possible. VMS are character limited, while screen-based displays provide the flexibility for cross-purpose usage. With the use of digital displays, emergency information, PSAs, advertisements, and other content can be displayed when real-time information is not available or necessary. Care should be given that full screen displays (LCD or similar) comply with ADA requirements.

On site real-time customer information should be simple and concise. Unlike websites or mobile applications which can hold the user's attention for extended periods of time, the screen providing real-time information should provide only what the customer needs. Content may include a shortlist such as:

- Next three arrival times (in minutes from current time)
- Service disruption notifications
- Instructions for customers in case of emergency, such as a directive to call 911, or number for other emergency resources

For stops that do not include digital displays, information regarding ways to access information online should be provided. These may include vertical panels, or placards advertising the 511 telephone service as well as go511.com.

Opportunities and Challenges

Cloud Services, the Internet of Things, and 5G Technologies will improve Metro's ability to provide and update information with the least amount of delay possible. Cloud technology could furthermore reduce costs by avoiding storage, data management and other operational burdens. These technologies can also support the development of specialized applications that can provide a full range of information to transit users.

Opportunities can be realized in the cross-functional use of video screens. In case of emergency, real-time transit information may be replaced by content from emergency services.

Real-time information could be expanded to include *Mobility-as-a-Service (MaaS) and Transportation Network Cooperatives (TNCs)*, to offer fully integrated multi-modal services to commuters.

Connected and Automated Vehicles will also add to the agency's ability to provide real-time information to customers, by removing the "middle man", between vehicles and riders.

The threat of vandalism is a critical challenge to successful deployment of hardware such as digital display screens. Expensive equipment such as screens is susceptible to damage by the public, and may need to be housed in a protective container to ensure its safety.

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REQUIRED

Other Related Elements

> Stations/Platforms - Signage and Passenger Information
> Stations/Platforms - Systems Components
> Branding - Stations
> Systems - Supporting Mobility as a Service
> Systems - Vehicle Tracking
> Systems - CAD/AVL
> Integration of Transit-oriented Communities - First/Last Mile Connectivity

Reference Documentation

NTCIP standards for electronic signage

Local and State ADA codes and requirements

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REQUIRED

Enhancing public safety through connectivity to NYC emergency and help points underground / Source: Transit Wireless

c. Help Points

Description

Help Points are stations being deployed throughout Metro's transit network. It allows direct communication between an individual and an operator in case of emergency. It may include emergency phone services, alarm buttons, or video alerts. It's imperative that access to emergency response is provided via a variety of methods, in case a single device is faulty or has been vandalized. There is overlap between this element and Security Elements; the efforts for both should be integrated and in alignment.

Guidelines for Implementation

Pre-requisites

- Emergency Phones: Phone line or supporting communication system associated with a physical address. It also needs an ADA compliant mounting location. It also requires a call/dispatch center to receive communications. The system also requires either solar/battery or wired power.
- There must be adequate accessible space dedicated to emergency phones, buttons, or other equipment.

Roles and Responsibilities

- Emergency Phones: Emergency phones should be maintained by the transit agency or subcontractor and calls from the phone should be directed to the agency transit safety/security operations center. Calls identified as an emergency should be relayed to the appropriate emergency dispatch center.
- Maintenance: Emergency phones must be quality checked for continued operation and maintained regularly.

Requirements

Physical

- Emergency Phones:
  - > User-friendliness: The emergency phones should support hands-free operations and may include direct connection to both information and emergency services.
- Signage in multiple languages should be posted at or near the communication device, easily visible by customers.

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REQUIRED

Other Recommendations

Emergency call-in features should be prominent at stations and easy to access. There should be several Notification and call-in devices in the event that one of them is inaccessible or faulty.

Several transit agencies have implemented silent alarms system on vehicles, which allow anyone to promptly notify of an emergency, without letting the perpetrator know that law enforcement has been alerted. A similar system for stations could be considered to alert operators and increase video monitoring, and potentially alert the authorities and first responders.

Opportunities and Challenges

Video Analytics will play a pivotal role providing the ability to quickly alert operators or safety officers in case of emergency, giving them the ability to intervene quickly.

There have also been instances where devices using Artificial Intelligence (AI) Technologies have been implemented in public spaces such as transit stations to offer mobile surveillance system and emergency communication services with operators.

Potential challenges exist in the accessibility of emergency phones and other hardware in instances where transit stations are busy and subsequently have high pedestrian volumes.

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4R Vehicles

a. Vehicle Tracking
b. Fare Payment & Validation
c. Schedule & Headways Management
d. Voice & Data Communications
e. Passenger Counters

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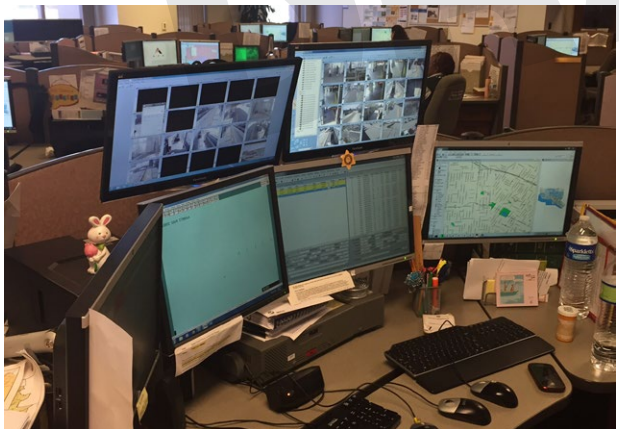
a. Vehicle Tracking



Vehicle Tracking

Vehicle Tracking

Description

Security elements at stations including equipment tracking BRT buses (usually via GPS-based automatic vehicle location-AVL solutions) is a fundamental requirement. Almost all transit operators in LA County utilize GPS-based solutions as part of a computer-aided dispatch-automatic vehicle location (CAD/AVL) system to track buses for operations, safety, customer information, performance monitoring, and schedule adherence purposes. Proper tracking can determine if buses are on-route, running hot, running late, or encountering other difficulties. Location updates are sent to the Bus Operations Center (BOC) where operations and communications with the fleet are managed. The most notable distinction between BRT and the

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rest of fixed route fleets is the necessity for very frequent location updates. This is particularly true of situations where BRT vehicles will use a Bus Signal Priority as a Service (BSPaaS) or improved arrival prediction systems. For example, whereas a normal CAD/AVL system using traditionally data radios may only support vehicle location updates of every 60 seconds or longer, newer systems using commercial cellular data or similar frequently support updates of every 10 seconds or less.

Metro Standards

While Metro BRT standards do not explicitly call out vehicle tracking, it is necessary to monitor and ensure that a service is meeting other standards established for BRT in LA County.

- *BRT-Lite:* Buses should be on time 75% of the time.
- *Full-BRT:* Buses should be on time 80% of the time.
- *Target:* Buses should be on time 90% of the time.

Guidelines for Implementation

Pre-requisites

All of the large and mid-sized transit operators in LA County utilize some version of a CAD/AVL system to support vehicle tracking and operations.

Roles and Responsibilities

The transit agency is fully responsible for providing and maintaining vehicle tracking functionality on BRT vehicles. Increasingly some Software as a Service options are emerging, but management and oversight would remain a transit agency responsibility.

Requirements

Functional

- All BRT vehicles must have vehicle tracking systems that at minimum include GPS/AVL that meets the following:
  - +/- 10 feet accuracy
  - 32+ channel GPS
  - Built in gyro and/or dead-reckoning functionality
  - Ability to track and record vehicle locations at least once every second
- All BRT vehicles that are deployed in service and use legacy TSP/BSP or (vehicle to intersection approaches to TSP) shall support vehicle location updates of every 1-2 seconds or less.
- All BRT vehicles deployed to support BSPaaS where the bus location is communicated to cloud-based TSP/BSP services shall support vehicle location updates and communications of those updates once every second.
- Where vehicle positioning is event driven, the collective events (e.g. stop arrival, stop departure, distance traveled, etc.) shall result in vehicle location updates of every 10 seconds or less.
- All vehicle location updates shall be timestamped and contain a recognizable vehicle ID.

Physical

- Transit agencies must deploy a CAD/AVL-based vehicle tracking solution on BRT buses.
- Should the agency desire to leverage existing fleetwide CAD/AVL solutions that cannot support the vehicle location update frequency noted above, then the agency should deploy supplemental vehicle location/tracking equipment on the BRT buses to support enhanced arrival prediction, TSP/BSP, and improved customer information. These more frequent updates are usually available through a Mobile Gateway Router (MGR) or another technology device on the bus (e.g. vehicle health tracking, etc.).

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Other Recommendations

Vehicle tracking is a critical and required function for BRT, and should be deployed in such a way to allow frequent vehicle location updates to back-office/CAD/AVL solutions, as well as support frequent location updates for in-field communications and operations. As connected vehicle applications evolve, consideration should be given of what role vehicle location tracking plays in V2X functions, and which devices on the bus support the required vehicle location frequency and accuracy requirements. The guidelines above should be viewed as a starting point that is modified as necessary to support particular corridor cases.

Opportunities and Challenges

Service Coordination

The use of the same/compatible software by all transit agencies could lead to significant opportunities for service and transfer coordination. It could also create opportunities for transit agencies to share resources.

Connected/Automated Vehicles

The deployment of connected, and eventually automated bus fleets will allow for vehicles to be connected and tracked not only by operators but also by riders, infrastructure operators, and other users of the road. The progress done in those areas will further support Corridor Traffic Flow Prioritization, Bus Interval & Signal Control with Speed Management, the development of dynamic curbside and roadways, and the Reallocation of Roadway Cross-Section/ Complete Streets/Road Diets.

Other Related Elements

> Operating Characteristics - Service Parameters and Strategies

> Stations/Platforms - Systems Components

> Running Way - Traffic Operations

> Integration of Transit-oriented Communities - First/Last Mile Connectivity

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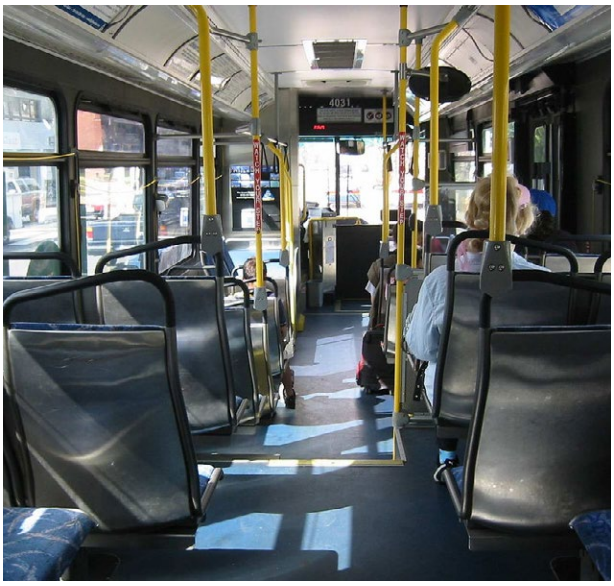

Fare Payment and Validation / Source: IBI Group

Fare Payment and Validation

b. Fare Payment and Validation

Fare payment and validation refers to the process of accepting and validating payment before and/or during boarding. It applies to the form of payment accepted as well as the location where payment is processed. LA County BRT standards call for all-door boarding for all station types. TAP is the regional smartcard transit fare system for LA County. This will generally imply one of the following:

> Ticket vending machines (TVMs) and smartcard validators at BRT stations

> Fareboxes supporting cash and TAP at the front door of BRT buses and TAP validators at all other doors

> No cash BRT router where riders must use mobile smartphone apps and/or TAP validation at any door

Any of the above would need to be supported by appropriate fare enforcement activities to ensure compliance with fare policies and payment. This usually includes fare enforcement personnel on the bus checking for valid forms of payment. The goal with BRT and all-door boarding is to reduce dwells and delays at stations involved in fare payment and processing, which can be a significant component in overall travel time for customers. It is likely that fare payment methods and processes will continue to evolve, as payment methods continue to develop in the broader payments processing industry, but roll-out of regional solutions usually occurs over several years, so region-wide upgrades may lag behind fare payment approaches that can be applied to individual agencies or corridors.

Metro Standards

> *BRT-Lite/Full-BRT/Target: All-door boarding for all stations.*

The standards do not require fare payment prior to boarding, and fare payment can occur either at the station and/or when boarding the bus. Paid fare zones may be designed at certain stations, which would require payment and validation to take place at specific entry points. There can also be in-person validation set up on board of vehicles by transit agency staff.

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Guidelines for Implementation

Pre-requisites

If cashless operations is selected for a corridor, then other forms of obtaining electronic or smartcard fare payment methods must be in place. This could include placement of TVMs at all BRT stations or at some key locations. Transit operators may already have established fare box systems on board their broader fixed route fleet. These can be supplemented by smartcard validators and other means to support all door boarding.

Roles and Responsibilities

The transit agency maintains responsibility for installation, maintenance, and oversight of all fare systems both on- and off-vehicle. Maintenance functions and back-office are often contracted out or in the case of regional systems such as TAP, operated under agreement with partner agencies. Mobile smartphone fare payment apps are typically offered as a contracted service (such as SaaS) and can be set up with different arrangements for contractor reimbursement. The most common approach is for the contractor to "take" a certain percentage of the fare as part of the contracted arrangement.

Requirements

Functional

- BRT vehicles shall support TAP validation either prior to boarding or at all doors.
- BRT vehicles may support cash collection via a farebox at the front door only.
- Agencies must provide functionality to support fare enforcement and confirmation on BRT vehicles by transit enforcement of contracted enforcement personnel.
- BRT should support a mobile smart phone (e.g. either regional or local) for fare payment. Note: LA Metro rolled out a new smart phone app/TAP integration in 2019.
- BRT may support future fare payment options as a test case or consistent with fleetwide rollouts for the particular transit agency (e.g. NFC, QR code, etc.).

Physical

- If using prepaid zones at BRT stations, they should be clearly designated and represent a clearly enforceable prepaid fare zone.
- If TVMs are used, there should be redundant (min. of 2) TVMS within reasonable proximity of each other (e.g. two on the same platform or on paired platforms across the street, etc.) subject to cost and space constraints.
- If cash payment is allowed on the bus, then signage on the bus and at stations should clearly designate that cash payments board at the front door only.

Other Recommendations

BRT is an important regionally connected service and consistency across various agencies and services is important. BRT corridors must support the current and emerging approaches and processes of TAP, but may choose to support additional methods and approaches to fare payment. Ultimately, a situation can be foreseen within the timeframe of this BRT Vision where customers simply board the bus, and their presence on a bus in motion will generate a fare payment via mobile devices (e.g. smart phone or other). Until that time, fare payment options will likely continue to be an evolving mix of technologies and options.

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Opportunities and Challenges

Universal Fare Payment

The generalization of TAP and mobile fare payment could over time lead to the opportunity of integrating agencies payment systems into a regional fare payment system that would make transit and other Mobility-as-a-Service and Transportation Network Company services easier and more efficient. The use of a regional fare payment system would also support the implementation of a variable fee structure, where customers can pay a variable amount based on distance and the number of services used within one same trip.

Figure 6: Components of Fare Payment on Vehicles / Source: IBI Group

Distributed Ledger Technologies & Blockchain will support the development of secure mobile payments across a broad range of financial sectors and may eventually supplant the more traditional methods of payments and account management. It should be anticipated that DLT impacts to transit fare payment will likely be part of a larger transformation of the financial sector and processes.

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Other Related Elements

> Operating Characteristics - Fare Collection and Boarding Protocols

> Stations/Platforms - System Components

> Branding - Stations

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Source: Community Transit - IBI Group

Source: Community Transit - IBI Group

c. Schedule and Headways Management

Schedule and Headways Management refers to the technologies and processes that track how transit vehicles arrive at stations on schedule and within target headway ranges, including feedback to operators on their current status relative to schedules or headway. BRT is one of the service types that can benefit from considering different approaches to managing the distribution of buses along the corridor to try and provide more reliable service with less bunching or gapping of vehicles. Bunching or gapping of vehicles is a natural operations phenomena that occurs due to variations in traffic, dwell times, wheelchair ramp activations/tie-downs, driver behavior variability, and physical constraints in the roadway or station areas. Generally, there are two approaches to managing BRT spacing, timing, and operations along a corridor:

- *Traditional static scheduling* – Buses operate on a predetermined schedule (designated as a series of blocks and trips) where each station time point is assigned a specific arrival/departure time for each bus trip. Static schedules are utilized and adjusted to try and account for this variability between peak and off-peak periods, and to take into account operational experience. As a general rule, buses operating under static schedules are not allowed to run "hot" or early at time points to reduce customer frustration. The challenge with BRT operations is that efforts to help buses run faster or to save travel times can be defeated by an out-of-date or unadjusted schedule, and each bus/trip operates independently, making it difficult to gain overall efficiencies along the corridor (particularly where one bus may have the opportunity to gain greater efficiencies than others). Scheduled operations are typically applied where frequencies of buses are at 7.5 minutes or greater. The higher the frequency, the greater the opportunity for significant bunching under this approach.
- *Headway management* – Buses operate at set headways (e.g. every 5 minutes) regardless of the particular trip. Customers are provided information such as "between the times of 6AM and 7PM, buses for Route X arrive at this stop every five minutes." There are various approaches to controlling headways along a corridor, but buses are not held at time points based on schedule. Bunching of buses is instead monitored along the corridor, and buses are provided instructions to adjust speeds (within a safe range), or institute temporary holds at particular

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locations. Spacing of buses is frequently reset at layover or transit center locations. Traditionally, headway management was applied to service frequencies of 7.5 minutes or less, but trends and the availability of technology have been pushing this limit up to as high as 15 minutes. During off-peak/lower frequency periods, headway-based routes tend to convert to schedule-based approaches. The advantage for BRT corridors is that headway management can: enhance the feel/perception of BRT as a higher speed service with less stops, avoid stopping and waiting at time points, and allow individual vehicles to make the most out of BRT physical and signal priority opportunities. The challenge is that headway management has historically been more resource intensive, requiring additional operations and supervisory personnel to properly manage. The emergence of better vehicle tracking and headway management approaches and tools offers to reduce this burden.

Metro Standards

> *BRT-Lite:* 12-minute headway during peak periods.

> *Full-BRT:* 10-minute headway during peak periods.

> *Target:* five-minute headway during peak periods for BRT-Lite and Full-BRT.

> Off-peak headways cannot exceed 30 minutes, except on weekends and holidays.

Guidelines for Implementation

Pre-requisites

Actively managing headways requires a CAD/AVL system, vehicle tracking with location updates every 30 seconds or less, and a Bus Operations Center (BOC) with experienced staff proactively monitoring and managing the BRT corridor.

Roles and Responsibilities

The transit agency is responsible for all aspects of scheduling, setting headway policies and procedures, staffing, management and operations of the approach.

Requirements

Functional

- Headway management monitoring and alerting tool (either deployed separately or as part of a CAD/AVL system) – the tool needs to be configured to match the characteristics of the operating corridor and the headway policies set by the agency (e.g. what measures drivers can or should take, what situations should prompt active intervention, how are layovers and departures from layover addressed, etc.).
- Headway management and monitoring display for bus communications supervisors (BOC) – similar to a route ladder or display showing relative spacing of all buses along the BRT corridor.
- Headway management displays to the bus operator.
- If semi-autonomous functions are used, headway control could be tied into ACC or automated speed control for buses in exclusive dedicated guideways (drivers would always retain full steering control and control over the bus).
- Reporting and performance metrics based on headways at stops as opposed to schedule adherence, so that operations and policies can be adjusted.
- BSP functionality should be integrated with headway functionality to consider a balanced approach that alleviates bunching but still makes good use of BSP efficiencies.

Physical

- Some approaches to headway management require the bus to hold at specific locations when called for due to bunching, these locations need to allow for a safe extended dwell by the bus (usually less than 120 seconds).

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Other Recommendations

Transit agencies should review the potential application of active headway management to BRT corridors where peak frequencies are 12 minutes or more frequent. The approach should be strongly considered where the frequencies are 5 minutes or more frequent. The specific policies and procedures for headway management may vary based on the particular corridor characteristics and dedicated BRT infrastructure. Some approaches may seek to manage relative bus spacing by providing guidance directly to operators to target up/down on their speeds (within speed limits), whereas others may focus on hold points to alleviate bunching along with resets at turn-around terminal locations. Very frequent service might call for "leap-frogging" where a following bus overtakes a bus in front that is bogged down with heavy loads or dwells. Headway management has traditionally been viewed as resource intensive, but this need not be the case with the proper technologies and operational policies.

Opportunities and Challenges

The implementation of ITS and *Connected Vehicles* will provide further operations control and the ability to intervene quickly in instances where traffic disruptions could potentially lead to delays, as well as support improved headway management approaches. *Corridor Traffic Flow Prioritization & Autonomous Vehicles, and Bus Interval & Signal Control with Speed Management* is a specific example where headway management can be synchronized with signal operations to provide an optimized flow for BRT buses.

Other Related Elements

> Operating Characteristics - Service Parameters and Strategies

> Running Way - Traffic Operations

> Running Way - Roadway Geometrics

> Running Way - Intersection Geometrics

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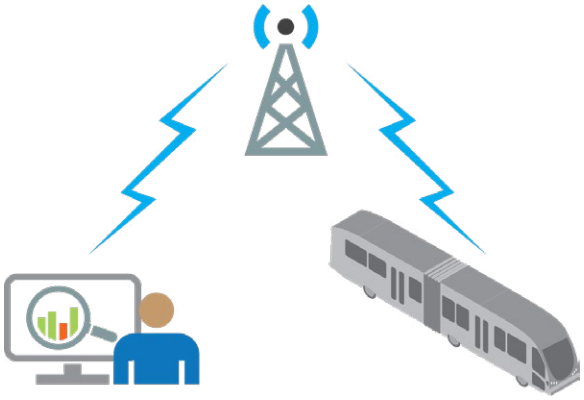

Figure 7: Voice and Data Communications / Source: IBI Group

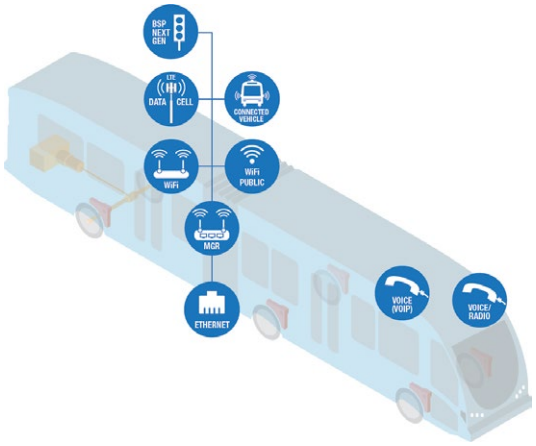

Figure 8: Components of Voice and Data Communications on Vehicles / Source: IBI Group

d. Voice & Data Communications

Voice and Data Communications refers to the technology used to share information between driver and operator, between vehicle and infrastructure, and between operator, vehicle and rider. It is a central component of CAD/AVL systems. Voice and data communications systems can be through a common device or separated out based on the needs of the agency and existing infrastructure. Voice communications are usually through a land mobile radio (LMR) solution or digital mobile radio system (DMR). Increasingly, some agencies are using data-based communications to support mobile Voice over IP (VoIP) which has parallels to the technologies for the voice communications used in many of today's office phone systems. Most transit voice systems utilize a Request to Talk/Priority Request to Talk (RTT/PRTT) approach where communications are set up privately between a communications supervisor at the operations center and a driver. Smaller systems sometimes operate on open talk groups where all operators and communications supervisors can hear all communications to/from vehicles.

Historically, data communications were through LMR or DMR systems, but these solutions limit bandwidth and vehicle location update frequency. Most agencies, including LA Metro, have been moving to data communications through a Mobile Gateway Router (MGR) that centralizes data communications on-board with support for commercial cellular, agency WiFi, and increasingly agency FirstNet cellular solutions. As noted in the on-board architecture overview, the MGR is a critical element for establishing and configuring communications to/from vehicles.

Metro Standards

> Reliable voice and data communications are essential to BRT and all fixed route operations and must be deployed.

Guidelines for Implementation

Pre-requisites

Agencies should establish a standardized on-board architecture for their transit and BRT vehicles, which includes a standard approach, equipment, and systems for voice and data communications. Voice communications systems should be common across agencies fixed route fleet and BRT vehicles, although data communications equipment may vary in order to meet requirements for BRT vehicle location update frequencies.

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REQUIRED

Roles and Responsibilities

- The transit agency should provide an operations center and staff to receive and process voice and data communication.
- BRT services and routes should have dedicated communications supervisory personnel during peak periods to monitor operations, manage communications, and proactively make service adjustments as needed.
- The transit agency or a subcontracted third party should install the communication system.
- The transit agency or a subcontracted third party should conduct regular checks and maintenance.
- The transit agency or a subcontracted third party should develop and maintain a mobile application that allow data communication. There should also be staff available to process information received by customers and respond appropriately.

Requirements

Functional

- Voice communications preferably should support RTT/PRTT approaches, or at minimum BRT services should be on a separate talk group from the rest of fixed route service.
- Voice communications from BRT should be directed and managed by communications supervisory personnel
- Voice communications should support a covert listen in function when an emergency or silent alarm is activated by the driver (unless this function is provided by another system).
- The need for a redundant or fallback voice communications solution should be reviewed and depending on the results of the assessment be provided.
- Data communications should support commercial cellular or FirstNet cellular communications that supports high-bandwidth/high-availability communications.
- The potential need for redundant data communications (e.g. through a secondary cellular carrier or fallback LMR/DMR data solution) should be reviewed. In many cases in LA County, redundant solutions will not be selected as the failure rate of primary systems and costs of redundancy does not frequently call for it.
- Data communications should be centralized through an MGR on board BRT vehicles that allows for configuration of data transfer priorities.
- Data communications should provide sufficient bandwidth to support: vehicle location updates (see vehicle tracking section), live video look-in for emergency situations (small subset of vehicles at any one time), system status, vehicle health, passenger loads, and related information.

Physical

- All voice and data equipment on the BRT buses should be robust and ruggedized to provide reliable service in a transit vehicle environment.
- All voice and data communications backhauls should be robust and constructed to quickly recover from major events/incidents.

Other Recommendations

As noted, voice communications should support an RTT/PRTT approach, and agencies should consider whether, for BRT operations, direct voice communications between drivers and field supervisors is needed. All BRT should route data communications through an on-board MGR.low Prioritization & Autonomous Vehicles, and Bus Interval & Signal Control with Speed Management is a specific example where headway management can be synchronized with signal operations to provide an optimized flow for BRT buses.

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REQUIRED

Opportunities and Challenges

Voice and Data Communications technologies will determine the extent and level of sophistication that can potentially be used for transit signal priority system, guideway and headway control, on-board safety and customer service. Cloud Services and the innovation resulting from Connected/Automated Vehicle technologies represent tremendous opportunities to bring data communications to high performance levels at the vehicle to vehicle and vehicle to infrastructure level.

Other Related Elements

> Systems - Transit Signal Priority
> Systems - Guideway Control and Management
> Systems - Real-time Customer Information
> Systems - Vehicle Tracking
> Systems - Schedule & Headways Management
> Systems - CAD/AVL
> Systems - Video Live Look-in
> Systems - Arrival Prediction

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Passenger Counters / Source: Flickr

e. Passenger Counters

Passenger counters are devices that serve three primary functions: (1) they can provide general on-board loads for BRT operations purposes; (2) they allow an agency to compile ridership information and trends by time of day/week/month/year and station; and (3) they allow an agency to fulfill its NTD reporting requirements. In addition, data from automated passenger counter (APC) systems can be used to determine boardings/alightings by station and provide a metric on dwell time per passenger boarding per station. APC systems often also provide supporting information at greater levels of detail on dwell times versus some CAD/AVL systems.

Metro Standards

Metro's dwell time standards provide guidance on how long it should take for passengers to board/alight at stations.

- *BRT-Lite:* 2.5 seconds per person/average 18 seconds at each stop
- *Full-BRT:* 2 seconds per person/average 15 seconds at each stop
- *Target:* 1.7 seconds per person/average of 12 seconds per stop

Guidelines for Implementation

Pre-requisites

All BRT vehicles shall be equipped with APCs sensors and supporting analyzers (preferably installed at the manufacturer if the bus is new). All APC sensors should be checked and calibrated as new BRT vehicles are received. APC systems should be integrated with data communications and CAD/AVL systems.

Roles and Responsibilities

The transit agency, vehicle OEM, or a subcontracted third party should install the APC devices on all vehicles, conduct performance assessments and service reviews on a regular basis, and perform checks and maintenance of the APC system.

Requirements

Functional

- APC system shall provide boarding and alighting data for each BRT vehicle at each station.
- APC system shall provide operations with an approximate comparison of on-board

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loads versus vehicle capacity (e.g. less than 50% full, 50% full, 75% full, 100% full+). Consideration of what constitutes capacity will be set by agency policy.

- APC system shall conduct balancing and post-processing of APC data for planning and reporting purposes.

Physical

- All BRT vehicles shall be equipped with APCs covering all doors.

Other Recommendations

APCs are an important technology for providing information on the performance of BRT services and making necessary adjustments. Full APC systems shall be required on all BRT vehicles. At some point in the future, APC equipment on the vehicles may become secondary to new systems where riders smartphones communicate directly with vehicle and transit systems for fare payment, etc.

Opportunities and Challenges

Location-Based Services (LBS) can now provide very specific origin-destination and demographic data that can also support counting and ridership monitoring efforts, and guide agencies in designing routes that better connect people to their destination.

As trends such as Gig-Based Economy and Remote Working become more common, there will be a disruption in typical travel patterns of LA County residents. Data collected from technologies such as passenger counters and LBS will be particularly critical to ensure a successful deployment of BRT services.

Other Related Elements

> Operating Characteristics - Service Conditions and Classifications

> Operating Characteristics - Service Parameters and Strategies

> Systems - Voice & Data Communication

> Systems - On-Board Architecture

> Systems - CAD/AVL

> Systems - Technology Support Elements

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REQUIRED

5R Control Center & Operations

a. CAD-AVL
b. Active Headway Management
c. Voice & Data Communications
d. Arrival Prediction
e. Customer Information
f. Business Intelligence and Performance Metrics

a. CAD-AVL

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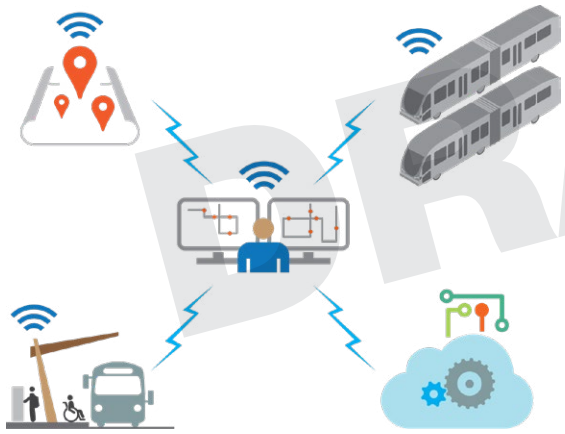

Figure 9: Components of CAD-AVL / Source: IBI Group

Description

Computer Aided Dispatch (CAD) and Automated Vehicle Location (AVL) (CAD/AVL) is the central core Intelligent Transportation Systems (ITS) element for BRT. It is the primary tool for providing operational situational awareness to the operations control center, a key source of customer information, a primary performance metrics monitoring tools, and the primary method of determining and tracking when service adjustments need to be made due to incidents, traffic conditions, heavy load conditions, etc. All large and mid-sized transit operators in the region utilize some form of CAD/AVL system.

LA Metro's CAD/AVL solution is called ATMS, and Metro is commencing efforts to scope the replacement of this system, which is nearing the end of its useful life. Core elements of a CAD/AVL system include an on-board computer for managing communications and operations related functions (e.g. stop announcements, visual displays, head sign integration, APCs, etc.), a mobile data terminal for interfacing with the driver, vehicle tracking that includes GPS and dead-reckoning functions, and sometimes integration with TSP/BSP devices.

REQUIRED

Metro Standards

While not specifically called out in the Metro BRT standards, a CAD/AVL system of some sort must be deployed for all BRT services.

Guidelines for Implementation

Pre-requisites

If an agency operates a CAD/AVL for fixed route operations, this system should be extended to the BRT vehicles for coordinated operational awareness. CAD/AVL assumes a robust voice and data communications system (see relevant guidelines section).

Roles and Responsibilities

The transit agency or a subcontracted third party must install CAD/AVL systems on vehicles, conduct regular checks and maintenance of the systems, and provide an operations center with staff to process and respond to information.

Requirements

Functional

- CAD/AVL shall provide operational situational awareness for all BRT buses including: vehicle position, schedule adherence, on/off route, block/trip/schedule, scheduled reliefs, emergency or covert alarm, approximate passenger loads, and snapshot of performance summaries
- CAD/AVL shall be able to separate out BRT from other services and routes, and support focused operations/dispatch personnel monitoring BRT service performance
- CAD/AVL shall support tracking service adjustments such as fills, short-turns, block/trip cancellation, detours and other typical service adjustments
- CAD/AVL or supporting system shall track when BRT vehicles or buses enter or leave a dedicated guideway (particularly median running or access controlled guideways)
- CAD/AVL shall support headway monitoring & management
- CAD/AVL shall provide basic performance metrics such as schedule or headway management performance, passenger counts, pull-out/pull-in performance, revenue and non-revenue miles and hours
- CAD/AVL may support conditional BSP/TSP
- CAD/AVL shall support communications between the operations center and BRT drivers, including voice, canned/freeform text messages, and service adjustment instructions
- CAD/AVL shall support feeds to customer information systems in an industry standard format (e.g. GTFS, GTFS-RT, etc.)

Physical

- CAD/AVL equipment (including a vehicle logic unit and mobile data terminal) shall be deployed on each BRT bus
- On-board CAD/AVL equipment shall be integrated with the MGR, video surveillance, radios (if applicable), head signs, and automated stop/visual announcement systems

Other Recommendations

CAD/AVL systems must be deployed on BRT vehicles. If an agency has an existing CAD/AVL solutions on the fixed route fleet, but it is lacking in specific BRT required functionality, then the agency should supplement the CAD/AVL functionality to fill these gaps.

Opportunities and Challenges

Bus Interval and Signal Control with Speed Management, and Corridor Traffic Flow Prioritization are two example of concepts that will rely heavily on CAD-AVL. The expansion of current communications technologies such as Cloud services and 5G, as well as the development of Automated and Connected Vehicles will make these ITS systems more sophisticated, and provide operators with the ability to play an even more active role in the

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REQUIRED

monitoring, driver support functions, and headway and guideway management.

Other Related Elements

> Operating Characteristics - Service Parameters and Strategies
> Running Way - Traffic Operations
> Systems - Voice & Data Communication
> Systems - Video Live Look-in
> Systems - Passenger Counters
> Systems - On-board Architecture
> Systems - Schedule and Headway Management

Reference Documentation (Standards & Codes)

> LA Metro Fleet Management & Communications Systems Strategic Plan
> LA Metro IT Strategic Plan

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REQUIRED

Source: IBI Group

b. Active Headway Management

Active Headway Management refers to the various systems that can be used to ensure that services stay within headway targets. It can both ensure that buses do not get delayed, or do not bunch up one behind the other. Active headway management help determine how many buses are needed on a given route per hour in regular circumstances as well as during special events, or during congestion or other disruptive events. Under active headway management, vehicle locations tracking is combined with control center monitoring and supervision to make adjustments to bus positions, travel speeds, and turn-arounds at layover points to alleviate bunching or gapping through one of several means:

- Voice or text communications sent from the operations center to the driver to take action to hold at a predetermined point or adjust other behavior.
- Automated systems input asking operators to target up or down their travel times or to hold at a predetermined locations for a specific period of time (refer to Schedule & Headway Management in vehicles section).
- Authorizing following buses to bypass delayed buses in front of them on the same route.
- Other approaches set target speeds for vehicles based on relative vehicle spacing.

Headway operations work best where dedicated runningways are available and the route is not unduly long.

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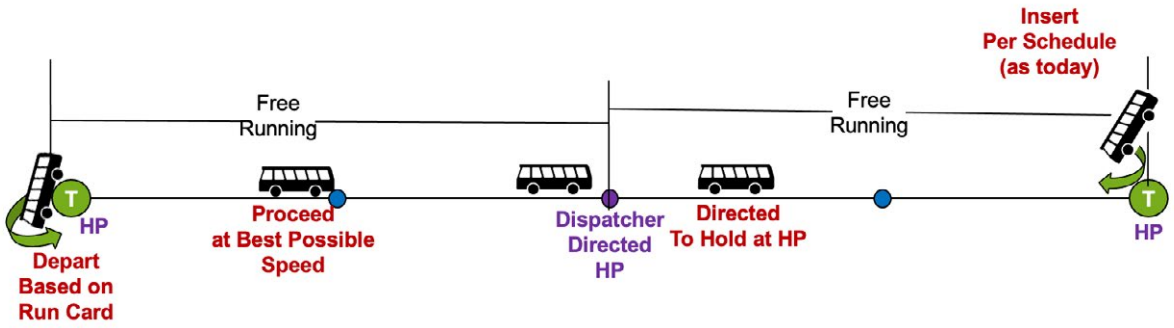

Figure 10: Example of hold & insert approach to active headway management

REQUIRED

Metro Standards

> *BRT-Lite:* 12-minute headway during peak periods. Off-peak headways cannot exceed 30 minutes, except on weekends and holidays.

> *Full-BRT:* 10-minute headway during peak periods. Off-peak headways cannot exceed 30 minutes, except on weekends and holidays.

> *Target:* five-minute headway during peak periods for both services.

Guidelines for Implementation

Pre-requisites

CAD/AVL systems need to be in place to allow vehicle tracking and headway management. If the existing CAD/AVL system cannot support active headway management, the data from the CAD/AVL system can be used for supplemental applications/tools.

There must be an operations center with programs and staff to process information and respond accordingly.

There should be a fleet of standby buses that can be quickly sent along the route to respond to service needs and respect headway minimums.

Roles and Responsibilities

The transit agency must set policies, deploy appropriate supporting tools, and conduct training of operators and communications supervisors to support active headway management.

Requirements

Functional

- Active headway management should be supported by CAD/AVL and high frequency vehicle location tracking.
- Active headway management shall provide a headway focused display to control center operations personnel to enable them to easily view:
  - Bunching & gapping
  - Adjustment points for holds or bypasses
  - Instructions being provided to drivers by the system (if applicable)
  - Physical roadway configuration (e.g. median runningway, etc.)
- Active headway management should take into account segment-based run times (both scheduled and average historical by time of day) to be included in bunching & gapping calculations.
- Active headway management should be tracked and provide performance metrics based on the arrival and departure time of each bus at each station.
- Impacts and integration of BSP functionality with active headway management should be planned and considered so as to create complementary outcomes rather than potentially conflicting ones.

Physical

- Proper active headway management may require additional buses to be available for inserting trips during peak periods or ridership and congestion (depending on the specific headway management approach being used).
- Proper active headway management may require additional field supervisor personnel deployed at key turn-around or layover locations to help reinforce directions to drivers from the operations control center.

Recommendations

Transit agencies should review the potential application of active headway management to BRT corridors where peak frequencies are 12 minutes or more frequent. The approach should be strongly considered where the frequencies are 5 minutes or more frequent. The specific policies and procedures for headway management may vary based on the particular corridor characteristics and dedicated BRT infrastructure.

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REQUIRED

Opportunities and Challenges

The implementation of ITS and Connected Vehicles will provide further operations control and the ability to intervene quickly in instances where traffic disruptions could potentially lead to delays, as well as support improved headway management approaches. Corridor Traffic Flow Prioritization & Autonomous Vehicles, and Bus Interval & Signal Control with Speed Management is a specific example where headway management can be synchronized with signal operations to provide an optimized flow for BRT buses.

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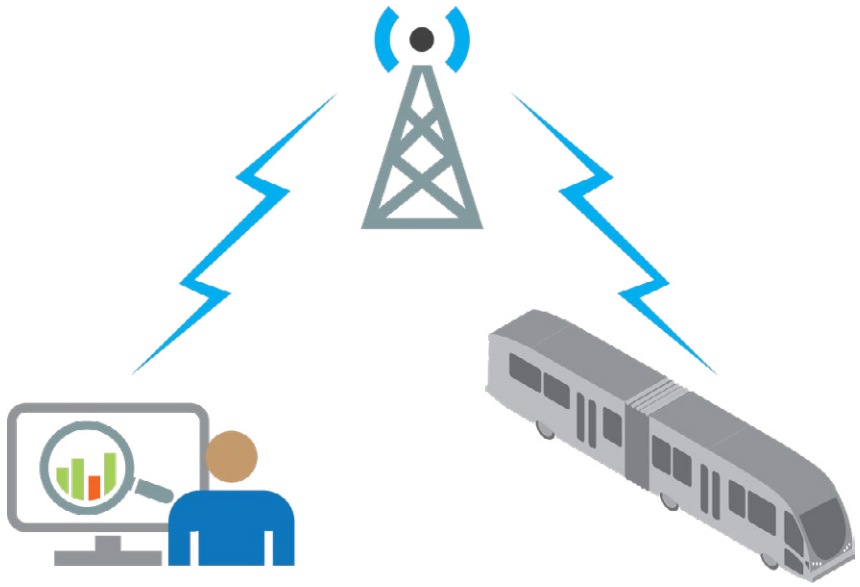

Figure 11: Voice & Data Communications / Source: IBI Group

c. Voice & Data Communications

Voice and Data Communications refer to the technology used to share information between driver and operation center, between vehicle and infrastructure, and between operator, vehicle and rider. It is a central component of CAD/AVL systems. Voice and data communications systems can be through a common device or separated out based on the needs of the agency and existing infrastructure. Voice communications are usually through a land mobile radio (LMR) solution or digital mobile radio system (DMR). Increasingly, some agencies are adopting data-based communications to support mobile Voice over IP (VoIP) which has parallels to the technologies for the voice communications used in many of today's office phone systems. Most transit voice systems utilize a Request to Talk/Priority Request to Talk (RTT/PRTT) approach where communications are set up privately between a communications supervisor at the operations center and a driver. Smaller systems sometimes operate on open talk groups where all operators and communications supervisors can hear all communications to/from vehicles.

Historically, data communications were through LMR or DMR systems, but these solutions limit bandwidth and vehicle location update frequency. Most agencies, including LA Metro, have been moving to data communications through a Mobile Gateway Router (MGR) that centralizes data communications on-board with support for commercial cellular, agency WiFi, and increasingly agency FirstNet cellular solutions. As noted in the on-board architecture overview, the MGR is a critical element for establishing and configuring communications to/from vehicles.

Metro Standards

Reliable voice and data communications are essential to BRT and all fixed route operations and must be deployed.

Guidelines for Implementation

Pre-requisites

Agencies should establish a standardized on-board architecture for their transit and BRT vehicles, which includes a standard approach, equipment, and systems for voice and data communications. Voice communications systems should be common across agencies fixed route fleet and BRT vehicles, and should allow operation staff to effectively manage multiple communication channels for drivers and field staff.

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REQUIRED

Roles and Responsibilities

- The transit agency should provide an operations center and staff to receive and process voice and data communication.
- BRT services and routes should have dedicated communications supervisory personnel during peak periods to monitor operations, manage communications, and proactively make service adjustments as needed.
- The transit agency or a subcontracted third party should install the communication system.
- The transit agency or a subcontracted third party should conduct regular checks and maintenance.
- The transit agency or a subcontracted third party should develop and maintain a mobile application that allow data communication. There should also

Requirements

Functional

- Voice communications preferably should support RTT/PRTT approaches, or at minimum BRT services should be on a separate talk group from the rest of fixed route service.
- Voice communications should be directed and managed by communications supervisory personnel.
- Voice communications should be backed up and archived on a daily interval at a centralized location.
- Voice communications should support a covert listen in function when an emergency or silent alarm is activated by the driver (unless this function is provided by another system).
- The need for a redundant or fallback voice communications solution should be reviewed and depending on the results of the assessment be provided.
- Data communications should support commercial cellular or FirstNet cellular communications that supports high-bandwidth/high-availability communications.
- The potential need for redundant data communications (e.g. through a secondary cellular carrier or fallback LMR/DMR data solution) should be reviewed. In many cases in LA County, redundant solutions will not be selected as the failure rate of primary systems and costs of redundancy does not frequently call for it.
- Data communications should be centralized through an MGR on board BRT vehicles that allows for configuration of data transfer priorities.
- Data communications should provide sufficient bandwidth to support: vehicle location updates (see vehicle tracking section), live video look-in for emergency situations (small subset of vehicles at any one time), system status, vehicle health, passenger loads, and related information.

Physical

- All voice and data equipment on the BRT buses should be robust and ruggedized to provide reliable service in a transit vehicle environment.
- All voice and data communications backhauls should be robust such that communications can be maintained during higher data traffic events and constructed to quickly recover from major incidents.

Recommendations

As noted, voice communications should support an RTT/PRTT approach, and the system should support direct voice communications between operation staff and field supervisors. All BRT should route data communications through an on-board MGR.

Opportunities and Challenges

Voice and Data Communications technologies will determine the extent and level of sophistication that can potentially be used for transit signal priority system, guideway and

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REQUIRED

headway control, on-board safety and customer service. Cloud Services and the innovation resulting from Connected/Automated Vehicle technologies represent tremendous opportunities to bring data communications to high performance levels at the vehicle to vehicle and vehicle to infrastructure level.

Other Related Elements

> Systems - Transit Signal Priority
> Systems - Guideway Control and Management
> Systems - Real-time Customer Information
> Systems - Vehicle Tracking
> Systems - Schedule & Headways Management
> Systems - CAD/AVL
> Systems - Video Live Look-in
> Systems - Arrival Prediction

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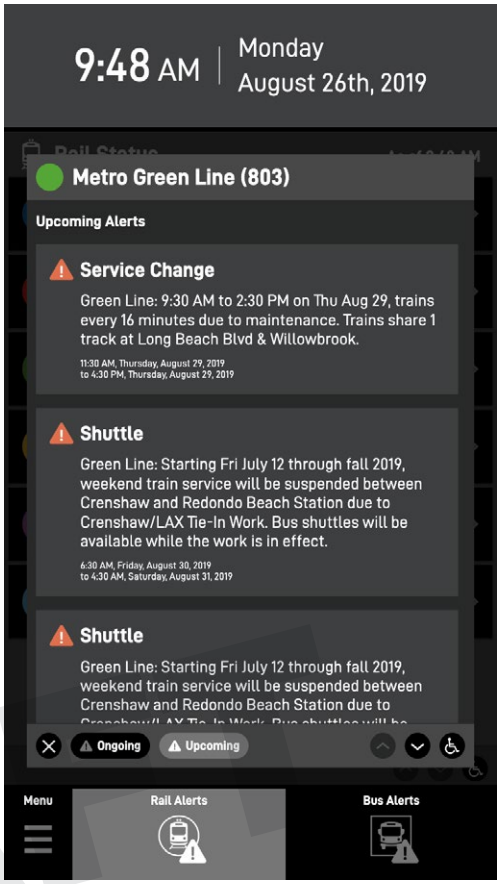
Source: Metro BOC - IBI Group



Source: Metro BOC - IBI Group

d. Arrival Prediction

Arrival Prediction refers to the use of frequent vehicle location information paired with schedule and enhanced prediction algorithms to provide improved arrival prediction.

Tracking BRT buses (usually via GPS-based automatic vehicle location-AVL solutions) is a fundamental requirement. Almost all transit operators in LA County utilize GPS-based solutions as part of a computer-aided dispatch-automatic vehicle location (CAD/AVL) system to track buses for operations, safety, customer information, performance monitoring, and schedule adherence purposes. This also enables the calculation and provision of predicted arrival times based on scheduled adherence as the vehicle progresses throughout the trip and other criteria such as historic performance or other known issues or bottlenecks.

Providing predicted arrival times via mobile applications and other communications channels allows riders to plan around any delays before they arrive at their origin/stop. Riders may seek alternate modes of transportation, or simply plan to arrive at a stop later, effectively reducing wait time and the overall duration of their trip. When predicted arrival times are displayed at the stop for riders who are already there, having this information can reduce the perceived wait during delays. This is all contingent on the data being accurate.

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REQUIRED

Metro Standards

> *BRT-Lite:* Buses should be on time 75% of the time and should arrive within a 12 minute headway during peak periods. Off peak headways cannot exceed 30 minutes, except on weekends and holidays.

> *Full-BRT:* Buses should be on time 80% of the time and should arrive within a 10 minute headway. Off peak headways cannot exceed 30 minutes, except on weekends and holidays.

> *Target:* Buses should be on time 90% of the time and arrive within a 5 minute headway.

Guidelines for Implementation

Pre-requisites

- Vehicles should be equipped with tracking devices. Devices should be connected to a transmission system via WiFi or cloud-based program.
- There should be an operations center with available staff to review and process information.
- Arrival data should be shared with customers via displays at stations, mobile applications (incl. third party apps), and other channels.

Roles and Responsibilities

- The transit agency or a subcontracted third party should install tracking systems on vehicles.
- The transit agency or a subcontracted third party should conduct regular checks and maintenance on tracking devices and transmission systems.
- The transit agency should provide an operations center and staff to review and share updated arrival information.
- The transit agency should continuously monitor the quality of predicted arrival times.

Requirements

Functional

- The system should generate predicted arrival times at least 30 minutes prior to the trip starting.
- The system should provide the last vehicle location coordinates every 30-60 seconds.
- The system should reevaluate and generate new predictions for each stop arrival time as the vehicle progresses in the trip and conditions change.
- Predicted arrivals must be accurate based on predefined acceptable accuracy thresholds. This is done by comparing all predictions made against actual arrival times. Predicted arrival times for a given stop are expected to increase in accuracy as the vehicle gets closer to that stop.
- The agency should implement analytics and tools necessary to evaluate the accuracy of arrival times by stop.

Physical

- The system should produce a standard data feed that helps standardize the way downstream communication channels consume the data and can be consumed by third-party developers / mobile applications. The industry standard is GTFS-realtime; GTFS-realtime is a standard developed by Google for delivering transit real-time data. The data are generated in the Protocol Buffer format and must be integrated with General Transit Feed Specification (GTFS) schedule data to be meaningful to applications that consume the data. GTFS-realtime can include:
  > *Trip Updates* – this feed provides real-time updates on the progress of a vehicle along a trip, including arrival predictions
  > *Vehicle Positions* – this feed provides real-time positioning information for a given vehicle

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REQUIRED

Recommendations

> Technology – All BRT vehicles should be equipped with a Mobile Gateway Router for communications with cloud-based applications as well as internal agency systems.

> Technology – Agencies should consider whether BRT systems are best deployed in an internal or cloud based/SaaS environment.

> The agency should consider developing a process independent of said systems to measure prediction data accuracy.

Opportunities and Challenges

Cloud Services will allow for the more rapid evolution of systems over time and deployment with less investment in fixed infrastructure. In the longer term, *Automated and Connected Vehicles* will bring on new technologies that will further increase communication from vehicles to operators, and from vehicle to vehicle. Deployment of AV and CV fleets will increase speed, safety and efficiency of communication, and of BRT systems overall, thanks to the ability to program more vehicles to make way for priority BRT. Coupled with *Corridor Traffic Flow Prioritization,* this means that virtual lanes or priority for BRT vehicles will be created and further support arrival prediction and service reliability.

Other Related Elements

> Stations/Platforms - Signage and Passenger Information

> Stations/Platforms - Systems Components

> Branding - Stations

> Integration of Transit-oriented Communities - First/Last Mile Connectivity

Reference Documentation (Standards & Codes)

The GTFS-real time specification is detailed at https://github.com/google/transit/tree/master/gtfs-realtime/spec/en. The Protocol Buffer format is detailed at https://github.com/google/transit/blob/master/gtfs-realtime/proto/gtfs-realtime.proto.

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REQUIRED

Source: IBI Group

e. Customer Information

Customer information refers to the ability to provide up-to-date information to riders regarding service and routes. Posted schedules cannot deliver critical information regarding transit delays, therefore real-time bus arrival information is critical. While most users carry mobile devices, real-time information dissemination provided by transportation agencies, on static equipment at the station will provide consistent and accurate information to customers, easily and with equity. Furthermore, given that riders at this point are already at the station and have planned their trip, having accurate real-time information may reduce the perception of delays should they occur.

Metro Standards

- *BRT-Lite:* 75% of all stations provide real-time information
- *Full-BRT:* 90 of all stations provide real-time information
- *Target:* 100% of all stations provide real-time information

Guidelines for Implementation

Pre-requisites

- Digital Display and/or Variable-Message Sign (VMS): Power and High-Speed/High-Bandwidth communication. Content: Source API or other data feed delivering real-time information to display
- The content management system must integrate with agency traveler information systems and ingest real-time data including data in GTFS-real time format

Roles and Responsibilities

- Operations and Maintenance of information – 511 operators at LA SAFE's TIC manage 511 content.
- Transit agency staff must perform regular physical checks of display, and communications infrastructure are necessary.
- The transit agency should continuously monitor the quality of predicted arrival times.

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REQUIRED

Requirements

Functional

Video screens or VMS must be mounted in a space visible and accessible to the greatest number of customers at any given time. Consideration must be given to impeding pedestrian circulation.

Predicted arrivals must be accurate based on predefined acceptable accuracy thresholds. This is done by comparing all predictions made against actual arrival times. Predicted arrival times for a given stop are expected to increase in accuracy as the vehicle gets closer to that stop.

The agency should implement analytics and tools necessary to evaluate the accuracy of arrival times by stop.

- Predicted arrivals must be accurate based on predefined acceptable accuracy thresholds. This is done by comparing all predictions made against actual arrival times. Predicted arrival times for a given stop are expected to increase in accuracy as the vehicle gets closer to that stop.

Physical

Sufficient power to run variable message signs or screens as well as communications infrastructure

- Adequate space to mount hardware
- WiFi or LAN infrastructure
- Location of seating must be addressed in designing optimal placement of video screens
- The system content management system should accept a standard data feed for predicted arrival times. The industry standard is GTFS-real time:
- GTFS-real time is a standard developed by Google for delivering transit real-time data. The data are generated in the Protocol Buffer format and must be integrated with General Transit Feed Specification (GTFS) schedule data to be meaningful to applications that consume the data. GTFS-real time can include:
  - *Trip Updates* – this feed provides real-time updates on the progress of a vehicle along a trip, including arrival predictions
  - *Vehicle Positions* – this feed provides real-time positioning information for a given vehicle

Recommendations

Metro has initiated over the summer of 2019 the deployment of digital displays along the Blue line.

Real-time customer information should be provided on similar displays at major BRT stops and transit stations. A consistent deployment of real time information infrastructure will serve to reinforce Metro's brand; therefore the design of digital displays currently deployed along the Blue line should be retained if possible. There should be minimal interruption to information display from advertising, or an integration of basic arrival updates onto the advertising slides. Displays should be visible and accessible from customer waiting areas. Consider developing displays using transit data; real-time arrival and departure, as well as schedule information, from LA SAFE's 511 system.

Real-time bus arrival times can be displayed using VMS signs; however the recommended approach is to invest in full screen digital displays. VMS are significantly character limited, while screen-based displays provide the flexibility for cross-purpose usage. With the use of digital displays, emergency information, PSAs, advertisements, and other content can be displayed when real-time information is not available or necessary.

Onsite real-time customer information should be simple and concise. Unlike websites or mobile applications which can hold the user's attention for extended periods of time, the screen providing real time information should provide only what the customer needs. Content may include a shortlist such as:

- Next three arrival times (in minutes from current time)
- Service disruption notifications
- Instructions for customers in case of emergency, such as a directive to call 911, or number for other emergency resources

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REQUIRED

To address ADA considerations, audio messages can be disseminated in addition to video or visual messaging.

For stops that do not include digital displays, information regarding ways to access information online should be provided. These may include vertical panels, or placards advertising the 511 telephone service as well as go511.com.

Opportunities and Challenges

Cloud Services, the Internet of Things, and 5G technologies will improve Metro's ability to provide and update information with the least amount of delay possible. Cloud technology could furthermore reduce costs by avoiding storage, data management and other operational burdens. These technologies can also support the development of specialized applications that can provide a full range of information to transit users.

Opportunities can be realized in the cross-functional use of video screens. In case of emergency, real-time transit information may be replaced by content from emergency services.

Real-time information could also be expanded to include *Mobility-as-a-Service (MaaS) and Transportation Network Cooperatives (TNCs)*, to offer fully integrated multi-modal services to commuters.

Connected and Automated Vehicles will also add to the agency's ability to provide real-time information to customers, by removing the "middle man", between vehicles and riders.

The threat of vandalism is a critical challenge to successful deployment of hardware such as digital display screens. Expensive equipment such as screens is susceptible to damage by the public, and may need to be housed in a protective container to ensure its safety.

Other Related Elements

> Stations/Platforms - Systems Components

> Stations/Platforms - Signage and Passenger Information

> Branding - Stations

> Integration of Transit-oriented Communities - First/Last Mile Connectivity

Reference Documentation (Standards & Codes)

The GTFS-real time specification is detailed at https://github.com/google/transit/tree/master/gtfs-realtime/spec/en . The Protocol Buffer format is detailed at https://github.com/google/transit/blob/master/gtfs-realtime/proto/gtfs-realtime.proto.

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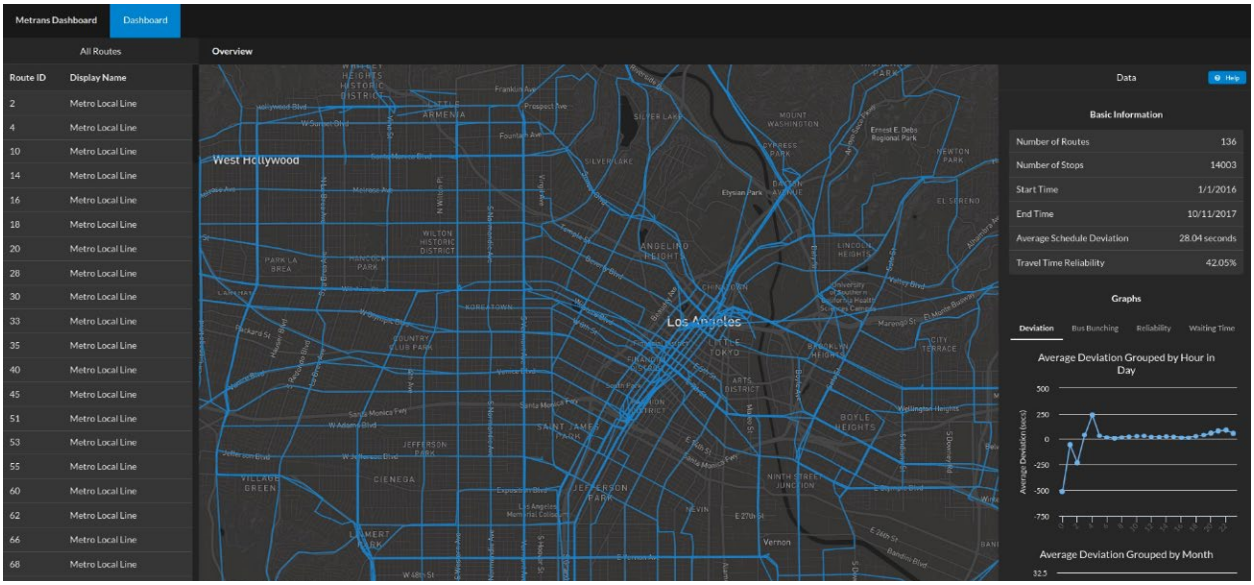
REQUIRED



Source: infolab.usc.edu

f. Business Intelligence

Business Intelligence (BI) refers to a collection of technologies and techniques that are strategically applied by an agency to glean actionable insights from data. It is a tool that can be used to simplify performance tracking and evaluate policy impacts. This is done by integrating and cleansing operational data and presenting it in dashboards and reports that allow agency users to view metrics and key performance indicators and drill down to specific issues or questions. BI sets the foundation for a robust analytic environment starting with prescriptive analytics (what happened) and can enable analysts and data scientists to build predictive (what might happen) and prescriptive (what should we do) models.

Guidelines for Implementation

Pre-requisites

The transit agency should ensure that ownership of data is detained regardless of how operational systems are implemented, be it on premise or in the cloud. The agency should have access to business data under all circumstances with a direct database connection, web services (API), or another agreed upon method for live data access.

Roles and Responsibilities

- The transit agency should identify performance metrics for regular tracking.
- The transit agency or a subcontracted third party will run performance analysis and develop performance reports.

Requirements

Functional

- *Technology* – Using Metro or agency BI tools, BRT should develop specific dashboards and information elements that meet BRT needs. BRT data elements (e.g. ridership, TSP, headway/schedule adherence, service adjustments, pullouts, etc.) should be available in one place for integrated reporting and review.
- *Technology* – BI tools should support real-time (day-of) BRT operations, as well as regular operations review.
- *Operations* – BRT operations should be monitored on a regular basis to implement refinements and service adjustments as needed (e.g. schedule or headway adjustments, addition of trippers based on service needs, etc.)

DRAFT

Physical

Access to data and systems such as CAD/AVL must be established through a direct database connection, web services (API), or another agreed upon method.

Recommendations

The success of a Business Intelligence or performance monitoring solution often hinges on access to quality data. Before BI tools are licensed or built, the agency should attempt to answer critical questions or calculate performance metrics manually at first by analyzing all source data to identify potential issues early in the process. The agency should also assess the impact of querying production systems in real time and impact on system performance, which may necessitate the building of a data warehouse for more intensive analytics.

Opportunities and Challenges

- BRT can serve as an example for best practices for on-going policy and operations assessment and monitoring.
- Changes to schedules and operations can quickly be assessed to determine impacts to customers, operations, and costs to allow more rapid refinement and adjustment.
- KPI tracking and analytics tools, as well as easy access to this information at various levels within the agency should improve over time.
- Broad availability of high-level KPI and metrics data may make issues with baseline data (e.g. schedules, assignments, untracked service changes) more problematic.
- Availability of ready info for BRT services above and beyond regular service may make it more a target for those not supportive of transit.

Other Related Elements

- Operating Characteristics - Service Reviews and Shakeups

REQUIRED

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OPTIONAL (ENCOURAGED)

20 Roadside Elements

a. Transit Lane Enforcement
b. Guideway Control & Management
c. Access Control
d. Ramp Meter Interrupt
e. Connected Bus

a. Transit Lane Enforcement

Transit lane enforcement refers to the various technologies, policies, and institutional arrangements necessary to ensure dedicated or peak hour bus lanes are properly enforced. Although this element is not required, it is strongly encouraged, as the use of bus lanes by unauthorized vehicles can have considerable impacts on bus throughput, on-time performance and speed. Violations of bus only lanes are quite common, and in LA County agencies have noted concerns about TNC (e.g. Uber, Lyft, etc.) stopping to drop-off or pick-up passengers in bus only lane and/or station platform areas. It is generally easier to enforce median runningways or curbside bus lanes that don't allow right-in/right-out access. Enforcement can take the form of manual enforcement by law enforcement agencies, and/or automated camera enforcement. Automated enforcement of bus lanes is common in Europe, but could present some institutional, policy, and procedural challenges in LA County. NY MTA has instituted a bus lane enforcement program called ABLE that uses bus based cameras to capture lane violators and process warnings and ultimately violation fines through the NY DOT. A pilot of this concept is being considered by Metro.

Three basic approaches can be used to apply technology to the bus lane enforcement issue:

> *Video Feeds to Officers* - Provide a live video feed of high violation areas for access to law enforcement so that they can "enforce from around the corner" and then cite violators. This could be used across several locations to maintain visibility and unpredictability of the enforcement activities. This approach reduces institutional and violations processing issues and provides visible enforcement feedback while lowering the work level and exposure of officers.

> *Fixed Cameras in Lanes* - Use cameras at fixed locations with embedded video analytics to determine violators versus vehicles simply passing through the bus lane to access driveways. This can be combined with plate capture and appropriate enforcement processes to provide warning letters followed up by violations for repeat offenders. This approach provides for enforcement when officers are not available and regardless of whether buses are using that portion of the lane at the time.

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OPTIONAL (ENCOURAGED)

> *Camera on Buses* - Use cameras on buses that capture violators and license plates for processing similar to fixed cameras. The advantage of this approach is that field infrastructure is reduced and equipment can be maintained at the bus yard. Additionally, violators that are detected are actually preventing clear passage of a bus.

Metro Standards

While there are not specific Metro standards for bus lane enforcement, keeping bus lanes open for BRT use is crucial to ensuring performance standards can be met and maintained over time, including:

Headway:

> *BRT-Lite:* Buses should arrive at 12-minute intervals.
> *Full-BRT:* Buses should arrive at 10-minute intervals.
> *Target:* Buses should arrive at five-minute intervals.

Speed:

> *BRT-Lite:* Average speed should be 15 MPH.
> *Full-BRT:* Average speed should be 18 MPH.
> *Target:* Average speed should be 20 MPH.

On-time Performance/Reliability:

> *BRT-Lite:* Buses should be on time 75% of the time.
> *Full-BRT:* Buses should be on time 80% of the time.
> *Target:* Buses should be on time 90% of the time.

Guidelines for Implementation

Pre-requisites

A bus lane needs to be in existence with supporting signage and striping that clearly designate the lanes and restrictions on any traffic entering or crossing the lanes. Zones where right turn lanes are allowed to cross or occur from the bus lane would be excluded from enforcement.

Bus lane enforcement cameras are frequently used in Europe / Source: IBI Group

Roles and Responsibilities

Bus lane enforcement requires close coordination between the transit agency, local law enforcement, and local traffic departments. It is likely that Memorandums of Understanding (MOUs) or even some legislative changes may be required, although enforcement options should be within the purview of the local agency councils. The following general responsibilities apply:

- *Transit Agency* – The transit agency would be responsible for budgeting and leading design modification efforts to support lane enforcement, including technologies to detect violators and capture the information necessary for processing warnings and violations. The agency would also need to install appropriate equipment on the buses or along the lanes, and establish operating rules and guidelines. Finally, the transit agency would need to monitor the status of systems and operations.
- *Local Agency DOT* – The local agency DOT would need to review signage and striping for enforcement and coordinate with local law enforcement.
- *Law Enforcement* – Depending on the jurisdiction in which the bus lanes operate, the local law enforcement will need to conduct enforcement activities.

It should be noted that fees from violations would likely not be provided to support transit agencies, but that enforcement activities would be beneficial to transit operations and performance.

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OPTIONAL (ENCOURAGED)

Requirements

Functional

- Need video coverage of the bus lanes where enforcement issues exist with coverage sufficient to capture an image of the vehicle, operator and license plate.
- For fixed cameras in lanes, need video analytics to support identification of actual violators versus vehicles simply crossing the lanes to access driveways or not actually blocking the bus lane.
- Communications from field cameras to central or cloud-based processing system.
- For bus-based cameras, need video coverage forward facing with artificial intelligence to identify violators or support operating tagging. Coverage should be sufficient to capture an image of the vehicle and license plate.
- Method for cellular or yard-based communications to download video to a central or cloud-based solution.
- Video capture and processing system to review potential violators and process warnings or violations.
- Support systems to monitor and maintain video cameras and enforcement systems.

Physical

- Signage and striping to clearly designate bus lanes.
- Mounting structures for cameras to provide a clear view of vehicles in the bus lanes, as well as supporting equipment cabinets. It may be possible to integrate this equipment into BRT stations and equipment enclosures.
- Special signage to note transit lane usage violations and enforcement by cameras.

Other Recommendations

A successful enforcement strategy should plan for frequent enforcement, with high enough violation fees to be an effective deterrent. It should ideally include a mix of both police enforcement and, if allowed, automated camera enforcement. Metro should consider leading a pilot project as part of its BRT service program to assess the benefits of camera enforcement and sustain a dialogue between lawmakers and service providers in the region.

Education and monitoring are two other important components that should be integrated into Metro's enforcement program.

Opportunities and Challenges

Video Analytics can provide automated enforcement options, as well as activate notifications to warn violators. On the other hand, as roadways become more flexible and **dynamic**, lane enforcement might become more challenging, as it would require management systems that can adapt to time of day and demand-driven lane allocation.

Connected Vehicles

Connected vehicle functionality can inform drivers when they are in a transit lane, and ultimately support enforcement activities.

Other Related Elements

> Operating Characteristics - Multiple Services Sharing a Corridor

> Operating Characteristics - Service Reviews and Shakeups

> Runningways - Roadway Geometrics

> Runningways - Traffic Operations

> Systems - Autonomous and Connected Vehicles

Reference Documentation

California Vehicle Code – Specifically ARTICLE 3. Offenses Relating to Traffic Devices [21450 - 21468]

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OPTIONAL

Single lane reversible median busway / Source: Skyscraper Page Forum

b. Guideway Control and Management

Guideways are dedicated runningways for transit or BRT. They can be median running down the middle of an arterial, separated runningway similar to reclaimed ex-railroad right-of-way for the Metro Orange Line, or they can be curbside running. They can have time restrictions and allow exclusively BRT, or other local services as well. In special circumstances, they can also allow use by other vehicle types (e.g. Circulator shuttle, rideshare, carpool). Guideway control and management provides operational guidance, restrictions and guideway flow management to specific runningways based on type of vehicle, time of day, priority rating, etc.

Given constrained right-of-way in many areas of the county where guideways would be implemented for BRT, guideway control and management can apply technologies and operational controls for transit and signals to support:

> *Reversible lanes* – This allows a single lane to be used either interchangeably by direction (e.g. as a median bus runningway in a constrained underpass or interchange environment) or by peak direction (e.g. where the bus runningway exists in a highly peak traffic directional environment).

> *Peak hour lanes* – This allows curbside lanes or other lanes to be adjusted to BRT or bus only lanes during peak periods or based on peaking traffic conditions.

> *Controlled access* – Controlled access can use a variety of signal indications, gates, and/or other technologies and barriers to limit access to a guideway. For example, local services may be integrated to access a BRT guideway at specific locations, but their access to the guideway could be managed based on relative BRT/bus spacing and headways. This can prevent bus bunching at shared stations.

> *Signal interval control for median guideways* – Combining guideway management and control with TSP and signal coordination/ management approaches can provide for programmed intervals that help BRT vehicles move from station to station while hitting fewer red lights. Intervals are programmed and managed with the signal system based on the physical guideway layout and bus headways, then adjustments can be made to vehicle speeds to accommodate these intervals with active TSP measures supporting signal timing adjustments as needed. The overall goal is to develop a more smoothly operating guideway with fewer stops between stations rather than simply pushing a single bus through the guideway as quickly as possible.

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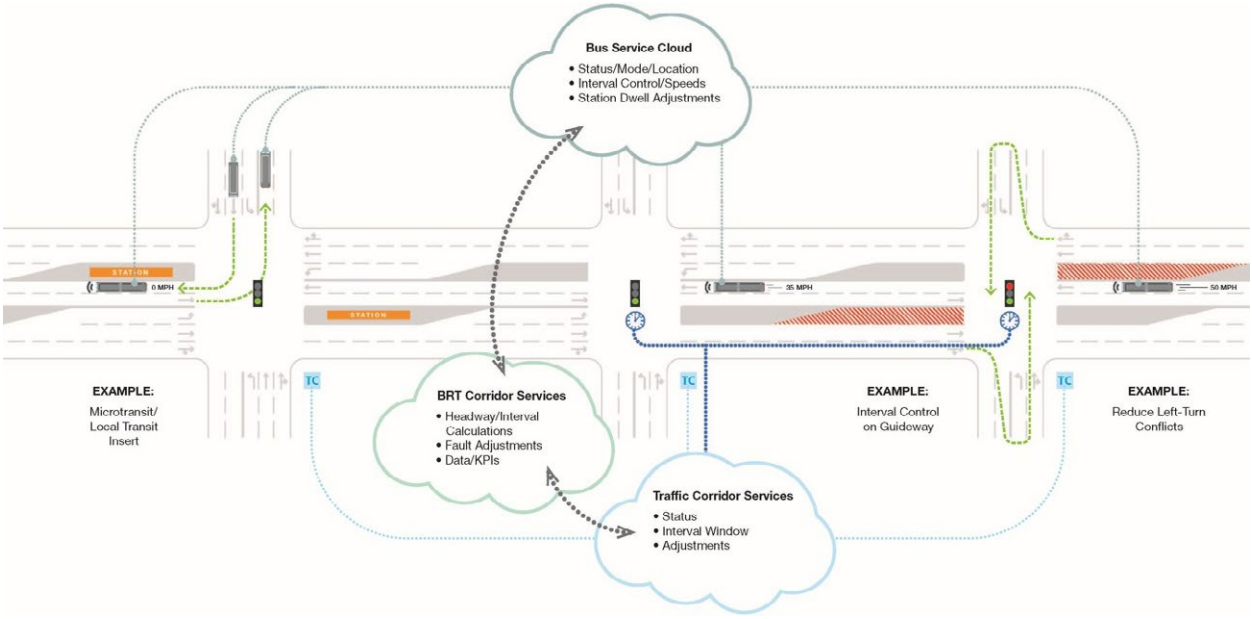

Figure 12: Example Concept of Guideway Interval Control - with the signal system working in conjunction with BRT speeds and managing intervals for vehicles to progress from station to station (local bus access control is also shown) / Source: IBI Group

While many of these can be implemented with static signage and striping, increasingly the expectation of drivers is that roadway lane designations will be clearly available in navigation apps, through electronic signage, and ultimately through connected vehicle technologies and in-vehicle displays.

Electronic signage can dynamically manage BRT Guideways in a variety of conditions / Source: ITVhub

Metro Standards

While there are not specific standards for guideway control for BRT, the use of guideway management and control approaches can be useful in achieving dedicated runningway and TSP standards.

> *BRT-Lite:* 20% of BRT-Lite corridors should have dedicated lanes during peak and 10% at all times. 75% of signals should have active priority (90% of signals on guideways).

> *Full-BRT:* 50% of the corridor should have dedicated lanes. 90% of signals should have active signal priority (100% of signals on guideways).

> *Target:* 100% of BRT corridors should have dedicated lanes. Conflicting left turns should be removed and conflicting driveways should be consolidated. 100% of signals along BRT corridors should have active signal priority focuses on achieving BRT performance metrics.

Guidelines for Implementation

Pre-requisites

In order to be as effective as possible, there are several prerequisites for guideway management and control, including:

- Reliable real-time communications from traffic signals to a central signal control or monitoring system for reporting and operations purposes.

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OPTIONAL

- Frequent vehicle location updates from BRT vehicles to the guideway management system; every second or less for BRT to signal communications, or every 7 seconds or less for cloud based or corridor center-to-center systems.
- Agreements with the agencies managing signals to support programmed signal timing intervals focused on getting the bus from station with no to few stops at signals.
- Appropriate specialized indications for BRT vehicles and buses that will not be confusing to other traffic (e.g. MUTCD compliant).
- Sufficient curb-to-curb width and specialized designed striping and signage to support dynamic or flexible guideway management.

Roles and Responsibilities

The specific roles and responsibilities will vary based on the specifics of the guideway and the methods of control being utilized. In general responsibilities include:

- *Transit agency* – Providing for needed signal system, signage systems, corridor, and communications upgrades to BRT corridors, and on-going operational support budget for maintenance and monitoring. Also providing necessary equipment and supporting communications from the BRT vehicles to the signals and/or access management systems.
- *Local agency* – Implementing or overseeing implementation of guideway control and signal systems and communications, supporting signal configurations in signal timing, implementing timing adjustments to allow for special bus phases where appropriate, monitoring signal operations, and repairing signal related guideway electronics equipment.
- *Contractor* – A consultant is often hired to support the identification of guideway system equipment and suggesting configurations, as well as supporting initial implementation testing and oversight.
- *Specialty Roles* – Simple guideway control and access management can be carried out by typical design, construction, and engineering teams, however if more sophisticated interval control and speed management is desired, then the applications managing it must be specifically developed to meet the project needs. This may involve specialty software, vehicle system, and/or university research contractors.

Requirements

Functional

- Track BRT (every 1 to 3 seconds depending on system) vehicles to determine location and headways/bunching.
- Identify individual buses and vehicles by type to determine if they are "allowed" access to the guideway.
- Provide real-time communications from signals and between signals to a central signal management system for monitoring purposes.
- Supporting electronic signage depending on specific notifications needed to operators which might include:
  - Overhead or shoulder lane designation signage (noting to buses and other vehicles that a lane is currently a bus lane and/or directionality of that lane).
  - Bus signal indications to inform BRT and bus operators of when to enter/proceed along/or exit a guideway.
  - In-vehicle indications for speed or access available (where appropriate).
- For guideway interval control, need communications between bus tracking and signal interval functions to adjust TSP, as well as provide speed inputs to buses.
- Performance monitoring and reporting solution to provide feedback on equipment status, performance, and information for system fine-tuning.

Physical

- Appropriate signage and striping to make guideway access points clear and understandable to both bus operators and general drivers.

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OPTIONAL

- Reduced conflicts (either cross streets or left turns) conflicting with the guideway where possible.
- Gantries or structures to support guideway signage and equipment.

Other Recommendations

The design of runningways must give careful consideration early on to operations, surrounding traffic conditions, physical design constraints, and passenger comfort when the BRT vehicle traverses the guideway at operating speeds. If guideways are not implemented with proper bus detection, signal priority, and management solutions, they can become a "physical trap" where buses are delayed while typical traffic signal operations are performed. The number of potential conflicting cross-street, and left-turn movements should be reduced to the minimum possible. Guideway design and systems should be focused on getting the greatest number of BRT vehicles between each station with little to no stops for signals or other forms of cross-street control. Pedestrian impacts and timing should be carefully considered as these can create significant delays for BRT vehicles, and it is best to board/alight on the far side of a controlled pedestrian crossings where possible with priority given to the BRT vehicle where safe to do so.

Opportunities and Challenges

The following trends and emerging technologies should be considered when designing the physical and technology elements of a guideway:

Dynamic Roadways

As advanced technologies such as **Connected Vehicles** and **Augmented Reality** become more accessible, dynamic roadways will allow the development of flexible road designation that can be adjusted based on demand and need at any given time. This may allow for a reduction in physical signage on the streets and increased use of in-vehicle indications and control.

Cloud-based Solutions

The power and flexibility of cloud based computing and communications solutions offers to simplify guideway management solutions. A cloud-based computing algorithm can receive frequent BRT vehicle position updates and process signal information provided by the signal/signal systems. This allows for more sophisticated adjustments of signal timing and BRT vehicle speeds to increase effectiveness and lower impacts.

Bus Interval and Signal Control

Building on a cloud-based approach, bus interval and signal control seek to manage bus headways through providing speed notifications to operators or controlling BRT speeds in dedicated runningways. Operators still maintain override and directional control of the vehicle. Intervals are placed within the signal timing of the corridor to provide optimal windows for BRT passage from station to station with lower chances of red lights, and active TSP functionality makes minor adjustments where vehicles are slightly off from the planned intervals.

Automated and Connected Vehicles

Automated and connected vehicle functionality should be planned for future implementation along any BRT guideway. It can be anticipated that vehicle to infrastructure connected vehicle functions will be implemented to manage vehicle access, speed control indications, enhance safety at guideway crossings, and ultimately support semi-autonomous or autonomous operations.

Other Related Elements

> Operating Characteristics - Multiple Services Sharing a Corridor
> Operating Characteristics - Service Parameters and Strategies
> Runningways - Traffic Operations
> Runningways - Roadway Geometrics
> Runningways - Intersection Geometrics
> Runningways - Runningway Placement Considerations
> Systems - Transit Signal Priority
> Systems - Access Control
> Systems - Access Control

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Access Control / Source: IBI Group

c. Access Control

Access control describes the process during which a remote operator or program grants access to a bus to and from guideways, to special transit lanes, transit centers, or even shared streets where other vehicular traffic is restricted or prohibited. A LA County example of access control is the current effort to install railroad crossing like control gates at intersections along the Metro Orange Line. The implementation of quad-control gates along the Orange Line will be one of the first North American examples of using this approach to access control for BRT. There are several other applications where technology-based access control can be helpful. Increasingly, as our roadways face demands for broader and more equitable use across modes, the need for restricting or managing access increases. One common example in European cities is restricted access to shared street environments, where there is mixing of low-speed pedestrian, bicycle, bus, and sometimes local access auto/delivery traffic.

While it is possible to manage access to BRT facilities, lanes, transit centers, etc. using signage and striping, active access control can provide a higher level of control and separation. As technologies enhance over time, more dynamic use of roadway space will occur which may need to be combined with various forms of access management and control. In addition, access control may not always be physical in the future. As autonomous vehicles and shuttles proliferate, certain vehicle types may be "electronically" restricted from accessing certain guideways, lanes, shared street spaces, or transit centers.

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Current example of moveable bollards for access control/ Photo Credit: National Signal

Shared street space with access control in Europe (examples exist where local access or bus is allowed / Photo Credit: ITVHub

Metro Standards

While there are not specific standards related to access control for BRT, it can be a useful tool in meeting standards for dedicate lanes.

> *BRT-Lite:* 20% of BRT-Lite corridors should have dedicated lanes during peak and 10% at all times.

> *Full-BRT:* 50% of the corridor should have dedicated lanes.

> *Target:* 100% of BRT corridors should have dedicated lanes. Conflicting left turns should be removed and conflicting driveways should be consolidated.

Guidelines for Implementation

Pre-requisites

The physical design of the BRT corridor or facility must be designed in such a way as to make efficient use of access control and management.

Roles and Responsibilities

Roles and responsibilities will vary on the specific application. In some situations where the access controls are for transit facilities only, the transit agency will be solely responsible for implementation, monitoring, and maintenance. In situations involving local agency right-of-way, the transit agency may support design, monitoring, and funding of operations and maintenance, but the local city or owning agency will likely be responsible for overall monitoring and maintenance. Specific roles and responsibilities should be defined during the planning and design stages.

Requirements

Functional

- Identify individual buses and vehicles by type to determine if they are "allowed" access to the controlled area. Access control is usually based on an RFID tag mounted to the vehicle, but video-based access control is also possible.
- Activation and status monitoring of the access control gates/barriers and systems to operate efficiently and alert when faults occur.
- Supporting communications from the access control systems to operations controls and safety management centers.
- Video feeds to operations or control centers for monitoring and enforcement by operations personnel.
- Clear signal indications to notify vehicles that access has been granted or denied and that the system is operational.

Physical

- Appropriate signage and striping to make guideway access points clear and understandable to both bus operators and general drivers.
- Physical barrier or gates where appropriate to enforce or clarify access points.

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OPTIONAL

Other Recommendations

In an increasingly complex urban mobility environment, access control can be an essential ingredient of supporting an effective BRT system. It can allow BRT vehicles to access areas where other traffic should not be allowed for safety or other considerations. It can limit unwanted vehicle intrusions into dedicated guideways or transit facilities, and it can support a more dynamic use of roadway infrastructure where certain.

Opportunities and Challenges

The following trends and emerging technologies should be considered when designing the physical and technology elements of a guideway:

Dynamic Roadways

As advanced technologies such as **Connected Vehicles** and **Augmented Reality** become more accessible, dynamic roadways will allow the development of flexible road designation that can be adjusted based on demand and need at any given time. This may allow for a reduction in physical signage on the streets and increased use of in-vehicle indications and control.

Reallocation of Roadway Cross-Section/ Complete Streets/Road Diets

With the growing development of shared street concepts, bus services will have the opportunity to provide access and services to areas limited to vehicle circulation. Access control would allow for harmonious shared of the street between public transportation, cyclists, and pedestrians.

Automated, Connected Vehicles and Corridor Traffic Flow Prioritization will continue to play a central role in guideway configuration and access control, facilitating communication between vehicle, operators, and infrastructures.

Other Related Elements

> Operating Characteristics - Multiple Services Sharing a Corridor

> Runningways - Traffic Operations

> Runningways - Roadway Geometrics

> Runningways - Runningway Placement Considerations

> Systems - Guideway Control and Management

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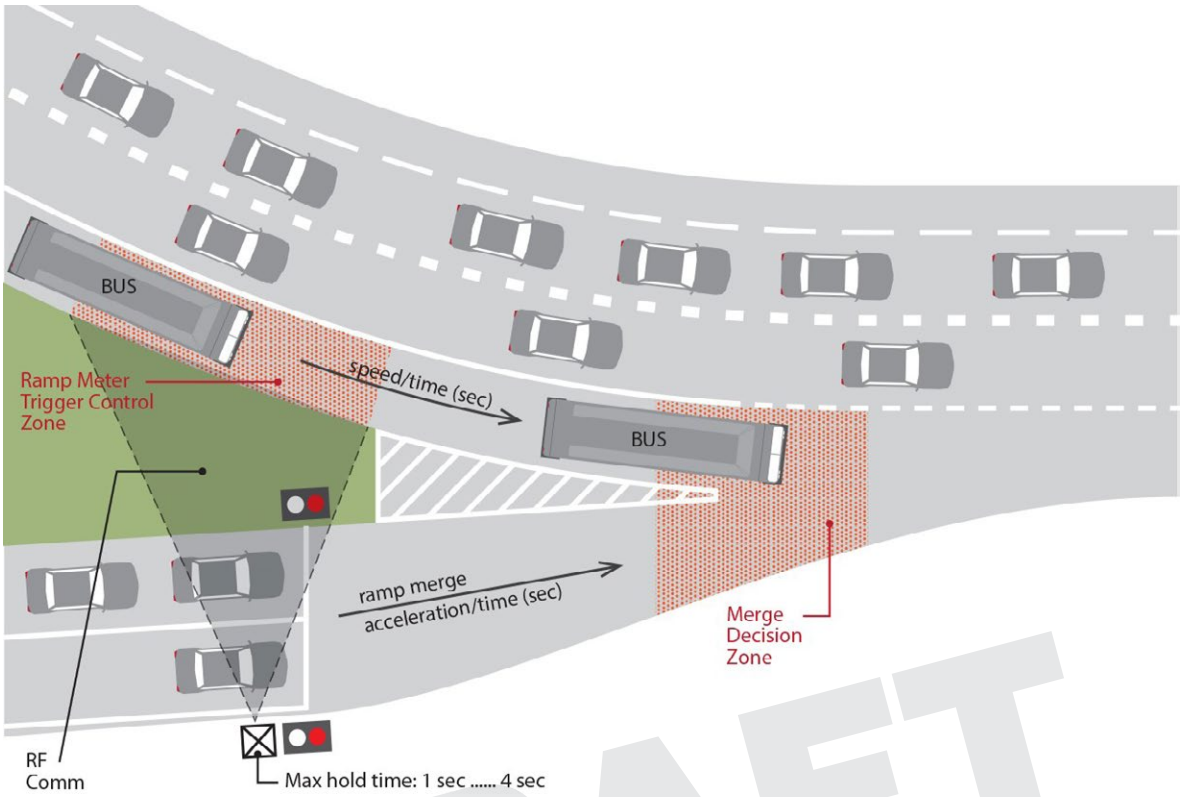

Figure 13: Ramp Meter Interrupt / Source: IBI Group

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d. Ramp Meter Interrupt

BRT services that use freeways for a portion of the route frequently use ramps that are metered to merge onto the freeway. Ramp meters manage the flow rates onto freeways to reduce congestion and limit or delay flow breakdown on the facility. Where freeways are part of a BRT corridor, two types of ramp meter interrupt may prove useful to assist in giving the BRT priority: (1) where multiple on-ramp lanes exist along with an HOV or bus bypass ramp lane; and (2) where a bus on shoulder or transit only shoulder running lane is in use on the outside shoulder that crosses merge areas with on-ramps (see figure above).

In both cases, technologies can be applied to hold regular on-ramp lanes for a few extra seconds when a bus is present. In the case of a bypass on-ramp lane, this allows the bus to easily merge and progress down the ramp while other on-ramp lanes are held. In the case of the shoulder lane, the presence of the bus can trigger a hold of the on-ramp lanes that reduces the potential for conflicts at the merge or auxiliary lane area where the shoulder running bus and the on-ramp traffic has a conflict zone.

Ramp meter interrupt functionality exists in available Caltrans ramp meter software, and a transit only lane/outside shoulder demonstration project is underway in the San Diego region on I-805. Several technology options are available including use of TSP equipment, connected vehicle equipment, and/or video detection to determine the presence of a BRT vehicle. Operating BRT on the outside shoulder does have broader considerations involving physical conditions, operations guidelines and consideration, and typical peak traffic conditions that should be taken into account.

OPTIONAL

Pilot vehicle testing for the outside shoulder transit only lane running BRT with ramp meter interrupt - San Diego, Chula Vista / Photo Credit: IBI Group

Metro Standards

While there are not specific BRT standards for ramp meter interrupt and bypass lanes in the county, they can be part of achieving improved on-time performance and count towards dedicated lanes in some cases when in combination with transit only lane/shoulder lane implementation.

- *BRT-Lite*: Buses should be on time 75% of the time. 20% of BRT-Lite corridors should have dedicated lanes during peak and 10% at all times.
- *Full-BRT*: Buses should be on time 80% of the time. 50% of the corridor should have dedicated lanes.
- *Target:* Buses should be on time 90% of the time. 100% of BRT corridors should have dedicated lanes. Conflicting left turns should be removed and conflicting driveways should be consolidated.

Guidelines for Implementation

Pre-requisites

Ramp meter interrupt techniques assume the presence of an on-ramp with a ramp meter and either a bus bypass lane, HOV lane, or an outside shoulder transit only lane. It is important that the ramp meter operations be tied into and supported by the Caltrans ramp metering system for monitoring and management purposes. If a shoulder transit only lane is used, then operational guidelines must be established for when the buses may operate in the lane. Usually, these guidelines assume that freeway speeds are 35mph or less and that the bus will not exceed 10 mph over the prevailing traffic flow. Adverse weather or lighting conditions may prevent use of the shoulder transit only lane. Improvements are often required to drainage, pavement, and signage to support these operations.

Roles and Responsibilities

Ramp meter interrupt implementation and operations requires close coordination with Caltrans and local agencies impacts by ramp modifications. The following general responsibilities apply:

- *Transit Agency* – The transit agency would be responsible for budgeting and leading design modification efforts to support ramp meter interrupt, including technologies necessary to detect the bus and communicate to the Caltrans ramp meter. Also, the agency would need to install appropriate equipment on the buses, and establish operating rules and guidelines. Finally, the transit agency would need to monitor the status of systems and operations and determine when bus operations using ramp meter interrupts would be allowed.
- *Caltrans* – Would review and approve designs, inspect construction efforts, update ramp meter controllers and software, and monitor ramp meter operations.
- *California Highway Patrol* – Is involved in pilot programming and ensuring safe use of the facility.

Requirements

Functional

- Need to be able to track and detect the position of the bus either on the outside shoulder or the ramp bypass lane (depending on the specific application). Usually this is

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accomplished through TSP or connected vehicle equipment (e.g. On-board Unit & Roadside Unit OBU/RSU).

- For outside shoulder transit only lanes, need to be able to determine if the bus is in the transit only lane or adjoining freeway lanes, as well as monitor and track speeds of the bus and general traffic flows.
- Need to be able to monitor status of the ramp meter and send a single to the ramp meter controller when an interrupt is required.
- Need to be able to set the maximum ramp meter interrupt by ramp meter location.
- Support the ability to track operations and equipment and communications status to monitor and maintain the system.

Physical

- Ramp bypass lane for bus or improved shoulder for transit only lanes.
- Mounting locations for communications equipment and video detection (if used).
- Static signage, electronic signage and signal indications for ramps to inform traffic when an interrupt is occurring.

Other Recommendations

Any mixed flow freeway ramp used by a BRT should have a bypass lane and ramp meter interrupt functionality. If a corridor is intending to utilize an outside shoulder transit only lane, then a ramp meter interrupt functionality is required for any on-ramp merge zones.

Opportunities and Challenges

Automated, Connected Vehicles and Corridor Traffic Flow Prioritization

Connected vehicle equipment and applications are especially well suited to ramp meter interrupt functionality, but are not required to implement it.

Institutional challenges can exist in implementing ramp meter interrupt, and it may be necessary to treat the effort as a pilot program, particularly with transit only lanes on shoulders.

Other Related Elements

> Operating Characteristics - Multiple Services Sharing a Corridor

> Operating Characteristics - Service Parameters and Strategies

> Systems - Transit Signal Priority

> Systems - Connected Vehicle

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Transit Signal Priority / Source: www.ggwash.org

e. Connected Bus

Connected vehicles (CV) refer to the ability of a vehicle to communicate and share information with surrounding roadway infrastructure and technologies using CV standards and protocols. Connected vehicle applications are rapidly evolving, and their use in planning, implementing, and operating BRT corridors should be considered throughout the project development cycle. Connected vehicle functions are usually described as being based on vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-everything (V2X) approaches. This design guidelines section specifically addresses bus to roadside infrastructure functions. These types of connected vehicle applications are most likely to apply to the following functional areas:

- *Transit signal priority* – Where a bus uses CV technologies and protocols to request and process signal priority with a signal controller or system.
- *Vehicle safety* – Where a bus receives feedback from roadside infrastructure on conflicting signal movements, lane closures, or other unsafe conditions.
- *Automatic Boarding* – Where presence of riders is detected and triggers the opening of the vehicle door.
- *Dynamic lane and guideway management control* – Where a bus uses CV technologies to identify lanes, status, directionality, and access points specific to BRT dedicated lanes, such as when it is ok to enter a median runningway, what directionality is set for a reversible lane, or what speed is most appropriate to match timed intervals for signals along a corridor.
- *Yard or transit center management* – Where a bus uses CV technologies in combination with CV roadside equipment to determine bay positions, layover status, and/or parking locations in a transit center or yard.
- *Mobility integration* – Where a bus communicates route, status, and other relevant information to roadside or station-based connected vehicle applications and protocols to support customer information and Mobility as a Service (MaaS) applications.
- *Future autonomous vehicle* – In the future autonomous vehicle functions may be supported by V2I communications and functions.
- *Intersection and roadway safety functions* - V2V and V2I based strategies can offer enhanced safety for transit vehicles and other traffic. This can include such items as red lighting runner warnings, collision warnings, proximity of pedestrians/cyclists, etc. Some bus based CV pilot test efforts are already underway in the LA region.

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Vehicle specific connected vehicle functions are discussed in the vehicle section of the design guidelines.

Metro Standards

No specific Metro BRT standard exists related to connected vehicles and protocols. The technologies can however be helpful in supporting performance standards in a variety of areas.

Guidelines for Implementation

Pre-requisites

In order for connected vehicle applications to be effective, real-time communications should be in place from roadside CV equipment to central traffic and/or network monitoring systems. The end device needs to support the function required of the CV application. For example, TSP can be based on CV communications and protocols, but the end traffic signal controller must be capable of receiving the request and acting upon it.

Roles and Responsibilities

In order to implement CV-based approaches, close coordination between the transit agency and local agencies is required.

- *Transit agencies* – If CV roadside equipment is not already in place, it can be anticipated that the transit agency will need to budget for appropriate equipment along the BRT corridor, as well as ensure compatible equipment is deployed on the BRT vehicles. The transit agency may install, configure, monitor, and maintain vehicle-based CV equipment and applications
- *Local agencies* – Local agencies may install, configure, monitor, and maintain roadside CV equipment and applications.
- *Contractors* – Contractors will likely be needed to support design, implementation, and testing of CV applications along the BRT corridor.
- *Specialty Roles* – For the foreseeable future, CV applications will likely involve research, OEM, or university involvement to help develop and operationalize the applications.

Requirements

Functional

- Connected vehicles can support a wide range of functions, but typically provide location, direction, speed, and Basic Safety Message (BSM) information on a nearly continuous basis. The BSM includes data to support adaptive cruise control, speed harmonization, queue warnings, TSP, and incident/work zone alerts. BSM also includes information on vehicle actions, such as braking, throttle, steering wheel inputs, vehicle path prediction, and many other elements.
- Roadside CV equipment that can receive and process vehicle messages and information, as well as send out status, alerts, and information related to roadside infrastructure elements. For example, CV equipment connected to a traffic controller could be used to notify a bus that cross-street traffic has the "green."
- Roadside and vehicle CV equipment will communicate with vehicles via Dedicated Short Range Communications (DSRC) cellular V2X, and/or 5G.
- Mapping of the roadside infrastructure using CV protocols to identify transit lanes, runningways, other traffic lanes, and related attributes.
- Back office systems to support monitoring of equipment and applications.

Physical

- Physical space should be retained in shelters and in equipment cabinets along BRT corridors to support CV equipment and installations.

Other Recommendations

The exact path forward for CV technologies is not finalized, but it will play an increasing role in the sharing of information and functions between

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vehicles, roadside infrastructure, and ultimately pedestrians and other forms of mobility. As each BRT corridor is assessed, it should be determined what near- and longer-term CV applications may be appropriate. BRT corridors are an excellent opportunity to test CV concepts, but not at the expense of near-term operational effectiveness. When available, OEM buses should be procured with on-board units (OBUs) using CV protocols.

Opportunities and Challenges

Automated and Connected Vehicles hold wide promises of increased safety on the road. They will provide for increased efficiency for many operational functions such as ramp meter interrupt for bus on shoulders, bus arrival at transit centers, routing to/from layover areas, automated accident notification, **Augmented Reality** for driver warnings, transit signal priority, etc. It will also support the development of **Corridor Traffic Flow Prioritization**, and other **Driver-Assist Technologies.**

Cloud Services will support the scaling and deployment of the technology needed to further develop connected vehicles. Paired with the **Internet of Things (IoT) and Mobility as a Service (MaaS)** services, it will allow the full integration of modes into a unified system, as well as the development of a platform where people can obtain immediate access to accurate data.

Artificial Intelligence (AI) Technologies is another core component that will bring further opportunities to develop connected vehicle technologies. If adequate customization can be achieved, it could play a significant role in analyzing systems' performance and adjusting service and mobility options in order to achieve increased ridership, among other things.

Other Related Elements

> Stations/Platforms - Systems Components
> Stations/Platforms - Signage and Passenger Information
> Runningways - Traffic Operations
> Integration of Transit-oriented Communities - First/Last Mile Connectivity
> Systems - Transit Signal Priority
> Systems - Vehicles

Reference Documentation

USDOT Intelligent Transportation Systems Joint Program Office – Connected Vehicle Website Info:

https://www.its.dot.gov/research_archives/safety/cv_safetypilot_progress.htm &

https://www.its.dot.gov/research_archives/safety/transit_v2v.htm

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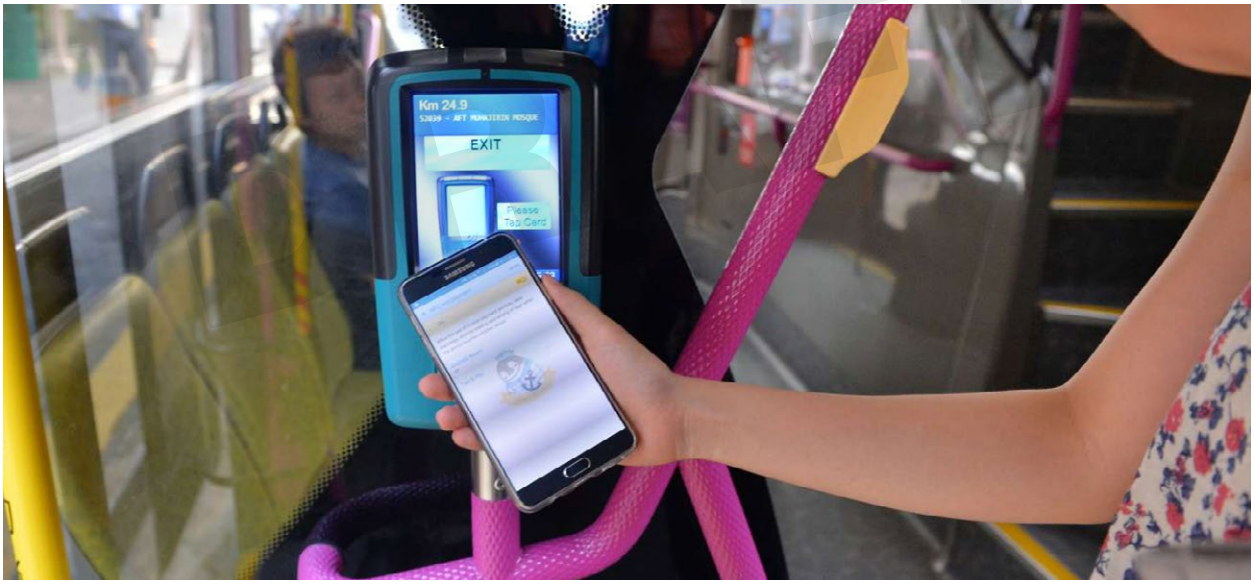
30 Stations

a. Fare Payment & Validation
b. Active Lighting Control
c. Customer WiFi and Charging
d. Technology Support Elements (e.g. 5G, etc.)
e. Digital Advertising



Fare Payment Validation / Source: The Straits Times

a. Fare Payment and Validation

Fare payment and validation options for BRT at stations currently include:

> *Ticket Vending Machines (TVMs)* – That can support cash, credit/debit card, smartcard/pass validation.

> *Smartcard Validators* – That can be used to validate and deduct value or trips from a pre-paid smartcard device.

> *Mobile Fare Payment* – That allows riders to pay on their phone and either display a valid fare payment code or in some cases validate an on-phone smartcard option.

The LA County region has widely adopted the TAP system as a form of fare media, smartcard payment, and validation solution. This allows riders to buy, recharge, and use TAP for fare payment and validation with a variety of fare payment rates and programs.

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Determining the best method of fare payment and validation depends on the specific characteristics of the anticipated riders for the new BRT service. Will a high percentage pay cash fares? This makes fare payment at a farebox at the front of the bus time consuming and generates extended dwells. TVMs may be the answer at locations with high-cash payment, but these systems can be expensive to deploy and maintain, particularly if the agency doesn't already have such as system for other services. If a high-percentage of riders will be TAP users, then it should be determined if validation can be accommodated by validators at each bus door or if prepaid fare zones may be most appropriate. Some agencies mix the two concepts depending on station types (particularly where rail and BRT services may be supported at the same transit station).

Metro Standards

TVMs at stations are not required in the BRT standards as many BRT stop/station locations may lack the space necessary for pre-paid fare zones. However, all-door boarding is required as part of the BRT standards, and this can be supported through a variety of fare payment approaches including using TVMs at stations. Transit Access Pass (TAP) is the regional standard for smartcard fare payment in the region, and any BRT service in the region must support TAP as an option.

Guidelines for Implementation

Pre-requisites

If TVMs and validators are to be deployed at stations, then appropriate power and communications must be designed and deployed for each station to support these elements. Also, security camera coverage of TVM payment areas where cash will be handled or vaults removed must be provided.

Roles and Responsibilities

The agency must specify and contract for the design and deployment of the fare payment equipment at stations. For larger agencies, these systems may be deployed by agency staff once appropriate communications and power are in place. The agency maintains the fare payment equipment at stations, or if multiple agencies use a station, then some form of interagency agreement may be required.

Usually agencies contract for removal of TVM cash vaults at regular intervals. Fare enforcement is conducted by the agency either on vehicle or at prepaid fare zones at stations using either agency or contracted staff.

Requirements

Functional

- Station-based TVMs shall be TAP compatible and allow the distribution, add value, and payment for TAP smartcards and related TAP fare payment devices.
- TVMs shall support all current agency fare programs (e.g. 1-trip, day-pass, monthly, reduced fare programs, etc.)
- If TVMs accept cash payment, then they shall make change.
- TVMs may be deployed without cash payment options (if the BRT line is expected to have very low levels of cash payment), and cash riders would pay at the bus farebox.
- TVMs shall be connected to a central fare system that monitors status of the TVMs, communications, and fare transactions.
- TVMs and validators shall send health alerts to support maintenance.

Physical

- If station prepaid fare zones are used, they shall be clearly marked.
- TVMs shall be placed to not obstruct the flow of pedestrian or station area traffic, as well as comply with ADA requirements.

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- TVMs shall be deployed two per platform to provide redundancy unless the opposite platform TVMs or on-board payment options provide redundancy.

Other Recommendations

Fare payment options are evolving with LA Metro introducing the TAP wallet that allows an account based solution that can be used across multiple mobility options. TAP wallet allows even "unbanked" transit riders to replenish their accounts at designated outlets. Agencies should ensure any TVM and validators deployed can be easily updated to the latest TAP standards.

Opportunities and Challenges

The implementation of new TAP payment options and services, as well as account based solutions may make investments in expensive TVM equipment and infrastructure redundant. If riders can easily charge or pay for fare services and simply TAP validate as they enter any transit vehicle, the usefulness of TVMs is reduced significantly.

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Other Related Elements

> Vehicles - Fare Payment and Validation

OPTIONAL

Active Lighting Control / Source: Franck Michel, Flickr

b. Active Lighting Control

Active Lighting can be added to regular lighting at stations to relay information and enhance safety features. Active lighting control uses technology and sensors to provide active monitoring and management of lighting elements at BRT stations. For example, active lighting control can be set up to:

> Change colors of particular lights or start a lighting sequence based on the approach of a BRT vehicle. Where multiple BRT routes intersect, the lighting color or conditions can be different for different routes. Another example is where a BRT station might be shared with local and BRT services. A lighting sequence or colored lights could be activated when a BRT vehicle approaches at the station, but not when local buses approach.

> Adjust lighting intensity and colors based on ambient lighting needs and presence of customers waiting for a bus. This could allow lighting to use less power when it is not needed.

> Adjust lighting to deter security or loitering concerns where lighting intensity can be increased to discourage extended loitering or reduce shadowed areas.

> Activate specific colors or lighted beacons based on emergency situations with control provided through activation of an emergency phone or operations control center actions. For example, a green light or beacon could be activated to help direct emergency services to the appropriate station platform or area.

Many cities are deploying smart streetlight systems that allow for lighting to adjust based on ambient conditions, presence of people, or specific situations. This simply extends that concept to BRT stations.

Metro Standards

Per the BRT standards, all BRT stations should be designed and implemented with lighting, including lighting in addition or in support of any street lighting that may be present in the corridor. However, active lighting control is a design and operations consideration and is not called for in the standards.

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Guidelines for Implementation

Pre-requisites

The station and lighting elements should be designed with consideration of the possible use of active lighting control. Consideration needs to be given about whether the benefits of active lighting control outweigh the potential drawbacks (e.g. it may prove distracting for neighboring uses/businesses, etc.).

Roles and Responsibilities

The transit agency would typically retain responsibility for the design, implementation, monitoring and maintenance of active lighting control elements. Active lighting control can be driven by automated triggers (e.g. bus arrival), operations control center personnel, and/or safety/security center personnel.

Requirements

Functional

- Ability to set up lighting actions based on various triggers.
- System to detect the pending arrival of a bus at the station (if this is the activation desired), usually triggered by GPS position updates through a cloud-based solution or through a TSP type device.
- Ability to remotely monitor and manage lighting controls and troubleshoot problems.

Physical

- Deployment of individual manageable lighting elements to support desired lighting controls/ actions.
- Deployment of a lighting control/ management device usually networked with communications to a central or cloud-based control system.
- Active lighting elements should clearly distinguish themselves from baseline lighting with the activation trigger and reasons being clearly discernable to customers waiting at the station.

Example of active lighting control at a bus station / Source: Rosco

Other Recommendations

Although motion-detection features are useful to alert customers and drivers of the presence of others, it can leave stations in the dark and provide uncomfortable environments for users. Active lighting control should be limited to areas where surrounding light is already present and where there are not substantial concerns about disturbing neighbors. Noise and movement detection systems should be sensitive enough to detect any human activity, and should light up a wide area to remove dark areas and blind spots. It should also include an alert system transmitted to operations center, to allow quick intervention as needed.

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Opportunities and Challenges

Video Analytics will support the implementation of active lighting control technologies, providing the ability to interpret signals and movement, and communicate these signals as lighting needs.

Other Related Elements

> Stations/Platforms - Lighting

> Stations/Platforms - Systems Components

> Integration of Transit-oriented Communities - Public Realm/Open Space

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OPTIONAL

Active Lighting Control / Photo Credit: Franck Michel, Flickr

c. Customer WiFi and Charging

Customer WiFi is an amenity that can enhance the attractivity of transit and make BRT a preferred mode. It refers to the ability to provide free WiFi services, easily accessible without login credentials, to riders waiting at transit stations. WiFi has other applications at stations, but this section pertains specifically to WiFi services as an amenity to enhance the rider experience and provide the ability for riders to access services that require a higher bandwidth than may be currently available through their selected data plan with their telecommunications service provider.

Metro Standards

Customer WiFi is not mentioned in the standard for Metro BRT-Lite and Full-BRT services.

Guidelines for Implementation

Pre-requisites

- *Service:* Continuous (24/7) access to the selected telecommunications digital network, or cable network through an internet service provider.
- *Power:* Electrical power supply for gateway, routers, access points.
- *Connecting Device (Ruggedized Mobile Gateway (Modem or Modem/Router)):* Supports 3G/LTE/5G or fiber optic connectivity and provides continuous (24/7) access through telecommunications service provider to internet backbone. (Recommended option)
- *Connecting Infrastructure:* Wired alternative to above WAN connectivity, such as fiber optic or DSL. (Secondary option)

Roles and Responsibilities

- Transit agency staff must perform regular physical checks of display and communications infrastructure.
- Transit agency technology managers must annually review and adjust agreements, acceptable standards and per passenger data usage policies (if any) to keep up with quickly evolving technology capabilities.

Requirements

Functional

- *WiFi standard:* All equipment should support IEEE Standard: 802.11n, ac, and ax, with backward compatibility to previous 802.11b and g standards.

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- *WiFi Access Point (with the following capabilities):*
  - > Centralized management and provisioning capability
  - > Back-up power supply
  - > Unlimited In-network Roaming
  - > Limited Number of Uplink Requirements
  - > 2.4 Ghz 802.11 b/g/n Transceiver with Super-G, XRS, Mimo Technologies
  - > 5 Ghz 802.11 a/n/ac Transceiver with Turbo-G and Mimo Technology
  - > Centralized Access Control
  - > Fault-tolerant Infrastructure Implementation
  - > Real-time Client Scanning and Triangulation Services
  - > Advanced Authentication and Session Management
- > *WiFi Mesh Network System (Alternative for large footprint stations or multiple stations within 3000 ft proximity to one another):*
  - All of the above capabilities for the access point plus ability to serve as the backbone uplink for other client devices on the mesh network.

Physical

- *Service:* Service provider agreement
- *Power:* As specified for typical mobile gateways and access points
- *Connecting Device (Mobile Gateway):*
  - > Multi-carrier (3G/4GLTE/5G); dual SIM for carrier failover and flexibility
  - > Flexible 9-30 VDC power input
  - > Ruggedized (e.g., MIL-STD-810G certified for shock, vibration, temperature; IP5
  - > Interfaces (e.g., Ethernet port, DB9 or USB)
  - > WiFi AP support
- *Connecting Infrastructure:* Last mile fiber optic cable or DSL cable (secondary alternative)

Other Recommendations

Customer WiFi at stations and onboard the BRT vehicle is an important feature to ensure safety, allow transit riders to quickly communicate with operators or law enforcement, and improve the rider experience and perceptions of convenience. It is also a useful tool to access real-time information regarding routes, schedules, service disruption, TNCs, and other MaaS elements. Although most people currently have access to data via their mobile devices, customer WiFi should be made available at major transit stations in the short term.

Transit agencies should investigate possibilities for realizing economies of scale by using WiFi infrastructure deployed on BRT vehicles. Further economies of scale may be realized by the use of mesh network systems that provide WiFi coverage over a larger area and requiring a smaller number of uplinks to the internet backbone.

The availability of WiFi service should be advertised at stations on signage, as well as folded into the rotation of content on other screens or equipment being deployed for information dissemination.

Opportunities and Challenges

The Gig-based Economy implies that more and more people are working based on limited term contracts and changes in travel pattern. Customers may need to constantly stay connected and work in informal places. The ability to use WiFi while waiting at transit stations, as well as on the bus can support the need of this type of worker.

Opportunities for branding and customer service can be realized by using a WiFi portal. While the recommendation is to provide free WiFi, the agency should firewall the service with a page requiring users to agree to Terms and Conditions. This page can be used to advertise agency services, provide a method by which users can provide feedback, or connect with a mobile application providing customer service and emergency communication.

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OPTIONAL

Internet technology is currently deployed using 4G networks; however, 5G is becoming available and the preferred option in some settings for service providers. 5G is still in the rollout stages in many cities, including Los Angeles. Agencies should take care to investigate the viability of deploying free WiFi in areas where 5G is available, but also ensure that 4G LTE services continue to be supported until the 5G network matures. Stations outfitted with WiFi running on 4G must also ensure that equipment deployed has cross-compatibility with 5G to accommodate this transition period between the two protocols.

Other Related Elements

- Operating Characteristics - Fare Collection and Boarding Protocols
- Stations/Platforms - Signage and Passenger Information
- Branding - Stations
- Integration of Transit-oriented Communities - First/Last Mile Connectivity
- Integration of Transit-oriented Communities - Stations

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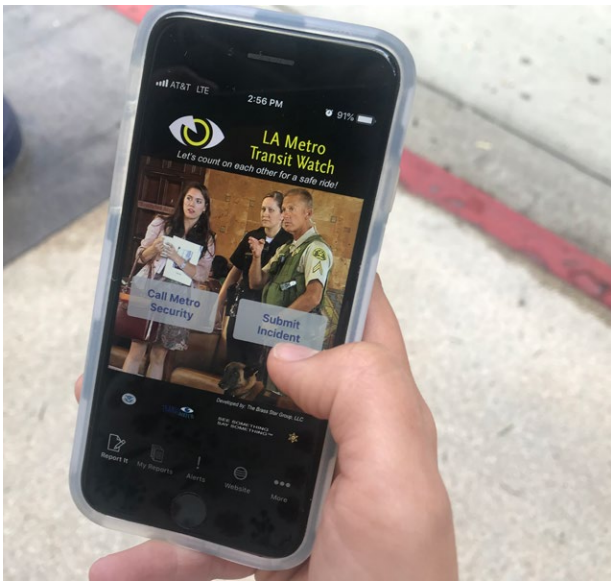

Technology Support Elements / Source: IBI Group

Technology Support Elements / Source: San Diego Reader

d. Technology Support Elements

Technology Support Elements refer to upcoming technologies such as 5G and supporting data platforms, which will allow for quick sharing of data and information between individuals, vehicles, infrastructures, and operations. 5G in particular has upcoming releases that will provide enhancements in flexibility, scalability and efficiency, and will enable very high bandwidth transmissions for streaming video, supporting security cameras and WiFi access points, with low latency communications that will be needed for use with potential future remote communications capabilities for vehicle control, real-time passenger information, security/environmental sensors, or other Internet of Things (IoT) applications. 2019 is considered to be the initial deployment year for 5G, but it could be another few years before Los Angeles joins the cities who already have limited rollouts of this technology. Telecommunications service providers often start by rolling out the technology at specific sites and venues (such as stadiums or large event centers). Therefore, the extensive 4G LTE networks will continue to provide the underlying technology in the near term until 5G is fully deployed by various telecommunications service providers. Additionally, 5G has some limitations that telecommunications service providers must overcome with subsequent releases of the technology – namely poor wall penetration and short range of coverage. An alternative to fixed wireless solutions like 5G and its predecessors are wired solutions such as fiber optic, DSL and cable infrastructure, and their respective service providers. The various wired solutions would be considered a secondary alternative due to the high initial cost and inflexibility of installation.

Metro Standards

Metro does not have stated standards for Technology Support Elements.

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Guidelines for Implementation

Pre-requisites

In order to be as effective as possible, there are several prerequisites for supporting technologies, including:

- Power supply
- Connectivity mechanisms, either wired (e.g., fiber-optic cable) or wireless (e.g., Wide-area Network (WAN)) access to the telecommunications service provider's network (i.e., 4G LTE or 5G digital cellular service).
- Continuous, reliable communications service (i.e., 4G LTE or 5G digital cellular service) will need to be active and available to stations and configured to allow agency remote or physical access to the router, access point, and service (for security equipment, fare payment applications) or to set up and enable customer WiFi access upon station activation.
- Implementation and verification of seamless interoperability between station communications equipment and BRT on-vehicle communications equipment to support technology-based amenities such as customer WiFi access points, and agency needs/capabilities such as passenger counting.
- Reliable, real-time communications from stations to an operations center or monitoring system for reporting and operations purposes.
- Agreements with telecommunications service providers will need to be in place between Metro and the service provider to accommodate any selected technologies that rely on cellular service or other wire-line services (if applicable).
- Agreements or memorandums of understanding may need to be in place between Metro and other municipalities where services, equipment or infrastructure will be shared or used cooperatively.

Roles and Responsibilities

- *Transit agency* – Provide needed connectivity to the digital cellular network (e.g., 5G, 4G LTE, etc.) by either wireless or wired communications infrastructure (or upgrades) to BRT corridors, including on-going operational support budget for maintenance and monitoring. Also provide necessary equipment and supporting communications services from the BRT stations or vehicles to the central operations and management centers, and data analytics tools for managing system performance or informing other systems such as passenger counting or fare payment systems.
- *Local agency* – Depending on division of responsibilities within each jurisdiction, local municipal agencies, may be responsible for some of the previously described transit agency responsibilities, and/or implementing or overseeing implementation of communications systems improvements, supporting communications equipment or system configurations, monitoring equipment operations and maintenance, or the administration of agreements with communications service providers.
- *Contractor* – Contractors may be responsible for the installation of communications systems, including supporting communications equipment or system configuration, providing communications system management tools or analytics.
- *Service Provider* – Service providers, such as telecommunications service providers or internet service providers (ISPs), will be responsible for providing either the commercial digital cellular communications services or, fiber optic or DSL services respectively, required to support interactions between points of service (stations or buses or operations centers) and the service provider's communications network.

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Requirements

Functional

- *Service:* Continuous (24/7) access to the selected telecommunications digital network, or cable network
- *Power:* Electrical power supply for routers, access points, and other integrated communications equipment
- *Connecting Device (Ruggedized Mobile Gateway):* Supports 3G/LTE/5G connectivity and provides continuous (24/7) access to telecommunications service. (Recommended option) or similar
- *Connecting Infrastructure:* Wired alternative to above WAN connectivity device, such as fiber optic or DSL. (Secondary option)

Physical

- *Service:* Service provider agreements
- *Power:* As specified for typical mobile gateways and access points
- *Connecting Device (Mobile Gateway):*
  - > Multi-carrier (3G/4G LTE/5G); dual SIM for carrier failover and flexibility
  - > Flexible 9-30 VDC power input
  - > Ruggedized (e.g., MIL-STD-810G certified for shock, vibration, temperature; IP5
  - > Interfaces (e.g., Ethernet port, DB9 or USB)
  - > WiFi AP support
- *Connecting Infrastructure:* Last mile fiber-optic cable or DSL cable (secondary alternative)

Other Recommendations

Stations should be designed to accommodate future technology support elements such as routers to connect to current digital cellular networks, and upcoming 5G. Interactive displays, fare payment infrastructures, passenger counting, security cameras and supporting mobile applications will all be transformed by and dependent on these new technologies. Therefore, stations should include space within the cabinet enclosure to support gateway routers for digital cellular service connections for WANs and customer WiFi. Cabinet infrastructure and housings should be an integrated yet modular design that accommodates easy connections to power and communications infrastructures and allows items, such as routers or access points, to be easily replaced as technology changes. When specifying technologies, robust and flexible equipment would be most cost effective. For example, when selecting routers, especially during this period of transition from 4G to 5G, a multi-carrier/multi-service capability is recommended where one router can switch between carriers and services as conditions dictate.

While wireless technology is the preferred trend, fiber-optic infrastructure may be available along certain BRT corridors. Running ways near stations should be designed to also allow for connections to fiber-optic communications infrastructure to support selected technologies (if needed).

A review should be conducted prior to and during the detailed design for a BRT station's communications infrastructure and the development of other supporting technology equipment specifications to determine what capabilities and services are currently available from the telecommunications service provider, router/modem technology providers, and trends in consumer technology capabilities. Additionally, it will be necessary to determine if service agreements and existing infrastructure support the design and specifications, or if upgrades or updates will be needed.

Opportunities and Challenges

Technology support elements will play a pivotal role in enhancing stations amenities such as customer WiFi, security devices, customer information displays, increasing the quality and speed of Video Analytics, or enabling the implementation of Artificial Intelligence Technologies.

Mobile Communications Standards

Internet technology is currently deployed using 4G networks; however, 5G is becoming available and will become the preferred option for providers over the next few years. Stations

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outfitted with systems and technologies running on 4G LTE may find the service reaches end of life in a short period of time (5-7 years). Low latency, high bandwidth, and connection density (more devices) are some of the primary advantages of 5G as the new standard for cellular-based broadband, thus creating a direct benefit over WiFi nodes that are connected to a fiber-optic network and require a more significant investment in physical infrastructure. An interim Gigabit-Class LTE is a higher-performance expansion of 4G LTE and is touted to be a pathway to 5G; additionally, 5G is not anticipated to replace 4G in the very near term, but will work in concert with 4G during the transition. Selection of routers and other broadband infrastructure will require an examination of current standards and anticipated near term changes in technologies at the time of deployment.

Some example use cases and opportunities for the currently available and emerging standards may include:

Mobility Data Specifications

Connectivity and interoperability with other mobility modes and services is a desired characteristic of BRT. Connectivity among modes requires data sharing and governance of the data. The capabilities in this realm are evolving quickly, so there will be a need to re-examine the available technologies and tools every few years. Currently, for example, the City of Los Angeles has developed a Mobility Data Specification (MDS), a publicly available data and API standard (for agencies and providers) that allows an agency to collect, analyze, and compare real-time data from Mobility-as-a-Service (MaaS) companies. Originally intended for visibility into dockless mobility devices, MDS has potential to facilitate the exchange of data for a much broader set of mobility services, including private mobility and car sharing that would help agencies gain visibility into regulatory compliance challenges (such as curb management) and would help make connections and trip planning more seamless for customers. Metro's back-office connections to this tool and/or similar tools will be important as part of the support technology suite for BRT. A challenge accompanying this data specification includes privacy concerns and competitive sensitivities associated with the private companies that are requested or required to share data.

5G Small Cell Tower Range and Penetration

The benefits of 5G are dependent upon a denser network of smaller cells due to current range and penetration limitations for 5G. The implementation and installation of the "small cell" towers needed for 5G will require local municipality/government authorization. A clear understanding of existing infrastructure around the proposed station will be key in determining how to best support the proposed technology devices and applications proposed for BRT stations.

Use Case	4G LTE	Gigabit-Class LTE	5G
Video for Surveillance	Visual recognition	HD visual recognition	Machine recognition & automatic triggers
Video for Public Safety	Video capture for analysis after event	Real-time HD video monitoring	Machine recognition and response
Wireless WAN	No wired/fiber infrastructure needed; accommodates low bandwidth requirements	No wired/fiber infrastructure needed; may accommodate higher bandwidth requirements	No wired/fiber infrastructure required; accommodates fiber-like requirements
Transit Vehicles	Tracking and telemetry applications (AVL)	Multi-media applications	Real-time driver assist and autonomous applications

Table 2. Summary of Short Urban Rail Routes

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Other Related Elements

> Operating Characteristics - Fare Collection and Boarding Protocols

> Stations/Platforms - Systems Components

> Stations/Platforms - Signage and Passenger Information

> Branding - Stations

> Branding - Stations

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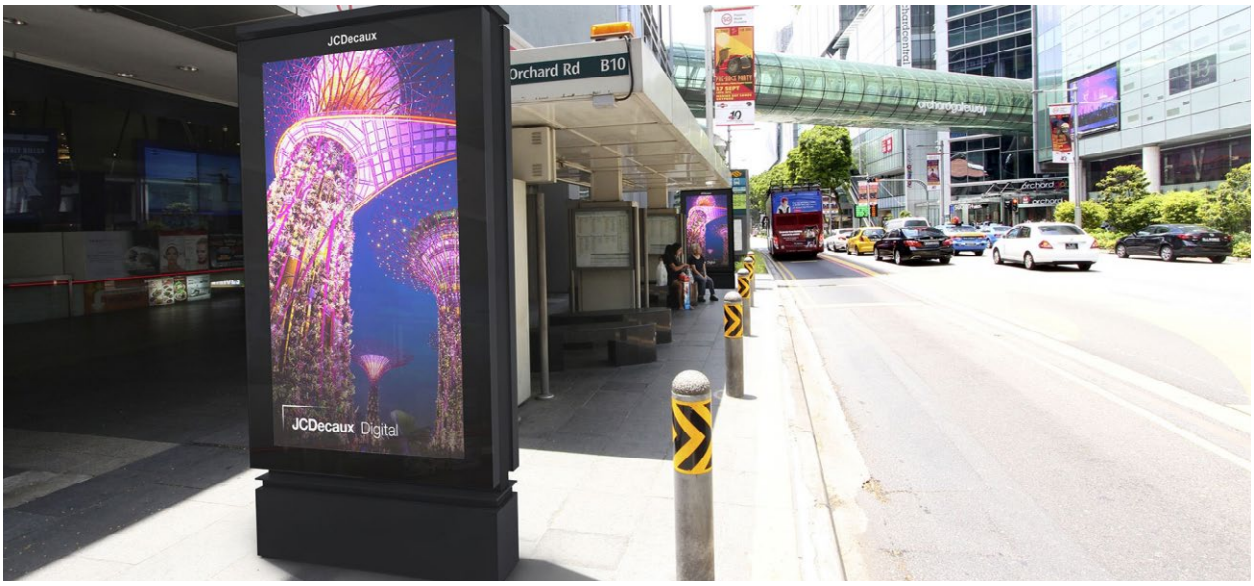

Digital Advertising Example/ Source: JCDecaux Singapore

e. Digital Advertising

Digital advertising represents an opportunity to integrate customer information needs, advertising opportunities, and even entertainment options for people waiting for a bus. Highly visible and ruggedized electronic displays are increasing being utilized to fulfill advertising contract needs/ opportunities, as well as customer information at rail and busy bus stops. Depending on the location and right-of-way considerations of the stops, digital advertising can be supported by agency deployed and managed systems and equipment or through contracted relationships with third party advertising companies.

LA Metro has been rolling out digital advertising mixed with customer information and service alerts through an arrangement with a third party at rail stations. Equipment is deployed and maintained by the third party which allows certain space and screen allocations for customer information needs. A similar approach could be utilized for other rail services and BRT corridors depending on institutional agreements and current advertising contact considerations.

Metro Standards

Metro has not established standards for digital advertising at BRT stations. However, deployment of digital advertising should be restricted to high-volume stations with good security, lighting, and vandal resistant enclosures. Also, the types of digital advertising and enclosures should enhance, support, or at least not conflict with the branding elements of the BRT.

> *BRT-Lite:* BRT designator on stations and vehicles.

> *Full-BRT:* Distinctive design and logo, coordinated colors, and art.

Guidelines for Implementation

Pre-requisites

Availability of power and communications to the location of the advertising display.

Roles and Responsibilities

The transit agency is responsible for incorporating the space, power, and communications drops to support near-term or future planned digital advertising displays. The transit agency may need to review and negotiate allowances for the displays with other agencies

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if the station resides outside the transit agency right-of-way. In any event, the transit agency will need to negotiate advertising fees and requirements for content provision, maintenance and installation of the displays.

Advertising companies may take on the full roll of providing, installing, delivering content, and maintaining the display. Communications may utilize the transit agency backbone communications to stations or be provided separately.

Requirements

Functional

- Provide customer information feeds for inclusion into digital advertising content.
- Provide management tools for content management and framing (if not provided by contractors).
- Displays should be bright enough to be easily visible in direct and/or bright sunlight.

Physical

- Provide conduit and pullbox/cover for future potential digital advertising pylons.
- Provide power and communications for installed advertising pylons/displays.
- Enclosures should be vandal and weather resistant.
- Advertising pylons should not take up space under the shelter canopy that could be used for customers.

Other Recommendations

Although it can bring revenue, digital advertising should be secondary to service information and updates. Standards must be developed that allow for presentation of digital advertising only secondarily to critical information dissemination. Advertisements should be run only after real-time transit arrival information, emergency access instructions and information, and potentially PSAs have adequate time for display.

Interactive Adobe EchoSign Game / Source: Owen Jones

Opportunities and Challenges

Digital advertising provides benefits not available in static, printed panel advertising. The frequency and duration of advertising can be adjusted based on the importance of other information.

Other Related Elements

> Stations/Platforms - Signage and Passenger Information

> Stations/Platforms - Systems Components

> Branding - Stations

> Systems - Customer System Information

> Integration of Transit-oriented Communities - First/Last Mile Connectivity

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40 Vehicles

a. Connected Bus
b. Autonomous Vehicle Control/Driver-assist Systems
c. Vehicle Health
d. Onboard WiFi

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a. Connected Bus

Connected vehicles (CV) refer to the ability of a vehicle to communicate and share information with surrounding roadway infrastructure and technologies using CV standards and protocols. Connected vehicle applications are rapidly evolving, and their use in planning, implementing, and operating BRT corridors should be considered throughout the project development cycle. Connected vehicle functions are usually described as being based on vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-everything (V2X) approaches. This design guidelines section specifically addresses bus to roadside infrastructure functions. These types of connected vehicle applications are most likely to apply to the following functional areas:

> *Transit signal priority* – Where a bus uses CV technologies and protocols to request and process signal priority with a signal controller or system.

> *Vehicle safety* – Where a bus receives feedback from roadside infrastructure on conflicting signal movements, lane closures, or other unsafe conditions.

> *Automatic Boarding* – Where presence of riders is detected and triggers the opening of the vehicle door.

> *Dynamic lane and guideway management control* – Where a bus uses CV technologies to identify lanes, status, directionality, and access points specific to BRT dedicated lanes, such as when it is ok to enter a median runningway, what directionality is set for a reversible lane, or what speed is most appropriate to match timed intervals for signals along a corridor.

> *Yard or transit center management* – Where a bus uses CV technologies in combination with CV roadside equipment to determine bay positions, layover status, and/or parking locations in a transit center or yard.

> *Mobility integration* – Where a bus communicates route, status, and other relevant information to roadside or station-based connected vehicle applications and protocols to support customer information and Mobility as a Service (MaaS) applications.

> *Future autonomous vehicle* – Future autonomous and connected vehicle functions may be supported by V2X communications and functions for a variety of operational and safety features.

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Vehicle specific connected vehicle functions are discussed in the vehicle section of the design guidelines.

Metro Standards

No specific Metro BRT standard exists related to connected vehicles and protocols. The technologies can however be helpful in supporting performance standards in a variety of areas.

Guidelines for Implementation

Pre-requisites

In order for connected vehicle applications to be effective, real-time communications should be in place from roadside CV equipment to central traffic and/or network monitoring systems. The end device needs to support the function required of the CV application. For example, TSP can be based on CV communications and protocols, but the end traffic signal controller must be capable of receiving the request and acting upon it.

Roles and Responsibilities

In order to implement CV-based approaches, close coordination between the transit agency and local agencies is required.

- *Transit agencies* – If CV roadside equipment is not already in place, it can be anticipated that the transit agency will need to budget for appropriate equipment along the BRT corridor, as well as ensure compatible equipment is deployed on the BRT vehicles. The transit agency may install, configure, monitor, and maintain vehicle-based CV equipment and applications.
- *Local agencies* – Local agencies may install, configure, monitor, and maintain roadside CV equipment and applications.
- *Contractors* – Contractors will likely be needed to support design, implementation, and testing of CV applications along the BRT corridor.
- *Specialty Roles* – For the foreseeable future, CV applications will likely involve research, OEM, or university involvement to help develop and operationalize the applications.

Requirements

Functional

- Connected vehicles can support a wide range of functions, but typically provide location, direction, speed, and Basic Safety Message (BSM) information on a nearly continuous basis. The BSM includes data to support adaptive cruise control, speed harmonization, queue warnings, TSP, and incident/work zone alerts. BSM also includes information on vehicle actions, such as braking, throttle, steering wheel inputs, vehicle path prediction, and many other elements.
- Roadside CV equipment that can receive and process vehicle messages and information, as well as send out status, alerts, and information related to roadside infrastructure elements. For example, CV equipment connected to a traffic controller could be used to notify a bus that cross-street traffic has the "green."
- Roadside and vehicle CV equipment will communicate with vehicles via Dedicated Short Range Communications (DSRC) and/or 5G.
- Mapping of the roadside infrastructure using CV protocols to identify transit lanes, runningways, other traffic lanes, and related attributes.
- Back office systems to support monitoring of equipment and applications.

Physical

- Physical space should be retained in shelters and in equipment cabinets along BRT corridors to support CV equipment and installations.

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Other Recommendations

The exact path forward for CV technologies is not finalized, but it will play an increasing role in the sharing of information and functions between vehicles, roadside infrastructure, and ultimately pedestrians and other forms of mobility. As each BRT corridor is assessed, it should be determined what near- and longer-term CV applications may be appropriate. BRT corridors are an excellent opportunity to test CV concepts, but not at the expense of near-term operational effectiveness. When available, OEM buses should be procured with on-board units (OBUs) using CV protocols.

Opportunities and Challenges

Automated and Connected Vehicles hold wide promises of increased safety on the road. They will provide for increased efficiency for many operational functions such as ramp meter interrupt for bus on shoulders, bus arrival at transit centers, routing to/from layover areas, automated accident notification, **Augmented Reality** for driver warnings, transit signal priority, etc. It will also support the development of **Corridor Traffic Flow Prioritization**, and other **Driver-assist Technologies.**

Cloud Services will support the scaling and deployment of the technology needed to further develop connected vehicles. Paired with the **Internet of Things (IoT) and Mobility as a Service (MaaS)** services, it will allow the full integration of modes into a unified system, as well as the development of a platform where people can obtain immediate access to accurate data.

Artificial Intelligence (AI) Technologies is another core component that will bring further opportunities to develop connected vehicle technologies. If adequate customization can be achieved, it could play a significant role in analyzing systems' performance and adjusting service and mobility options in order to achieve increased ridership, among other things.

Other Related Elements

> Stations/Platforms - Systems Components
> Stations/Platforms - Signage and Passenger Information
> Runningways - Traffic Operations
> Integration of Transit-oriented Communities - First/Last Mile Connectivity
> Systems - Transit Signal Priority
> Systems - Vehicles

Reference Documentation

USDOT Intelligent Transportation Systems Joint Program Office – Connected Vehicle Website Info:

https://www.its.dot.gov/research_archives/safety/cv_safetypilot_progress.htm &

https://www.its.dot.gov/research_archives/safety/transit_v2v.htm

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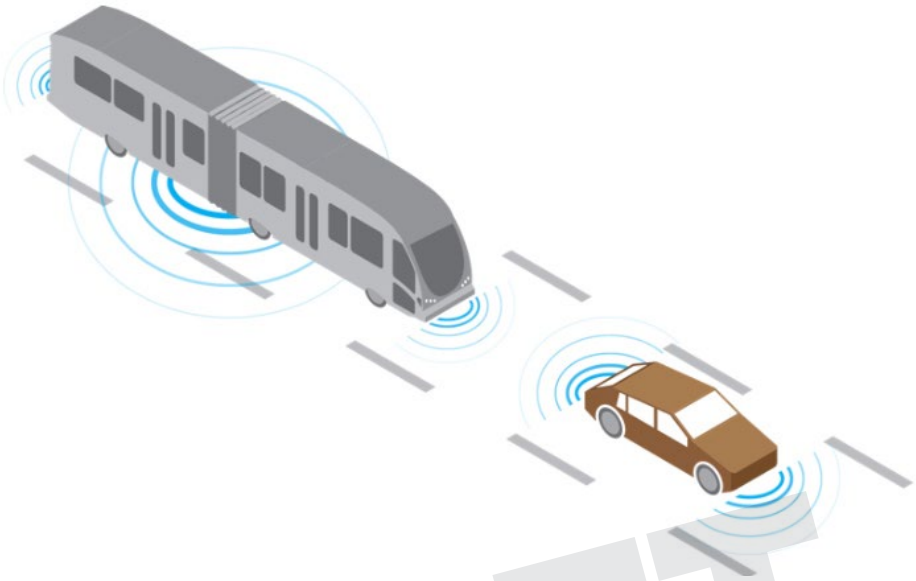
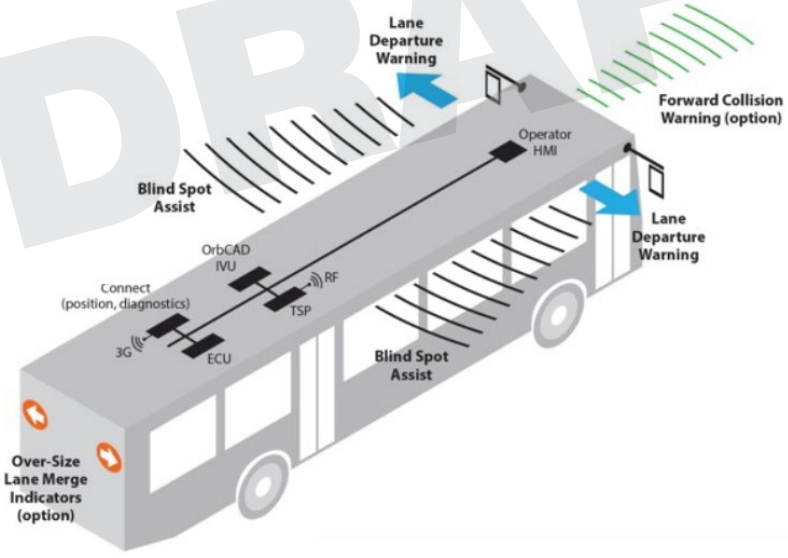
b. Autonomous Vehicle Control/ Driver-assist Systems



Source: IBI Group



Source: IBI Group

In the context of this study, Autonomous Vehicle Control & Driver-assist Systems refer to programs that assist drivers by supporting some vehicle control functions and providing supplemental warnings about surrounding traffic and safety concerns. On-board Driver Assistance Systems (DAS) include sensors, processors, and displays to continuously monitor traffic for safe operating conditions and can provide Forward Collision Warning (FCW), Lane Departure Warning (LDW), Pedestrian and Cyclists Collisions Warning (PCW), and Blind Spot Detection (BSD) alerts to bus operators during appropriate situations. Driver assist systems are best specified during

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the manufacture of the vehicle. Systems that combine the capabilities BSD and PCW are evolving and some are currently on the market, although the individual capabilities of the BSD do not replace the capabilities of the PCW, or vice versa. As driver assistance systems become more mature, many of the capabilities will likely continue to be packaged into more sophisticated multiple-capability systems using a variety of complementary technologies (e.g., radar, image processing, lidar, etc.) in a single integrated system versus the installation of individual systems with the aforementioned capabilities that must be integrated with one another upon installation on the bus.

Specific BRT applications can benefit from autonomous functions – such as bus speed controls (to meet signal control windows of opportunity) and median running (lane guidance), resulting in lower driver fatigue. These guidelines will be safety or speed related

Metro Standards

N/A

Guidelines for Implementation

Two types of Driver-assist Systems – 1. Warning systems that require the actions of a trained, skilled and alert driver to safely mitigate the conditions that caused a system alert; 2. Warning and mitigation systems that require a combination of actions of a trained, skilled and alert driver to determine if additional actions are required mitigate the conditions that caused a system alert or the automated system responses (e.g., automatic braking). This guideline focuses predominantly on the first, the warning systems, with the exception of speed controls that may also include throttle controls and possibly braking controls.

Pre-requisites

For all driver assist systems and autonomous functions, buses must be equipped with systems and technologies that include sensors, processors, and visual displays or audible alert devices required to inform the drivers' operational decisions. These systems are best specified by the transit agency before purchasing the vehicle and installed during manufacturing. Alternatively, these systems and technologies may also be procured and installed by subcontracted third party providers. Maintenance and operations training and schedules must be developed to support the system deployment and on-going operation. Driver education and training plans are also a requirement for these systems. Coordination and collaboration with labor representatives are an important pre-requisite to ensure accurate understanding of how driver assistance and autonomous vehicle control systems are intended to integrate into current and planned operations. The systems discussed in this guideline current do not take the place of a trained, skilled, alert driver exercising safe driving habits and using appropriate judgement when taking any action based on the current driving conditions. Based on the present day maturity of these technologies, the systems discussed in this guideline are largely warning systems with some low levels of automation.

An optional element of this system may also include an interface to communications equipment or an on-board unit (OBU) that permits the status of the driver assistance and autonomous vehicle control systems to be communicated and monitored remotely at a central operations center.

Roles and Responsibilities

For new BRT buses, the transit agency is responsible for specifying the equipment to be installed on the bus to the manufacturer.

For retrofitting of existing BRT buses, the transit agency will be responsible for specifying the equipment to be installed on the bus and the transit agency or a subcontracted third party must

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install driver-assist technologies on vehicles and monitor the equipment performance and health and conduct regular maintenance and upgrades. Overall operational safety and the bus operator's ability to trust and rely on the proper operation of these technologies raises the criticality of monitoring and maintenance of the systems. The transit agency and/or the technology vendor or vehicle manufacturer must establish and implement appropriate education and training programs for the maintenance (and in some cases installation, replacement, or repair) for each type of drive assist technology deployed in the vehicle.

The transit agency or a designated sub-contracted driver training organization will be responsible for providing initial and ongoing education and training for drivers and operators who will interact with vehicles equipped with driver-assist technologies.

Requirements

Functional

Forward Collision Warning (FCW)

- All BRT vehicles must have forward collision warning systems that meet the minimum safety and performance standards set forth by the International Organization for Standardization standard ISO 17361:2017(en) and will be superseded by its current replacement standard (if any), at minimum.
- The system will not take any automatic action to prevent possible lane departures. Responsibility for the safe operation of the vehicle remains with the driver.
- All FCW systems must provide the capability to monitor and display the following distance between the BRT bus and a vehicle in front of the bus.
- The system must provide a visual, tactile (vibration) and/or audible warning alert for the bus operator when minimum safe following distance thresholds are reached.
- The system must provide an alert that indicates one of two states for the system: 1. The system is currently operable and functioning correctly, or 2. The system is not functioning correctly or in a non-operational state.

Lane Departure Warning (LDW)

- All BRT vehicles must have lane departure warning systems that meet the minimum safety and performance standards set forth by the International Organization for Standardization standard ISO 15623:2013(en) and will be superseded by its current replacement standard (if any), at minimum.
- The system will not take any automatic action to prevent possible lane departures. Responsibility for the safe operation of the vehicle remains with the driver.
- The system will disengage when the turn signal is on or when the driver is accelerating to overtake another vehicle.
- The system will be pro-active – warning the driver when the bus encroaches on the lane boundary based on system's ability to detect visible lane markings.
- The system must provide a visual, tactile (vibration) and/or audible warning alert for the bus operator.
- The system must provide an alert that indicates one of two states for the system: 1. The system is currently operable and functioning correctly, or 2. The system is not functioning correctly or in a non-operational state.
- LDW systems are monitoring systems that are dependent upon the visibility of lane markings. Consideration and training will be needed to ensure that drivers understand that in construction areas or during periods of bad weather that theses system may be non-operational.

Pedestrian and Cyclists Collisions Warning (PCW)

- All BRT buses must be equipped with a pedestrian or cyclist collision warning system with software that can distinguish and classify moving objects (i.e., is capable of discerning the difference between vehicles and pedestrians and cyclists). The system must be able to detect objects in the vehicle's path, track the bus's distance to the

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objects, calculates the time to impact taking into account the bus's current speed, and determine the type of object based on its movement pattern, height and size.

- The system will not take any automatic action to prevent possible lane departures. Responsibility for the safe operation of the vehicle remains with the driver.
- All BRT vehicles must have pedestrian and cyclist detection and collision warning systems that meet the minimum safety and performance standards set forth by the International Organization for Standardization following two standards: ISO 19237:2017(en) and ISO 22078:2020(en) and will be superseded by their current replacement standards (if any), at minimum.
- For BRT buses, and based on the ISO standards, the Bicycle Detection and Collision Mitigation System (BDCMS) must be of Class II and Type II that the size/ operation of the vehicle (Heavy vehicle), and different ambient illuminance conditions (Daytime, twilight and nighttime)
- For BRT buses, the Pedestrian Detection and Collision Mitigation Systems (PDCMS) described in the aforementioned ISO standard indicates that, at minimum, a warning of imminent collision will be provided to the driver, and depending on the capabilities of the system, the countermeasure included with this standard includes activation of the vehicles brakes. These countermeasures may be considered as part of the system at the time it is specified to determine if they fit within the requirements for and Metro's level of readiness for vehicle safety automation.
- The system must provide a visual, tactile (vibration) and/or audible warning alert for the bus operator.
- The system must provide an alert that indicates one of two states for the system: 1. The system is currently operable and functioning correctly, or 2. The system is not functioning correctly or in a non-operational state.

Blind Spot Detection (BSD)

- All BRT vehicles must have a blind spot detection system that meets the minimum safety and performance standards for Lane Change Decision Aid Systems set forth by the International Organization for Standardization standard ISO 17387:2008(en) and will be superseded by its current replacement standard (if any), at minimum.
- The BSD system must be capable of detecting objects alongside (laterally and to the immediate rear of) the bus and that provides a detection zones and coverage areas that are commensurate with the size, length, and configuration of the BRT bus. A typical coverage area will need to be large for the articulated BRT buses (e.g., 10 feet from the side of the bus and along a 15-20 foot parallel section of the side of the bus).
- The BSD system or the parent system, should be capable of connection to the bus through the J1939 CAN BUS.
- The BSD system must filter out stationary objects to reduce false alerts.
- The system must provide a visual, tactile (vibration) and/or audible warning alert for the bus operator.
- The system must provide an alert that indicates one of two states for the system: 1. The system is currently operable and functioning correctly, or 2. The system is not functioning correctly or in a non-operational state.

Speed Controls

- BRT buses should be equipped with an adaptive cruise control system and/ or collision mitigation braking system. Adaptive cruise control is an enhancement to conventional cruise control that will allow the bus driver to set a speed for the bus and follow a forward vehicle at a safe distance by controlling the power train or the engine or both; some systems may also employ the brake.

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- Note: Traditionally the driver would use this system primarily during longer intervals between stations and on freeways using conventional cruise control (Limited Speed Range Adaptive (LSRA) Cruise Control) which can only assist the driver with speed adjustments to a certain minimum speed, but the systems and technologies (Full Speed Range Adaptive (FSRA) Cruise Control) have evolved to include collision mitigation braking capabilities that allow the system to assist the driver by bringing the vehicle to a standstill in full stop-and-go driving conditions or to assist in avoiding rear-end collisions).
- All BRT vehicles must have adaptive cruise control systems that meet the minimum safety and performance standards set forth by the International Organization for Standardization standard ISO 15622:2018(en) and will be superseded by its current replacement standard (if any), at minimum.
- The system must provide sensors (radar, or lidar, and/or cameras) that automatically adjust the bus speed based on the pace of a preceding vehicle traveling ahead in the same direction.
- The system must be able to dethrottle the bus and navigate full stop-and-go driving conditions, providing for a full stop in heavy traffic conditions or to avoid rear-end collisions.
- The system must provide a visual, tactile (vibration) and/or audible warning alert for the bus operator.
- The system must provide an alert that indicates one of two states for the system: 1. The system is currently operable and functioning correctly, or 2. The system is not functioning correctly or in a non-operational state.

Physical

Forward Collision Warning (FCW)

- Sensors mounted on the front of the bus (e.g., radar, lidar, and/or cameras)
- Driver interface mounted within range of the driver for visual and/or tactile (vibration), and/or audible alerts.
- On-board vehicle data processor and data storage
- Communications equipment (i.e., cellular modem or other device capable of transmitting data from the bus to a hosted environment with computer equipment capable of accepting and storing data.

Lane Departure Warning (LDW)

- Sensors mounted on the front and sides of the bus (e.g., optical, electromagnetic, GPS, or other technologies or combinations of technologies)
- Driver interface mounted within range of the driver for visual and/or tactile (vibration), and/or audible alerts.
- On-board vehicle data processor and data storage
- Communications equipment (i.e., cellular modem or other device capable of transmitting data from the bus to a hosted environment with computer equipment capable of accepting and storing data).

Pedestrian and Cyclists Collisions Warning (PCW)

- Sensors mounted on the front, sides and rear of the bus (e.g., radar, lidar, and/or cameras)
- Driver interface mounted within range of the driver for visual and/or tactile (vibration), and/or audible alerts.
- On-board vehicle data processor and data storage
- Communications equipment (i.e., cellular modem or other device capable of transmitting data from the bus to a hosted environment with computer equipment capable of accepting and storing data.

Blind Spot Detection (BSD)

- Sensors mounted on the sides of the bus (e.g., radar, lidar, and/or cameras)

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OPTIONAL

- ✔ Driver interface mounted within range of the driver for visual and/or tactile (vibration), and/or audible alerts.
- ✔ On-board vehicle data processor and data storage
- Communications equipment (i.e., cellular modem or other device capable of transmitting data from the bus to a hosted environment with computer equipment capable of accepting and storing data.

Speed Controls

- Sensors mounted on the front of the bus (e.g., radar, lidar, and/or cameras)
- Driver interface mounted within range of the driver for visual and/or tactile (vibration), and/or audible alerts.
- On-board vehicle data processor and data storage
- Communications equipment (i.e., cellular modem or other device capable of transmitting data from the bus to a hosted environment with computer equipment capable of accepting and storing data.

Other Recommendations

Technologies that assist drivers with awareness and safe operational decisions are becoming more readily available in configurations that are suitable for transit and commercial vehicles. The maturity of driver assistance system technologies and their integration with OEM vehicles will continue to evolve rapidly beyond the capabilities and standards described in this section. Therefore, as Metro considers fleet vehicle replenishment and acquisition, it is recommended that Metro includes consideration, examination, and discussions with manufacturers about their offerings of driver assist technologies. Third party, after-market integrations of driver assist technologies are improving, but must be assessed on a case by case basis to determine if the retrofit of existing vehicles is worthwhile taking into consideration the useful life of the vehicle and Metro's vehicle replacement cycle.

Opportunities and Challenges

Technology Maturity

Automated Vehicles and Driver-Assist technologies are still being tested in controlled environments and not all are ready for deployment on public transit systems yet. As technologies are ready for deployment, Metro will need to determine from a policy standpoint, how long a technology must be in successful operation prior to integration into the Metro fleet.

Operator Education and Adoption

Close coordination and education of vehicle operators is paramount in developing understanding and comfort around the information that can be provided to the driver and how the system improves safety and reduces risks of collisions due to inherent operating difficulties (e.g., blind spots). Drivers will need to understand basic levels of automation and understand that initially these technologies provide alerts/warnings and can gradually add in automation (such as braking assistance in FCW systems). These levels of automation likely will be gradual in adoption and education will be essential in gaining driver confidence in the technologies.

Other Related Elements

> Operating Characteristics - Service Parameters and Strategies

> Running Way - Roadway Geometrics

> Running Way - Intersection Geometrics

> Running Way - Running Way Placement Consideration

Reference Documentation (Standards & Codes)

> International Organization for Standardization (iso.org) standard ISO 15623:2013(en) Intelligent transport systems — Forward vehicle collision warning systems —

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Performance requirements and test procedures

> International Organization for Standardization (iso.org) standard ISO 19237:2017(en) Intelligent transport systems — Pedestrian detection and collision mitigation systems

(PDCMS) — Performance requirements and test procedures

> International Organization for Standardization (iso.org) standard ISO 22078:2020(en) Intelligent transport systems — Bicyclist detection and collision mitigation systems (BDCMS) — Performance requirements and test procedures International Organization for Standardization (iso.org) standard ISO 17387:2008(en) (BSD)

> International Organization for Standardization (iso.org) standard ISO 17361:2017(en) Intelligent transport systems — Lane departure warning systems — Performance requirements and test procedures

> International Organization for Standardization (iso.org) standard ISO 15622:2018(en) Intelligent transport systems — Adaptive cruise control systems — Performance requirements and test procedures)

> ISO/TR 16352:2005(en) Road vehicles — Ergonomic aspects of in-vehicle presentation for transport information and control systems — Warning systems

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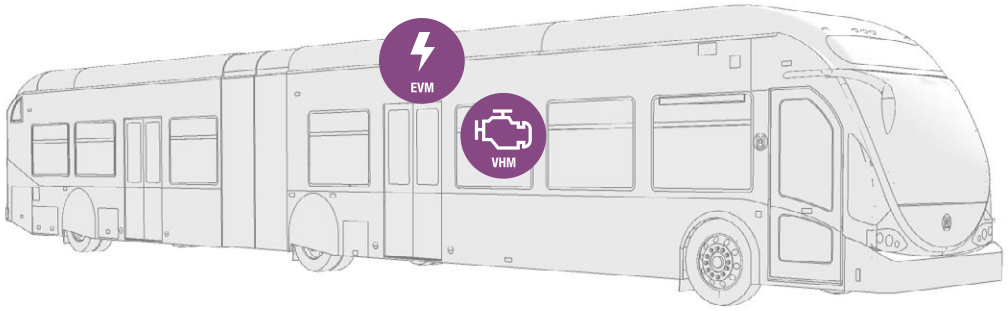

Figure 13: Vehicle Health Components on Vehicles / Source: IBI Group

c. Vehicle Health

(Although this element is not required, it is strongly encouraged.)

Vehicle health (sometimes referred to as VHM systems) refers to the on-board feedback from electrical and mechanical systems. These systems can provide information such as engine temperature, oil pressure, electrical faults, failing equipment charge status, etc. It also collects miles in revenue and non-revenue service, which determines preventative maintenance cycles. VHM systems' typical uses include:

> Notifying bus operations of vehicle health issues that require immediate attention or prevent the BRT vehicle from continuing service. This might include critical systems on-board BRT vehicles that support necessary guidance, access control, and/or TSP/BSP functions.

> Providing maintenance staff the ability to quickly identify or troubleshoot issues on buses in operations.

> Collecting background information on bus health and performance trends to assist with near term and longer term maintenance activities.

As BRT fleets increasingly include all-electric vehicles, specialized VHM systems focused on electric battery status, charge levels, usage, range, etc. become more critical. With electric vehicles, this information can be part of operational decision making. For example, a BRT vehicle is needed for an additional trip, but do the batteries have sufficient charge to support the additional trip and range, or should some recharging be conducted first? If recharging is required, how long will it take and what additional range will it provide?

Metro Standards

> VHM systems are not required by Metro BRT standards, but in the case of all-electric BRT buses, they are strongly recommended.

Guidelines for Implementation

Pre-requisites

VHM systems on-board buses are usually integrated into the agencies maintenance management system and/or asset management system.

Roles and Responsibilities

The transit agency maintains full responsibility for VHM and resulting maintenance from the

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OPTIONAL (ENCOURAGED)

information the system collects, as well as oversight of any subcontracted party conducting the maintenance or using the VHM system. Some VHM systems are provided by OEM bus manufacturers that are available for transit agencies to use as VHM tools.

Requirements

Functional

- VHM system shall identify and provide near-real time alerts to operations and maintenance on critical vehicle health elements that would require a BRT vehicle to be removed or replaced in service.
- VHM system shall collect on-board vehicle health status and diagnostics information for longer term trends analysis and adjustment of preventative maintenance schedules based on real-world BRT operations and use.
- VHM shall support remote access by authorized maintenance personnel to remotely collect and diagnosis situations.
- Where hybrid buses are deployed, the VHM status information shall include data and diagnostics on the operations and status of the hybrid systems.
- Where all-electric vehicles are deployed on BRT routes, VHM should provide both quick summary views and more detailed status on battery status, charge state, temperature, distance traveled since last charge, estimated remaining range, and estimated charge time to various battery charge levels.

Physical

- VHM systems and equipment can usually be procured with new vehicles, but sometimes VHM systems are different across different vehicle makes or models. It is recommended that key information be unified in a separate VHM system for maintenance and operations quick-view purposes.

Other Recommendations

Often BRT services are selected for deployment of new vehicle types including new on-board systems, mechanical systems, and drivetrains. Many agencies are selecting all electric buses for BRT services. When new buses (or at least new to the agency) are selected for BRT service, VHM systems become more critical as maintenance and operations learns more about the reliability and troubleshooting processes for many of the new systems and vehicle components. The BRT vehicles often have special characteristics that make it more difficult to simply swap them for other buses in the broader fleet, and this means that spare ratios may be lower than is typical for the rest of the fleet. This factor drives the need for VHM. In particular, agencies using all electric vehicles should have a VHM solution that provides details to maintenance on the information suggested in this section, and overview information to operations in order to make real-time operations decisions about vehicle swaps, service adjustments, recharging requirements, etc.

Opportunities and Challenges

The Internet of Things (IoT) and Metro's use of MGRs for its BRT buses can ultimately support maintenance checks and send diagnostics to maintenance teams at a fast pace, ensuring quick interventions and healthy vehicles.

Other Related Elements

> Systems - Voice & Data Communication

> Systems - On-board Architecture Overview

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***Onboard WiFi** / Source: Des Moines Area Regional Transit Authority*

d. Onboard WiFi

Onboard WiFi (wireless connectivity) provides riders on BRT vehicles with free access to the Internet using the WiFi connectivity (e.g. 802.11ac) of their mobile device or smartphone. While most mobile devices support commercial cellular (e.g. 4g LTE or even 5G) communications, these have data limitations, caps, and costs for the user. Free onboard WiFi can be viewed as a benefit to riders as it allows them to access the Internet without using paid data services, and it allows them to conduct business or personal matters while riding the bus. The rules and guidelines for using free onboard WiFi vary from agency to agency, but all agencies require accepting a notification screen on usage guidelines. Onboard WiFi is offered without warranty or promises by the agency. Some agencies limit or restrict streaming of high-bandwidth video or similar services, and/or restrict access based on website blacklists (e.g. potentially offensive material). LA Metro has begun roll-out of onboard WiFi for fixed route bus services which would include BRT services with the network name "Free Metro WiFi" on labelled buses. In addition to accessing email, social media, web pages, etc., riders can access Metro customer service, alert Metro security, and/or view real time bus information. Plans are that this service will roll-out to the full Metro bus fleet.

Metro Standards

> Specific standards have not been set for onboard WiFi for BRT services in the LA County region, and while their implementation is option it is strongly encouraged.

Guidelines for Implementation

Pre-requisites

Onboard WiFi will require the agency to establish and configure network connectivity to the Internet through a commercial cellular provider. The setup can be separate from all other on-board communications equipment and systems, or it can be functionally placed within an existing on-board vehicle systems architecture. If the agency is using FirstNet for their data communications from the vehicle, then any on-board WiFi must be configured to run through a separate commercial cellular network.

Roles and Responsibilities

- The agency will need to establish guidelines for use, conduct appropriate marketing on the availability of the service, maintain contracts with commercial cellular providers, install (or contract to install) appropriate equipment on the vehicles, and monitor overall usage levels.

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Agencies typically contract for unlimited data usage to avoid potential overage charges. If usage levels are very high and/or complaints about the service availability occur, the agency can expand the available bandwidth on each vehicle, but will incur additional equipment and cellular costs.

- Riders will be asked to agree to use the service consistent with the usage guidelines and usage terms.
- Commercial cellular carriers provide connectivity to the Internet from the WiFi access points on the vehicles.

Requirements

Functional

- Service shall provide potential users with upfront notification of the terms of usage of the service, including privacy, limits on use, lack of warranties, and security considerations and require their acknowledgement before proceeding.
- Service shall allow the agency to monitor WiFi access, bandwidth usage, and number of users by time of day, day-of-week, month, and type.
- Service shall allow a capped number of users accessing onboard WiFi per vehicle.
- Service shall allow the agency IT department to turn-off or suspend the connectivity at any time.
- Service shall allow the agency to restrict or filter certain websites or types of sites (at agency discretion).
- Appropriate network security measures shall be in-place to prevent any cross-over of breach of on-vehicle system communications with available on-board customer WiFi.
- Service shall not interfere with other on-board vehicle system communications as indicated by on-board pilot tests.

Physical

- Onboard WiFi shall allow 802.11ac capable or newer devices to access the service.
- Each BRT vehicle shall include a WiFi access point, antenna, and appropriate cellular modem to access 4G LTE or newer service.
- Installation and use of a Mobile Access Router (MAR) or Mobile Gateway Router (MGR) to manage on-board WiFi configurations and monitoring is preferred.
- No direct connectivity between the onboard WiFi access point and devices shall be allowed with the on-board vehicle Controller Area Network (CAN) bus.

Other Recommendations

It is popular for riders to try and stream video (e.g. Netflix, Hulu) over the onboard WiFi. Agencies should determine how restrictive they will be in terms of allowing access to popular services. Too many restrictions tend to make on-board WiFi of limited use to riders and result in poor use of the amenity. Unlimited restrictions may lead to very slow or unusable connectivity for riders unless the systems are designed to support higher data bandwidths. Usually large file downloads and HD video streaming are

Opportunities and Challenges

Communications technologies are evolving rapidly with 5G systems already being rolled out on some commercial cellular networks. The equipment deployed on vehicles should allow for upgrades to 5G technology (e.g. modem swap) without requiring full replacement of the system. As commercially available data options increase, the value of On-board WiFi may decrease over time, however cost and data usage considerations are likely to remain in effect for transit riders.

Other Related Elements

> Vehicle - Voice & Data Communications

> Systems - Technology Support Elements

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50 Control Center & Operations

a. Video Live Look-in
b. Supporting Mobility as a Service (MaaS)
c. Yard Management

a. Video Live Look-in

Video Live Look-In refers to telecommunications technologies that allow direct streaming of video and audio content to operations center. The video and audio live streaming may be combined or separate components. Traditionally, vehicles have onboard microphones to provide audio live streaming when a covert alarm (CA) is triggered by the operator. More recently, with the increased adoption of data-based communications and the advances in video technology, video live look-in has become increasingly common onboard transit vehicles, as it provides an increased level of situational awareness for operations and control center staff during onboard incidents. Aside from the data communication components, the system consists of multiple video cameras on both the interior and exterior of the vehicle, as well as an onboard computer to process recorded footage, and a Digital Video Recorder (DVR) to store recorded footage.

The technology and components required for video surveillance at BRT stations is largely similar to on-vehicle systems. The difference is that the BRT station video systems will likely have a wired data communication system that is not reliant on wireless data. This will provide a more consistent video live stream as well as the opportunity to provide a high quality video live stream.

Metro Standards

Reliable data communication channel to enable live look-in in the event of an incident onboard and at BRT stations.

Guidelines for Implementation

Pre-requisites

Agencies should establish a standardized plan for an on-board video system for their transit and BRT vehicles, as well as BRT stations. This includes the number and positioning of video cameras needed to allow for all areas to be monitored. Minimum data bandwidth requirements should be established to enable consistent video live look-in quality. There should be an operations center, established standard operating procedures, and available staff to monitor video, review alerts and respond as needed. There should be a single operation center to monitor both vehicle and BRT station video footage.

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Roles and Responsibilities

- The transit agency or a subcontracted third party should install cameras at stations and on vehicles.
- The transit agency or a subcontracted third party should conduct regular checks and maintenance of video equipment.
- The transit agency should establish an operations center, create standard operating procedures, and make available staff to monitor video, review alerts and respond as needed.

Requirements

Functional

- Communications from camera systems along dedicated lanes and BRT stations should allow for reliable high-speed communications to/from cloud-based services.
- Communications from camera systems on-board transit and BRT vehicles should allow for reliable and high quality video live streaming.
- Camera systems should be setup to support high definition and glare-free operations (but do not need to support facial recognition for BRT purposes).
- Camera systems should support operator input to allow for tagging, such that agency staff can review the specific segment of the recording at another time.
- Camera systems should support input from operational staff to enter live look-in.
- The BOC positions for BRT and related safety/security positions should be arranged to support automatic activation of screens with video analytics based alerts and alarms.
- Video analytics skill sets should be developed and maintained among operation staff to understand and support fine tuning of operations.

Physical

- Video camera equipment should be robust and ruggedized to provide reliable service in a transit vehicle environment.
- On-board video camera processing and storage equipment shall be robust and ruggedized to ensure video files are securely stored on-board until the files are transferred to the central system.
- Examples and typicals should be determined for placement of camera feeds/video analytics covering key access and station platform areas.
- Locations for video analytics/camera placement should allow view of dedicated lanes, particularly in areas close to entry/exit and/or station areas.

Recommendations

Video camera and data communication equipment should enable a high quality video live look-in feed as well as a high quality recording. Operation staff should be trained to utilize the live look-in functionalities.

Opportunities and Challenges

Video Analytics can lead to major advancement for security on vehicles and at stations. However, widespread deployment could have on-going costs (analysis as a service). Future advancements in communication technologies such as 5G, will further enable high quality on-board video streams.

Other Related Elements

> Systems - Guideway Control and Management

> Systems - CAD/AVL

> Systems - Voice & Data Communications

> Systems - Video Live Look-in

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Metro MicroTransit Pilot

b. Supporting Mobility as a Service (MaaS)

Mobility as a Service (MaaS) refers to the technologies and infrastructures that can integrate services into the overall offer of public transportation services. This element specifically refers to the technologies/systems that can be put in place to integrate BRT services in order to make public transit more convenient and effective. MaaS provides end-to-end trip planning, with services such as ride hailing, bikeshares, scooters, on-demand shuttle services, etc.

The customer facing aspect of a MaaS platform is a single user interface where users may receive trip planning recommendations based on input, they can then select the trip choice, and purchase fare or pay for the trip. This is enabled through a single platform by utilizing open data standards and interfaces where service and payment providers can integrate their respective services. This means users can access all of these services via a single account without having to register and provide payment information for each of these services.

Metro Standards

> Metro should create or develop open data standards and interfaces for service providers to intergrade with.

Guidelines for Implementation

Pre-requisites

- A platform combining all mobility services available, which can be accessed through any widely user platforms, such as a mobile application.
- There needs to be an agreement between the local jurisdiction, the transit agency, payment processors and service providers.
- Open API and data standards that facilitate data sources for developers and data providers to add to the digital platform.
- Customer WiFi should be offered at stations and on vehicles to facilitate the use of the digital platform and support trip planning "on-the-go".

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OPTIONAL

Roles and Responsibilities

- The transit agency should allocate sufficient right-of-way and curb space for mobility services.
- The transit agency should work with mobility service providers in offering services complementary to BRT services.
- The transit agency or a service provider should maintain and manage the mobile application.
- The transit agency or a service provider should continue to develop the mobile application and open data standards such that it continues to be compatible and to keep up with advancements in technology and mobility services.
- The transit company should provide up to date service data to the coordinating entity.

Requirements

Functional

- *Technology* – Any MaaS app and functions should distinctly identify BRT as a special level of service (e.g. separate from local bus).
- *Technology* – Any MaaS payment options (mobile app, near field communication (NFC), etc.) should be supported by BRT once regional adoption occurs.
- *Technology* – Information on MaaS services and availability should be readily apparent to BRT users (e.g. via app, on-the bus, customer information at stations, etc.), including any defined microtransit or Mobility on Demand (MoD) service area restrictions.

Physical

- Ensure all major BRT stations support the full suite of MaaS needs (e.g. bike lockers, shared bikes, shared scooters, local micro-transit PUDO, etc.). Spaces should be separate from loading/alighting zones to avoid conflicts between users.
- Provide customer WiFi and customer information displays at BRT stations to enable efficient information access for users in transit.

Recommendations

The platform should utilize open data standards and be open to any service provider interested in sharing information and payment structure, and willing to comply with the terms and agreement defined within the agreement. The platform should be user friendly, offer reliable trip recommendations to users and provide seamless transitions between services.

Opportunities and Challenges

> Excellent opportunity to support first/last mile connectivity to BRT.

> Attracts new potential users to BRT.

> Provides one stop shop for trip planning, payment, customer info – including for BRT.

> Promotes new options to meet personal mobility needs (e.g. all options under one roof)

> Can be integrated regionally to support Muni and Metro needs.

> In some cases could compete with BRT, possibly using higher subsidized services.

> It is unclear what MoD and MaaS services will be most successful and many are provided by private parties which means that allowances need to be made as the types of services may change over time.

> There are opportunities to obtain corporate sponsors to support the cost of maintenance and management of the mobility platform. While corporate sponsors would gain visibility at large, these agreements could also benefit customers through discounted fares and rewards.

> 5G technologies will offer accrued opportunities for the integration of services and the development of service repositories.

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Other Related Elements

> Operating Characteristics - Multiple Services Sharing a Corridor

> Stations/Platforms - Signage and Passenger Information

> Branding - Running Ways

> Integration of Transit-oriented Communities - First/Last Mile Connectivity

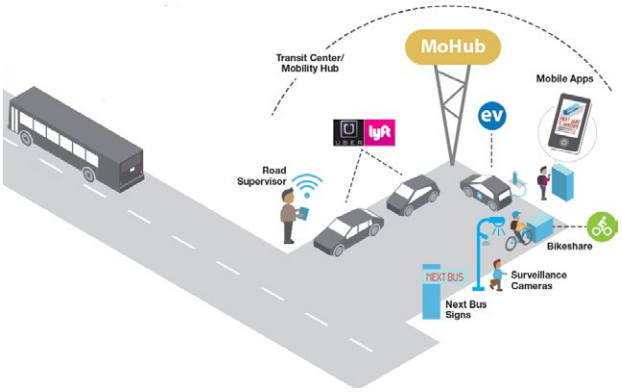

Figure 14: Example of Mobility Hub / Source: IBI Group

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Yard Management / Source: IBI Group

c. Yard Management

Yard management systems include the software and hardware components that allow for the tracking, assignment, and pull-in/pull-out of BRT vehicles (particularly where BRT vehicle types are unique and yard space is constrained). The yard map display is a primary component of a yard management system, where a detailed base map is configured to show the layout of parking lanes, maintenance locations, and the locations of other typical yard features. This allow operations staff to keep track of where the BRT vehicles are within the yard at all times and to identify when a vehicle departs or arrives at the yard. Should a driver notify operations staff of an issue on-board during the pre-trip inspection, the system will allow staff to quickly reassign the operator to another available vehicle in the yard. It is important that the system only allow assignment of specific vehicles to BRT routes.

There are different types of technologies that allow for precision location tracking of vehicles in the yard, these include: transponders, GPS, and triangulation using wireless routers between the yard and on-board units. Aside from vehicle location tracking, it is important for the yard management system to include or integrate with other transit management systems. Integrating with a maintenance system will enable operations staff to notify drivers as they return to the yard should they park they vehicle in a maintenance facility or at a parking spot located close to such facility. This will also provide maintenance staff with insights on where the vehicle is located and when preventative maintenance is due for a particular vehicle.

Metro Standards

While not specifically called out in the Metro BRT standards, a yard management system of some sort must be deployed for all bus yards that operate BRT services.

Guidelines for Implementation

Pre-requisites

The yard management system should operation in conjunction with the CAD/AVL system. The latter keeps track of vehicles that are outside of the yard and are in service, whilst the former keeps track of vehicles within the yard. Agencies should also consider other systems such as HR, payroll, and vehicle scheduling, which may be integrated with the yard management system.

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OPTIONAL

Roles and Responsibilities

- The transit agency should provide an operations center and staff at each yard to manage vehicles.
- The transit agency or a subcontracted third party should install the yard management system software.
- The transit agency or a subcontracted third party should install the yard hardware that may be needed for tracking vehicles in the yard.
- The transit agency or a subcontracted third party should develop and maintain system interfaces that allow data transfer between other management systems.

Requirements

Functional

- The yard management system should receive updated vehicle yard positions on a regular basis.
- The yard management system should identify regular transit and BRT vehicles separately within the yard.
- The yard management system should track when vehicles enter or leave the yard, utilizing either existing on-board positioning systems or a yard based vehicle tracking system.
- The yard management system should allow operations and supervisory staff to modify operator and vehicle assignments.
- The yard management system should either allow yard maps to be imported or provide tools to configure and modify yard maps.
- The yard management system should be managed by yard operations personnel.
- The yard management system should interface with the agencies' other systems, such as maintenance, CAD/AVL, and vehicle/operator scheduling system.

Physical

- All vehicle tracking equipment and positioning should provide good coverage such that tracking is consistent regardless of yard configuration.
- All data communications backhauls should be robust such that near real-time position tracking can be provided within the yard.

Recommendations

As noted, the yard management system should support accurate vehicle tracking within the yard, and the system should support operator and vehicle reassignment capabilities for yard operations staff. The system should be integrated with other systems that the agency uses to support BRT operations management.

Opportunities and Challenges

Innovation resulting from *Connected/Automated Vehicle* technologies could standardize small scale vehicle location technologies by utilizing vehicle to infrastructure communication hardware.

Other Related Elements

> Control Center & Operations - CAD/AVL

> Control Center & Operations - Voice & Data Communications

> Vehicles - Vehicle Tracking

> Vehicles - Connected Bus

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5
BRT Branding Design Elements

There is an adage in the marketing world that suggests "you are not who you think you are, you are who your customer thinks you are." As a result, transit agencies are increasingly interested in understanding what actions can be taken to define and improve their brands as a way of improving the customer experience. This chapter covers those efforts within the context of BRT.

DRAFT

1 Standards and Goals
2 Metro Literature/Policy Review
3 Running Ways
4 Stations
5 Vehicles
6 Other Considerations

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1 Standards and Goals

a. Brand Consistency and Awareness
b. System Integration
c. Attracting New Ridership
d. Establishing a Branding Approach

Metro has worked consistently over the past decade to pull the various components of its transportation services into a combined program of branding awareness, to benefit the user public in its understanding of service availability and product differentiation. Well-conceived branding portrays Metro as a transportation agency that strives to be relevant from the standpoint of mobility, service efficiency, customer satisfaction and, importantly, social equity.

a. Brand Consistency and Awareness

Consistent application of graphics, tone, and images creates a readily identifiable image of Metro as an agency that is continuing its long history of public service while pursuing new and expanded transit and innovative transportation-related technology. The expansion of BRT services provides an exciting opportunity to employ a highly beneficial countywide BRT service.

This branding section of the BRT Design Guidelines seeks to apply Metro's current design and branding standards to new BRT infrastructure while highlighting examples of successful and innovative solutions from other agencies and cities. It can also serve to inform branding decisions by other cities and agencies in LA County who seek to implement a BRT system or coordinate their existing service with Metro.

b. System Integration

The branding guidelines in this report are designed to provide consistency of approach where necessary (elements of continuity), while identifying where one-off, unique items of design and delivery (elements of variability) could be deployed in support of individual route character.

Elements of Continuity

> Vehicle branding and stations across a BRT line.

Elements of Distinction (Variability)

> Where another transit or planning authority is the primary provider or funder of the station.

> Agencies might explore unique branding in special circumstances, such as a location adjacent to a university or historic/culturally significant area.

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c. Attracting New Ridership

Positive public perception of transit is important for retaining existing riders while attracting new ones. Although branding is not directly related to overall system design, it can contribute to legibility and ease of use of the system.

Clear and consistent branding reinforces a message that other aspects of the system are thoughtfully designed and that the public can rely on the services provided. As a public resource, transit can also instill an intangible sense of civic pride and, when done well, form a core component of daily life. This core component is ever more relevant as Metro seeks to complement the overall effort to combat climate change.

Text kept to a minimum while tone remains upbeat and friendly.

Metro brand identity example in station rendering.

d. Establishing a Branding Approach

Essential to developing and executing a successful BRT line is developing a distinguishable brand for the service. Clearly denoted branding elements and distinctive signifiers along BRT routes, vehicles and stations allows for riders to differentiate between lines and helps riders navigate the system.

Over the past fifteen years, Metro has redefined its approach to branding by combining its design studio, communications, marketing, business-to-business sales, print shop, and other related activities into a centralized department. This has led to greater consistency in the way that the Metro brand is communicated, not just through external advertising and marketing, but also within the Metro system and its vehicles.

For new BRT lines at Metro, the identity and branding will be guided by existing standards set by Metro Communications. For example, where new naming conventions across LRT and BRT lines were recently adopted, those conventions will be extended for a consistent brand identity.

Local jurisdictions or smaller transit agencies may not have the scale or flexibility in reallocating staff resources to be able to completely redefine branding, marketing, and communications services. However, long-range planning efforts may incorporate an agency branding audit that includes an analysis of types of service. Implementation of a BRT brand should in turn support the audit's recommendations, with the goal of reinforcing a brand image that one would expect from a high- quality transit service.

Agencies implementing BRT for the first time should consider future growth and whether or not branding of the line will accommodate expansion efforts or new routes. Once a graphic style for the BRT service has been determined, agencies should produce a graphic standards manual that clearly articulates its intended purpose, logo, and color specifications. The manual should also set standards for repetition and/or evolution of the branding program with regard to existing or future service.

Where possible, agencies may seek to coordinate or integrate branding with other municipal services or designs. The City of Hillsboro, OR, for example implemented a citywide wayfinding program and incorporated light rail station markers into its design package. Phased installation of signage helped spread costs over multiple budget years and were also partially paid for by outside grants.

The level of brand collateral will also vary between transit agencies. Nevertheless, the ability to clearly differentiate between a BRT line and a local or municipal line is crucial for the transit rider's route planning, expectation of service, and user experience.

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2 Metro Design Criteria and Policy

In reviewing these design guidelines, it may be necessary to refer to prior Metro documents to ensure consistency of effort moving forward.

a. Metro Bus Rapid Transit Design Criteria
b. Metro Transit Service Policy
c. Metro Systemwide Station Design Standards and Directive Drawings
d. Metro Systemwide Station Design Standard Policy
e. Metro Rail Design Criteria
f. Metro Writing & Style Guide
g. Metro Logo Guidelines

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When embarking upon new branding initiatives associated with BRT planning and delivery, it is important to recognize and build upon the comprehensive work completed to date. A first step in appreciation of this prior effort is to methodically review it to avoid missteps moving forward. This section outlines the most significant take-aways from the literature review.

a. Metro Bus Rapid Transit Design Criteria (2008-2014)

This document provides design concept standards and guidance for the implementation of all BRT projects in LA County. Branding-related goals emphasize clarity, simplicity, and consistency. It also emphasizes BRT's role in bolstering positive perceptions of transit. The BRT Design Guidelines provide an initial basis for updating the 2008 BRTDC document.

b. Metro Transit Service Policy

The Transit Service Policy document sets forth the policies, principles, and requirements that Metro staff uses to design or modify the service network. It includes guidelines for items that may be considered for branding, such as passenger amenities at stations and line lettering conventions.

c. Metro Systemwide Station Design Standards and Directive Drawings

Metro Systemwide Station Standards are contained within Section 6 of the Metro Rail Design Criteria (MRDC) and the Design Architectural Standard and Directive Drawings provide guidance for Metro stations to ensure safe, state-of-the-art, maintainable and sustainable station environments in a consistent

architectural language and brand identity. These standards inform the station design concepts that are developed under Section 7.2 Station Platform Design Criteria.

d. Metro Systemwide Station Design Standards Policy

This policy requires that all future BRT station designs conform to the Metro BRT Design Criteria and Standard Drawings that will be developed as part of the BRT Vision & Principles Study. It reaffirms a commitment to Metro's Systemwide Station Design Standards or "Kit-of-Parts" design toolkit, and emphasizes safety, state-of-the-art design, maintainability, sustainability, consistency, legibility, and accessibility of stations and related equipment. It also defines Metro departmental responsibilities related to Systemwide Station Design Standards implementation.

e. Metro Rail Design Criteria

Section 6 of the Rail Design Criteria pertains to the architectural design of all station types. Elements include area requirements, design of platforms, amenities, artwork, signage, advertising, landscaping, platform access, standards for the selection of materials, and general principles and standards for use in the design of bus access, Pick-up/Drop-off and Park and Ride facilities, stations and ancillary facilities. It includes space requirements; materials and finishes; standards for planning and construction, and area requirements.

f. Metro Writing & Style Guide

Metro's Writing & Style Guide encourages greater consistency in written communications. Key recommendations that can apply to branding include keeping the overall 'tone' of messaging conversational, friendly, and optimistic. Communications should keep Metro's target audiences in mind when writing and minimize the use of technical terms.

g. Metro Logo Guidelines

Taking cues from Metro's stationery and other printed materials, the BRT Design Guidelines should consider design and branding elements to be simple and direct, clean and uncluttered. The use of Metro's logo on station and bus elements should respect Metro's desire to maintain a positive relationship with its employees, customers and the public.

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3 Running Ways

a. Components
b. Description
c. Metro Standards and Goals
d. Guidelines for Implementation

Running ways are relevant to the branding exercise in that they serve to advertise the existence of BRT service, either as a dedicated lane or in mixed traffic – a potential continuous or intermittent stripe of color running the length of the corridor. In the process, running ways also provide an ideal opportunity for BRT system wayfinding.

a. Components

Although engineering standards may supersede efforts to add more creative elements to running ways, the design of bus lanes and the elements that are adjacent to them can form a part of the BRT brand. These components and their placement are illustrated in the image below.

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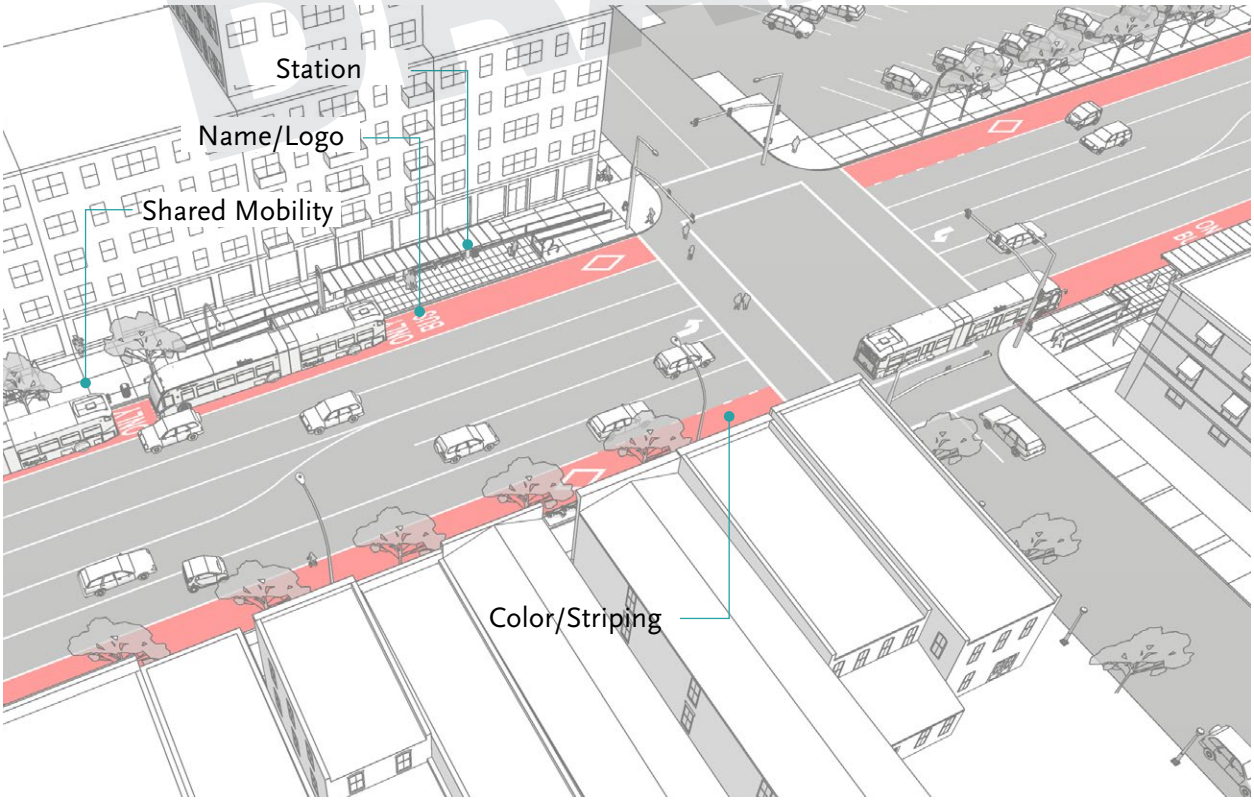

Running ways context diagram - see section 7.3 for more information

b. Description

Running ways can include both fully dedicated rights-of-way (e.g., Metro Orange Line), as well as exclusive lanes (e.g., Rapid 720 peak hour). A detailed discussion of bus running ways is covered in chapter 7.3 BRT Running Way Criteria. Recommendations from a branding standpoint relate primarily to color and striping.

c. Metro Standards and Goals

Metro must coordinate roadway treatments with local jurisdictions and as such does not have specific brand guidelines related to color and striping. The Federal Highway Administration's Manual on Uniform Traffic Control Devices recommends separating dedicated bus lanes from other traffic using solid single or double white stripes. The MUTCD states:

"A solid single white line conveys that crossing into the bus lane is discouraged, whereas a double solid white line means that encroachment is legally prohibited." *(MUTCD 3B.04)*

Existing peak period bus lanes in Los Angeles follow the single stripe convention and are unpainted. Elsewhere in the country, cities/agencies have deployed or are testing red paint, thermoplastic, or embedded color in asphalt to demarcate bus lanes. Bus lanes also require additional signage to inform other users of the street if and how they may use the lanes, such as for right turns or for off-peak parking.

d. Guidelines for Implementation

- **Consideration:** Clearly-marked, full-time, bus-only lanes throughout the corridor help to identify BRT service and clearly distinguish it from local bus service.
- **Recommendation:**
  - > Use high-visibility paint wherever possible to clearly communicate transit prioritization.

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Paint used to delineate shared station use between bikes and bus - Los Angeles, CA - Photo Credit: IBI Group

Thermoplastic Bus Lane Coating

Bus Lane Pavement Markings and Label

4 Stations

a. Platform
b. Shelter/Canopy
c. Identity Pylon
d. Lighting
e. Service Information/Wayfinding

Although components of BRT stations are not branding in the strictest sense, their visual character contributes to the look and feel of the transit network and are the most significant way in which the general public experiences transit, beyond BRT vehicles themselves. When they are coordinated and follow consistent standards, stations can create positive, deep associations with the BRT network.

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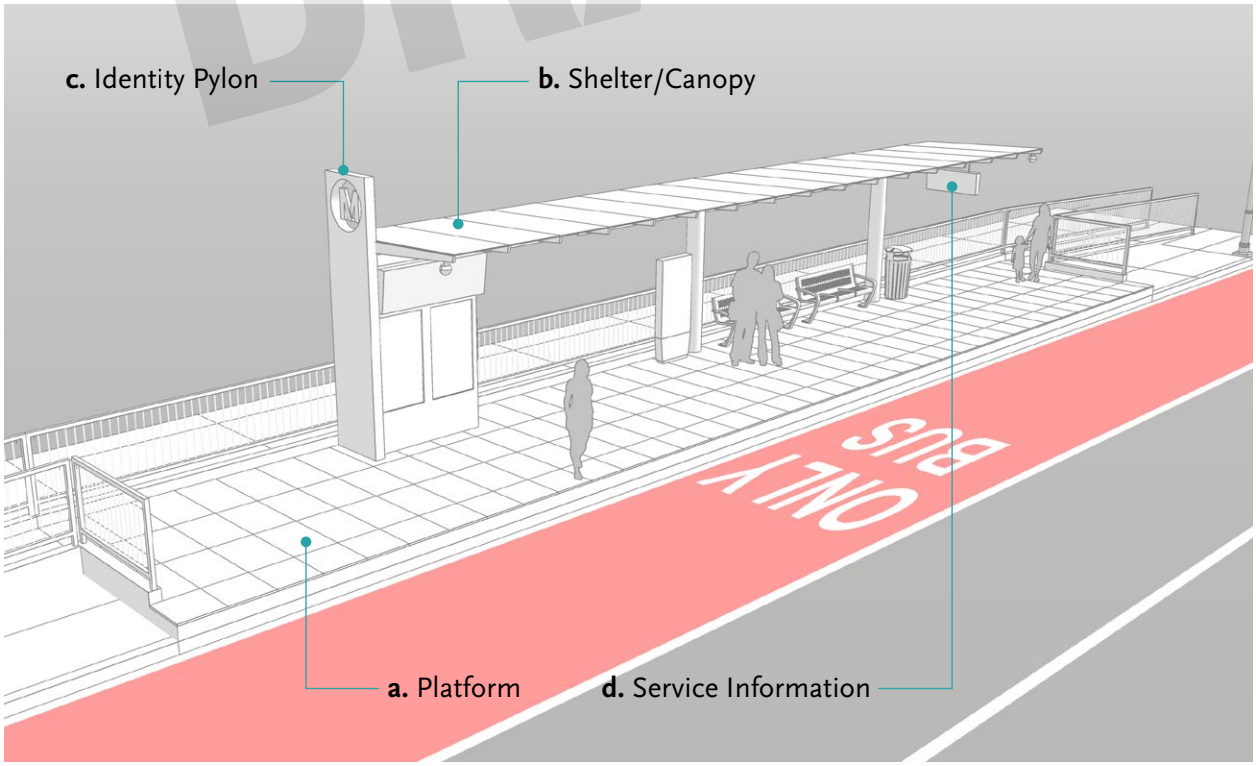


Station components diagram - see section 7.2 for detailed station design & configuration

a. Platform

Description

A BRT station that is well-organized and responds to local community context adds value to BRT brand awareness and recognition. BRT station platforms are to be more spacious than standard bus stops and made of durable, high-quality materials, such as poured-in-place concrete floor finishes, and stainless steel furnishings. Site furnishing such as benches, trash receptacles, leaning rails, and bike racks are within the same brand family and consistent across all BRT stations.

Metro Standards and Goals

> Architectural design of platforms is determined by Metro's standard kit-of-parts as identified in the Systemwide Station Design Standard Policy.

Guidelines for Implementation

- **Consideration:** BRT stations are ideal for enhancing the brand exposure for the BRT system. Capitalize on their many surfaces to introduce branding elements to reinforce distinct service.
- **Recommendation:**
  > Choose surfaces and materials that are durable and easy to maintain.

GRTC Pulse BRT Platform - Richmond, VA

b. Shelter/Canopy

Description

Branded shelters and canopies at BRT stations reinforce brand identity and recognition for transit riders and can further distinguish from standard bus service. Proper naming conventions also provide a transit rider with trust and confidence to quickly navigate the BRT stations. In addition, new trends in shelter and canopy design embedded with smart technologies, such as cell phone charging stations, solar panels and WiFi can also be integrated in the shelter design. Refer to Chapter 7.2 Station and Platforms Design Guidelines for further guidance about canopy and shelter design.

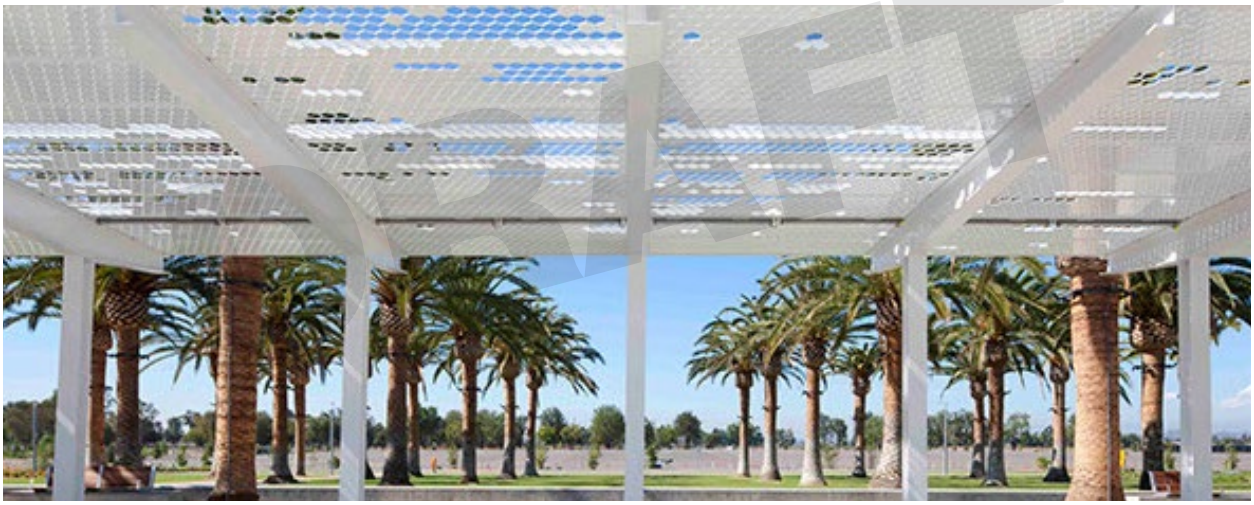
Metro Standards and Goals

> Design canopies that follow architectural standards and Metro's Kit of Parts.

> Select materials and designs that are consistent across stations.

Guidelines for Implementation

Consideration: BRT station shelters and canopies are ideal for incorporating branding motifs into their functional elements.



Perforated pattern in canopy creates interesting shade pattern on ground - Great Park, Irvine

Color and/or art into top and side panels adds interest.

c. Identity Pylon

Description

Whether integrated into the canopy as incorporated in the BRT station design guidelines, or as standalone elements, pylons can be utilized to further define the station boundaries and support brand identity. The identity pylon should be consistent across all BRT stations and at the minimum include the transit agency logo and an element that indicates the station name or BRT line. These elements can either include the BRT name, color or specific logo. In order to address concerns about spatial constraints, the identity pylons can be integrated into other station elements.

Metro Standards and Goals

Metro's Pin concept was first implemented in 2016 at the North Hollywood station as a standalone element. The Chapter 7.2 Station and Platforms Design Guidelines specify how BRT-specific versions of an identity pylon will be integrated into canopies.

Guidelines for Implementation

- **Consideration:** Full BRT service shall utilize a signifier/identity pylon that is integrated with the station/canopy design to reinforce the BRT brand and agency.
- **Recommendation:**
  - > Consider how multiple lines of service or transit providers should be shown on the pylon.
  - > Properly locate pylons that are easily recognizable from a distance.
  - > Where BRT lines share stations with other lines of service, consider combining route labels in the identity pylon.

Incorporate Key Elements From Current System

Service routes clearly shown at night - Paris, France

Transit mall pylon and route information - Portland, OR

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d. Lighting

Description

Lighting ensures that riders feel safe and secure at BRT stations, but it also influences the look and feel of BRT station design. Station elements such as the shelter, identity pylon, signage, and wayfinding should be well-lit and fully integrated with LED lighting to support perceptions of comfort and security. In addition to providing visibility at all times of day, lighting poles immediately surrounding the station can support navigation to and from the station. The use of sufficient indirect LED lighting can create a place of respite and further promote brand identity. The Section 7.2 Stations and Section 7.4 Systems chapters in this document also include guidance regarding lighting.

Metro Standards and Goals

> Lighting standards are dictated by Metro's architectural standards and must conform to specific accessibility and safety requirements.

> Variations are unlikely to occur for branding purposes.

Guidelines for Implementation

- **Consideration:** Lighting presents an ideal opportunity to creatively brand a BRT station location and, further, to distinguish it from local bus stops.
- **Recommendation:**
  > Ensure proper lighting and illumination for platforms, signage, pylons, and other branded station elements.

  > Consider additional artistic lighting elements that could support BRT branding efforts through coloring of unique elements or unique treatments at transfer/terminal stations

Lit canopy acts as beacon - Onmitrans SB, San Bernardino, CA Photo Credit: Gruen Associates

Transit mall pylon and router information - Portland, OR

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e. Service Information/Wayfinding

Description

Signage and wayfinding at BRT stations guides transit riders to the BRT line, their next destination through transfer information, and directional key points of interest. Signage and wayfinding should accompany the BRT brand collateral and be coordinated with other transit agencies and jurisdictions. BRT lines will also have service information readily available at every station.

In addition to posted service and route maps, interactive digital display boards provide an improved user experience with up-to-date alerts and service times.

Global cities are increasingly moving toward the primary use of symbols in order to better accommodate residents visitors and residents who speak a variety of languages. Metro has followed this trend in preparation for upcoming world events such as the 2028 Los Angeles Summer Olympic Games. Wherever possible, care and consideration should be given to the development of service information and wayfinding programs that are primarily reliant on symbols rather than words.

Metro Standards and Goals

> Review BRT Station Design Criteria (Chapter 2 of this document), Metro Systemwide Station Design Standards and the Metro Transfers Design Guide for requirements based on station size.

> Avoid station clutter with clear and concise signage and standardized icons.

Guidelines for Implementation

Consideration: It is important to convey a uniformly high quality service for BRT customers.

Recommendation:

> Provide relevant information including frequency of service and headway change times, clearly presented in easy-to-read font types on real-time arrival displays.

> Use minimal text (in English and Spanish), fortified by symbols and graphics over using extraneous words.

> Coordinate city or district-level wayfinding with local jurisdictions.

> Refer to Metro Transfers Design Guide for best practices.

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Consistent branding across several pylon and sign sizes - London, UK *Photo Credit: Transport for London*

5 Vehicles

a. Vehicle
b. Head Sign
c. Name Badge/Logo/Tag Line/Color

a. Vehicle

A significant contributor to the BRT brand is the vehicle type. The vehicle serves as the rider's direct interaction with the BRT line and provides multiple opportunities for the establishment of a consistent brand. BRT vehicles may include distinct characteristics that differentiate them from standard bus fleets, while maintaining design consistency with the transit agency as a whole.

The vehicle's BRT brand is visible by the name, logo, tag line or symbol. Although branding opportunities vary across transit agencies and depend on existing or planned naming conventions, it is essential the vehicle reflect a distinguishable brand hierarchy that clearly calls out the transit provider and BRT service.

In addition to providing transit, the vehicle itself interacts as a wayfinding mechanism for transit riders. Clear and direct head signs, as well as printed route maps in the vehicle's interior contribute to clear navigation in boarding, stops, and transfers between lines.

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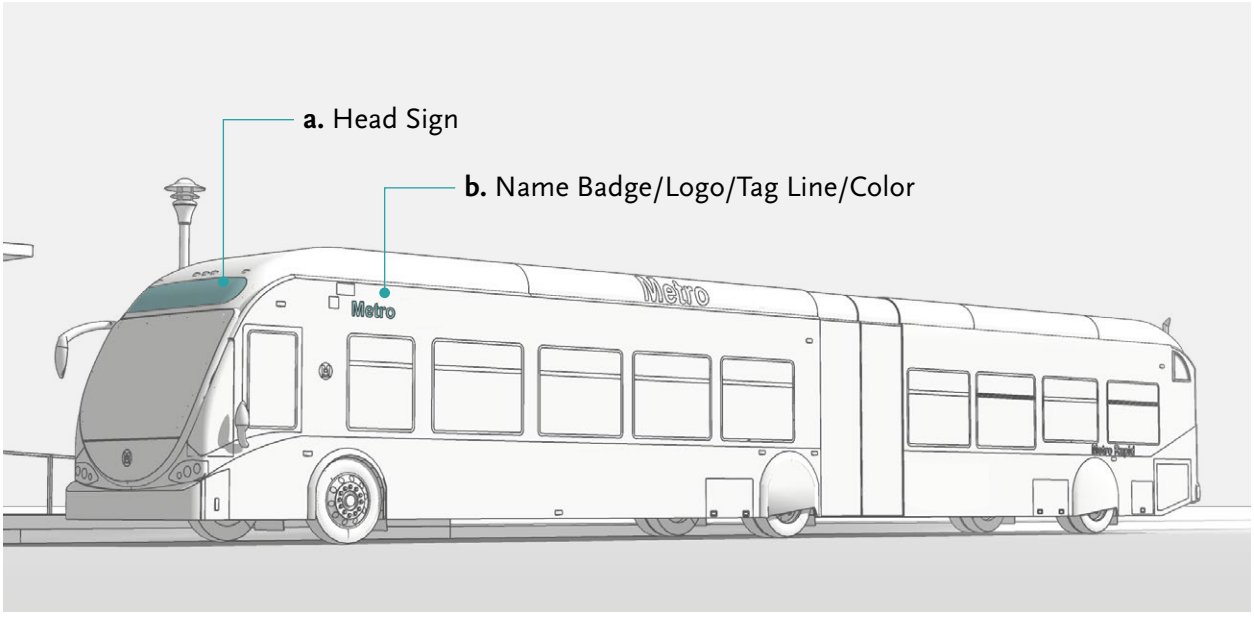

Bus Diagram Indicating Vehicle Branding Components

b. Head Sign

Description

Digital head signs on the BRT bus front can provide low-cost methods to support the BRT brand.

Indistinct or mislabeled head signs can lead to confusion during the boarding process, as riders quickly scan the head sign to determine the vehicle heading to their destination. Today's best practices are to provide additional route cues beyond the route name/number or destination, such as key boulevards or points of interest the line is passing through. This also signals to transit riders their multiple options to reach their destination. Head signs are often utilized for seasonal greetings, special events, or support for local sport teams, though these are best used sparingly to ensure clearly labeled lines at all times.

Metro Standards and Goals

> Metro's Transit Service Policy (2015) specifies that "headsigns will list the destination in which the vehicle is traveling towards in one frame."

Guidelines for Implementation

- **Consideration:** The BRT vehicle itself is an effective way to promote the positive aspects of enhanced transit service. Every effort should be made to maximize that opportunity.
- **Recommendation:**
  - > If a dedicated fleet is operationally feasible, establish distinct BRT colors.
  - > Maximize legibility of route number/name.
  - > Consider digital maps that can be updated faster than paper.

Typical Metro head sign with route number, route name and destination displayed. Color and contrast increase legibility from a distance. Photo Credit: Jonathan Riley

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c. Name Badge/Logo/ Tag Line/Color

Description

The name badge, logo, tag line, and livery for BRT should be developed in unison to ensure cohesion between the multiple brand elements. BRT lines often include unique signifiers, represented by either a logo, color, or secondary badge. These signifiers should be easily replicable along the BRT branding elements as a way of establishing brand hierarchy. Agencies implementing BRT for the first time should consider future growth and whether or not branding of the line will accommodate expansion efforts or new routes.

Metro Standards and Goals

> Metro uses 700-799 route numbers for Rapid service.

> Silver Line route numbers 910/950/950X indicate stop frequency and route configuration.

> Orange Line service was reconfigured to remove route numbers and uses simple orange-colored Metro Liner Branding text.

> Orange and Silver Lines will become the G and J Lines, respectively, as the system's naming convention is updated.

Guidelines for Implementation

Consideration: Beyond the color of the rolling stock, the essence of a branding strategy for BRT service is the development of route "name badge, logo, and color."

Recommendation:

> The name badge might also feature neighborhood/destination placed squarely in front of the route number.

> Review latest efforts by other transit agencies (such as Transport for London) to ensure best practices given that graphic "looks," strategies and techniques are continually evolving.

> Once a graphic style for the BRT services has been determined, produce a graphic standards manual for the route, clearly articulating its intended purpose, logo, and color specifications for repetition and/or evolution of the branding program with regard to existing or future service.

> Identify clearance requirements for use of branding elements.

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SBX Bus Design Excerpt

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6 Other Considerations

a. Customer Experience
b. Bus Advertising/Art Bus
c. Station Advertising
d. Public Art

While not branding in the strictest sense, the combined elements of running ways, stations and vehicles contribute to an agency's image and can influence public perception of the system. These element should be coordinated with overall branding efforts in order to support consistency across the many ways in which the public views the transit network in a positive light.

a. Customer Experience

Enhancements

The customer experience on board is influenced by interior design, which plays a role in distinguishing the BRT line from standard bus services. BRT lines typically include spacious interiors, comfortable seating and ample lighting. Real-time arrival information and next stops shown on digital displays can help further mimic the interior of rail service. Also refer to the Chapter 7.4 ITS Systems chapter of this document for further guidance on real-time customer information.

Metro Standards and Goals

> Automatic voice announcements should use the same number and naming conventions as maps, timetables, and station signs.

Guidelines for Implementation

Consideration: Customer experience is enhanced if bus interiors are well thought out with the use of harmonious, easy-to-maintain materials, combined with the provision of 'cutting edge' technology.

Recommendation:

> Provide comfortable seating and real time arrival and next stop digital displays.

> Provide route mapping beginning and end points, and stations between in advertising strip above the windows.

> Ensure ample provision of hanging straps to facilitate standing.

> Emphasize ample lighting and clearly visible linear route maps.

> Provision of WiFi capability and, possibly, USB charging ports is a positive nod to connectivity.

> Consider green/sustainable materials made from recycled plastic bottles or clothing fibers for seating and other interior finishes to demonstrate sustainability commitments.

> Consider deploying digital maps that can be updated faster than paper maps.

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b. Bus Advertising/Art Bus

Description

Striking and creative BRT vehicle wraps are occasionally utilized as a form of advertising or public art. Some transit agencies have partnered with local artists, organizations or galleries to display appealing works of art on their transit fleet or in stations. The challenge is to integrate these visual elements without distracting from BRT brand awareness. Within the Metro system, the Orange Line does not prominently feature advertising, and the Silver Line features playful illustrations of passengers on windows. Other transit lines, such as Foothill Transit, have opted not to include any advertising on their bus exteriors as a way of strengthening brand identity.

Metro Standards and Goals

> Metro Communications determines advertising contracts, vehicle wraps, and any deviations from established standards.

Guidelines for Implementation

- **Consideration:** Current and emerging bus wrap technology is a cost-effective way to enhance BRT transit service in an artful manner.
- **Recommendation:**
  - > Establish standards and/or uniform placement of bus wraps/advertisements to make sure that ad visuals do not interfere with Metro brand identity or passenger security.
  - > Consider how unique bus wraps or advertising can serve larger municipal goals or support cross-promotion with cultural institutions or civic initiatives.
  - > Investigate partnerships with local art galleries/museums to co-sponsor bus wrap programs based upon cultural or seasonal themes.

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Translink bus wrap collaboration with Vancouver's Contemporary Art Gallery (CAG) - Vancouver BC

c. Station Advertising

Description

Advertising on BRT lines can be included at stations, on shelters, and on display modules in order to generate revenue. Although advertising can be a form of revenue generation, overabundant use of visuals could distract from the BRT brand and navigation.

A transit agency should determine the appropriate use of advertising along the BRT lines and should be coordinated with any internal communications department or the municipal agency responsible for marketing and branding. Also refer to the Section 7.4 ITS Systems chapter of this document for further guidance regarding digital advertising.

Metro Standards and Goals

> Metro's Creative Services department determines policies and negotiates advertising.

Guidelines for Implementation

- **Consideration:** Advertising along BRT routes, including stations, will be subject to Metro, city and/or municipal transit agency policies. If it is allowed, ensure that its placement does not detract from branding strategies.
- **Recommendation:**
  - > Consider limiting advertising to transit-supportive initiatives, equity-focused programs, and public safety awareness.
  - > Follow agency guidelines on advertising dimensions and locations within the station canopy.

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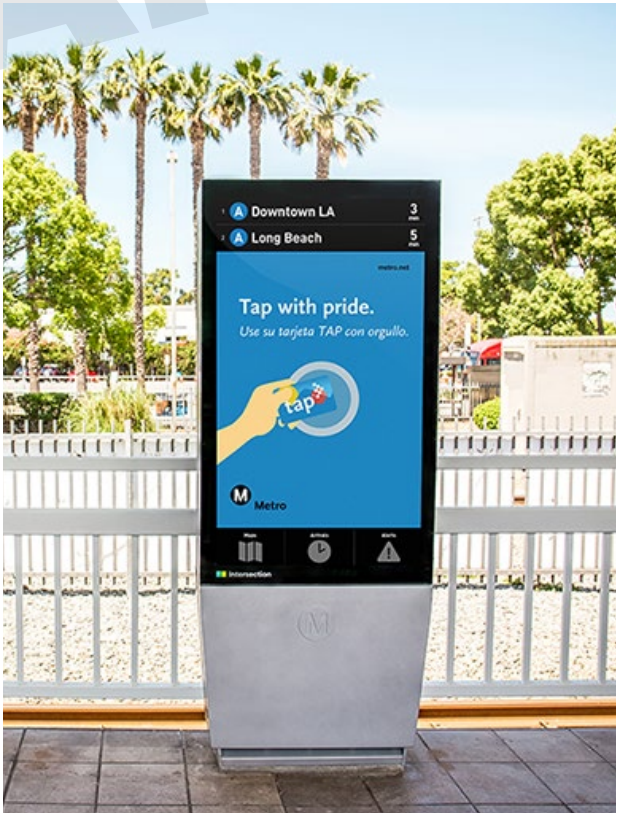
Site-Specific Ad Blends Into Surrounding Station Components

Non-profit advertising on glass panels - Vancouver BC International Airport Photo Credit: IBI Group



Consider Integrating Ads into Interactive System Panels/Kiosks

d. Public Art

Description

Integrating public art along BRT stations serves more than ornamental purposes by contributing to station identity and sense of place. While public art offers limitless opportunities to personalize station elements, the upkeep can lead to increasing maintenance and operational cost.

Providing clear guidelines on dimensions, materials, and locations that are adaptable along stations can provide more meaningful displays of public art that are easily coordinated with local artists. In instances where the physical representation of public art may not be feasible, other creative solutions that are adaptable include displaying art through digital displays, or artistic lighting within BRT station elements.

Metro Standards and Goals

> Metro has streamlined the ways in which public art will be incorporated into stations by adding it into station design criteria. The Metro Public Art department will define and administer the provision of work for new lines of service.

Guidelines for Implementation

- **Consideration:** One of the clearest ways to distinguish a bus shelter within a distinct neighborhood is by incorporating public art into its design. It is also a way to foster community pride and support local artists.
- **Recommendation:**
  - > Local jurisdictions should look to industry best practices for guidance as well establish public art guidelines.
  - > Utilize durable materials such as glass art panels, porcelain enamel steel work, or pylons.
  - > Incorporate creative elements such as digital displays or lighting.
  - > Investigate local partnerships with local artists to provide their work for nearby BRT stations.

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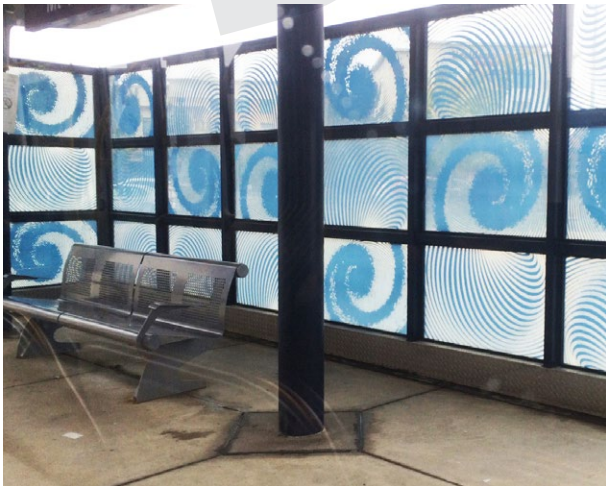

Public art along Red Line differs in style while maintaining overall consistent use of materials and location - Portland, OR
Photo Credit: IBI Group

Etched glass panels at Trimet station - Portland, OR

6

BRT Planning and Integration Into Transit-oriented Communities

Existing policies related to transit-oriented communities help in evaluating the opportunities and constraints of transit-supportive planning efforts related to BRT and define a vision for integrating TOC principles into the planning of the Countywide BRT network.

DRAFT

1 TOC Design Objectives
2 Policy Context
3 BRT Required and Supporting Elements

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DRAFT

1 TOC Design Objectives

a. TOC Policy Goals
b. Objective of TOC Design Guidelines
c. Partnerships with Local Municipalities

Transit-oriented communities (TOCs) are places that, by their design, allow people allow people to drive less and access transit more.

A transit-oriented community maximizes equitable access to a multi-modal transit network as a key organizing principle of land use planning and holistic community development. TOCs differ from Transit Oriented Development (TOD) in that a TOD is a specific building or development project that is fundamentally shaped by close proximity to transit. TOCs promote equity and sustainable living in a diversity of community contexts by: (a) offering a mix of land uses that support transit ridership of all income levels (e.g. housing, jobs, retail, services and recreation); (b) ensuring appropriate building densities, parking policies, and urban design that support accessible neighborhoods connected by transit; (c) elevating vulnerable road users and their safety in design; and (d) ensuring that transit related investments provide equitable benefits that serve local, disadvantaged and underrepresented communities.

The purpose of this BRT Planning and Integration into transit-oriented communities Design Guidelines is to provide additional guidance to planners and policy makers from within local jurisdictions and Metro on how to include TOC principles and policies within BRT projects.

Although Metro BRT projects are the main focus of the chapter and its geographic context is for projects in LA County, these guidelines can also provide guidance to other transit agencies looking to incorporate TOC concepts into their BRT plans.

Metro's TOC Policy promotes policies and actions that maximize the benefits of the transportation investments in communities by incorporating equity and community development as critical considerations.

Metro's TOC Policy defines Metro's goals in how the Agency "considers, funds, enables, and/or incentivizes activities that support the development of balanced communities throughout LA County." The Policy outlines "TOC activities" that can be considered as serving a transportation purpose, and establishes the geographic reach of these activities.

Figure 1 on the following page illustrates the geographic boundaries within which TOC activities can take place. First/Last Mile amenities can be implemented throughout the catchment area of a BRT station and are often focused closer to the station.

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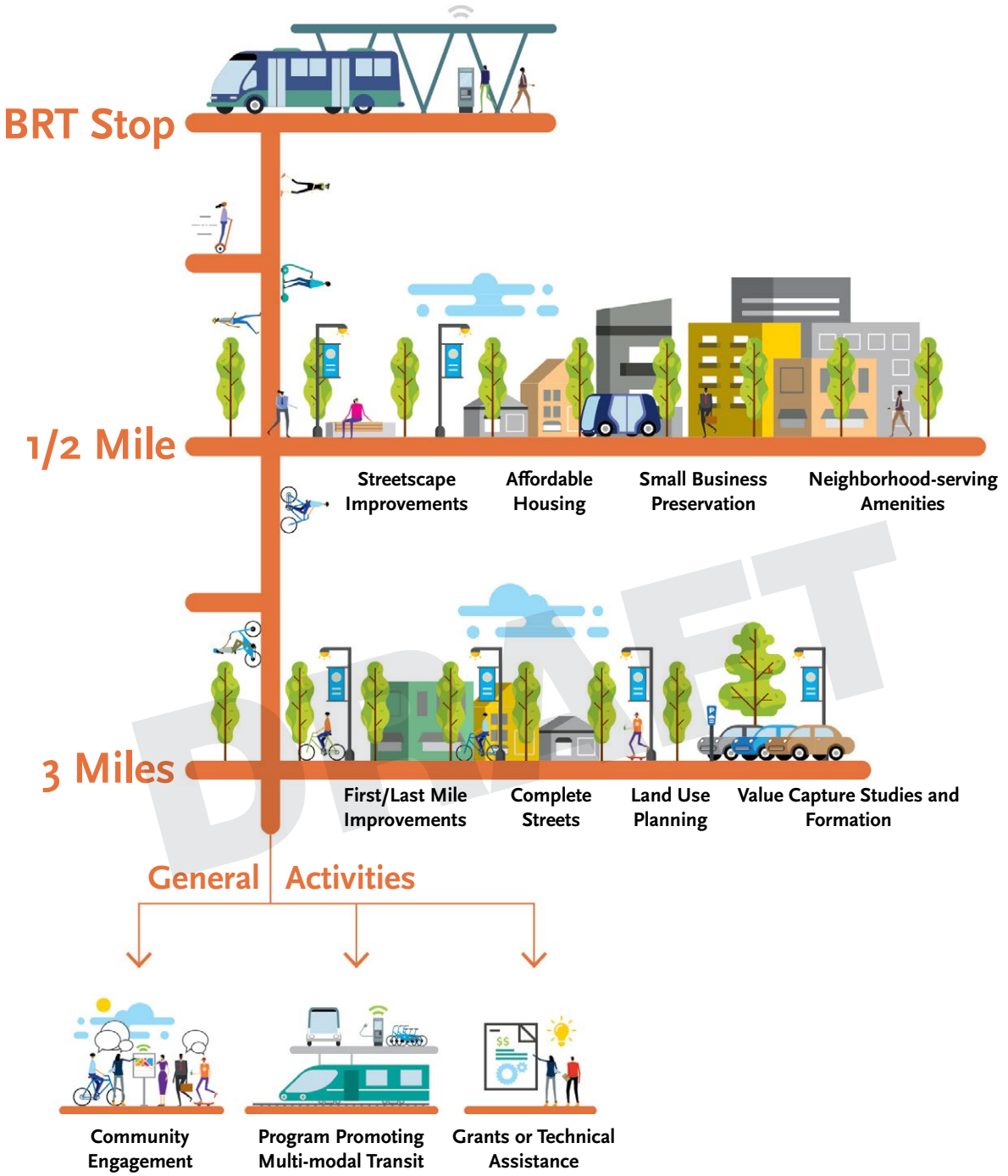

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Figure 1: TOC Activity Boundaries

a. TOC Policy Goals

The five goals of Metro's TOC Policy are:

1. *Increase transportation ridership and choice* – through promotion of alternate, non-motorized modes of transportation, enhanced first/last mile connectivity, and working to create safer environments.
2. *Stabilize and enhance communities surrounding transit* – by prioritizing transit-adjacent affordable housing, supporting local residents and business, and creating sustainable infrastructure.
3. *Engage organizations, jurisdictions, and general public* – by including intentional outreach to communities that are harder to reach through traditional outreach strategies, and increased collaboration with local residents, businesses, and community organizations.
4. *Distribute transit benefits to all* – by incorporating equity metrics into the planning and evaluation process.
5. *Capture value created by transit* – by considering value capture mechanisms around transit investments that are reinvested in TOC activities.

Metro's TOC Policy Goals and its Equity Focus Communities metric are integral to the corridor identification, evaluation, and screening processes as well as the planning, design and implementation of future BRT projects.

b. Objective of TOC Design Guidelines

The objective of this chapter is to provide guidance to transit and land use planners on integrating TOC into the planning and implementation of new BRT corridors, summarize existing policies and best practices related to TOCs, and evaluate the opportunities and constraints of transit-supportive planning efforts related to BRT. These guidelines also distinguish those elements that are required for BRT planning, and those which are TOC supportive but may be optional due to budgetary, schedule, policy, or site constraints. These guidelines can be used as a "playbook" to build partnerships between the implementing agency and local jurisdictions.

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c. Partnerships with Local Municipalities

As LA County's largest provider of transit services, Metro's primary role is to plan and operate transit service. Additionally, Metro's TOC unit includes five core functions that help encourage, incentivize and support local jurisdictions to plan for equitable TOCs. These five core TOC functions include:

> The Joint Development team works with local communities and developers to develop viable Metro owned properties that remain after the public transit infrastructure is built. This process is outlined in the Joint Development Policy.

> The Adjacent Development Review team coordinates with private development occurring adjacent to Metro right-of-way to ensure safety, avoid impacts to transit service, and identify synergies between the development and Metro stations to increase ridership.

> The First/Last Mile team works with local communities to develop First/Last Mile Plans (FLM) for all Measure M corridors. The FLM team's work is guided by the Agency's FLM Policy, as well as its First/Last Mile Strategic Plan and Active Transportation Strategic Plan.

> The Systemwide Design team reviews station design of all Measure M corridors focusing on:

- Providing a safe, accessible and comfortable Metro experience.
- Connecting Metro stations to the greater regional transit network.
- Orienting stations to neighborhood destinations and pedestrian routes.
- Improving the durability of Metro's infrastructure to reduce maintenance.
- Supporting the vision of transit-oriented communities.

> TOC Strategic Initiatives group administers Metro's Transit Supportive Planning efforts that include:

- TOD Planning Grant Program.
- The Transit Supportive Planning Toolkit.
- Metro's Union Station redevelopment program.
- Mobility Corridor Integration.
- The Policy and Planning group is also lead for the West Santa Ana Branch TOD Strategic Implementation Plan (TOD SIP) and is responsible for developing the TOC Implementation Plan.

As a partner, Metro supports local agencies in setting the land use and design policies that regulate the public right-of-way in which BRT will operate.

Collaboration between Metro and local jurisdictions is therefore essential to the implementation of successful BRT projects. The TOC Policy further defines areas that fall within Metro's functional jurisdiction and those that are within the realm of local jurisdictions.

DRAFT

2 Policy Context

a. Overview
b. First/Last Mile Policy
c. Metro Systemwide Station Design Standards Policy
d. AB 1560
e. City of Los Angeles TOC Affordable Housing Incentive Program
f. Housing Crisis Act of 2019 (SB330)
g. Equity and Community Engagement
h. TOC Policy and Implementation Plan

DRAFT

a. Overview

Transit projects exist within a policy context that is larger than that defined by the agency providing service. Clear guidelines and a transparent planning process are essential to building community trust, improving communication, and delivering projects within requirements set by policy, but TOC policies continue to evolve. This section reviews some TOC-related connections such as community character, housing affordability, and gentrification/displacement that are impacted from a policy perspective.

b. First/Last Mile Policy

First/Last Mile (FLM)—describes the space that connects transit service such as BRT with a rider's origin and destination. FLM planning for transit-oriented communities in the context of BRT is covered in greater detail in Section 3, but Metro's First/Last Mile (FLM) Planning and Implementation Policy (Board Motion 14.1) provided the initial direction to Metro staff to begin FLM planning on a countywide basis. Subsequent evolving policy documents have further defined the FLM process and were reviewed to inform this document.

c. Metro Systemwide Station Design Standards Policy

This policy requires that all future BRT station designs conform to the Metro BRT Design Criteria and Standard Drawings that are developed as part of the BRT Vision and Principles Study. It reaffirms a commitment to Metro's Systemwide Station Design Standards or "Kit-of-Parts" design toolkit and emphasizes safety, state-of-the-art design, maintainability, sustainability, consistency, legibility, and accessibility of stations. These priorities contribute to a station's integration with the community and support overall TOC goals.

d. AB 1560

Assembly Bill 1560 provides State-level guidance on what constitutes Bus Rapid Transit, as well as its relationship to the environmental clearance processes for residential projects under CEQA. The bill defines BRT as including all of the following:

1. Full-time dedicated bus lanes or operation in a separate right-of-way dedicated for public transportation with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

2. Transit signal priority.
3. All-door boarding.
4. Fare collection system that promotes efficiency.
5. Defined BRT Stations.

Infill residential projects located within ½ mile of a BRT stop that meets the above guidelines would therefore be exempt from certain restrictions under CEQA. These implications should be considered early in the project development process both by the lead agencies implementing a BRT project and the local jurisdictions in which the project is built.

e. City of Los Angeles TOC Affordable Housing Incentive Program

Although the City of Los Angeles is not the only local jurisdiction in which Metro operates, its population and geographic size constitute a large portion of Metro's ridership and service area.

The city's recently-enacted TOC ordinance is an important consideration for the integration of transit and land use planning and represent a significant effort to reduce Vehicle Miles Traveled (VMT) and address California's housing crisis. The TOC guidelines provide tiers of affordable housing incentives for areas adjacent to major transit stops, and the policy demonstrates how density can be concentrated in the areas best suited to handle it: at major transit stations and stops, as well as intersections of frequent bus lines where transit access is highest. Due to the nuances of the policy, Metro and the City of Los Angeles will need to coordinate how the planning of new BRT service interacts with eligibility for housing development incentives.

f. Housing Crisis Act of 2019 (SB330)

Senate Bill 330, "The Housing Crisis Act of 2019" is a statewide bill designed to accelerate the approval of housing developments, including residential development, mixed-use development with a large residential component, and transitional housing until 2025. Among other goals, it limits a local jurisdiction's ability to downzone residential areas, speeds up permitting requirements and processing times, and limits development fees and building requirements. The bill also contains measures to address displacement. It bans demolition of affordable and rent-controlled units unless developers replace them, pay to rehouse tenants, and offer them first right of return at the same rent.

g. Equity and Community Engagement

Metro is committed to involving stakeholders and the public in the decision-making process. Metro's Equity Platform Framework (February 15, 2018), recognized transportation as "an essential lever" to enable access to opportunity. The platform is built on four pillars which should guide community engagement practices and the decision making process:

1. *Define and Measure* – by using consistent metrics throughout the project development phase.
2. *Listen and Learn* – by building partnerships with communities and incorporating their input throughout.
3. *Focus and Deliver* – by prioritizing those metrics which Metro as a transit provider is most capable of influencing.
4. *Train and Grow* – by educating staff and the next generation of transit planners.

h. TOC Policy and Implementation Plan

In 2018, the Board adopted the TOC Policy as a commitment to incorporate equity and community development in how the agency plans and realizes its transportation investments across the county, with a near-term next step of developing an implementation plan.

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Metro is in process of developing the TOC Implementation Plan as the primary implementation tool of the TOC Policy. The TOC Implementation Plan is grounded in four initiatives:

1. *Creating TOC Corridor Baselines Assessments for Measure M Transit Corridors:* Highlight community characteristics, opportunities, and needs to support communities in leveraging the positive benefits of the transit investment and preparing for potential unintended consequences.
2. *Continually Improving Metro TOC Programmatic Areas:* Includes a series of actions that Metro will undertake to ensure that Metro TOC Programs align with the Policy goals and outcomes.
3. *Enhancing Metro's Internal Coordination:* Activities that Metro will undertake to align internal coordination in support of creating TOCs in LA County.
4. *Strengthening Coordination and Collaboration with Metro's Partners:* Calls for the essential ongoing coordination and collaboration with municipalities, local communities, and advocacy organizations for the region to realize equitable TOCs, given that many of the activities that are critical to TOCs are outside of Metro's jurisdiction.

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3 BRT Required and Supporting Elements

a. BRT Required Elements
b. BRT Supporting Elements
c. Conclusion

The section includes two key definitions:

> BRT Required Elements, those TOC items that are required for consideration in BRT planning; and

> BRT Supporting Considerations, those items that extend the reach of a holistic planning practice but may be constrained due to budget, schedule or jurisdictional control.

a. BRT Required Elements

EVALUATING TOC OPPORTUNITIES & CHALLENGES IN CORRIDOR PLANNING

Zoning, development and land use patterns, affordable housing policies, and active transportation infrastructure have major impacts on the provision and success of public transit. As such, evaluating these types of TOC factors as part of the BRT planning process is critical to a successfully integrated transportation project in the community. As part of early planning for new BRT corridors, Metro will evaluate TOC opportunities and constraints along each alignment option to inform the selection of a locally preferred alignment, along with technical review on engineering, real estate acquisitions, etc. Development incentives such as density bonuses or reduced parking minimums for projects adjacent to high-quality transit are important tools to help address the state and city's housing affordability crisis. These types of incentives also concentrate development of new housing stock and denser development in the areas that are best designed to handle it: at major intersections and along arterial roads, away from more sensitive and less developed neighborhoods. While Metro does not control local land use policy or development incentives, understanding the land use and development context is essential to making decisions on the preferred alignment and preferred station locations.

Opportunities

> Evaluating land use, development patterns, and local zoning/development policies as part of BRT corridor alignment and station studies.

> Work with cities to proactively update land use and development policies to support transit, as well as affordable housing and rent stabilization policies to protect communities from displacement along major transit corridors or in proximity to major transit lines.

> Prioritizing the implementation of BRT lines and stations in locations where transit supportive development patterns currently exist, are planned, or are more likely to occur in the future.

Challenges

> Prioritizing BRT alignments along high density and/or mixed use corridors may overlook areas where high-quality transit options are lacking or where there are historical patterns of disinvestment.

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> Updating local zoning standards and housing policies requires resources, which are often constrained in small cities, or cities with high risk of displacement as investment occurs near transit.

Reference Documentation

> Metro TOC Policy (2018)

STATION LOCATION

Chapter 2 of these design guidelines contains the core materials that will guide the detailed station design and location process. Due to the greater distances between stations on BRT as compared with local bus service and the greater capital costs of building them, properly locating stations is critical. Stations that are thoughtfully designed, attractive, and optimally placed to serve the surrounding community will encourage transit ridership and retention of existing riders. Table 2 below describes factors that must be considered during the process of selecting station locations.

Opportunities

> Excellent opportunity to solicit and incorporate community and key stakeholder feedback.

Challenges

> Balancing hard restrictions such as right of way/property restrictions and traffic engineering with soft concepts like urban design requires a high degree of coordination.

Reference Documentation

> BRT Vision and Principles Design Guideline 7.2 – Stations

> Metro Transfers Design Guide (2018)

> Local zoning/land use policies

Criteria	Relevance to BRT
Metro policies	Metro projects must comply with all relevant Metro policies.
Major trip generators	Large employers and key activity centers such as hospitals and universities are more conducive to transit use.
Supportive land uses	Land that is developed at a greater density provides higher ridership potential.
Sidewalks and condition of sidewalks	Conversely, new transit projects can provide an opportunity to address these deficiencies with First/Last Mile improvements.
Bus/bike connections	Locating stations near other lines of service or bike infrastructure reduces friction between travel modes.
Adequate right of way, space constraints, safety	The greater footprint of BRT stations requires additional space for safe circulation.
Station usage forecasts	Stations with projected higher ridership may need to be located in an area that can accommodate the demand.
Congestion planning	Intersection density is a measurement that can be used as a proxy for walkability. Station location must balance proximity to intersections with congestion and impacts caused by other modes of travel.

Table 2: Station Location Criteria

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FIRST/LAST MILE PLANNING

Although individuals may complete the bulk of their journey between places on a bus or a train, they must first walk, bike, or roll to access transit. According to Metro's regular trip surveys, 89% of bus riders used some form of active transportation (walking, biking, skateboards, scooters) to reach their bus stop. This segment of their journey—the first/last mile—was analyzed in Metro's First/Last Mile (FLM) Strategic Plan in order to provide a strategy to improve FLM conditions by increasing safety and accessibility to transit. The Plan provides a toolkit to analyze existing conditions around potential BRT stations to identify needs in BRT corridors (such as improved lighting, crosswalks, or bike lanes), and emphasizes the important role that local jurisdictions play in connecting to transit. FLM treatments should be rightsized for each project and its local context, primarily by focusing on the highest ridership stations and those with the greatest number of transfers.

In 2016, Metro established FLM Policy (Board Motion 14.1). The policy calls for FLM planning, design, and construction around new transit stations. Over the last few years, Metro has conducted FLM planning for transit stations along several existing and future corridors. The agency is in the process of developing its First/Last Mile Guidelines, a coordination framework that describes processes for integration of FLM planning into transit project delivery. Metro will initiate the FLM planning process, working closely with local jurisdictions and stakeholders, including community-based organizations, to reflect local needs and priorities along primary access routes to the station. In this framework, local agencies would implement and maintain these FLM improvements located in their own right-of-way. FLM planning and implementation processes specific to BRT projects are currently being discussed; while BRT development phases are similar to other transit projects, there are differences that could prompt various considerations including, but not limited to, a focus on particular stations along a BRT corridor or a change in the studied area for FLM improvements surrounding the station.

Metro BRT projects planned in the future should budget for FLM activities in consultation with FLM staff and BRT-specific processes will be finalized in the First/Last Mile Guidelines (anticipated in Fall 2020).

Opportunities

> FLM planning/improvements can increase collaboration with local jurisdictions and encourage additional investment around transit projects.

> New transit lines provide a benefit to all street users through FLM infrastructure improvements.

Challenges

> FLM planning outside of the immediate station area requires additional coordination with local jurisdictions and property owners.

> Under constrained project budgets, FLM improvements can be difficult to implement.

Reference Documentation

> Metro First/Last Mile Strategic Plan (2014)

> Metro First/Last Mile Guidelines (Expected 2020)

JOINT DEVELOPMENT

BRT projects typically do not require acquisition of significant amounts of property, and therefore Metro is unlikely to undertake joint development at a large scale. In places where more intensive land development exists, bus maintenance and layover facilities may present potential for mixed-use joint development projects. Where property acquisition is necessary for construction support, agencies should consider whether consolidating several small acquisitions into one larger parcel makes sense both for construction staging and for long-term joint development purposes.

However, major transfer points or terminal stations may deviate from this generalization, such as at Metro's North Hollywood station. The station is the northern terminal of the Metro Red Line, and the current joint development plan occurring at the station includes a redesigned and expanded transit plaza to accommodate Metro's existing Orange Line BRT and local bus service, as well as the future North San Fernando

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Valley BRT and North Hollywood to Pasadena BRT projects. The plaza will better accommodate bus-to-rail transfers and provide improved outdoor spaces.

Opportunities

> Identify parcel acquisition needs as early as possible in a project and consolidate them for maximum benefit.

Challenges

> Joint development is a complicated process that requires coordination with additional private firms, property owners, and stakeholders.

Reference Documentation

> Metro Joint Development Policy

TRANSFER CONSIDERATIONS

Over 60% of Metro's riders transfer at some point in their journey. A well-designed transfer experience can help ensure that people make a seamless connection between modes or routes, thereby supporting ridership. Items like clear signage, safe crosswalks, and real-time arrival screens can encourage discretionary trips (where an individual may be traveling outside of their normal routine) by making them easier to navigate. Transfers should also be safe, clean and comfortable at all times of day, and in all kinds of weather. Metro's Transfer Design Guidelines extensively studied the transfer experience of current riders and contains guidelines and recommendations for improving both the existing system and future lines of service.

Opportunities

> Consider the transfer experience when locating stations to connect with other transit lines in order to maximize rider satisfaction.

Challenges

> Expanded transfer infrastructure can be costly to implement where right-of-way is constrained or property acquisition costs are high.

> Enhanced safety measures in the street right-of-way (e.g. crosswalks, bulbouts, pedestrian priority signals, lighting) requires close coordination with local city departments (e.g. Public Works, Street Services, Transportation) to implement.

Reference Documentation

> Metro Transfers Design Guide (2018)

b. BRT Supporting Elements

Beyond the considerations above that are required for successful corridor planning and design, the planning process for new BRT lines should consider to what degree additional TOC concepts can be incorporated into the project scope and budget.

MANAGING MOBILITY ACCESS

The First/Last Mile planning process covered above is the formal process by which active transportation connections to stations will be evaluated and planned. BRT planning, particularly station-area planning, should also consider new mobility models that have developed over recent years. Examples include privately-operated bicycle and scooter micromobility providers (such as Bird, Jump, and Lime), as well as ride-hail/ Transportation Network Companies ("TNCs", such as Uber and Lyft).

These new mobility models can help transit riders connect to stations, link major local destinations, and leverage upgrades to the wider active transportation network, but planning for and accomodating them is complex. Metro is responsible for planning for micromobility within the station area boundary. Outside of the station area, partnerships between Metro, local jursidictions, and private property owners can support safer, multimodal access to and from transit. Key enhancements to support these efforts may include signal prioritization, fully separated bike paths, and managing micromobility "corrals" so that they enhance rather than impede transit access.

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In addition, designated pick-up and drop-off areas for TNCs and new curb management programs can help reduce interference with bus operations, increase safety for passengers, and potentially drive foot traffic to nearby businesses. Metro is also running pilot programs to study and partner with micromobility and ride-hailing services. These pilot programs provide additional opportunities for local jurisdictions to learn from industry best practices and engage with Metro on mutually-beneficial programs.

Opportunities

> Integrate bicycle/scooter parking into station planning efforts.

Challenges

> BRT station footprints in many areas may be highly constrained, making accommodation for other vehicles difficult and/or expensive.

> Increasing on-board accommodations for bicycles and scooters can reduce vehicle seating capacity and may increase dwell times.

> Local policies on micromobility devices are changing rapidly.

URBAN HEAT ISLAND/URBAN GREENING

As climate change makes extreme temperatures and weather events longer, more frequent, and more intense, planning initiatives will need to provide greater priority to mitigation. In the Southern California context in particular, lack of shade and high temperatures leave many riders vulnerable—especially in those communities identified by Metro's EFC metric. To the largest extent possible, each and every consideration for the design and delivery of BRT service should be looked upon with the filter of climate change as a key criteria for decision making. Although transit service may provide negligible improvement to the urban heat island effect, its accompanying infrastructure can incorporate sustainability elements and protect riders. Corridors that provide greater reductions in VMT and GHG should receive higher evaluations in the screening process. Similarly, stations that create spaces where heat impacts can be mitigated through greening, shading and other design strategies should be more favorably evaluated.

In addition, the concept of design resilience is the capacity to adapt to changing conditions while maintaining service functionality. It will increasingly be a factor in the maintenance of the value of this design manual as society and technology progress.

Opportunities

> Increased transit ridership is seen as part of the solution to climate change. Its increasing contribution to mitigation of the negative effects of climate should be real and apparent.

Challenges

> The increased cost of addressing climate change is often looked upon as a negative, but the cost of avoiding it head on, is likely a greater factor in the long term.

Reference Documentation

> Metro Moving Beyond Sustainability Plan

> Metro Green Places Toolkit

c. Conclusion

Chapter 6 is intended to be a 'Living Document.' Given that TOC planning and implementation is a transitional link between Metro, local municipalities and the County of Los Angeles, it is subject to a wider array of external considerations that will assuredly influence the evolution of BRT service moving forward.

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Los Angeles County
Metropolitan Transportation Authority

Bus Rapid Transit Vision & Principles Study

January 2019 – October 2020

Stakeholder Engagement Report

Metro®

Bus Rapid Transit Vision & Principles Study

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Bus Rapid Transit Vision & Principles Study

1. Overview

The Bus Rapid Transit (BRT) Vision & Principles Study was undertaken to establish a cohesive set of guidelines and standards to direct Metro investment in on-street BRT projects. The Study establishes a local definition of BRT, supportive design guidelines and identifies the corridors where BRT can best meet Metro mobility goals as defined in the Vision 2028 Strategic Plan. Through this effort, the standard of a future LA County BRT network will be established and Metro's goal of creating a world-class transportation system will be further supported. Overall, the BRT Vision & Principles Study generated the following guiding deliverables:

> Metro BRT standards

> Metro Design Guidelines Manual

> Final Report with a recommended list of potential BRT corridors

2. Stakeholder and Public Engagement Program

To assist Metro in achieving the goals of the study, the outreach team worked closely with the technical contractor and Metro project management to develop a comprehensive outreach program designed to inform, educate and solicit input from a variety of stakeholders, including municipal transit operators, city officials, elected officials, Metro employees, community and transit organizations and members of the general public. Throughout the project, stakeholder engagement at was conducted to complement and help inform the technical process. Activities have included stakeholder workshops, presentations and project briefings, survey engagement, and formation of a Technical Advisory Committee. The team also worked with Metro's NextGen Bus Plan project staff to leverage opportunities for outreach at public meetings and collaborate where possible to assist in maximizing outreach options and stakeholder relationships and share data relevant for both projects. Outreach was tailored to be inclusive and gather feedback that accurately reflects the diversity of LA County's population including ethnicity, race, age, language, income levels and level of transit access and utilization.

3. Project Communication Resources

Outreach strategies included a number of communications tools to aid in building project awareness and encourage participation. Materials were developed in coordination with the project team and designed to effectively communicate project information. The following outlines the communication materials developed for this study.

3.1. Project Database

The project database served as the primary resource for public and stakeholder notification and communication. Database contacts received invitations to meetings and project updates by email, digital e-blasts, and through extended outreach calls to key stakeholders. To initiate the project, a primary database of contacts was developed with an initial 300+ stakeholders collected from existing project database sources, including the NextGen Bus Plan database, Orange Line Improvements database, and other contacts provided by the Metro technical contractor. Database contact categories included public agencies, transportation agencies, community organizations, neighborhood associations, business associations, academic institutions, special interest groups, Metro staff, interested parties and others.

3.2. Collateral and Educational Materials

Story Map

ESRI "Story Map" is an interactive mapping tool that combines maps with narrative text, images, interactive maps and multimedia content. The Story Map for the BRT Vision & Principles Study served as the main online portal for public project information and provided stakeholder access to:

- Core project information and graphics
- Project contact information as a method of input
- Project interactive maps and technical data, which were updated several times to reflect project milestones
- Links to the project survey in both English and Spanish
- Links to other relevant information, including related projects and Metro initiatives

Fact Sheet

An 8 ½" x 11" branded Fact Sheet was developed by the Project Team in both English and Spanish as a foundational collateral tool. This two-sided project sheet provided a brief project overview and purpose, goals of the study, information on the study process, schedule and project contact information. This handout was reviewed and updated as needed throughout the life of the project.

Comment Card

Comment cards were made available at all Technical Advisory Committee meetings, stakeholder workshops and NextGen Bus Plan public workshops. This method of feedback allowed stakeholders to provide their contact information for future project updates and

information as well as feedback on any aspect of the project. To ensure complete communication with the public, this piece was created in both English and Spanish.

Survey

A survey was developed as the primary mechanism for soliciting general public input on the project. It was designed to gather input on priorities for design elements as well as travel preferences and patterns. The survey was promoted in-person at public and stakeholder workshops and was also shared extensively online via countywide geotargeting and extended outreach partners.

Interactive Mapping Tools

In order to fully immerse the TAC and key stakeholders in the corridor study process, custom interactive mapping tools were created. These tools allowed technical data and specific corridor criteria to be presented on a live platform so that viewers could explore the possibilities and provide informed feedback to the technical team. The tools allowed analyzed BRT corridors to be layered with Metro's planned and existing transit lines as well as the proposed NextGen Bus Plan and other key landmarks and destinations in order to see transit system coverage and connections across the county. Users had the ability in real-time to comment on existing data and lines as well as draw new corridor lines for review and consideration by the technical team.

4. Outreach Activities

The outreach activities conducted provided project stakeholders with the necessary tools and resources to be educated, informed and offer valuable input at major milestones in the study. Identified key stakeholders and the public were given opportunities to connect directly with the BRT Study team, through both in-person and digital interactions. The following summarizes all outreach efforts and activities completed by the project team in support of the study.

4.1. Technical Advisory Committee (TAC)

To help guide the study process, a Technical Advisory Committee (TAC) was established in the early months of the project and was comprised of staff from Metro departments, cities and municipal transit operators. The TAC served as a collaborative discussion forum to provide input and feedback on the guidelines and standards being developed for the project and provided expertise on specific department and/or domain subject matter. The TAC also provided insight on the identification and validation of BRT corridors and direction on the identification of the future BRT network. This body also helped communicate project information and progress made to their respective member organizations, colleagues and

constituents. The TAC convened for the first time in February 2019 and held its final meeting in September 2020. A total of 12 TAC meetings were held over the course of the project and detailed minutes were provided to Metro following each meeting. A listing of dates and topics for those meetings is provided in the table below.

Date	Meeting Topic
2/22/2019	Project kick-off; development of project guiding principles
3/18/2019	Development of project goals & objectives
4/15/2019	Refinement/review of vision, guiding principles & goals
6/4/2019	BRT standards and corridor selection criteria development
7/25/2019	BRT standards & thresholds; elements of design discussion
9/24/2019	Stations & Running Ways
10/24/2019	Corridor Analysis
11/21/2019	Branding, Stations & Running Ways
12/12/2019	Operating, TOC & ITS Characteristics
4/16/2020	Corridor Analysis – Top 15
07/29/2020	Corridor Analysis – Top 7; update on design guidelines
09/03/2020	Strategic Network and Design Guidelines Review

4.2. Stakeholder Workshops

During the course of the study, the project team identified a list of 50+ stakeholders based on shared interests, geographic location, relevant industry/agency groups, local community organization and business representation. These included Valley Industry Commerce Association, Southeast LA Collaborative, Cal State LA, FASTLink DTLA, Pacoima Beautiful, LA Walks, Move LA, BizFed, ACT-LA, and local Councils of Government and Transportation Commissions, to name a few. A total of three workshops were conducted (2/7, 5/20 and 9/1, 2020) with these stakeholders and provided an opportunity to inform and gather insight on their unique perspectives regarding relevant issues and opportunities related to the development of LA County's BRT network. Organizations were also provided with project updates through email and phone calls. Project materials were regularly shared with these stakeholders in an effort to further the reach and distribution of study information and in turn, increase awareness and feedback from the public. Detailed notes from each of the stakeholder workshops is provided in the appendix.

4.3. Stakeholder Briefings and Presentations

To further assist the technical team with narrowing down the corridor recommendations, presentations and briefings were scheduled with key representatives and elected officials, with a specific focus on feedback related to the highest ranked seven corridors. These stakeholders helped the team identify local opportunities, support and constraints or issues. This input allowed the team to ascertain the level of public and/or policy support that might be expected for each of the corridors.

Additionally, throughout the project, updates and presentations were provided to a host of other key groups and Metro committees. A list of all presentations and workshops is provided below.

Date	Organization	Date	Organization
10/17/18	Planning & Programming	8/20/20	CD-1 Cedillo
12/11/18	Policy Advisory Council	8/20/20	CD-5 Koretz
4/9/19	Policy Advisory Council	8/21/20	South Bay Cities COG
4/10/19	General Manager Meeting	8/21/20	CD-11 Bonin
5/21/19	Bus Operations Subcommittee	8/21/20	Gateway Cities COG
6/11/19	Policy Advisory Council	8/21/20	SD-1 Solis
6/20/19	Streets & Freeways	8/24/20	LA Mayor Garcetti
7/18/19	Local Transit Systems Subcommittee	8/24/20	CD-4 Ryu
2/7/20	Key Stakeholder Workshop	8/25/20	SD-3 Kuehl
2/11/20	San Gabriel Valley COG	8/26/20	CD-10 Wesson
3/9/20	South Bay Cities COG	8/28/20	SD-5 Barger
3/10/20	Policy Advisory Council	8/28/20	Board Member Garcia
5/20/20	Key Stakeholder Workshop	8/31/20	City of Bell
5/21/20	BizFed	8/31/20	City of Beverly Hills
8/18/20	CD-13 O'Farrell	09/01/20	Board Member Najarian
8/18/20	SD-4 Hahn	09/02/20	LACDPW
8/18/20	SD-2 Mark Ridley-Thomas	09/03/20	City of West Hollywood
8/19/20	San Gabriel Valley COG	09/03/20	City of Long Beach/Long Beach Transit
8/19/20	CD-14 Staff (vacant)	09/9/20	City of Culver City
8/19/20	CD-9 Price	09/10/10	City of Lynwood
8/19/20	Westside Cities COG	09/11/20	FASTLink DTLA
8/20/20	CD-15 Buscaino		

Bus Rapid Transit Vision & Principles Study

Key Stakeholder Input Themes and Comments

Comment Theme	Comment Theme Summary
Proposed Routes Comments and questions that addressed the proposed routes and top 7 BRT corridors.	> **Atlantic:** Several stakeholders were supportive of the Atlantic BRT Corridor moving forward. > **Broadway:** Minimal issues with the Broadway corridor were voiced and interest was expressed in this corridor moving forward at several of the presentations. > **LA Cienega:** Stakeholders feel that while La Cienega is an important corridor, the LAX-Crenshaw Line will address concerns in that corridor. Others indicated a connection to the new LRT would also be beneficial and were supportive of the La Cienega Corridor. > **Sunset:** Concerns were expressed over the topography of the Sunset Corridor as it has steep inclines within the corridor. The corridor received support from several groups. > **Venice:** It was noted that residents in Palms Neighborhood Council want protected bike lanes on Venice Blvd. Other's also expressed support for the Venice Corridor. > **West Olympic:** Concern was expressed over the politics of selecting this corridor. It was also noted there is existing bus bunching near UCLA within this corridor as well as relevance once the Purple Line extension is completed. Concerns were also expressed by the auto-centric nature of this corridor

	and the unfriendly pedestrian nature of it. Some expressed support for this corridor to alleviate dangerous driving conditions in the corridor. > **Western:** Stakeholders expressed support for this corridor but it was mentioned that this may be too close to the Vermont Corridor. > Several Stakeholders expressed the lack of corridors that were presented that were north-south connections instead of east-west connections. Stakeholders also expressed concerns that the proposed routes were heavily concentrated in downtown Los Angeles and there were limited routes that offered connectivity for San Fernando or San Gabriel Valley residents.
Funding Comments and questions related to the funding of the BRT corridors and ancillary improvements.	> Multiple stakeholders requested cost estimates for what BRT corridors would cost to construct. > Several stakeholders also wanted comparisons to other modes of transit like Light Rail Transit or non-BRT bus transit.
Bike/Pedestrian Accessibility Comments and questions relating to the accessibility of BRT by pedestrians and bicyclists as well as adjacent infrastructure that would tie into a future BRT corridor.	> Interest expressed for standardizing safety features in the corridors including lighting and sidewalks. > Stakeholders expressed that enhanced bicycle and pedestrian safety measures in the corridor would improve the viability of the BRT corridor. > Several jurisdictions expressed interest in or noted there were street-scape improvements planned in the corridors.

Safety/Security Comments and questions relating to the safety on the future BRT lines as well as at the stations. Comments and questions also related to traffic safety and emergency access.	> Several stakeholders expressed concerns about security issues on existing Metro BRT lines. > A clarification was also raised as to whether or not emergency vehicle access would be hindered by the inclusion of a BRT line in these corridors.
Community Development Comments and questions related to community development that would support future BRT corridors.	> A suggestion was made for Metro to provide more information to cities on economic development opportunities that will help make them more supportive of future BRT implementation. > Clarifications were also requested as to how community development and TOC factored into the selection of the corridors.
Traffic/Parking Comments and questions related to the impact or benefits the proposed BRT lines would have in their corridors.	> Stakeholders expressed concerns about on-street parking and the possible removal of parking in the La Cienega or Sunset corridors. > Analysis conducted by a stakeholder shows that repurposing the Atlantic Corridor for BRT transit would help improve traffic flow.
Operations/Connectivity Comments and questions related to the future operation of the BRT lines in the proposed corridors as well as connectivity to other modes of existing or future transit.	> Clarification requested regarding the ability to include bus layover zones and mobility hubs. Interest expressed in the connectivity of La Cienega BRT to the North Crenshaw-LAX Project. Multiple stakeholders expressed interest in bus only lanes as a part of any BRT implementation project. > Also expressed support for transit connections with the NoHo to Pasadena BRT and the Glendale Metrolink Station.

	> Concerns expressed over the frequency of BRT service in existing corridors that don't accommodate early morning or late-night workforce.
Outreach/Perception Comments and questions related to the perception of BRT and anticipated support or issues communities may have with the implementation of specific corridors.	> Expressed concern over potential opposition to Venice. > Mentioned importance of coordinating with Atlantic Corridor Cities to gauge support. > Requested clarification on what outreach will be like to neighborhood councils and organizations if the Broadway Corridor is selected.

4.4. Public Workshop Engagement

Between January 2019 and March 2020, a total of 33 public workshops were hosted throughout Los Angeles County related to the Metro NextGen Bus Plan project. Given the ongoing coordination amongst the two projects and the similar target audience, these workshops served as an ideal opportunity to piggyback and share information about the BRT Vision & Principles Study. Study staff attended all NextGen public workshops and distributed project materials and information. The 2019 workshops served as an initial launch and awareness campaign for the project, while the 2020 public workshops allowed the team to engage with the public to a greater degree and further engage them by way of a project survey, one-on-one discussions and an open comment and question & answer forum. Comment cards were also available for those interested in providing a more detailed narrative or written input on the project. During the workshops, a total of 136 surveys and 27 comment cards were collected. A list of workshops dates and locations is provided below as well as a summary of the comments collected at the workshops.

2019 NextGen Workshops Date and Meeting Location by Service Council Area	
January 8, 2019	San Fernando Valley
January 9, 2019	Westside/Central
January 12, 2019	Gateway Cities

January 16, 2019	San Gabriel Valley
January 17, 2019	South Bay Cities
January 23, 2019	Gateway Cities
January 24, 2019	San Gabriel Valley
January 26, 2019	Westside-Central
January 31, 2019	Westside-Central
February 6, 2019	San Fernando Valley
February 28, 2019	San Fernando Valley
March 2, 2019	South Bay
March 4, 2019	Westside-Central
March 5, 2019	South Bay
March 7, 2019	South Bay
March 12, 2019	San Fernando Valley
March 13, 2019	Westside-Central
March 19, 2019	San Gabriel Valley
2020 NextGen Workshops Date and Meeting Location by Service Council Area	
February 2, 2020	All Regions-LATTC
February 4, 2020	South Bay Cities
February 5, 2020	San Fernando Valley
February 10, 2020	San Gabriel Valley
February 12, 2020	Westside-Central
February 13, 2020	Gateway Cities
February 19, 2020	Westside-Central
February 20, 2020	San Gabriel Valley
February 22, 2020	All Regions-Metro Headquarters
February 25, 2020	Gateway Cities
February 26, 2020	South Bay Cities
February 27, 2020	San Fernando Valley
March 5, 2020	Gateway Cities
March 7, 2020	South Bay Cities
March 11, 2020	San Gabriel Valley

Summary of Public Input and Comments

Public comment received during the in-person engagement activities was sorted by themes and catalogued for further review into the project comment log. Overall key themes that organically emerged included the following:

- The overall rider experience while using Metro BRT is lacking. Riders consistently raise concerns over bus cleanliness, bus overcrowding, rude operators and inconsiderate fellow riders. Commenters see the future of BRT as an opportunity to make improvements to these conditions
- Respondents are calling for future BRT lines that stretch across large sections of the county, primarily in the central portion. Regularly referenced corridors included Vermont Ave, Wilshire Blvd, and Santa Monica Blvd. The San Fernando Valley has also been referenced in respect to routes spanning across Sepulveda Blvd and Reseda Blvd. Outside of these specific regions, additional comments called for future BRT routes to link regions of Los Angeles such as San Fernando Valley – West Los Angeles.
- Any future BRT routes in Los Angeles should be more efficient and have better frequency than existing Metro BRT like the Silver Line and Orange Line. Riders regularly reference these lines as the benchmark that future BRT lines in Los Angeles should outperform in efficiency and customer experience.

COVID-19 Transition

Due to the COVID-19 public health crisis, which began in March 2020, eight of the Metro NextGen public workshops were cancelled. As a result, the BRT Vision & Principles Study transitioned the in-person engagement planned for these workshops to a digital outreach program. Geofenced targeted ads were deployed to continue the promotion of the project survey and were tailored to ensure a wide spectrum of reach, both from a geographic and demographic perspective. This included a targeted focus on reaching low-income communities, women, underrepresented ethnicities and stakeholders over the age of 50. A toolkit was prepared for use by the BRT TAC and key stakeholder groups mentioned earlier to share with their respective audiences and networks via social media and other online platforms. The results of this campaign as well as the collective survey effort both in-person and online are detailed in the next section of this report.

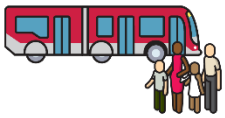
4.5. Project Survey

The project survey was live for input in both English and Spanish between February 1 and May 31, 2020. Surveys were available in a digital and hard copy format at all public meetings. Attendees were able to complete the survey on the spot using provided digital devices or paper copies of the survey. If requested, they were also able to take the survey online at a later time. Following the outreach of the COVID-19 pandemic, the survey was distributed online and through community-based organization and key stakeholder networks, as outlined above. Survey topics included information on the level of familiarity with current Metro BRT service, public transit use and habits, preferences and ranking of BRT features and amenities as well as a series of demographic questions. A total of 513 English and 13 Spanish surveys were submitted at the conclusion of the survey period. Below are highlights of the results from the survey engagement. A detailed report of the survey results is included in the appendix.

Bus Rapid Transit Vision & Principles Study

GENERAL OVERVIEW

Over 88% of respondants are already **familiar with BRT service**, and more than 56% currently use Metro's BRT Service



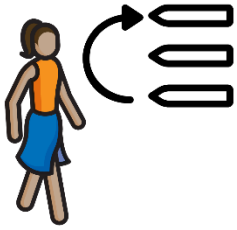
More than 58% of those surveyed use public transit **3 or more days a week**, with over 80% using Metro Bus and Rail services for that travel.

More than 97% of respondents would **support more BRT corridors** as part of the solution to mobility needs in LA County

Segment 1 included a specific reach for **low-income**, **age group 50+**, **Asian and African American populations**; Segment 2 included an additional target of **women** across the county

TOP 5 PRIORITIES FOR BRT FEATURES & AMENITIES

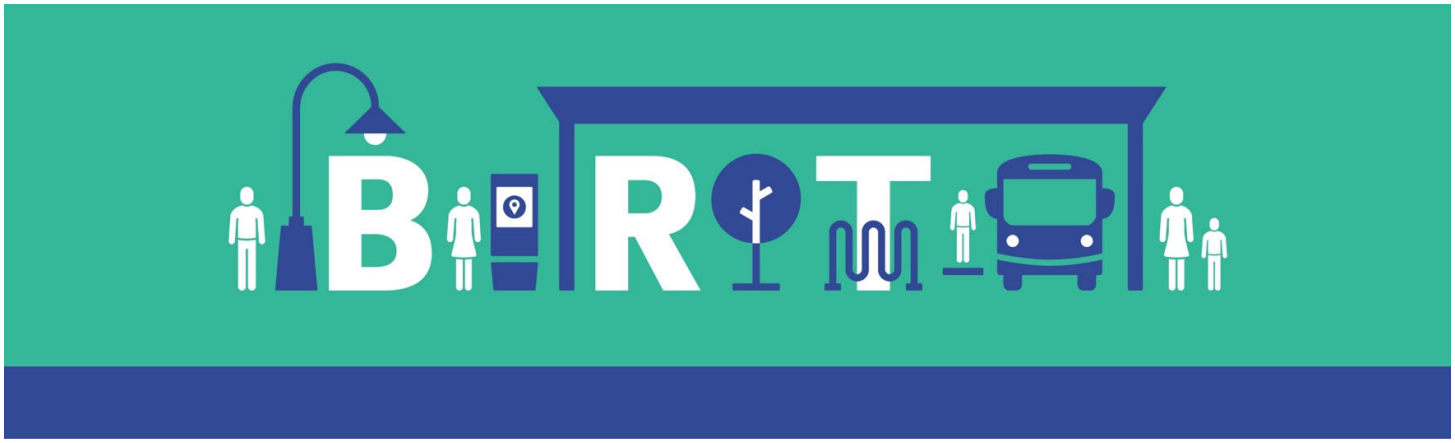
- Frequency
- Dedicated bus lanes
- Reliability
- Real-time information
- Faster travel times (origin to destination)



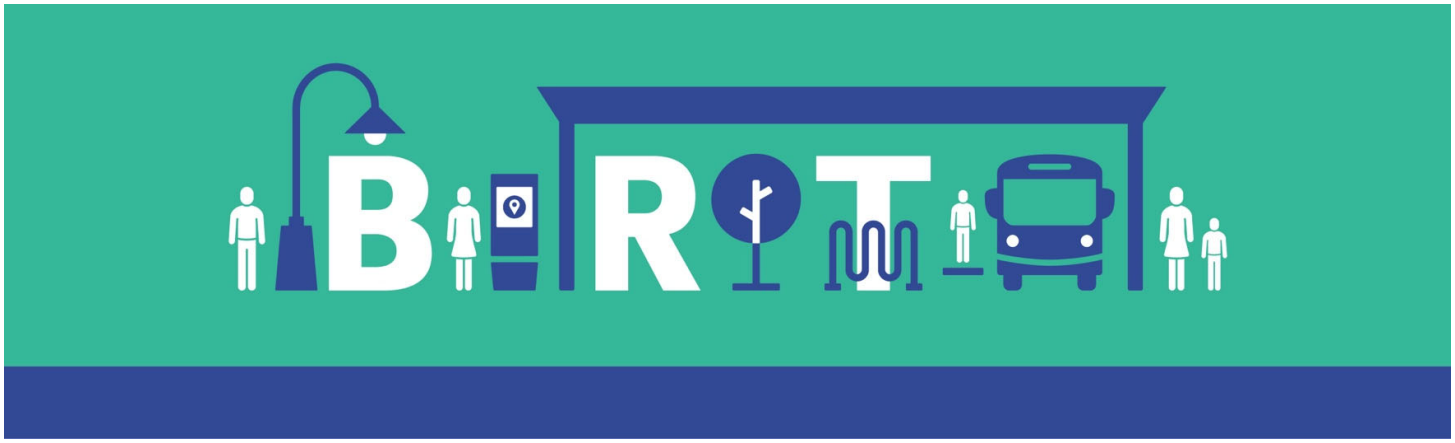
5. Project Outcomes & Next Steps

The BRT Vision & Principles study furthers Metro's first Vision 2028 Strategic Plan goal to "provide high quality mobility options that enable people to spend less time traveling." Upon Board approval, staff will proceed with the application of BRT design guideline manual to Metro's future BRT mobility corridor studies and work to incorporate the design guidelines into select administrative and technical documents where necessary to ensure adherence to the adopted guidance. The study identified a top five BRT corridors recommended for future project implementation. Metro staff will present this top five list to the Metro Board

for consideration, recommending that one of these corridors be taken into project development in the near-term. With Board concurrence on a specific corridor, staff will return to the Board at a later date with recommended programming actions and next steps. This will necessarily involve more detailed corridor level analysis, conceptual design work and public engagement with corridor communities and stakeholders.



APPENDIX



Appendix A

Outreach Materials:

Fact Sheet

Comment Card

BUS RAPID TRANSIT VISION & PRINCIPLES STUDY

PROJECT

The Bus Rapid Transit (BRT) Vision & Principles Study is a comprehensive study that will establish the standard of a future Metro BRT network and serve as a pillar for Metro's goal of creating a world-class transportation system.

PURPOSE

This study will develop the overall vision, goals and objectives for BRT in LA County. Specifically, the project will define local BRT operational standards and design guidelines that will guide future development of BRT routes and services, identify & prioritize ideal candidate corridors for BRT implementation and create a network of future potential BRT corridors throughout the county.

WHAT

BRT is a high-quality, high capacity bus-based transit system that delivers fast, comfortable and cost-effective service. Distinct rail-like stations, off-board fare collection, traffic signal priority and dedicated running lanes may all be part of future BRT lines serving Los Angeles County. Local examples of BRT type projects here in Los Angeles County include the Orange Line, serving the San Fernando Valley and the Silver Line serving EL Monte, Downtown LA and San Pedro.

NETWORK

This study will help improve LA County's public transit network. BRT fulfills a distinct role as a mode of transportation that enhances and integrates with existing LA County mobility services and future mobility hubs, as part of the world-class transportation system envisioned for all LA Metro customers.

PROCESS

Key data is one factor in driving the process. We will look at activity centers, population density, employment density, underinvested communities, as well as current, planned and previously studied projects to identify areas in the transportation network that would benefit from BRT service. Input received from the Technical Advisory Committee, key stakeholders and the public will also inform the study.

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WHEN

This is just the first step. This study began in early 2019 and will continue through summer 2020. Ultimately, the final report will identify and recommend a set of design guidelines and criteria that will define future BRT projects, along with a list of ideal BRT corridors for consideration by the LA Metro Board.

COMPLEMENT

Metro currently has three projects in the early stages of development that are considering BRT as a transit option; Vermont, North Hollywood to Pasadena and North San Fernando Valley Transit Corridors. The BRT system design guidelines developed through the Vision & Principles Study will directly inform and outline service features for all BRT projects moving forward and will tie into other transit improvement studies that are also currently underway.

COORDINATE

The project team are coordinating with Metro's NextGen Bus Plan to share data and better understand the analysis that was completed and outcomes of that study. We are using this information to help inform the BRT Vision & Principles Study.

LEARN MORE

BRT@metro.net
@metrolosangeles
losangelesmetro

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ESTUDIO DE VISION Y PRINCIPIOS DEL TRANSPORTE RÁPIDO DE AUTOBÚS

PROYECTO

El estudio de visión y principios del transporte rápido de autobús (BRT) es un estudio integral que establecerá las normas para una futura red de BRT de Metro y servirá como pilar para el objetivo de Metro de crear un sistema de transporte de clase mundial.

OBJETIVO

En este estudio, se desarrollará la visión general, los propósitos y los objetivos del BRT en el condado de Los Angeles. Específicamente, el proyecto definirá las normas operativas y las directrices de diseño locales para el BRT que guiarán el desarrollo futuro de las rutas y los servicios del BRT, identificarán y priorizarán los corredores viables ideales para la implementación del BRT y crearán una red de futuros corredores posibles para el BRT en todo el condado.

QUÉ ES

El BRT es un sistema de tránsito de alta calidad y capacidad basado en autobuses que ofrece un servicio de rápido, cómodo y económico. Es posible que estaciones con características similares a las del ferrocarril, el cobro del pasaje antes de subir al autobús, la prioridad de las señales de tráfico y los carriles de circulación exclusivos formen parte de las futuras líneas del BRT que funcionarán en el condado de Los Angeles. Algunos ejemplos locales de proyectos similares al BRT en el condado de Los Angeles incluyen Metro Orange Line, con servicio en el San Fernando Valley, y Metro Silver Line, con servicio en El Monte, el centro de Los Angeles y San Pedro.

RED

Este estudio ayudará a mejorar la red de transporte público del condado de Los Angeles. El BRT cumple una función distintiva como modo de transporte que mejora e integrar con los servicios de movilidad existentes en el condado de Los Angeles y los centros de movilidad futuros, como parte del sistema de transporte de clase mundial imaginar para todos los clientes de Metro.

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PROCESO

Los datos clave son uno de los factores para avanzar adelante el proceso. Analizaremos los centros de actividad, la densidad de población, la densidad de empleo, las comunidades en las que no se ha invertido lo suficiente, y también los proyectos actuales, planificados y estudiados previamente para identificar áreas en la red de transporte que se beneficiarían del servicio del BRT. Los comentarios recibidos del Comité Asesor Técnico, las principales partes interesadas y el público serán parte del estudio.

CUÁNDO

Este es el primer paso. Este estudio comenzó a principios de 2019 y continuará hasta el verano de 2020. En última instancia, el informe final identificará y recomendará un conjunto de directrices y criterios de diseño que definirán los proyectos futuros del BRT, junto con una lista de los corredores ideales del BRT para que la Junta Directiva de Metro los analice.

COMPLEMENTO

Metro en este momento tiene tres proyectos en las primeras fases de desarrollo que están considerando autobuses de tránsito rápido como opción; Vermont, North Hollywood a Pasadena y North San Fernando Valley Transit Corridors. Las directrices de diseño del sistema del BRT desarrolladas a través del estudio de visión y principios describirán las características del servicio y aportarán información sobre ellas de manera directa para todos los proyectos del BRT de aquí en adelante, y se vincularán a otros estudios de mejora del tránsito que también estén en curso en la actualidad.

COORDINACIÓN

El equipo del proyecto está coordinando con el Plan de Autobuses NextGen de Metro para compartir datos y comprender mejor el análisis que se completó y los resultados de ese estudio. Estamos utilizando esta información para contribuir al estudio de visión y principios del transporte rápido de autobús.

OBTENGA MÁS INFORMACIÓN

BRT@metro.net

@metrolosangeles

losangelesmetro

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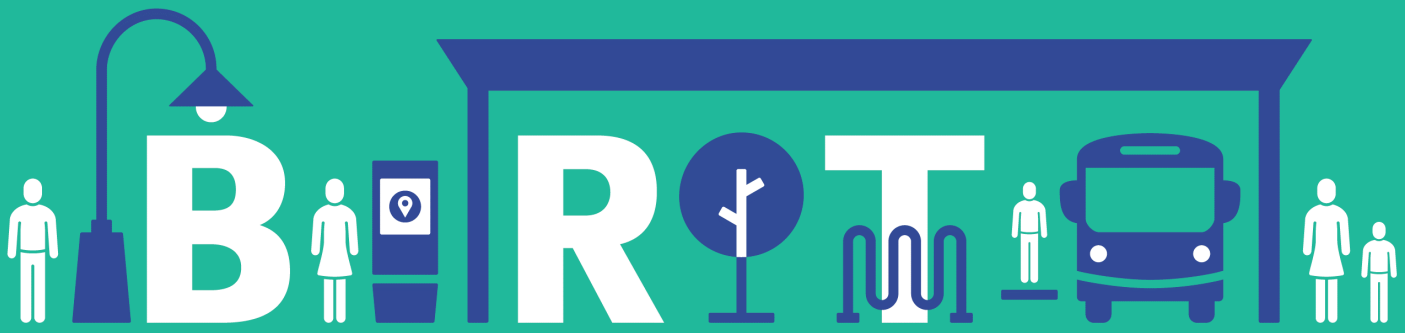


BUS RAPID TRANSIT VISION & PRINCIPLES STUDY

COMMENT CARD (OPTIONAL INFORMATION)

NAME:	DATE:	ZIP:

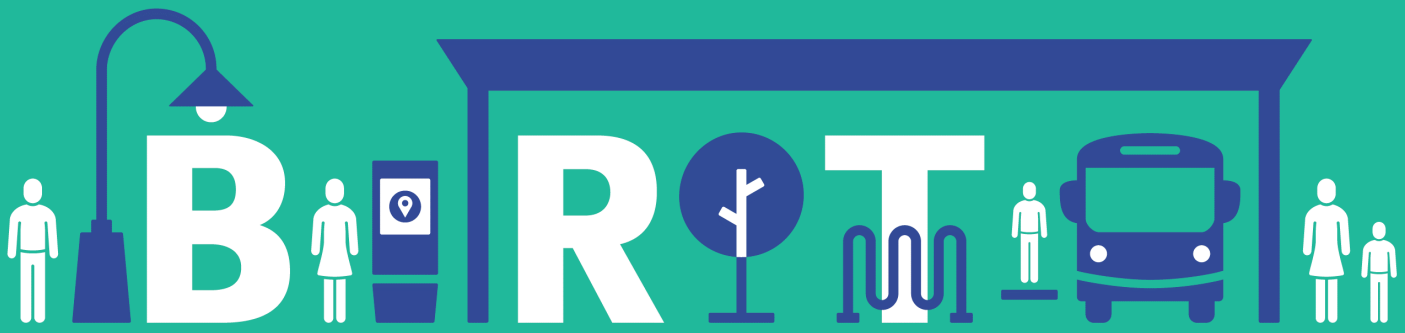
AGE: ☐ Under 18 ☐ 18-24 ☐ 25-34 ☐ 35-49 ☐ 50-64 ☐ 65 or older

GENDER: ☐ Male ☐ Female ☐ Non-binary

AFFILIATION:	EMAIL:

ADDITIONAL COMMENTS:

Metro®



EL ESTUDIO DE VISIÓN Y PRINCIPIOS SOBRE EL AUTOBÚS DE TRÁNSITO RÁPIDO

TARJETA DE COMENTARIOS (INFORMACIÓN OPCIONAL)

NOMBRE: | FECHA: | CÓDIGO POSTAL:

EDAD: ☐ Menor de 18 años ☐ 18-24 ☐ 25-34 ☐ 35-49 ☐ 50-64 ☐ 65 años o mayor

GÉNERO: ☐ Masculino ☐ Femenino ☐ No binario

AFILIACIÓN: | CORREO ELECTRÓNICO:

COMENTARIOS ADICIONALES:

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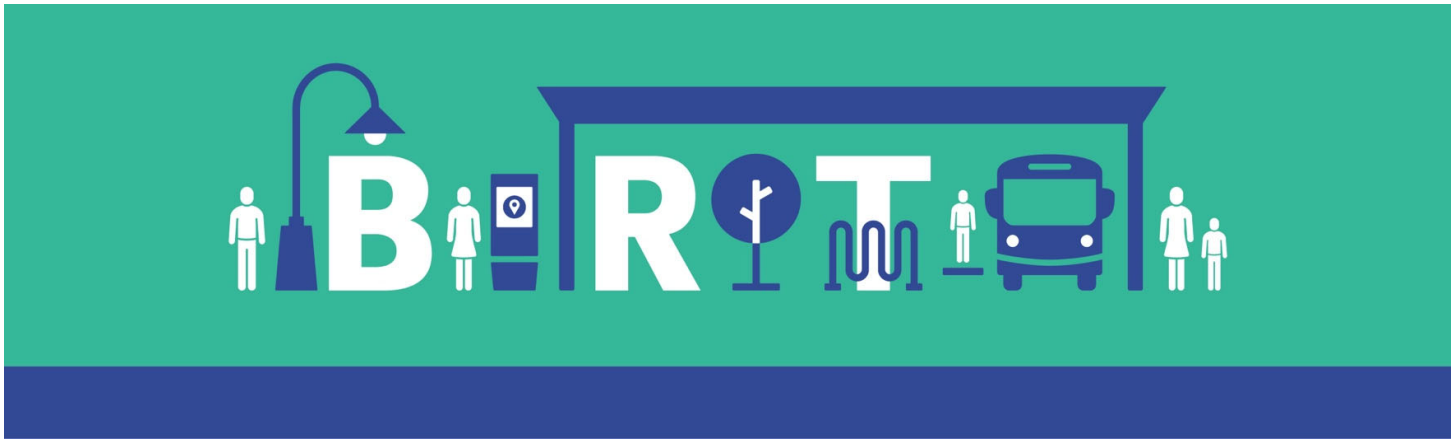

Appendix B

Project Survey:

Online Survey

Paper Survey

Survey Report

Metro Bus Rapid Transit Vision & Principles Study

GENERAL USE QUESTIONS:

Page exit logic: Skip / Disqualify Logic
IF: #1 Question "**Are you familiar with Bus Rapid Transit (BRT)?**

" is exactly equal to ("No, BRT is a new concept to me") **THEN:** Jump to page 4 - (untitled)

Min. answers = 1 *(if answered)* Max. answers = 1 *(if answered)*

2

1. **Are you familiar with Bus Rapid Transit (BRT)?**

- [ ] No, BRT is a new concept to me
- [ ] I've heard of BRT, but I don't know much about it
- [ ] Yes, I am familiar with BRT

(untitled)

Min. answers = 1 *(if answered)* Max. answers = 1 *(if answered)*

Show/hide trigger exists.

3

2. **Do you currently use any Metro BRT services?**

- [ ] Yes
- [ ] No

Min. answers = 1 *(if answered)* Max. answers = 2 *(if answered)*

Hidden unless: #2 Question "**Do you currently use any Metro BRT services?** " is one of the following answers ("Yes")

26

3. **What Metro BRT services do you currently use?** *Select all that apply.*

- [ ] Orange Line
- [ ] Silver Line

(untitled)

Max. answers = 6 *(if answered)*

4

4. **Do you use any additional public transit or mobility services?** *If so, please select all that apply.*

- [ ] Metro Bus
- [ ] Metro Rail
- [ ] Metro Bikeshare
- [ ] Other public transit providers (Metrolink, DASH, other local bus services, etc.)
- [ ] Ride hailing services (Uber, Lyft, etc.)
- [ ] Electric scooters (Lime, Byrd, etc.)

Min. answers = 1 *(if answered)* Max. answers = 1 *(if answered)*

5

5. **How many days a week do you usually use public transit services?**

- [ ] <1 day
- [ ] 1-2 days
- [ ] 3-4 days
- [ ] 5 or more days

BRT FEATURES AND AMENITIES:

Page description:
What features of BRT service would be important to you? *Select your top three choices in each category.*

Min. answers = 3 *(if answered)* Max. answers = 3 *(if answered)*

6

6. **Operating Characteristics** *(*Required)*

*

- [ ] BRT vehicles arrive every 5-10 minutes or more frequently
- [ ] BRT vehicles are reliably on time
- [ ] BRT stops spaced approximately every mile so that buses spend less time stopping and starting
- [ ] Traffic Signal Priority: BRT vehicles get an extended green light at intersections thus reducing stop time at red lights
- [ ] Dedicated bus lanes or physically separated busways in which buses can operate free from congestion: Median running lane or Curbside bus lane or Off-set bus lane
- [ ] Enforcement of dedicated bus lanes to ensure other vehicles do not block BRT vehicles

Min. answers = 3 *(if answered)* Max. answers = 3 *(if answered)*

7

7. **Enhanced Station Amenities** *(*Required)*

*

- [ ] Attractive shelters with seating
- [ ] Ample lighting
- [ ] Emergency phones and security cameras
- [ ] Real-time bus arrival information
- [ ] Off-board fare payment option
- [ ] Adequate shelter canopies to provide shade and shelter from rain
- [ ] Trees and landscaping

Min. answers = 3 *(if answered)* Max. answers = 3 *(if answered)*

8

8. **Traveling to the Station** *(*Required)*

*

- [ ] Add signalized crossings/crosswalks
- [ ] Repair sidewalks connecting to BRT stations and replace missing sidewalk segments
- [ ] Enhance facilities for people with disabilities and/or people travelling with strollers
- [ ] Secure bike parking at BRT stations
- [ ] Improved bike facilities connecting to and/or parallel to BRT corridors
- [ ] Connections to bike-share stations or other mobility devices such as scooters

Min. answers = 3 *(if answered)* Max. answers = 3 *(if answered)*

9

9. **Enhanced BRT Vehicle Features** *(*Required)*

*

- [ ] More room for people on BRT Vehicles
- [ ] WiFi on board
- [ ] Level boarding
- [ ] All door boarding

Min. answers = 3 *(if answered)* Max. answers = 3 *(if answered)*

10

10. **Regional Benefits** *(*Required)*

*

- [ ] Faster travel times from origin to destination
- [ ] More reliable and frequent service to major employers and destinations outside of central Los Angeles
- [ ] Zero emission buses that reduce greenhouse gas emissions
- [ ] Provide an attractive alternative to car travel
- [ ] Reduce traffic congestion and contribute to cleaner air
- [ ] Provide seamless connectivity to Metro's entire mobility network

Now rank your top three features and amenities. Click NEXT

13

Action: Page Timer

Page Timer to Auto Submit

Top three features and amenities:

Page exit logic: Skip / Disqualify Logic
IF: #13 Question "**How do you feel about BRT as a part of the solution to mobility needs in Los Angeles County?** *(*Required)*

" is exactly equal to ("I support more BRT corridors","I do not support more BRT corridors") **THEN:** Jump to page 8 - DEMOGRAPHIC QUESTIONS (Optional):

MULTIPUNCH **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 14

PIPING Piped Values From Question 11. (Secret Question to put all of the previously selected choices in one place.)

12. **Based on your previous responses, please select your top 3 features and amenities.** *(*Required)* *

MULTIPUNCH **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 17

13. **How do you feel about BRT as a part of the solution to mobility needs in Los Angeles County?** *(*Required)* *

- [ ] I support more BRT corridors
- [ ] I do not support more BRT corridors
- [ ] I support more BRT corridors but have some concerns. Please describe:

DEMOGRAPHIC QUESTIONS (Optional):

Page description:
The following information will be kept confidential and used only to ensure that we hear from residents of the diverse county we serve.

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

19

14. **What is your ethnicity?** *Select one.*

- [ ] Native American
- [ ] Hispanic/Latino
- [ ] African American
- [ ] White/Caucasian
- [ ] Asian/Pacific Islander
- [ ] Two or more races
- [ ] Other - Write In

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

20

15. **What is your annual household income?** *Select one.*

- [ ] Under $5,000
- [ ] $5,000-$9,999
- [ ] $10,000-$14,999
- [ ] $15,000-$19,999
- [ ] $20,000-$24,999
- [ ] $25,000-$34,999
- [ ] $35,000-$49,999
- [ ] $50,000- $99,999
- [ ] $100,00 or more

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

21

16. **What is your age?**

- [ ] <18
- [ ] 18-24
- [ ] 25-34
- [ ] 35-49
- [ ] 50-64
- [ ] 65 or more

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

22

17. **What is your gender identity?**

- [ ] Male
- [ ] Female
- [ ] Non-binary

23

18. **What is your 5-digit zip code?** *(*Required)*
Enter a number (Minimum 90000, Maximum 99999). *

24

19. **Please provide an email address if you would like updates regarding Metro's BRT Vision & Principles Study:**

Thank You!

1

Estudio de Visión y Principios sobre el Autobús de Tránsito Rápido de Metro

PREGUNTAS DE USO GENERAL:

Page exit logic: Skip / Disqualify Logic
IF: #1 Question "**¿Está familiarizado con el autobús de tránsito rápido (BRT)?**

" is exactly equal to ("No, el BRT es un concepto nuevo para mí") **THEN:** Jump to page 4 - (untitled)

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 2

1. **¿Está familiarizado con el autobús de tránsito rápido (BRT)?**

- [ ] No, el BRT es un concepto nuevo para mí
- [ ] He oído hablar del BRT, pero no sé mucho al respecto
- [ ] Sí, estoy familiarizado con el BRT

(untitled)

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

LOGIC Show/hide trigger exists.

ID 3

2. **¿Usa actualmente el servicio del BRT de Metro?** *Seleccione todas las opciones que correspondan.*

- [ ] Sí
- [ ] No

LOGIC Hidden unless: #2 Question "**¿Usa actualmente el servicio del BRT de Metro?** *Seleccione todas las opciones que correspondan.*
" is exactly equal to ("Sí")

ID 4

3. **¿Qué servicios de Metro BRT utiliza actualmente?** *Seleccione todas las que correspondan.*

- [ ] "Orange Line" Linea Naranja
- [ ] "Silver Line" Linea Plateada

(untitled)

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 6 *(if answered)*

ID 5

4. **¿Usa algún servicio adicional de transito o movilidad?** *Si es así, seleccione todas las opciones que correspondan.*

- [ ] Metro Bus (Autobús de Metro)
- [ ] Metro Rail (Tren de Metro)
- [ ] Metro Bikeshare (Sistema de bicicletas compartidas de Metro)
- [ ] Otros proveedores de transporte público (Metrolink, DASH, otros servicios locales de autobuses, etc.)
- [ ] Servicios de transporte de pasajeros (Uber, Lyft, etc.)
- [ ] Escuteres eléctricos (Lime, Byrd, etc.)

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 6

5. **¿Cuántos días a la semana usa los servicios de transporte público?**

- [ ] Menos de 1 día
- [ ] Entre 1 y 2 días
- [ ] Entre 3 y 4 días
- [ ] 5 días o más

CARACTERÍSTICAS Y COMODIDADES DEL BRT:

Page description:
¿Qué características del servicio del BRT serían importantes para usted? *Seleccione sus tres opciones principales en cada categoría.*

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 7

6. **Características operativas** *(*Necesitamos esta información)*

*

- [ ] Vehículos del BRT que lleguen cada 5 a 10 minutos o con más frecuencia
- [ ] Vehículos del BRT confiables en cuanto a la puntualidad
- [ ] Paradas del BRT con una distancia de aproximadamente una milla de manera que los autobuses pasen menos tiempo parando
- [ ] Prioridad de las señales de tráfico: que los vehículos del BRT tengan una luz verde más larga en las intersecciones para reducir el tiempo que el vehículo pasa detenido en la luz roja
- [ ] Carriles exclusivos de autobús o vías de autobús separadas físicamente en los que los autobuses pueden circular sin congestión: carril de circulación central o carril de autobús adyacente a la acera o área de descanso
- [ ] Creación de carriles de autobús exclusivos para garantizar que otros vehículos no bloqueen los vehículos del BRT

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 9

7. **Comodidades mejoradas de la estación** *(*Necesitamos esta información)*

*

- [ ] Paradas atrayentes con asientos
- [ ] Amplia iluminación
- [ ] Teléfonos de emergencia y cámaras de seguridad
- [ ] Información de la llegada de los autobuses en tiempo real
- [ ] Opción de pago de billetes antes de subir al autobús
- [ ] Marquesinas adecuadas para dar sombra y refugio contra la lluvia
- [ ] Árboles y paisajismo

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 10

8. **Viaje a la estación** *(*Necesitamos esta información)*

*

- [ ] Añadir cruces/cruces peatonales señalizados
- [ ] Reparar las aceras que conectan con las estaciones del BRT y reemplazar los tramos faltantes de las aceras
- [ ] Mejorar las comodidades para las personas con discapacidades y/o las personas que viajan con carriolas
- [ ] Estacionamiento de bicicletas seguro en las estaciones del BRT
- [ ] Mejores instalaciones para bicicletas que conectan y/o que están en paralelo con corredores del BRT
- [ ] Conexiones a estaciones de bicicletas compartidas u otros dispositivos de movilidad como escúteres

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 11

9. **Características mejoradas de los vehículos del BRT** *(*Necesitamos esta información)*

*

- [ ] Más espacio para las personas en los vehículos del BRT
- [ ] WiFi a bordo
- [ ] Abordaje a nivel
- [ ] Abordaje en todas las puertas

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 25

10. **Beneficios regionales** *(*Necesitamos esta información)*

*

- [ ] Tiempos de viaje más rápidos de origen a destino
- [ ] Servicio más frecuente y confiable para los principales empleadores y destinos fuera del centro de Los Ángeles
- [ ] Autobuses de cero emisiones que reducen las emisiones de gases de efecto invernadero
- [ ] Alternativa atractiva al viaje en automóvil
- [ ] Reducción de la congestión del tránsito y contribución a la limpieza del aire
- [ ] Conectividad fluida a toda la red de movilidad de Metro

Ahora clasifique sus tres características y servicios principales. Continua a la siguiente página.

ID 13

Action: Page Timer

Page Timer to Auto Submit

Las tres características y comodidades principales:

Page exit logic: Skip / Disqualify Logic
IF: #13 Question "**¿Qué opina del BRT como parte de la solución a las necesidades de movilidad en el condado de Los Ángeles?** *(*Necesitamos esta información)*

" is exactly equal to ("Estoy a favor de más corredores del BRT","No estoy a favor de más corredores del BRT") **THEN:** Jump to page 8 - PREGUNTAS SOBRE DATOS DEMOGRÁFICOS (Opcional):

VALIDATION **Min. answers = 3** *(if answered)* Max. answers = 3 *(if answered)*

ID 14

PIPING Piped Values From Question 11. (Secret Question to pull all of the previously selected choices in one place.)

12. **Según sus respuestas anteriores, seleccione sus 3 características y servicios principales.** *(*Necesitamos esta información)* *

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 15

13. **¿Qué opina del BRT como parte de la solución a las necesidades de movilidad en el condado de Los Ángeles?** *(*Necesitamos esta información)*

*

- [ ] Estoy a favor de más corredores del BRT
- [ ] No estoy a favor de más corredores del BRT
- [ ] Estoy a favor de más corredores del BRT, pero tengo algunas preocupaciones. Descríbalas:

PREGUNTAS SOBRE DATOS DEMOGRÁFICOS (Opcional):

Page description:
La siguiente información permanecerá confidencial y se usará únicamente para garantizar que recibimos información de los residentes del condado diverso en el que prestamos servicios.

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 16

14. **¿Cuál es su origen étnico?** *Seleccione una opción.*

- [ ] Nativo estadounidense
- [ ] Hispano/latino
- [ ] Afroamericano
- [ ] Blanco/caucásico
- [ ] Asiático/isleño del Pacífico
- [ ] Dos o más razas
- [ ] Otro:

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 17

15. **¿Cuáles son los ingresos anuales de su casa?** *Seleccione una opción.*

- [ ] Menos de $5,000
- [ ] De $5,000 a $9,999
- [ ] De $10,000 a $14,999
- [ ] De $15,000 a $19,999
- [ ] De $20,000 a $24,999
- [ ] De $25,000 a $34,999
- [ ] De $35,000 a $49,999
- [ ] De $50,000 a $99,999
- [ ] $100,00 o más

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 18

16. **¿Qué es su edad?**

- [ ] Menos de 18
- [ ] 18-24
- [ ] 25-34
- [ ] 35-49
- [ ] 50-64
- [ ] 65 o más

VALIDATION **Min. answers = 1** *(if answered)* Max. answers = 1 *(if answered)*

ID 19

17. **¿Cuál es su identidad de género?**

- [ ] Masculino
- [ ] Femenino
- [ ] No binario

ID 20

18. **¿Cuál es el código postal de 5 dígitos de su casa?** *(*Necesitamos esta información)*

Ingrese un número (Mínimo 90000, máximo 99999).

*

ID 21

19. **Por favor, proporcione una dirección de correo electrónico si desea recibir actualizaciones relacionadas con el estudio de visión y principios sobre el BRT de Metro:**

¡Gracias!

ID 1

Metro Bus Rapid Transit Vision & Principles Study

The Los Angeles County Metropolitan Transportation Authority (Metro) is conducting the Bus Rapid Transit (BRT) Vision & Principles Study. The goal of the study is to develop standards and design criteria that will guide future development of BRT routes and services in Los Angeles County. Simply defined, BRT is a high-quality, high-capacity bus-based transit system that delivers fast, comfortable and cost-effective transit service. Metro's BRT network will fulfill a distinct role within the existing LA County transportation network and serve as a pillar towards Metro's goal of creating a world class transportation system. We want to understand what design elements are most important to you. To date, the project team has examined key information and conducted analysis in order to rank and evaluate corridor feasibility and define BRT standards. The team continues to gather additional input from the public and key stakeholders in order to further inform the study. The final recommendations of the study are targeted to be presented to the Metro Board for consideration in summer 2020. Please take 5-10 minutes to complete the survey and provide your input.

GENERAL USE QUESTIONS:

1) Are you familiar with Bus Rapid Transit (BRT)?

[ ] No, BRT is a new concept to me

[ ] I've heard of BRT, but I don't know much about it

[ ] Yes, I am familiar with BRT

2) Do you currently use any Metro BRT services?

[ ] Yes

[ ] No

3) What Metro BRT services do you currently use? ***Select all that apply.***

[ ] Orange Line

[ ] Silver Line

4) Do you use any additional public transit or mobility services? ***If so, please select all that apply.***

[ ] Metro Bus

[ ] Metro Rail

[ ] Metro Bikeshare

[ ] Other public transit providers (Metrolink, DASH, other local bus services, etc.)

[ ] Ride hailing services (Uber, Lyft, etc.)

[ ] Electric scooters (Lime, Byrd, etc.)

5) How many days a week do you usually use public transit services?

[ ] <1 day><1 day

[ ] 1-2 days

[ ] 3-4 days

[ ] 5 or more days

BRT FEATURES AND AMENITIES:

What features of BRT service would be important to you? ***Select your top three choices in each category.***

6) Operating Characteristics ***(*Required)***

[ ] BRT vehicles arrive every 5-10 minutes or more frequently

[ ] BRT vehicles are reliably on time

[ ] BRT stops spaced approximately every mile so that buses spend less time stopping and starting

[ ] Traffic Signal Priority: BRT vehicles get an extended green light at intersections thus reducing stop time at red lights

[ ] Dedicated bus lanes or physically separated busways in which buses can operate free from congestion: Median running lane or Curbside bus lane or Off-set bus lane

[ ] Enforcement of dedicated bus lanes to ensure other vehicles do not block BRT vehicles

7) Enhanced Station Amenities *(*Required)*

[ ] Attractive shelters with seating

[ ] Ample lighting

[ ] Emergency phones and security cameras

[ ] Real-time bus arrival information

[ ] Off-board fare payment option

[ ] Adequate shelter canopies to provide shade and shelter from rain

[ ] Trees and landscaping

8) Traveling to the Station *(*Required)*

[ ] Add signalized crossings/crosswalks

[ ] Repair sidewalks connecting to BRT stations and replace missing sidewalk segments

[ ] Enhance facilities for people with disabilities and/or people travelling with strollers

[ ] Secure bike parking at BRT stations

[ ] Improved bike facilities connecting to and/or parallel to BRT corridors

[ ] Connections to bike-share stations or other mobility devices such as scooters

9) Enhanced BRT Vehicle Features *(*Required)*

[ ] More room for people on BRT Vehicles

[ ] WiFi on board

[ ] Level boarding

[ ] All door boarding

10) Regional Benefits *(*Required)*

[ ] Faster travel times from origin to destination

[ ] More reliable and frequent service to major employers and destinations outside of central Los Angeles

[ ] Zero emission buses that reduce greenhouse gas emissions

[ ] Provide an attractive alternative to car travel

[ ] Reduce traffic congestion and contribute to cleaner air

[ ] Provide seamless connectivity to Metro's entire mobility network

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13) How do you feel about BRT as a part of the solution to mobility needs in Los Angeles County? *(*Required)*

[ ] I support more BRT corridors

[ ] I do not support more BRT corridors

[ ] I support more BRT corridors but have some concerns. Please describe:

_____

DEMOGRAPHIC QUESTIONS (Optional):

The following information will be kept confidential and used only to ensure that we hear from residents of the diverse county we serve.

14) What is your ethnicity? *Select one.*

[ ] Native American

[ ] Hispanic/Latino

[ ] African American

[ ] White/Caucasian

[ ] Asian/Pacific Islander

[ ] Two or more races

[ ] Other - Write In: _____

15) What is your annual household income? *Select one.*

[ ] Under $5,000

[ ] $5,000-$9,999

[ ] $10,000-$14,999

[ ] $15,000-$19,999

[ ] $20,000-$24,999

[ ] $25,000-$34,999

[ ] $35,000-$49,999

[ ] $50,000- $99,999

[ ] $100,00 or more

16) What is your age?

[ ] <18

[ ] 18-24

[ ] 25-34

[ ] 35-49

[ ] 50-64

[ ] 65 or more

17) What is your gender identity?

[ ] Male

[ ] Female

[ ] Non-binary

18) What is your 5-digit zip code? ***(*Required)***
Enter a number (Minimum 90000, Maximum 99999).*

_____

19) Please provide an email address if you would like updates regarding Metro's BRT Vision & Principles Study:

_____

Thank You!

Estudio de Visión y Principios sobre el Autobús de Tránsito Rápido de Metro

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La Autoridad de Transporte Metropolitano del Condado de Los Ángeles (Metro) está realizando el Estudio de Visión y Principios sobre el Autobús de Tránsito Rápido (BRT por sus siglas en inglés). El objetivo del estudio es definir normas y criterios de diseño que guiarán el futuro desarrollo de rutas y servicios del BRT en el condado de Los Ángeles. En términos sencillos, el BRT es un sistema de tránsito de alta calidad y capacidad basado en autobuses que ofrecen un servicio de tránsito rápido, cómodo y económico. El BRT de Metro cumplirá una función distinta dentro de la red de transporte existente del condado de Los Ángeles y será un apoyo hacia el objetivo de Metro de crear un sistema de transporte de primera categoría. Queremos entender qué elementos de diseño son más importantes para usted. Hasta la fecha, el equipo del proyecto ha examinado la información clave y realizado análisis para clasificar y evaluar la viabilidad del corredor y definir los estándares BRT. El equipo continúa recabando comentarios adicionales del público y las partes interesadas clave para informar aún más el estudio. Las recomendaciones finales del estudio están dirigidas a la Junta del Metro para su consideración en el verano de 2020. Tómese entre 5 y 10 minutos para completar la encuesta y proporcionar su opinión.

PREGUNTAS DE USO GENERAL:

1) ¿Está familiarizado con el autobús de tránsito rápido (BRT)?

[ ] No, el BRT es un concepto nuevo para mí

[ ] He oído hablar del BRT, pero no sé mucho al respecto

[ ] Sí, estoy familiarizado con el BRT

2) ¿Usa actualmente el servicio del BRT de Metro? ***Seleccione todas las opciones que correspondan.***

[ ] Sí

[ ] No

3) ¿Qué servicios de Metro BRT utiliza actualmente? ***Seleccione todas las que correspondan.***

[ ] "Orange Line" Linea Naranja

[ ] "Silver Line" Linea Plateada

4) ¿Usa algún servicio adicional de transito o movilidad? ***Si es así, seleccione todas las opciones que correspondan.***

[ ] Metro Bus (Autobús de Metro)

[ ] Metro Rail (Tren de Metro)

[ ] Metro Bikeshare (Sistema de bicicletas compartidas de Metro)

[ ] Otros proveedores de transporte público (Metrolink, DASH, otros servicios locales de autobuses, etc.)

[ ] Servicios de transporte de pasajeros (Uber, Lyft, etc.)

[ ] Escuteres eléctricos (Lime, Byrd, etc.)

5) ¿Cuántos días a la semana usa los servicios de transporte público?

[ ] Menos de 1 día

[ ] Entre 1 y 2 días

[ ] Entre 3 y 4 días

[ ] 5 días o más

CARACTERÍSTICAS Y COMODIDADES DEL BRT:

¿Qué características del servicio del BRT serían importantes para usted? *Seleccione sus tres opciones principales en cada categoría.*

6) Características operativas ***(*Necesitamos esta información)***

[ ] Vehículos del BRT que lleguen cada 5 a 10 minutos o con más frecuencia

[ ] Vehículos del BRT confiables en cuanto a la puntualidad

[ ] Paradas del BRT con una distancia de aproximadamente una milla de manera que los autobuses pasen menos tiempo parando

[ ] Prioridad de las señales de tráfico: que los vehículos del BRT tengan una luz verde más larga en las intersecciones para reducir el tiempo que el vehículo pasa detenido en la luz roja

[ ] Carriles exclusivos de autobús o vías de autobús separadas físicamente en los que los autobuses pueden circular sin congestión: carril de circulación central o carril de autobús adyacente a la acera o área de descanso

[ ] Creación de carriles de autobús exclusivos para garantizar que otros vehículos no bloqueen los vehículos del BRT

7) Comodidades mejoradas de la estación ***(*Necesitamos esta información)***

[ ] Paradas atrayentes con asientos

[ ] Amplia iluminación

[ ] Teléfonos de emergencia y cámaras de seguridad

[ ] Información de la llegada de los autobuses en tiempo real

[ ] Opción de pago de billetes antes de subir al autobús

[ ] Marquesinas adecuadas para dar sombra y refugio contra la lluvia

[ ] Árboles y paisajismo

8) Viaje a la estación ***(*Necesitamos esta información)***

[ ] Añadir cruces/cruces peatonales señalizados

[ ] Reparar las aceras que conectan con las estaciones del BRT y reemplazar los tramos faltantes de las aceras

[ ] Mejorar las comodidades para las personas con discapacidades y/o las personas que viajan con carriolas

[ ] Estacionamiento de bicicletas seguro en las estaciones del BRT

[ ] Mejores instalaciones para bicicletas que conectan y/o que están en paralelo con corredores del BRT

[ ] Conexiones a estaciones de bicicletas compartidas u otros dispositivos de movilidad como escúteres

9) Características mejoradas de los vehículos del BRT ***(*Necesitamos esta información)***

[ ] Más espacio para las personas en los vehículos del BRT

[ ] WiFi a bordo

[ ] Abordaje a nivel

[ ] Abordaje en todas las puertas

10) Beneficios regionales ***(*Necesitamos esta información)***

[ ] Tiempos de viaje más rápidos de origen a destino

[ ] Servicio más frecuente y confiable para los principales empleadores y destinos fuera del centro de Los Ángeles

[ ] Autobuses de cero emisiones que reducen las emisiones de gases de efecto invernadero

[ ] Alternativa atractiva al viaje en automóvil

[ ] Reducción de la congestión del tránsito y contribución a la limpieza del aire

[ ] Conectividad fluida a toda la red de movilidad de Metro

13) ¿Qué opina del BRT como parte de la solución a las necesidades de movilidad en el condado de Los Ángeles? ***(*Necesitamos esta información)***

[ ] Estoy a favor de más corredores del BRT

[ ] No estoy a favor de más corredores del BRT

[ ] Estoy a favor de más corredores del BRT, pero tengo algunas preocupaciones. Descríbalas::: _____

PREGUNTAS SOBRE DATOS DEMOGRÁFICOS (Opcional):

La siguiente información permanecerá confidencial y se usará únicamente para garantizar que recibimos información de los residentes del condado diverso en el que prestamos servicios.

14) ¿Cuál es su origen étnico? ***Seleccione una opción.***

[ ] Nativo estadounidense

[ ] Hispano/latino

[ ] Afroamericano

[ ] Blanco/caucásico

[ ] Asiático/isleño del Pacífico

[ ] Dos o más razas

[ ] Otro:: _____

15) ¿Cuáles son los ingresos anuales de su casa? ***Seleccione una opción.***

[ ] Menos de $5,000

[ ] De $5,000 a $9,999

[ ] De $10,000 a $14,999

[ ] De $15,000 a $19,999

[ ] De $20,000 a $24,999

[ ] De $25,000 a $34,999

[ ] De $35,000 a $49,999

[ ] De $50,000 a $99,999

[ ] $100,00 o más

16) ¿Qué es su edad?

[ ] Menos de 18

[ ] 18-24

[ ] 25-34

[ ] 35-49

[ ] 50-64

[ ] 65 o más

17) ¿Cuál es su identidad de género?

[ ] Masculino

[ ] Femenino

[ ] No binario

18) ¿Cuál es el código postal de 5 dígitos de su casa? ***(*Necesitamos esta información)***
Ingrese un número (Mínimo 90000, máximo 99999).
*****

_____

19) Por favor, proporcione una dirección de correo electrónico si desea recibir actualizaciones relacionadas con el estudio de visión y principios sobre el BRT de Metro:

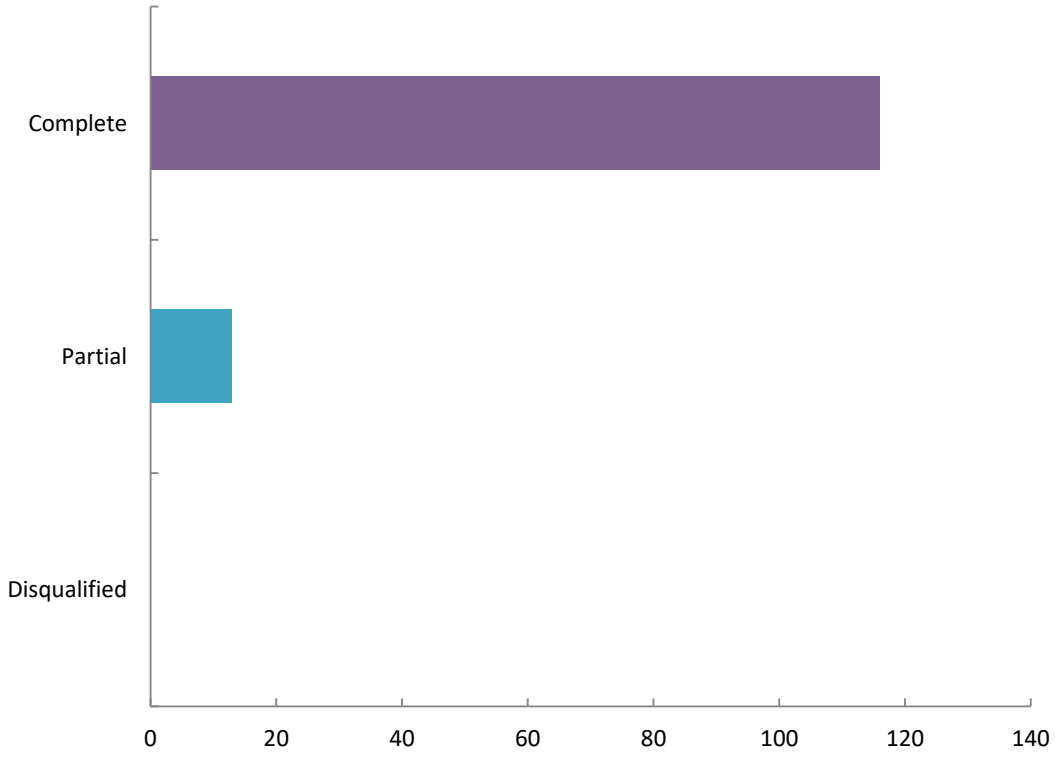
_____

¡Gracias!

Report for Metro Bus Rapid Transit Vision & Principles Study

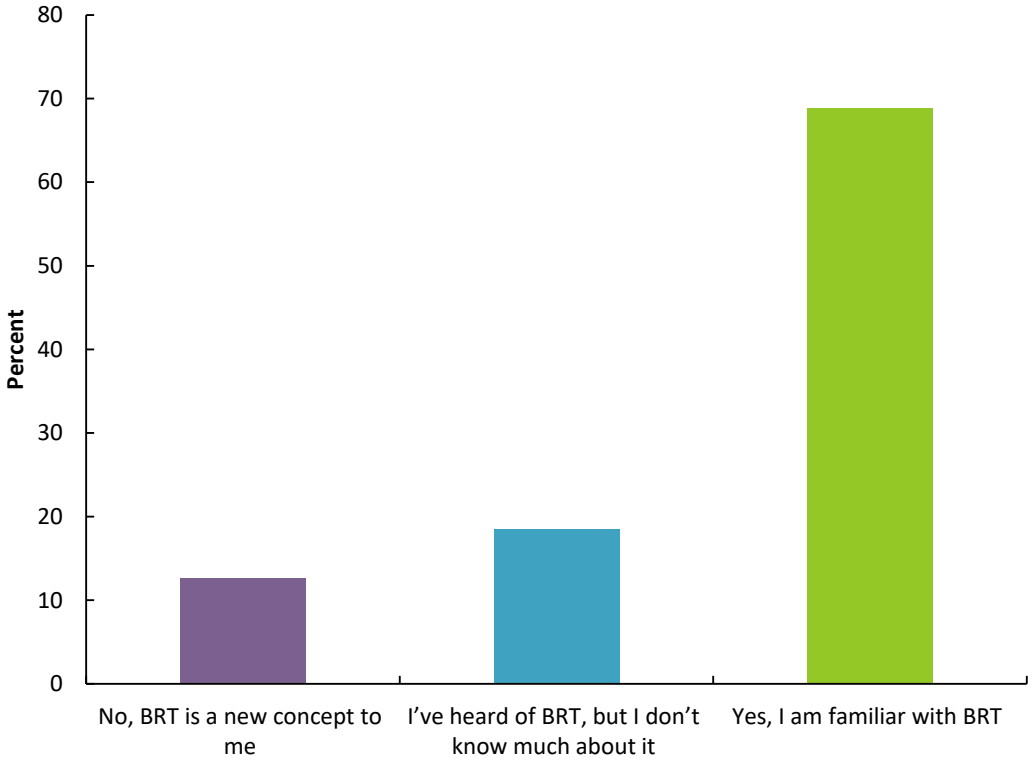
Metro Bus Rapid Transit Vision & Principles Study

Response Statistics



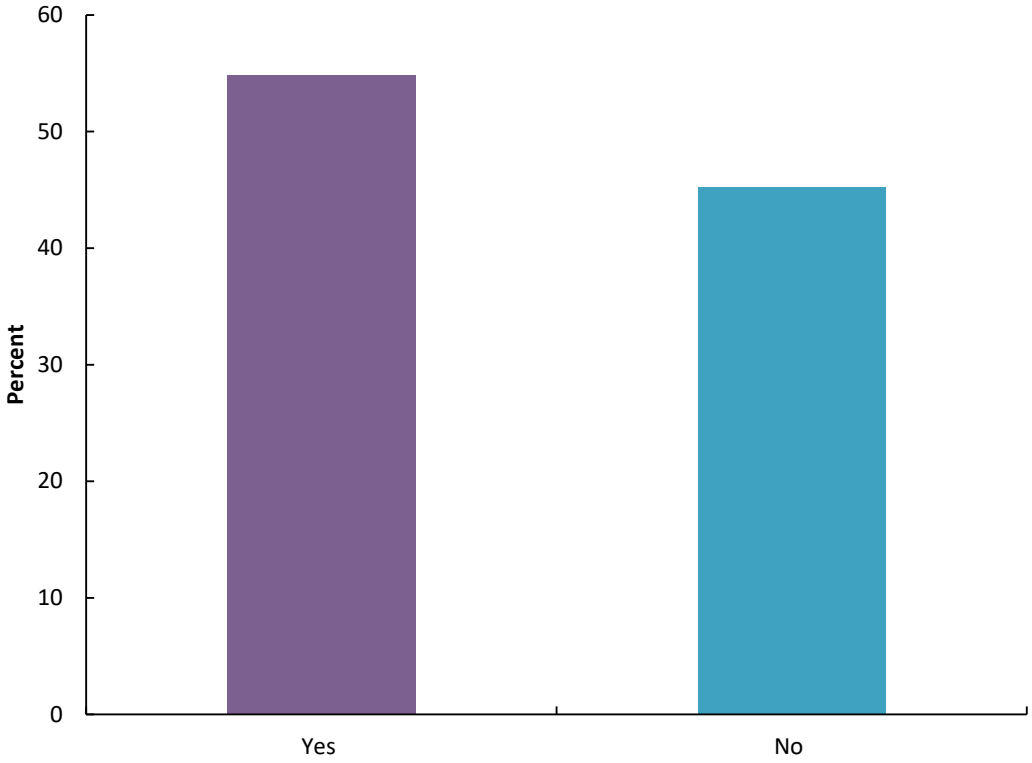
	Count	Percent
Complete	116	89.9
Partial	13	10.1
Disqualified	0	0
Totals	129	

1.Are you familiar with Bus Rapid Transit (BRT)?



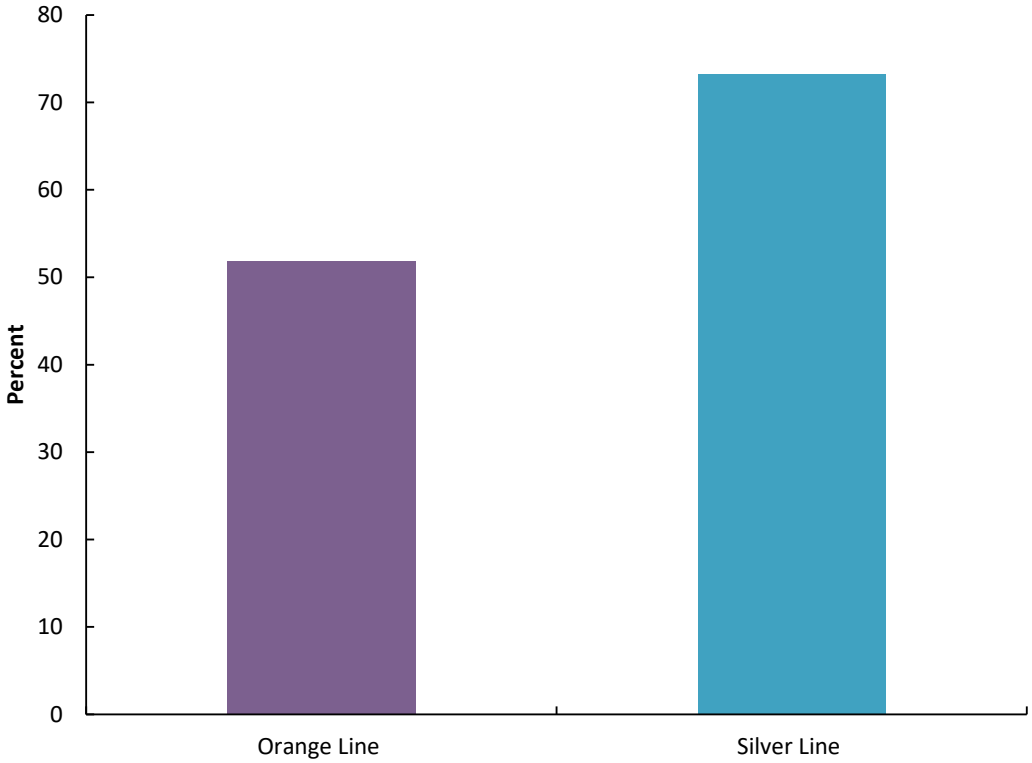
Value	Percent	Count
No, BRT is a new concept to me	12.6%	15
I've heard of BRT, but I don't know much about it	18.5%	22
Yes, I am familiar with BRT	68.9%	82

2.Do you currently use any Metro BRT services?



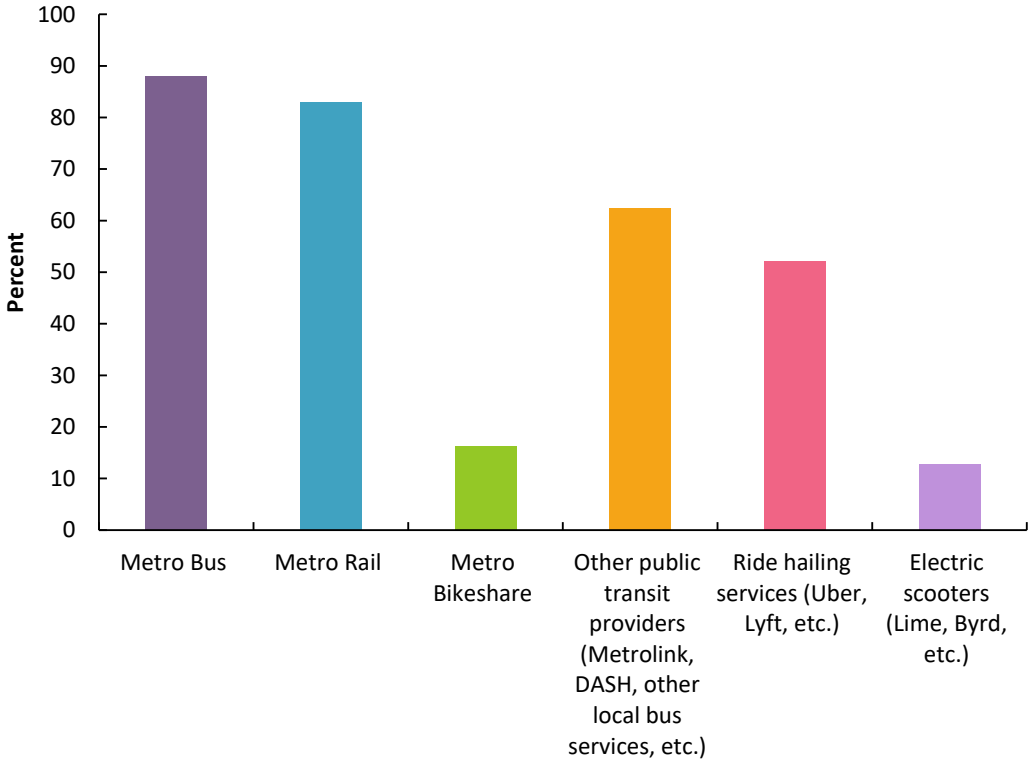
Value	Percent	Count
Yes	54.8%	57
No	45.2%	47

3.What Metro BRT services do you currently use? Select all that apply.



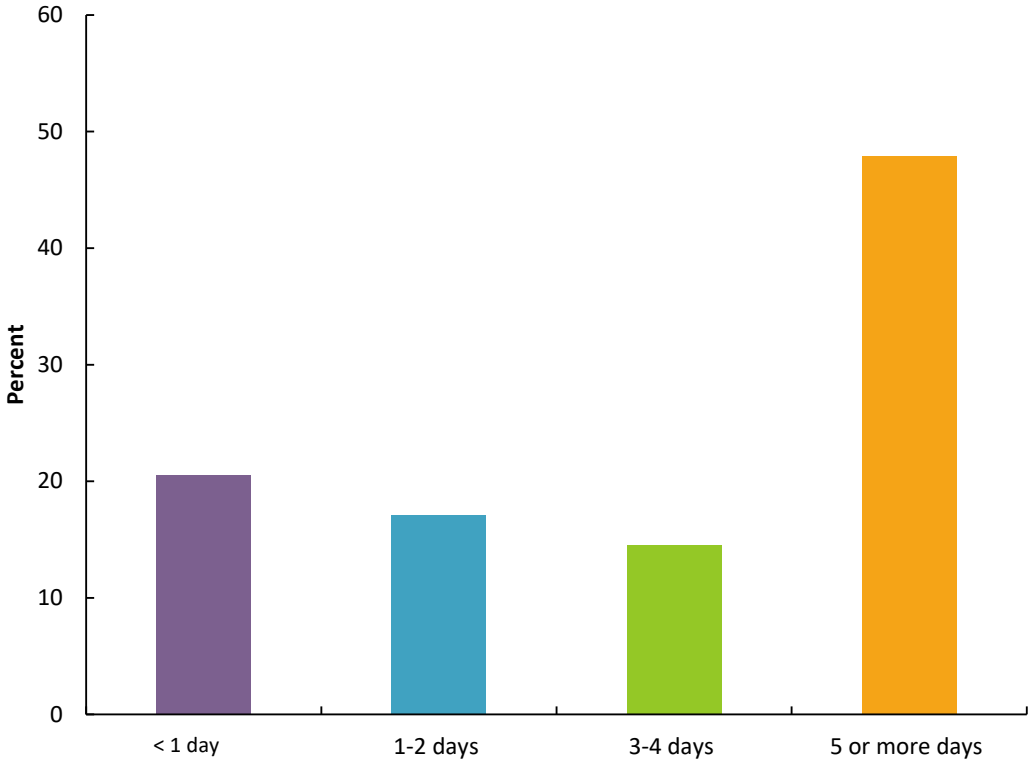
Value	Percent	Count
Orange Line	51.8%	29
Silver Line	73.2%	41

4.Do you use any additional public transit or mobility services? If so, please select all that apply.



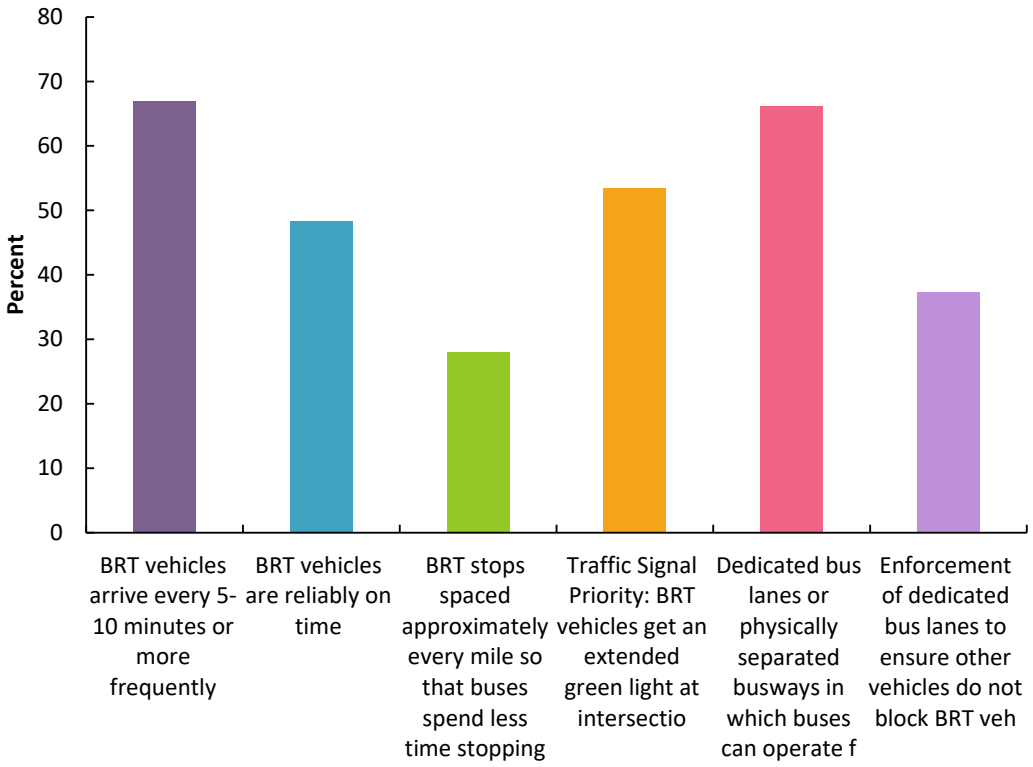
Value	Percent	Count
Metro Bus	88.0%	103
Metro Rail	82.9%	97
Metro Bikeshare	16.2%	19
Other public transit providers (Metrolink, DASH, other local bus services, etc.)	62.4%	73
Ride hailing services (Uber, Lyft, etc.)	52.1%	61
Electric scooters (Lime, Byrd, etc.)	12.8%	15

5.How many days a week do you usually use public transit services?



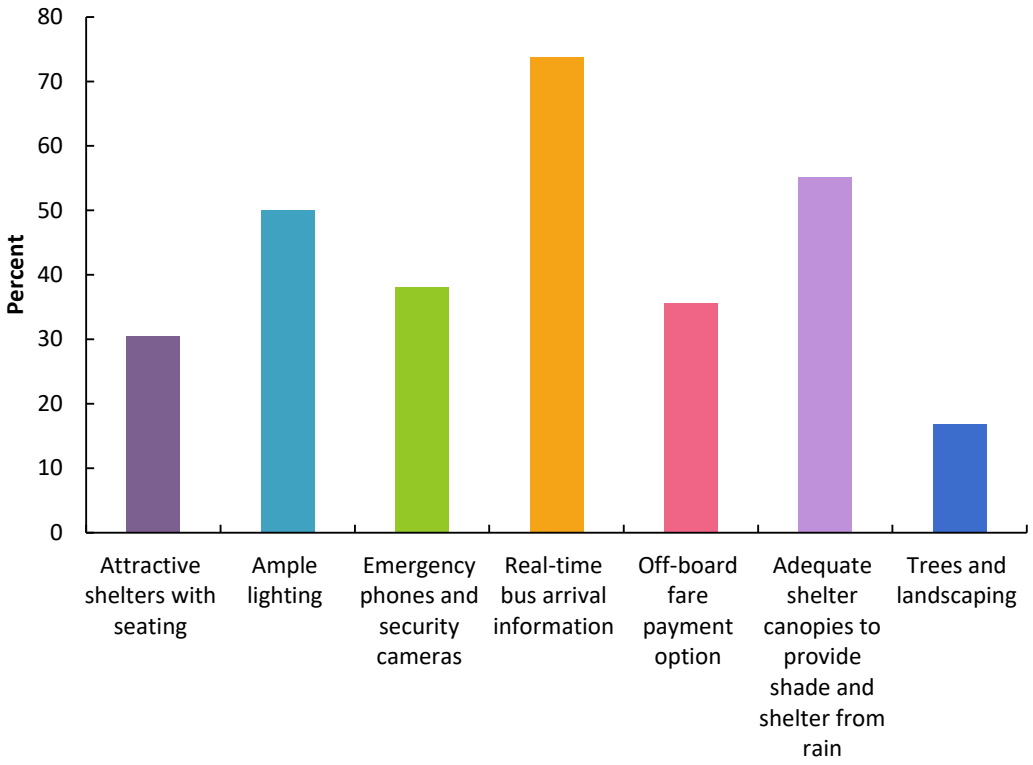
Value	Percent	Count
< 1 day	20.5%	24
1-2 days	17.1%	20
3-4 days	14.5%	17
5 or more days	47.9%	56

6.Operating Characteristics (*Required)



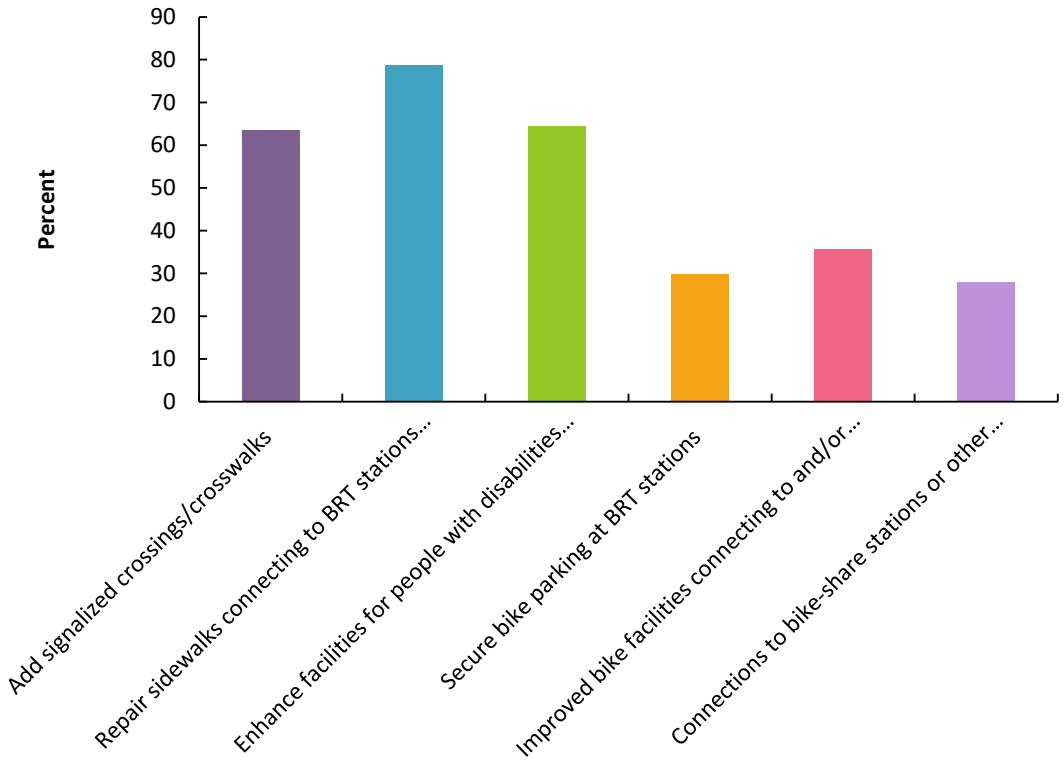
Value	Percent	Count
BRT vehicles arrive every 5-10 minutes or more frequently	66.9%	79
BRT vehicles are reliably on time	48.3%	57
BRT stops spaced approximately every mile so that buses spend less time stopping and starting	28.0%	33
Traffic Signal Priority: BRT vehicles get an extended green light at intersections thus reducing stop time at red lights	53.4%	63
Dedicated bus lanes or physically separated busways in which buses can operate free from congestion: Median running lane or Curbside bus lane or Off-set bus lane	66.1%	78
Enforcement of dedicated bus lanes to ensure other vehicles do not block BRT vehicles	37.3%	44

7.Enhanced Station Amenities (*Required)



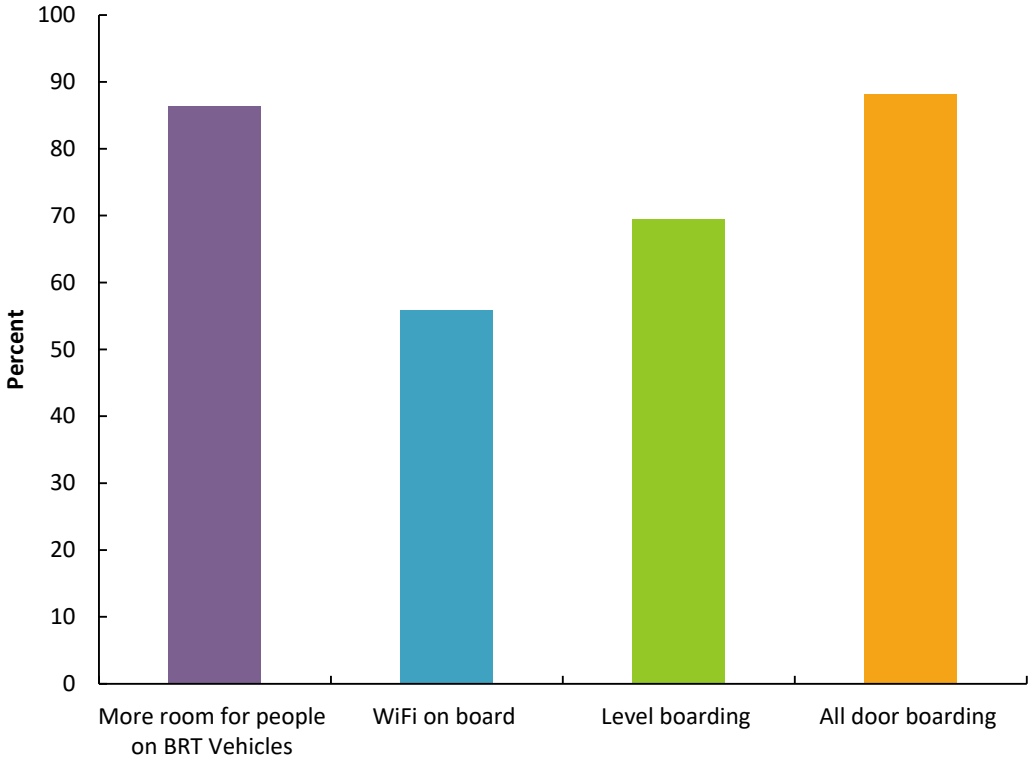
Value	Percent	Count
Attractive shelters with seating	30.5%	36
Ample lighting	50.0%	59
Emergency phones and security cameras	38.1%	45
Real-time bus arrival information	73.7%	87
Off-board fare payment option	35.6%	42
Adequate shelter canopies to provide shade and shelter from rain	55.1%	65
Trees and landscaping	16.9%	20

8.Traveling to the Station (*Required)



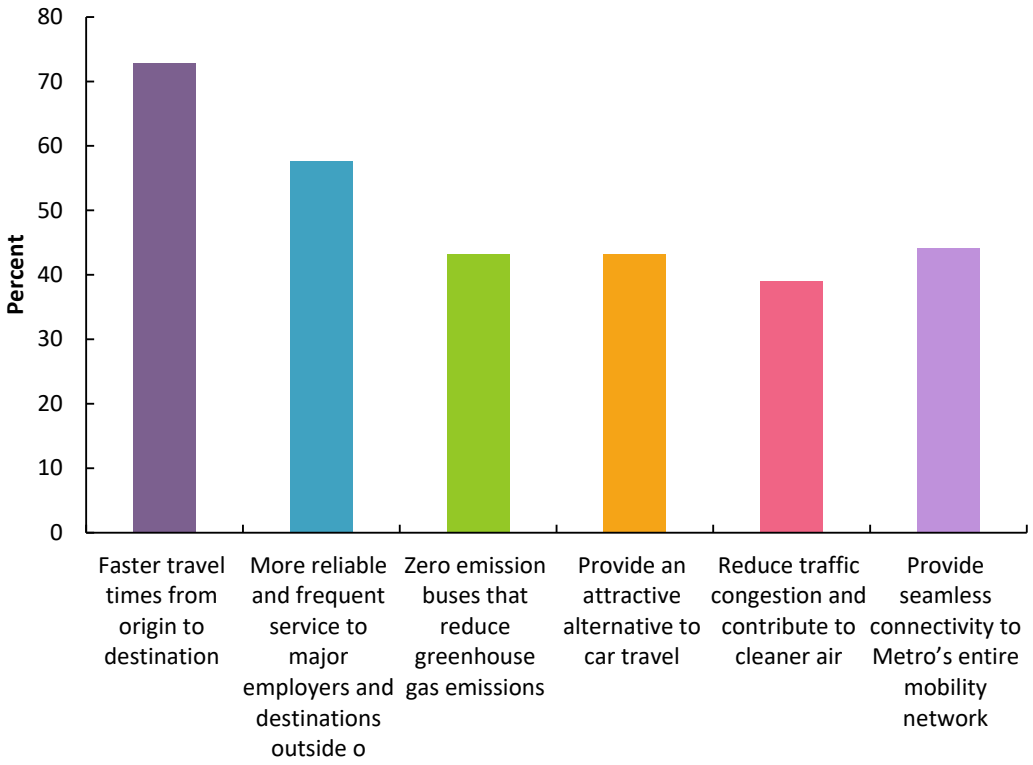
Value	Percent	Count
Add signalized crossings/crosswalks	63.6%	75
Repair sidewalks connecting to BRT stations and replace missing sidewalk segments	78.8%	93
Enhance facilities for people with disabilities and/or people travelling with strollers	64.4%	76
Secure bike parking at BRT stations	29.7%	35
Improved bike facilities connecting to and/or parallel to BRT corridors	35.6%	42
Connections to bike-share stations or other mobility devices such as scooters	28.0%	33

9.Enhanced BRT Vehicle Features (*Required)



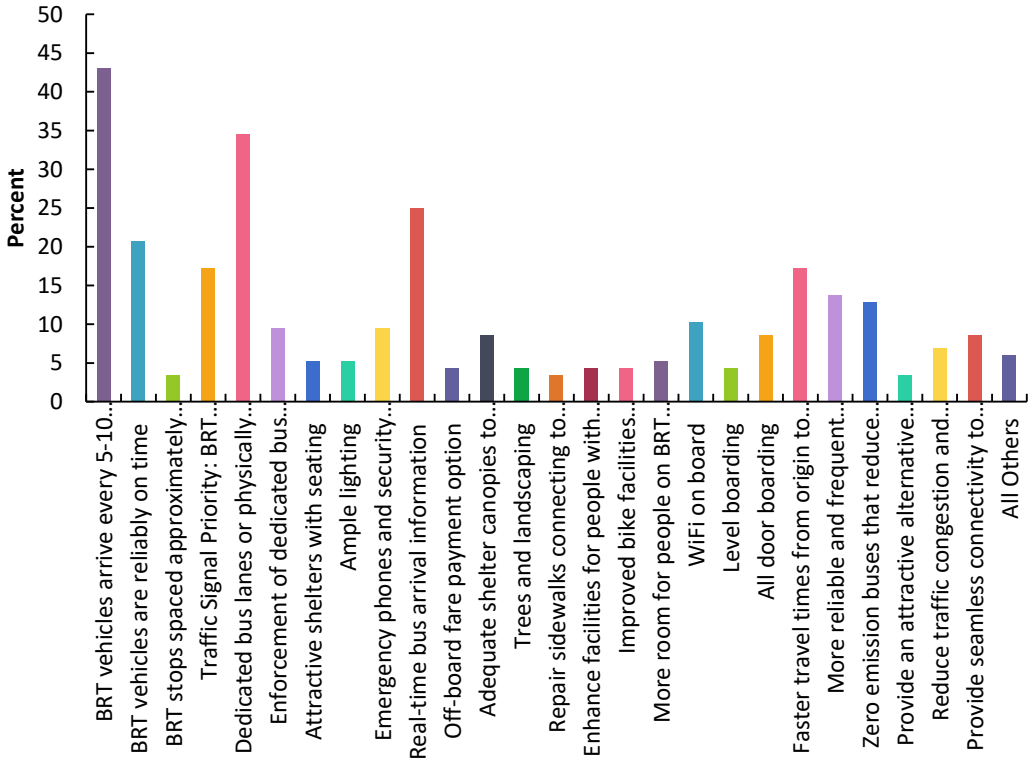
Value	Percent	Count
More room for people on BRT Vehicles	86.4%	102
WiFi on board	55.9%	66
Level boarding	69.5%	82
All door boarding	88.1%	104

10.Regional Benefits (*Required)



Value	Percent	Count
Faster travel times from origin to destination	72.9%	86
More reliable and frequent service to major employers and destinations outside of central Los Angeles	57.6%	68
Zero emission buses that reduce greenhouse gas emissions	43.2%	51
Provide an attractive alternative to car travel	43.2%	51
Reduce traffic congestion and contribute to cleaner air	39.0%	46
Provide seamless connectivity to Metro's entire mobility network	44.1%	52

11.Based on your previous responses, please select your top 3 features and amenities. (*Required)



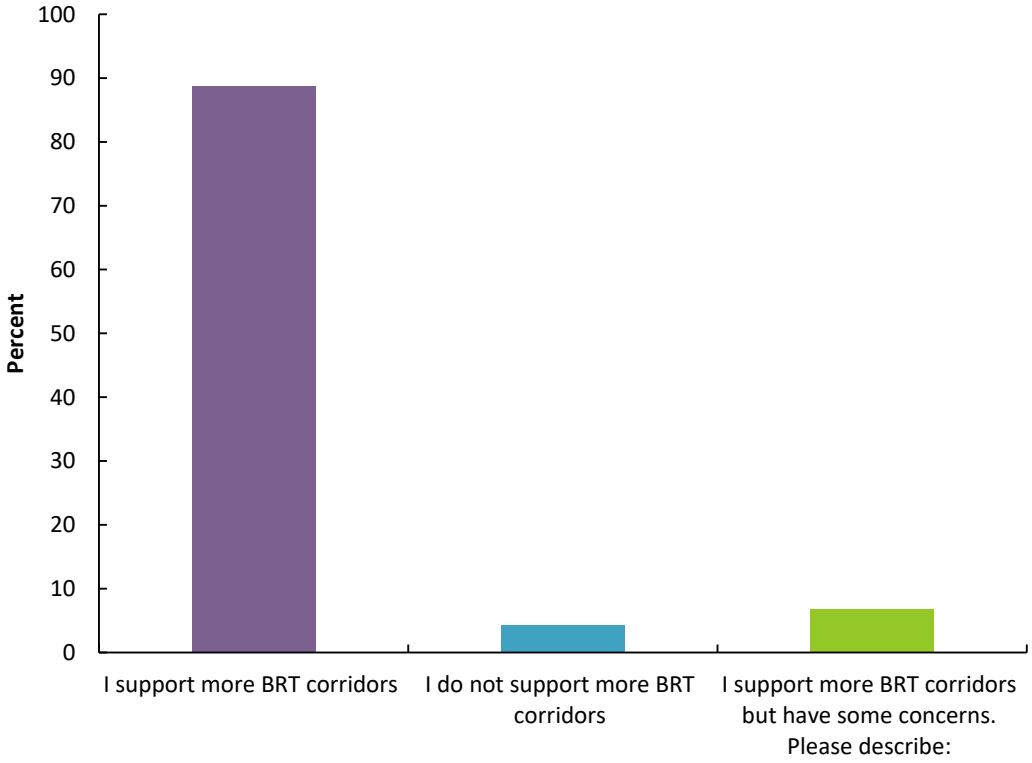
Value	Percent	Count
BRT vehicles arrive every 5-10 minutes or more frequently	43.1%	50
BRT vehicles are reliably on time	20.7%	24
BRT stops spaced approximately every mile so that buses spend less time stopping and starting	3.4%	4
Traffic Signal Priority: BRT vehicles get an extended green	17.2%	20

light at intersections thus reducing stop time at red lights		
Dedicated bus lanes or physically separated busways in which buses can operate free from congestion: Median running lane or Curbside bus lane or Off-set bus lane	34.5%	40
Enforcement of dedicated bus lanes to ensure other vehicles do not block BRT vehicles	9.5%	11
Attractive shelters with seating	5.2%	6
Ample lighting	5.2%	6
Emergency phones and security cameras	9.5%	11
Real-time bus arrival information	25.0%	29
Off-board fare payment option	4.3%	5
Adequate shelter canopies to provide shade and shelter from rain	8.6%	10
Trees and landscaping	4.3%	5
Add signalized crossings/crosswalks	1.7%	2

Repair sidewalks connecting to BRT stations and replace missing sidewalk segments	3.4%	4
Enhance facilities for people with disabilities and/or people travelling with strollers	4.3%	5
Secure bike parking at BRT stations	2.6%	3
Improved bike facilities connecting to and/or parallel to BRT corridors	4.3%	5
Connections to bike-share stations or other mobility devices such as scooters	1.7%	2
More room for people on BRT Vehicles	5.2%	6
WiFi on board	10.3%	12
Level boarding	4.3%	5
All door boarding	8.6%	10
Faster travel times from origin to destination	17.2%	20
More reliable and frequent service to major employers and destinations outside of central Los Angeles	13.8%	16

Zero emission buses that reduce greenhouse gas emissions	12.9%	15
Provide an attractive alternative to car travel	3.4%	4
Reduce traffic congestion and contribute to cleaner air	6.9%	8
Provide seamless connectivity to Metro's entire mobility network	8.6%	10

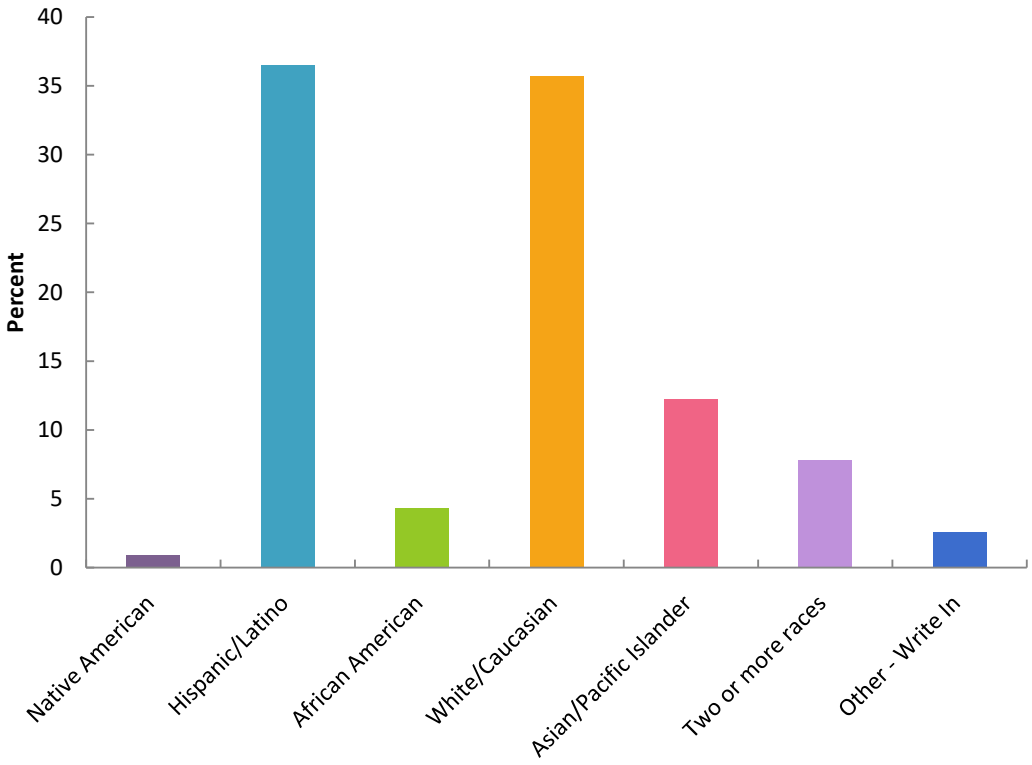
12.How do you feel about BRT as a part of the solution to mobility needs in Los Angeles County? (*Required)



Value	Percent	Count
I support more BRT corridors	88.8%	103
I do not support more BRT corridors	4.3%	5
I support more BRT corridors but have some concerns. Please describe:	6.9%	8

I support more BRT corridors but have some concerns. Please describe:	Count
Congestion during construction	1
Do it right and not on the cheap!!!!!!!!!!	1
Doesnt take away lanes	1
I understand street space is limited and I would not want BRT to be installed at the expense of existing or proposed bike lanes.	1
Indecisive because I haven't used the system yet.	1
Pasadena	1
more bus only lanes...	1
Totals	7

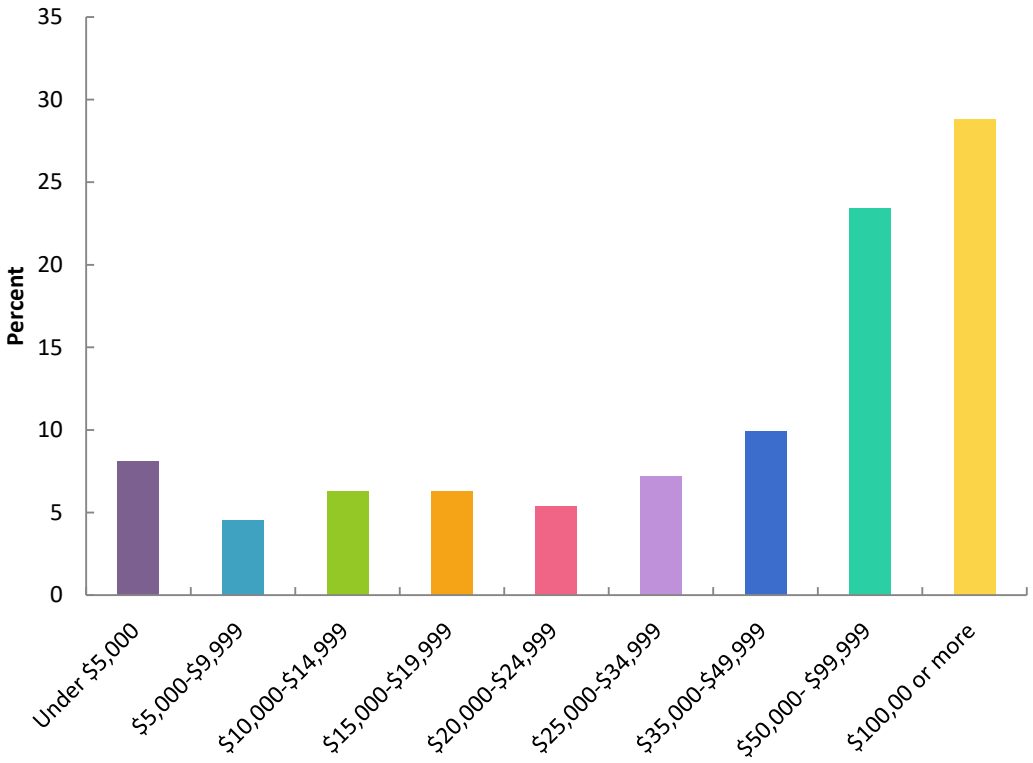
13.What is your ethnicity? Select one.



Value	Percent	Count
Native American	0.9%	1
Hispanic/Latino	36.5%	42
African American	4.3%	5
White/Caucasian	35.7%	41
Asian/Pacific Islander	12.2%	14
Two or more races	7.8%	9
Other - Write In	2.6%	3

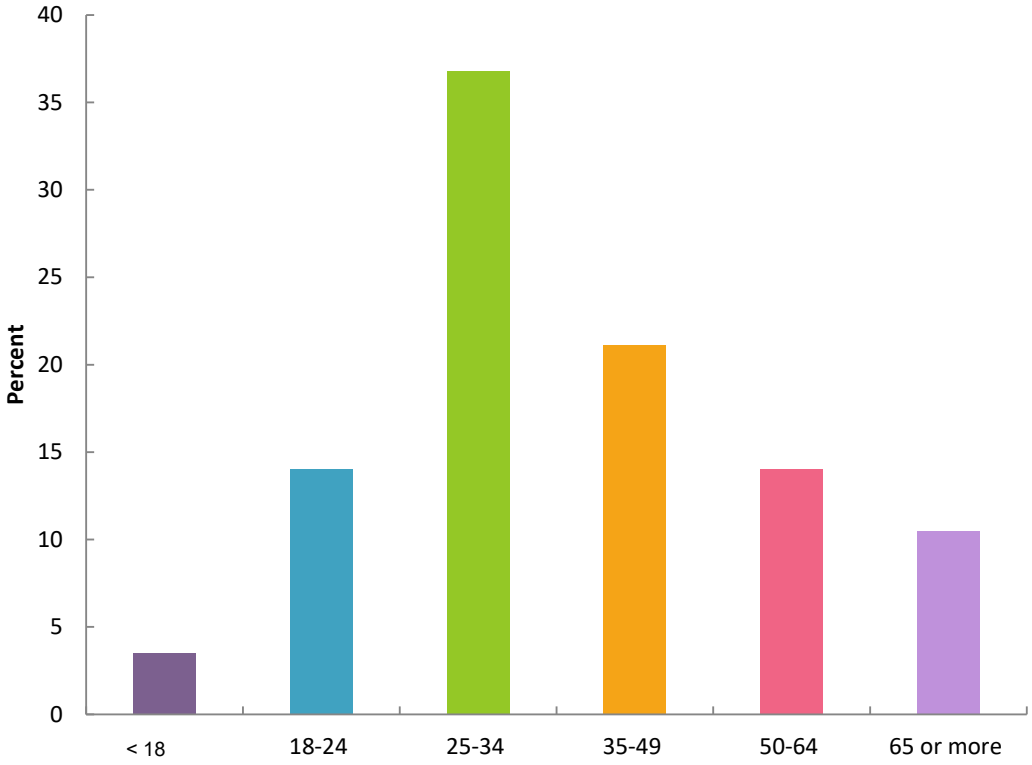
Other - Write In	Count
African	1
Mexican, chinese, white	1
Totals	2

14.What is your annual household income? Select one.



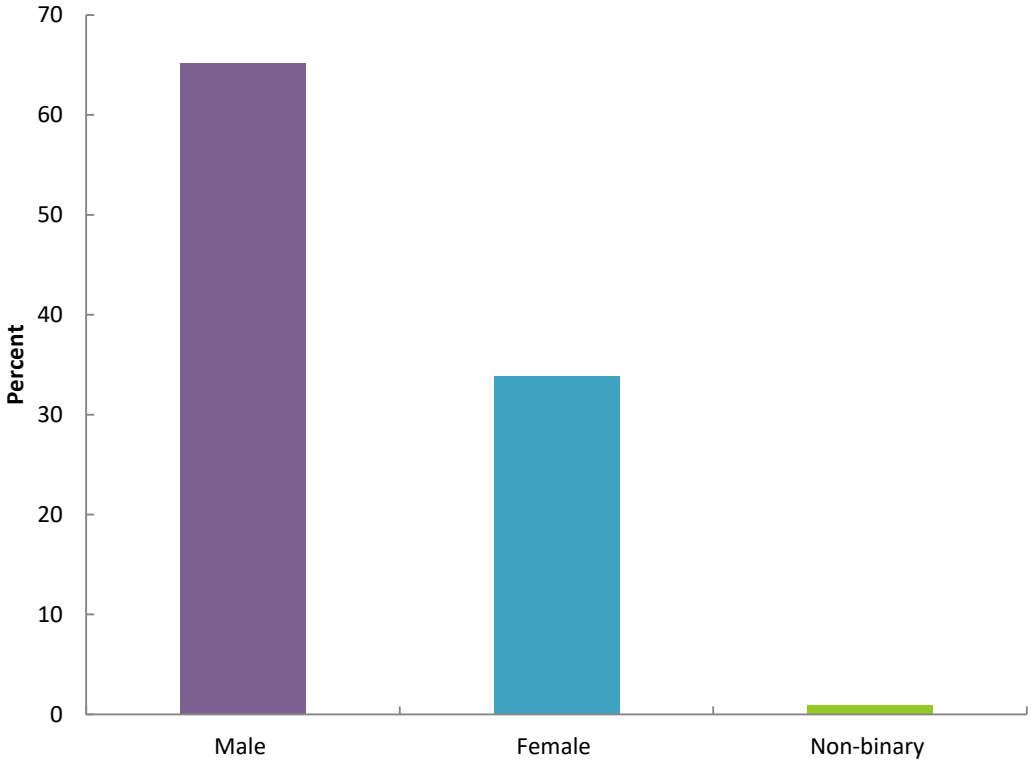
Value	Percent	Count
Under $5,000	8.1%	9
$5,000-$9,999	4.5%	5
$10,000-$14,999	6.3%	7
$15,000-$19,999	6.3%	7
$20,000-$24,999	5.4%	6
$25,000-$34,999	7.2%	8
$35,000-$49,999	9.9%	11
$50,000- $99,999	23.4%	26
$100,00 or more	28.8%	32

15.What is your age?



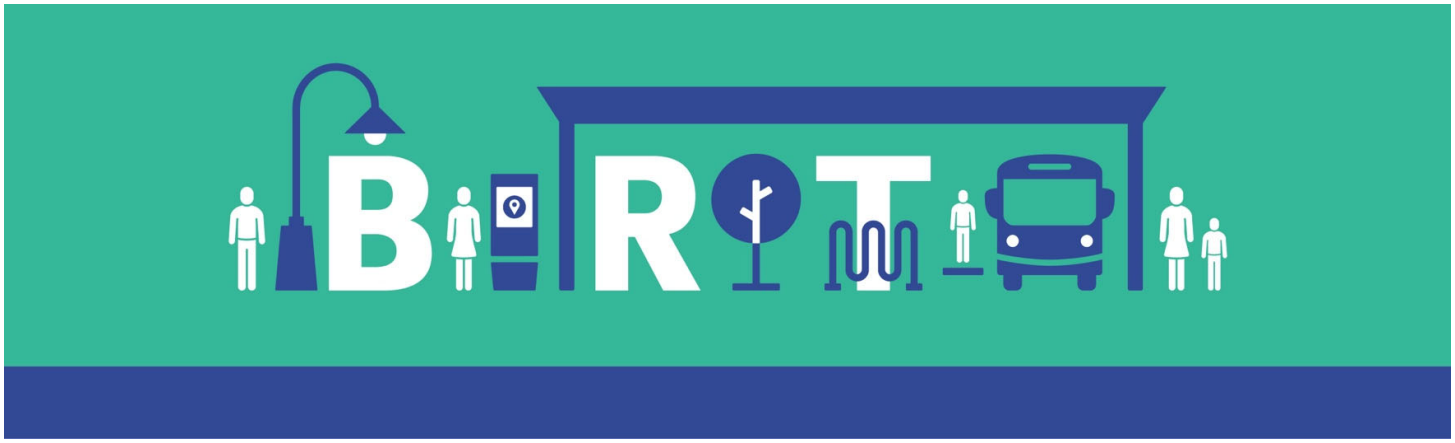
Value	Percent	Count
< 18	3.5%	4
18-24	14.0%	16
25-34	36.8%	42
35-49	21.1%	24
50-64	14.0%	16
65 or more	10.5%	12

16.What is your gender identity?



Value	Percent	Count
Male	65.2%	75
Female	33.9%	39
Non-binary	0.9%	1

Note: There are 8 English paper surveys.



Appendix C

Stakeholder Workshops:

Stakeholder List

Workshop Presentations

Workshop Summaries

Organization	Category	First Name	Last Name
Arroyo Verdugo Communities JPA	Government Agencies	Ann	Wilson
Central City of Los Angeles	Government Agencies	Stacy	Weisfeld
Central City of Los Angeles	Government Agencies	Michelle	Boehm
Gateway Cities Council of Governments	Government Agencies	Nancy	Pfeffer
Gateway Cities Council of Governments	Government Agencies	Stephanie	Cadena
Las Virgenes/Malibu Council of Governments	Government Agencies	Terry	Dipple
Las Virgenes/Malibu Council of Governments	Government Agencies	Elizabeth	Shavelson
North County Transportation Coalition	Government Agencies	Arthur	Sohikian
San Fernando Valley Council of Governments	Government Agencies	John	Bwarie
San Gabriel Valley Council of Governments	Government Agencies	Marisa	Creter
South Bay Cities Council of Governments	Government Agencies	Jacki	Bacharach
South Bay Cities Council of Governments	Government Agencies	David	Leger
Westside Cities Council of Governments	Government Agencies	Cecilia	Estolano
Westside Cities Council of Governments	Government Agencies	Winnie	Fong
AARP	Community Based Organization	Stephanie	Ramirez
Access Services	Transportation Services and Groups	Erick	Haack
Aging & Disability Transportation Network	Community Based Organization	Dina	Garcia
Angelinos Against Gridlock	Community Based Organization	David	Murphy
BizFed	Business Organizations	Jerard	Wright
Citizen's Advisory Council	Advisory Council	Darrell	Clarke
Climate Resolve	Community Based Organization	Bryn	Lindblad
Communities for a Better Environment	Community Based Organization	Darryl	Molina-Sarmiento
Communities for a Better Environment	Community Based Organization	Byron	Ramos-Gudiel
FAST	Transportation Services and Groups	Hilary	Norton
Investing in Place	Community Based Organization	Jessica	Meaney
LA County Bicycle Coalition	Community Based Organization	Eli	Akira Kaufman
LA Walks	Community Based Organization	John	Yi
Move LA	Transportation Services and Groups	Denny	Zane
Multicultural Communities for Mobility	Community Based Organization	Jill	Contreras
Sustainable Streets (Active Trans)	Community Based Organization	Ron	Durgin
Alliance for Community Empowerment (ACE) SFV focused	Community Based Organization	Michelle	Miranda
Alliance for Community Transit-LA	Transportation Services and Groups	Laura	Raymond
Best Start Metro LA	Community Based Organization	Brenda	Aguilera
Best Start Watts	Community Based Organization	Guadalupe	Zapata
Best Start Watts	Community Based Organization	Maria	Manzano
Best Start Wilmington	Community Based Organization	Irais	Colin
Cal State University System	Educational Institution	Carmen	Gapuchin
DayOne (SGV focused)	Community Based Organization	Catalina	Gonzalez
LA Chamber of Commerce	Business Organizations	Kendal	Asuncion
LA Chamber of Commerce	Business Organizations	Diana	Yedoyan
LA Community College District	Educational Institution	Maria	Iacobo
LAUSD	Educational Institution	Renee	Bell-Harbor
Pacoima Beautiful	Community Based Organization	Veronica	Padilla-Campos

SELA Collaborative	Community Based Organization	Wilma	Franco
SGV Economic Partnership	Business Organizations	Bill	Manis
SlateZ	Community Based Organization	Effie	Turnbull
Temple City Youth Committee	Community Based Organization	Peggy	Kuo
LA Forward	Community Based Organization	Alfonso	Directo
Valley Industry Commerce Association (VICA)	Business Organizations	Armando	Flores
Valley Industry Commerce Association (VICA)	Business Organizations	Stuart	Waldman
Watts Rising Collaborative	Community Based Organization	Wajeha	Bilal
LA County Supervisorial District 1	Elected Official Staff	Martin	Reyes
LA County Supervisorial District 1	Elected Officials	Hilda	Solis
LA County Supervisorial District 2	Elected Official Staff	David	Riccitiello
LA County Supervisorial District 2	Elected Officials	Mark	Ridley-Thomas
LA County Supervisorial District 3	Elected Official Staff	Nicole	Englund
LA County Supervisorial District 3	Elected Officials	Sheila	Kuhl
LA County Supervisorial District 4	Elected Official Staff	Young-Gi	Kim Harabedian
LA County Supervisorial District 4	Elected Officials	Janiche	Hahn
LA County Supervisorial District 5	Elected Official Staff	Dave	Perry
LA County Supervisorial District 5	Elected Officials	Kathryn	Barger

BRT Vision & Principles Study

Purpose of the Study

The Bus Rapid Transit (BRT) Vision & Principles Study is a comprehensive study that will establish the standard of a future Metro BRT network and serve as a pillar towards Metro's goal of creating a world class transportation system. This study will develop the overall vision, goals and objectives for BRT in LA County. It will define local BRT operational standards and design guidelines and identify new corridors that align with current and future needs and opportunities so that when funding is available, the County can strategically invest in the construction of innovative mobility options that will benefit the entire region.

The BRT survey will be open for responses through May 31, 2020.

Survey (English) Survey (Spanish)

Relationship to existing BRT service and active projects

This work will directly inform and outline service features for all BRT projects moving forward and will be integrated into existing efforts, to the extent possible. The Study will also tie into other transit improvements studies that are currently underway. The project team will coordinate to share data with programs and initiatives that have a direct impact on the study, including the NextGen Bus Plan, Long Range Transportation Plan and Mobility Matrices project. Metro currently has three projects in the early stages of development that are considering BRT as a transit option; Vermont, North Hollywood to Pasadena and North San Fernando Valley Transit Corridors.

BRT Technical Advisory Committee

A Technical Advisory Committee (TAC), comprised of Metro departments and staff from other transit providers and local cities, was formed at the outset of the project and has convened regularly since that time. The TAC has been an integral part of the technical process and provides a broad level of expertise, experience and input on all elements of the project.

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Stakeholder Engagement

Metro is working to conduct targeted engagement with stakeholders across the county. Ongoing activities include:

- Stakeholder briefings/presentations
- Stakeholder workshop
- BRT Technical Advisory Committee input
- Participation in NextGen Bus Plan public workshops
- Countywide survey engagement and education (click to take the survey)

Goals and Objectives

- Develop local BRT standards and guidelines
- Identify and prioritize candidate BRT corridors
- Identify a network of future potential BRT corridors

Development of local BRT design guidelines and standards

In order to develop standards and guidelines, Metro reviewed key information from internal sources as well as international, national and peer agencies (ITDP, FTA, APTA, TRB, NBRTI) and organized BRT standards into a

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- cross comparison of national and international BRT standards
- consideration of what standards are most applicable to LA County
- refinement of standards specific to Los Angeles for each element

Metro opted for a combination of performance and prescriptive-based standards that together will outline the necessary elements to achieve a world-class mobility experience. Metro defines two levels of BRT: Full-BRT and BRT-Lite, which include minimum standards.

Approach to candidate corridor identification and selection

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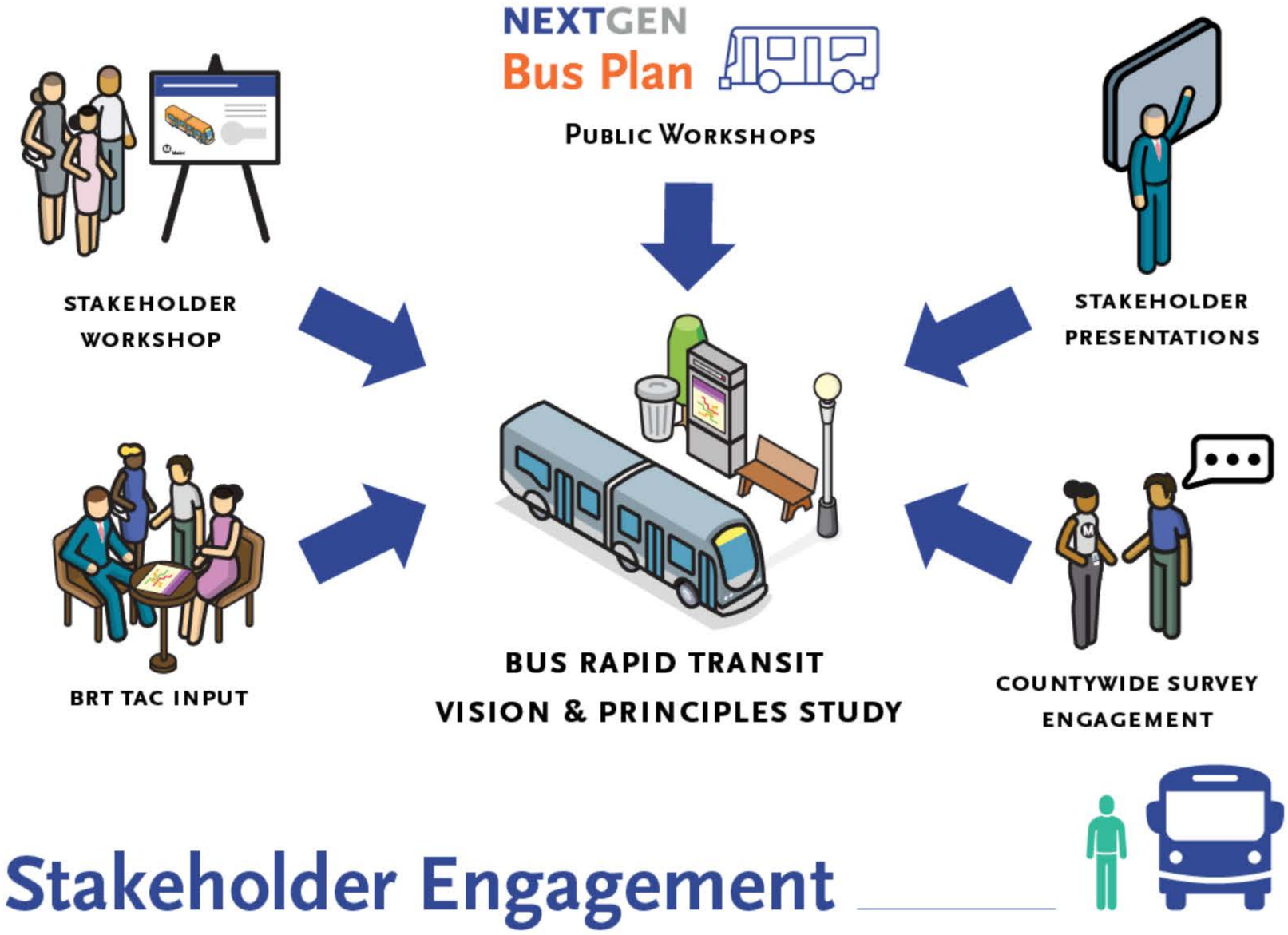

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- direct input from the project TAC
- use of a parametric design tool to identify corridors not previously discovered

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Analyzed BRT Corridors

After compiling all identified potential corridors, the technical team conducted several levels of screening and analysis and coordinated with Metro's NextGen Bus Study in order to rank and evaluate each corridor for feasibility. The top 30 highest performing corridors were carried forward for additional screening. During the second round of evaluation, the team will gather additional input from the public and key stakeholders and add in

PERFORMANCE STANDARDS

Dwell Time

Speed

On-Time Performance/Reliability

Headway/Frequency

PRESCRIPTIVE STANDARDS

All-Door Boarding

Signal Priority (TSP)

Dedicated Lanes

Branding

Station Amenities

BRT Standards

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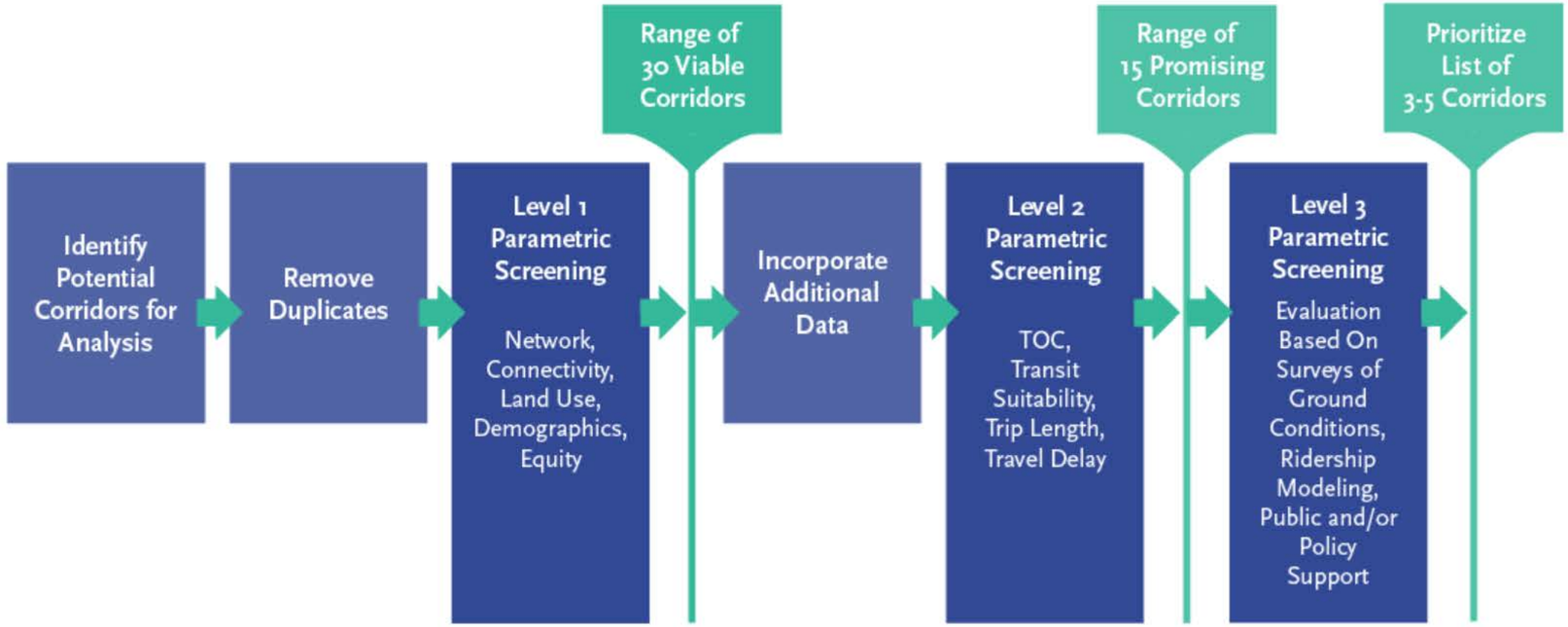
Identification of a future network of potential BRT corridors

How and where should Metro build LA's future BRT network?

Use our online interactive mapping tool to view analyzed corridors and provide your input on the future BRT network.



Corridor Analysis Methodology

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Next Steps

- Finalize standards & guidelines
- Refine priority corridor selections
- Identify a network of future potential BRT corridors
- Recommendations of the study are targeted to be presented to the Metro Board in Fall 2020

More Information

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- North Hollywood to Pasadena Transit Corridor
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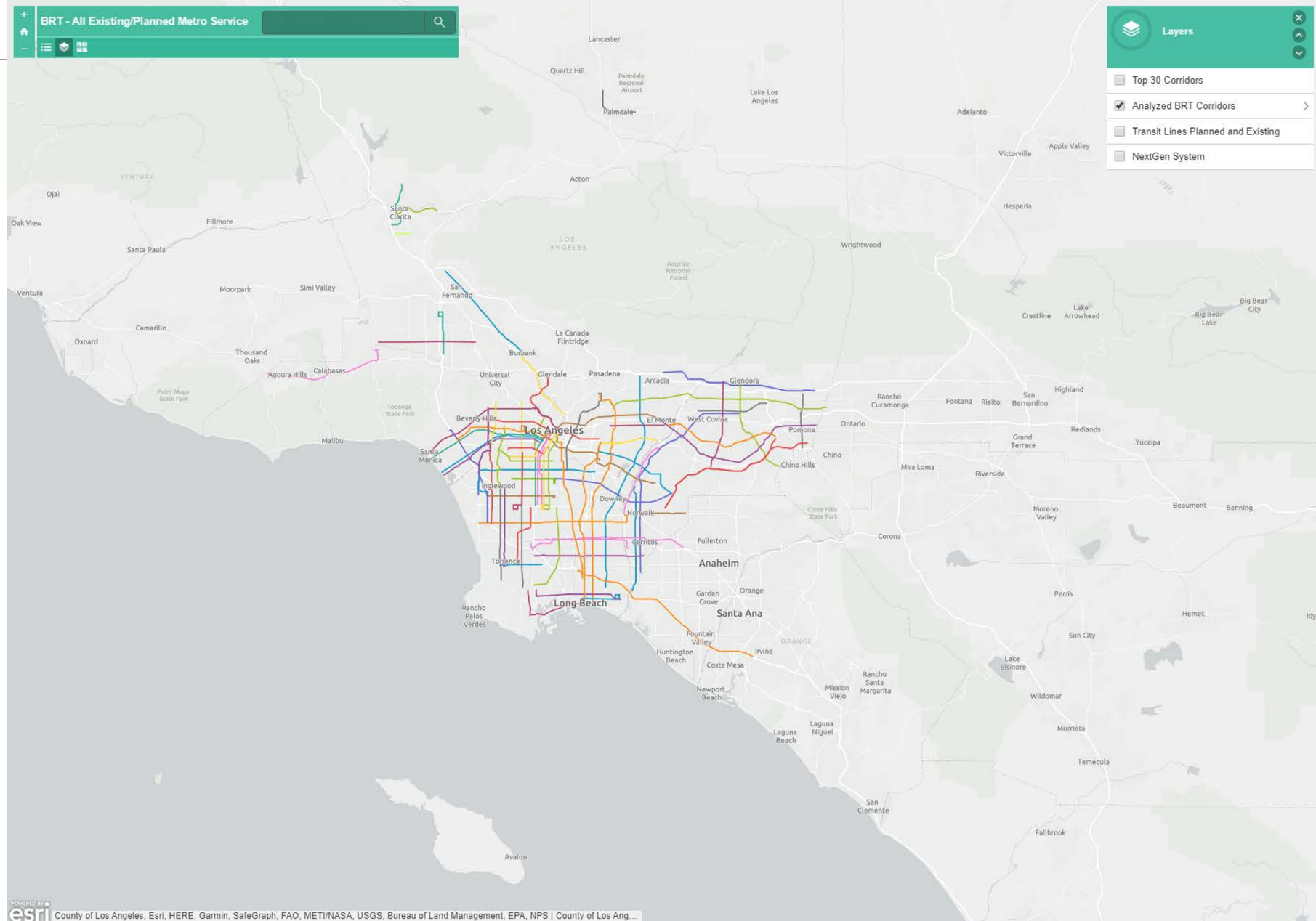

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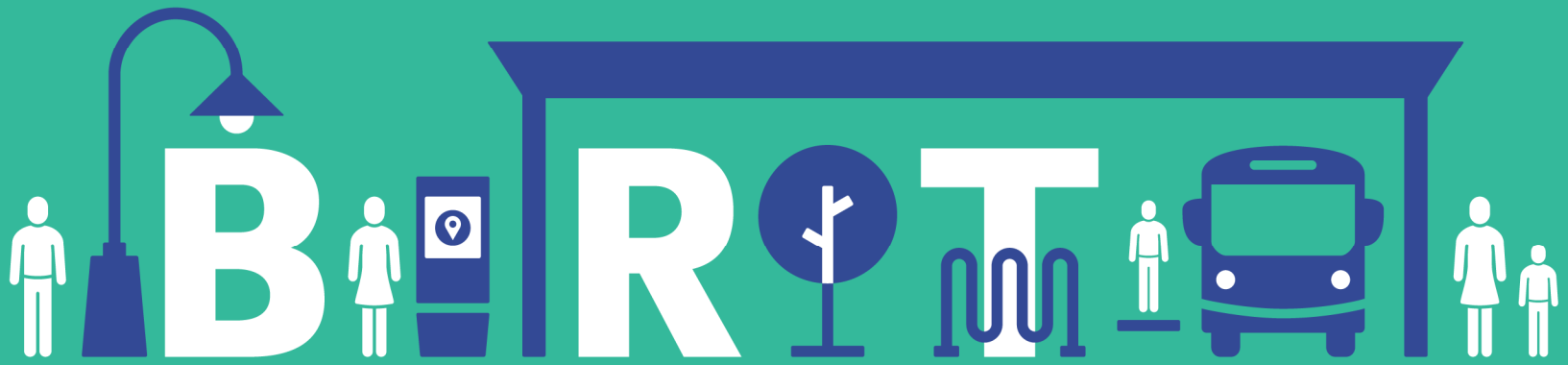

visioning BRT

BUS RAPID TRANSIT STUDY

Key Stakeholder Workshop

Wednesday May 20, 2020

Metro

Agenda

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BUS RAPID TRANSIT STUDY

BRT - The Convenient Choice Connecting Customers and Communities

- Study Overview
- Recap of Comments
- Corridor Analysis Methodology
- Top 15 Corridors
- Future BRT Network Overview
- Stakeholder and Public Engagement
- Next Steps

Metro

BRT Vision & Principles Study Overview

- **Study Purpose**
  - Define BRT
  - Provide the foundation for the assignment of Measure M BRT program funds
  - Support Measure M BRT projects
- **Study Outcomes**
  - BRT standards
  - Design criteria
  - Identify and prioritize BRT corridors
  - Future BRT network

Metro

Stakeholder Workshop – What We Heard

Connectivity is Fundamental

- BRT routes should connect to major transit hubs and bus/rail lines

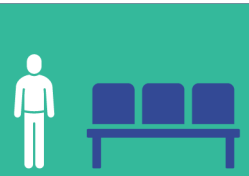
Coordinate with Municipal Operators and Cities

- Collaborate with municipal operators to avoid service inefficiencies
- Facilitate community development opportunities, including affordable housing

Operational and Design Details Matter

- Opportunity to update standards for support systems onboard buses and at stations—provides for future network efficiency
- BRT stops and stations should increase the efficiency of boarding/alighting

Stakeholder Workshop – What We Heard



Public Acceptance Continues to be a Challenge

- BRT currently has a negative connotation that should be corrected

Leverage Metro Policies

- BRT criteria should be tied to Metro Transit Oriented Communities (TOC) outcomes

Future BRT Network

- Eighteen new corridors or supplements to existing corridors

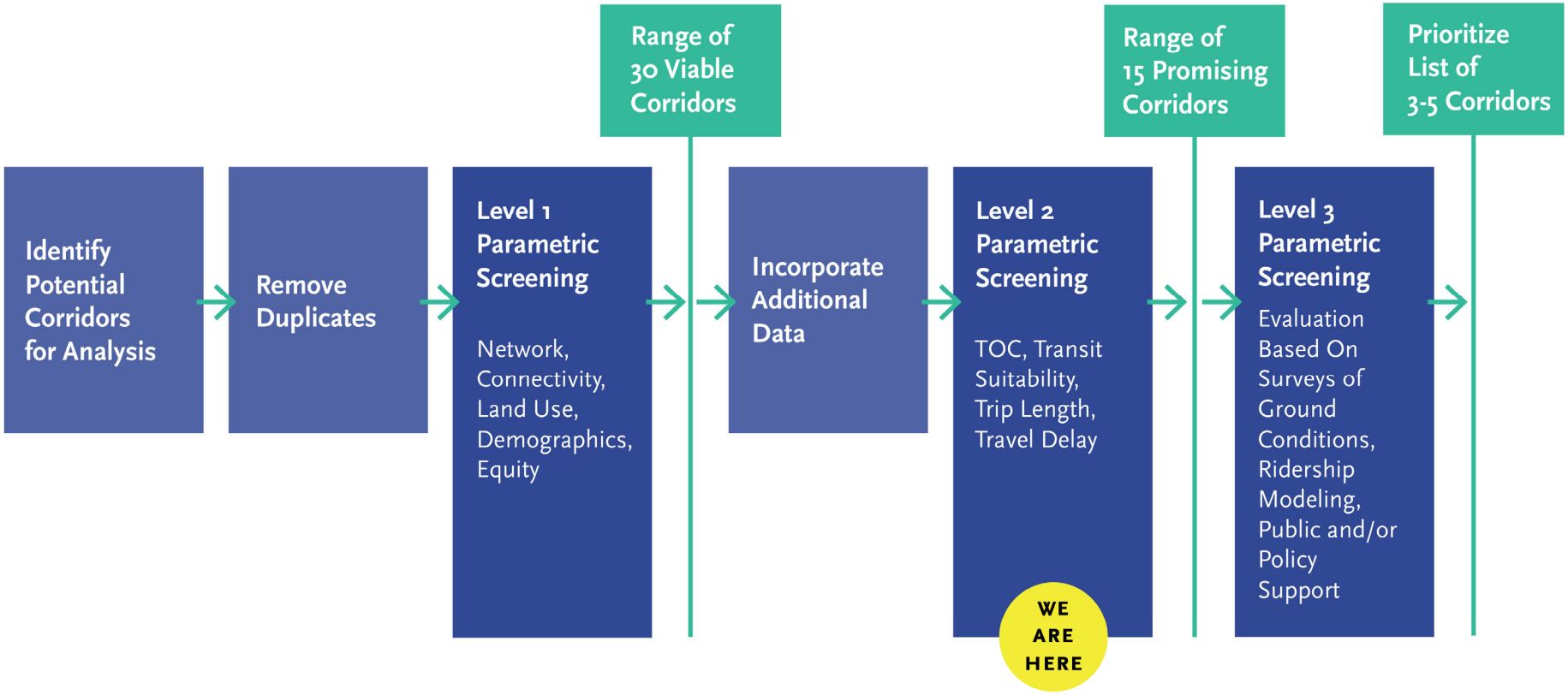
Metro

Open Discussion

Questions or Comments?

Metro

Corridor Analysis Methodology



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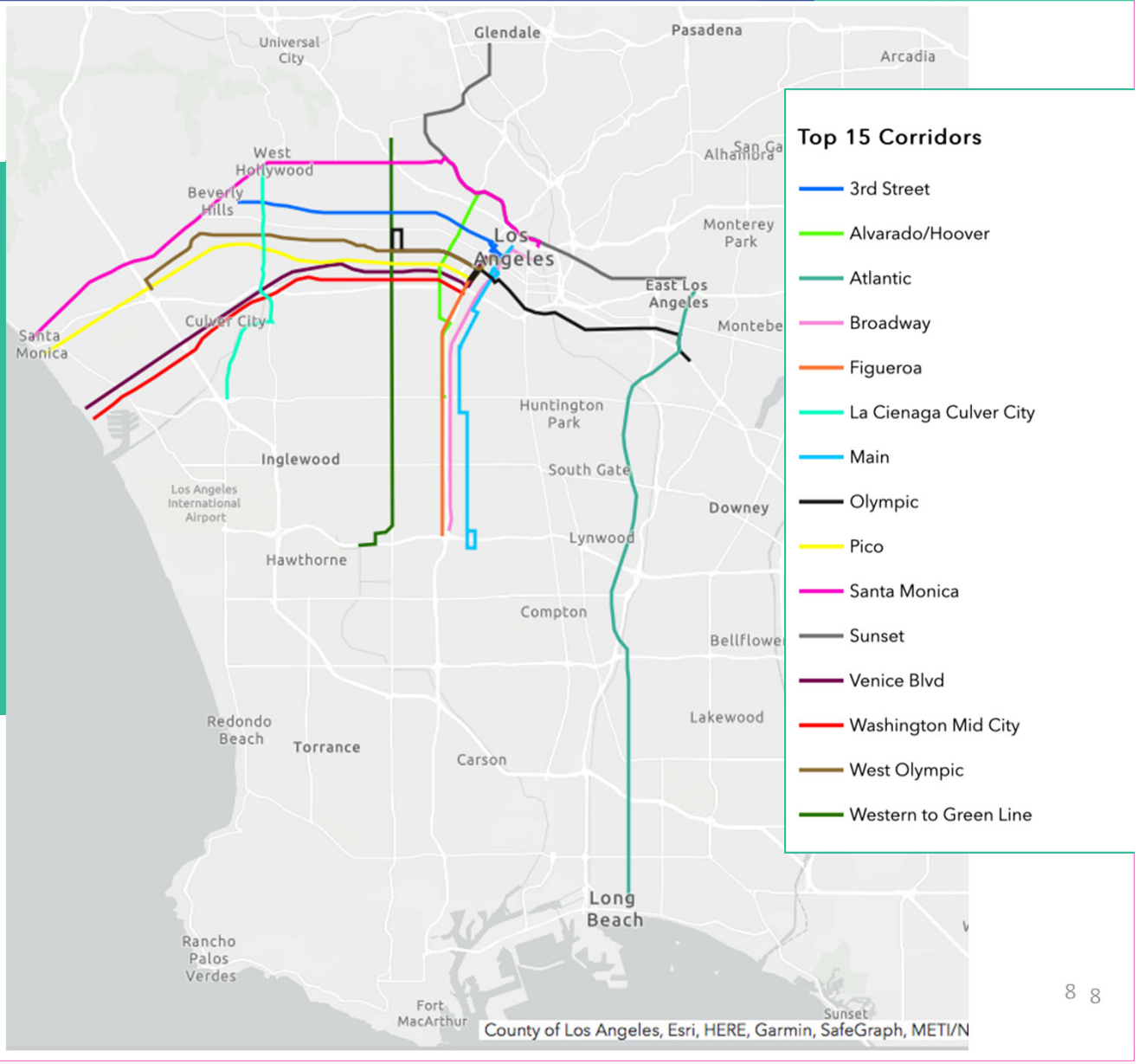
Top 15 Corridors

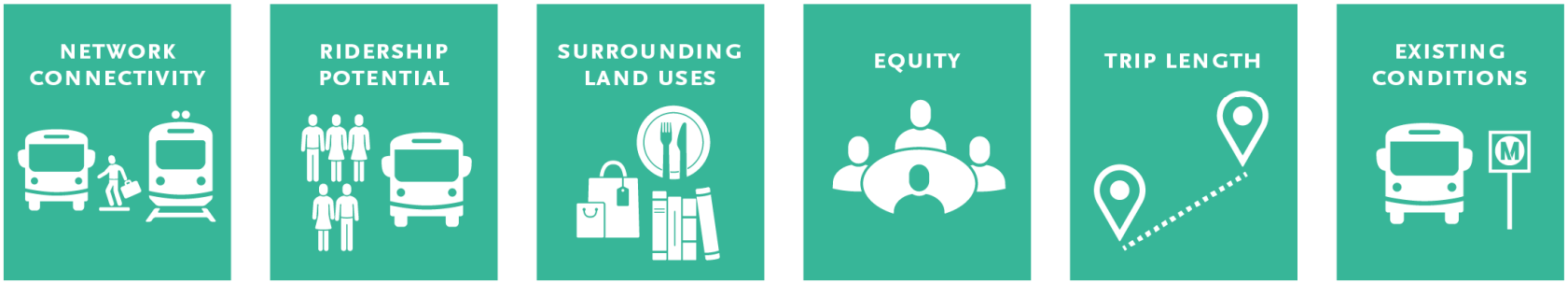
15 Potential Corridors

[Top 15 Potential BRT Corridors]



Future BRT Network

Build upon strong candidate corridors identified in a multi-step screening process that used the following criteria:



Utilize a gap analysis that:

> Considers existing and planned rail/BRT network

> Identifies gaps in coverage

> Connects future BRT corridors to one another and the Metro rail network

> Leverages corridors identified and screened through the project study

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Open Discussion

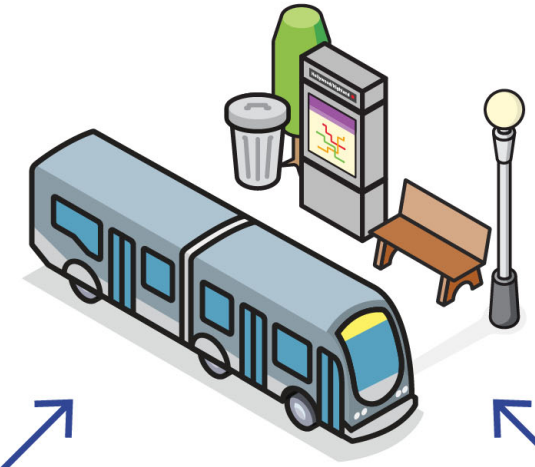
Questions or Comments?

Metro

Public and Stakeholder Input

BUS RAPID TRANSIT VISION & PRINCIPLES STUDY

STAKEHOLDER WORKSHOPS

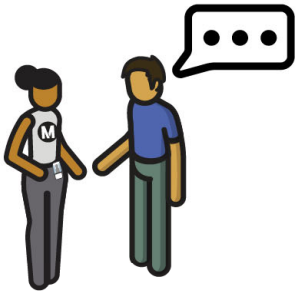


STAKEHOLDER PRESENTATIONS

BRT TAC INPUT

NEXTGEN Bus Plan

PUBLIC WORKSHOPS



COUNTYWIDE SURVEY ENGAGEMENT

Survey Results

GENERAL OVERVIEW

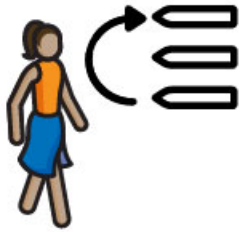
Over 60% of respondants are already familiar with BRT service, and more than 54% currently use Metro's BRT Service

More than 65% of those surveyed use public transit 3 or more days a week, with over 79% using Metro Bus and Rail services for that travel.

More than 91% of respondents would support more BRT corridors as part of the solution to mobility needs in LA County

TOP 5 PRIORITIES FOR BRT FEATURES & AMENITIES

- Frequency
- Dedicated bus lanes
- Reliability
- Real-time information
- Emergency phones & security cameras



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Stakeholder Input – Next Steps

BRT Survey

- Push to your membership
- Survey closes May 30, 2020

Map Comment Tool

- Record your comments on Top 15 Potential BRT Corridors
- Comment Tool closes May 30, 2020

Stakeholder Workshop

- Summer 2020
- Final 3 to 5 Select BRT Corridors
- Future BRT Network

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Demonstration of Map Comment Tool

Interactive Tool Demonstration for Review & Comment on 15 Corridors

Top 15 Potential BRT Corridors

Metro

Open Discussion

Questions or Comments?

Metro

Contact Us

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BUS RAPID TRANSIT STUDY

Thank you!

Lauren Cencic
Project Manager
CencicL@Metro.Net

Paul Backstrom
Deputy Project Manager
BackstromP@Metro.Net

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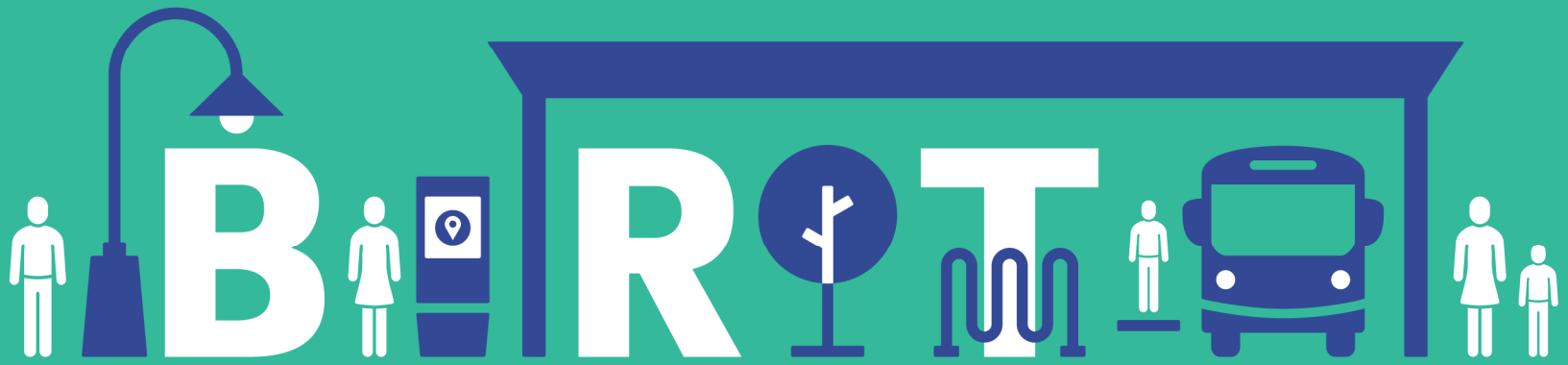

visioning BRT

BUS RAPID TRANSIT STUDY

Key Stakeholder Workshop

Tuesday September 1, 2020

Metro

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visioning BRT
BUS RAPID TRANSIT STUDY

BRT - The Convenient Choice Connecting Customers and Communities

- Study Overview and Purpose
- Recap of Key Stakeholder Comments and Input to Date
- Stakeholder and Public Engagement
- Development of BRT Standards & Design Guidelines
- Corridor Analysis Methodology
- Corridor Prioritization Process
- Future Unfunded Network
- Next Steps

Metro

BRT Vision & Principles Study Overview

- **Study Purpose**
  - Define BRT
  - Provide the foundation for the assignment of Measure M BRT program funds
  - Support Measure M BRT projects
- **Study Outcomes**
  - BRT standards
  - Design criteria
  - Identify and prioritize BRT corridors
  - Future BRT network

Metro

Stakeholder Workshops– What We Heard

Connectivity is Fundamental

- BRT routes should connect to major transit hubs and bus/rail lines

Coordinate with Municipal Operators and Cities

- Collaborate with municipal operators to avoid service inefficiencies
- Facilitate community development opportunities, including affordable housing
- Consider ‘complete streets’ studies and other initiatives or plans currently underway that could compliment or provide opportunities for this Study

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Stakeholder Workshops– What We Heard

Public Acceptance Continues to be a Challenge

- BRT currently has a negative connotation that should be corrected

Leverage Metro Policies

- BRT criteria should be tied to Metro Transit Oriented Communities (TOC) outcomes

Operational and Design Details Matter

- Opportunity to update standards for support systems onboard buses and at stations—provides for future network efficiency
- BRT stops and stations should increase the efficiency of boarding/alighting

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Summary of Outreach

Survey Engagement

- Distributed in-person and online through digital and extended outreach methods
  - 526 total surveys completed
  - 27 comment cards submitted

Public Meetings

- Tabling at 33 NextGen public meetings

Stakeholder Workshops and Presentations

- 40+ presentations and workshops with key organizations and stakeholders have been held
- 11 TAC meetings

Story Map Site Traffic

- 5,100+ views since launch

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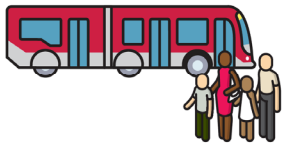
Survey Highlights

GENERAL OVERVIEW

Over **88%** of respondants are already **familiar with BRT service**, and more than **56%** currently use Metro's BRT Service



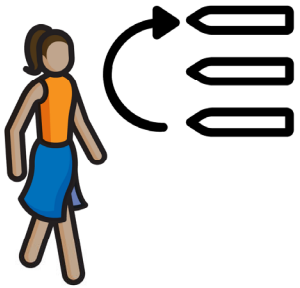
More than **58%** of those surveyed use public transit **3 or more days a week**, with over **80%** using Metro Bus and Rail services for that travel.

More than **97%** of respondents would **support more BRT corridors** as part of the solution to mobility needs in LA County

Segment 1 included a specific reach for **low-income**, **age group 50+**, **Asian and African American populations**; Segment 2 included an additional target of **women** across the county

TOP 5 PRIORITIES FOR BRT FEATURES & AMENITIES

- Frequency
- Dedicated bus lanes
- Reliability
- Real-time information
- Faster travel times (origin to destination)



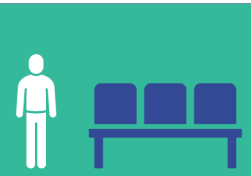
Metro

Open Discussion

Questions or Comments?

Metro

BRT Standards



Full BRT and BRT lite

- Accommodate the complex geographical and political constraints of LA County

BRT standards

- Use both performance and prescriptive standards
- TAC discussion on thresholds for each standard

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BRT Standards

- Dwell Time
- Speed
- On-Time Performance / Reliability
- Headway
- All-Door Boarding
- Intersection Priority (TSP)
- Dedicated Lanes
- Branding
- Station Amenities

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BRT Elements of Design

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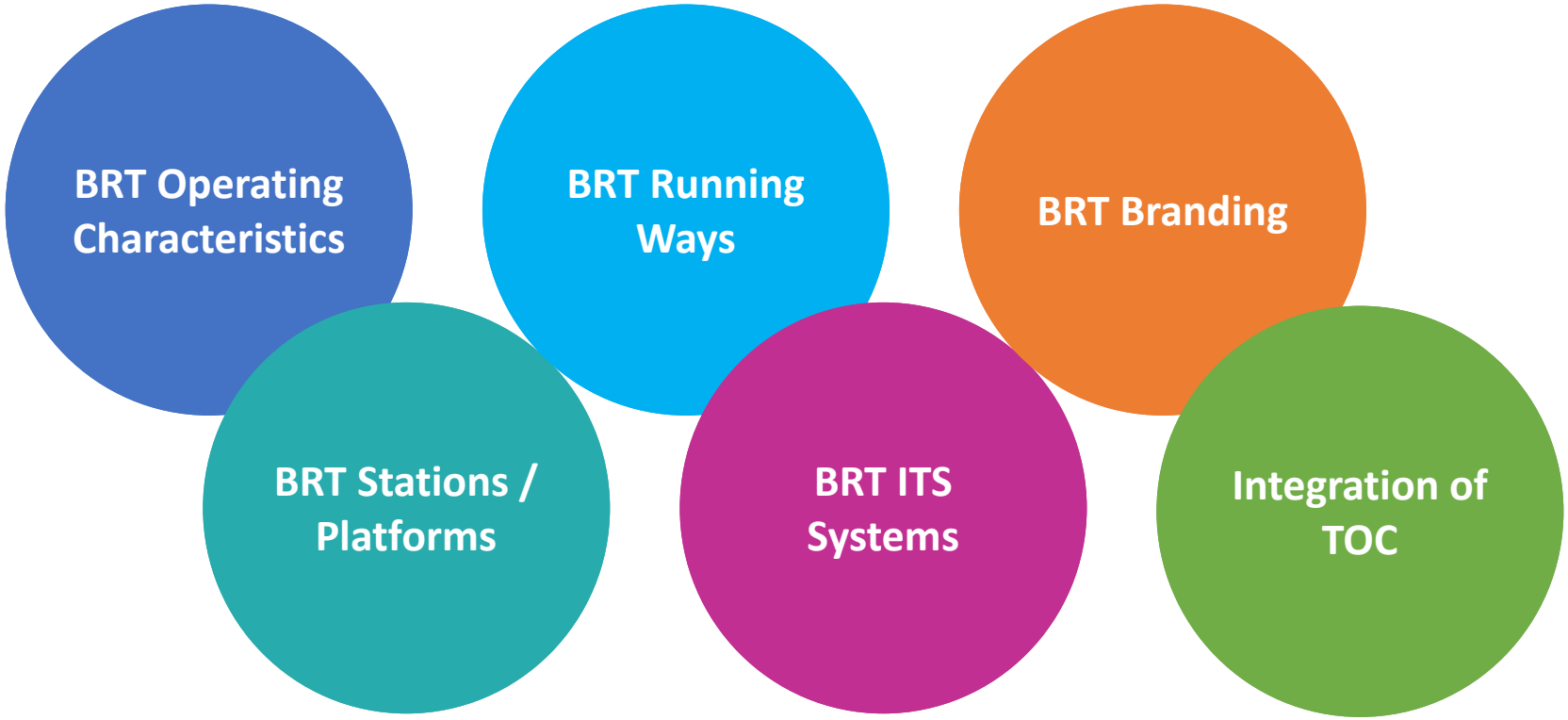
BUS RAPID TRANSIT STUDY

Purpose:

Design guidelines are recommendations intended to provide clear instructions to designers and developers on how to adopt specific principles, such as intuitiveness, learnability, efficiency, and consistency.



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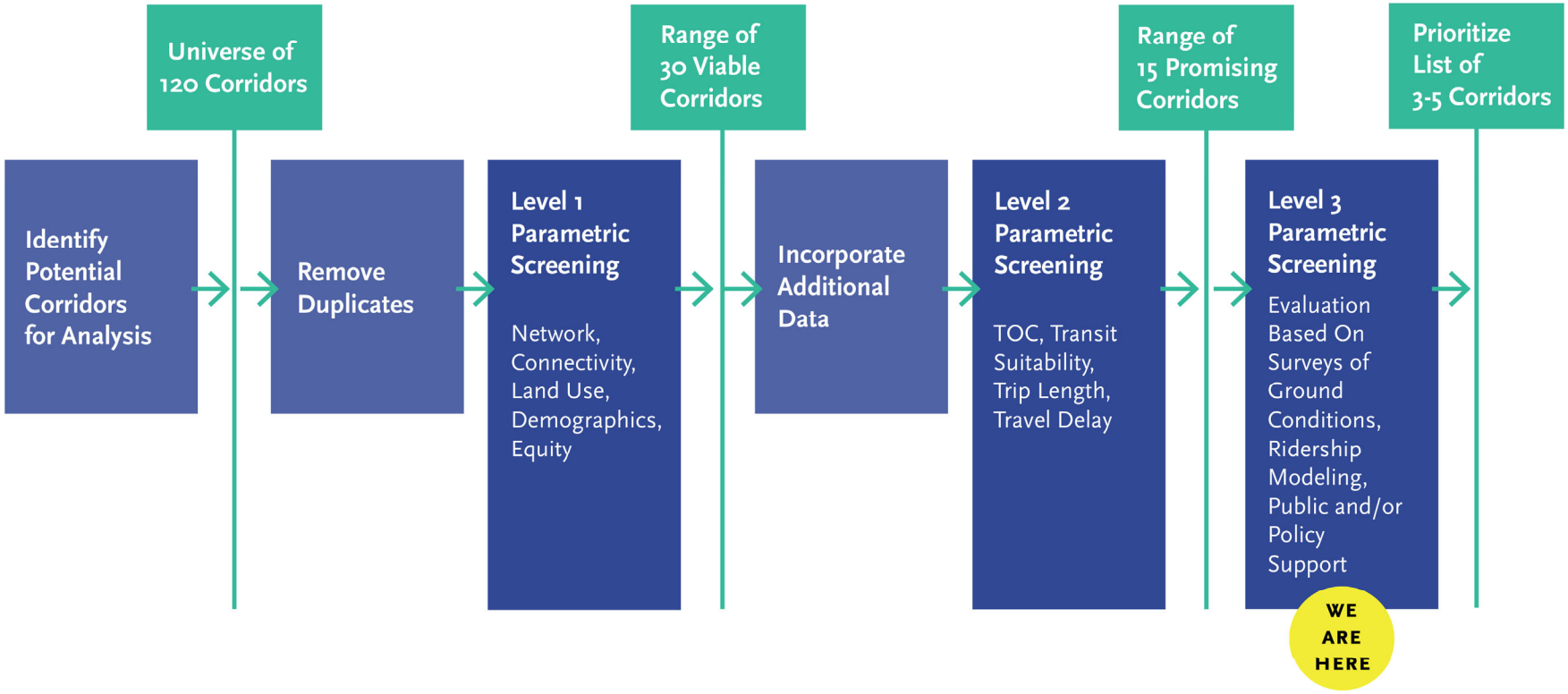
BRT Stations

Open Discussion

Questions or Comments?

Metro

Corridor Prioritization Methodology



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Analysis From 15 to 7 Corridors

Highest Ranked 7 Corridors

- West Olympic
- Venice
- La Cienega
- Western
- Sunset
- Broadway
- Atlantic

Corridors Not in the Highest Ranked 7

- Santa Monica
- 3rd Street
- Olympic
- Pico
- Washington
- Alvarado/Hoover
- Figueroa
- Main

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Highest Ranked 7 Corridors

7 Potential Corridors

[7 Potential BRT Corridors Interactive Map]

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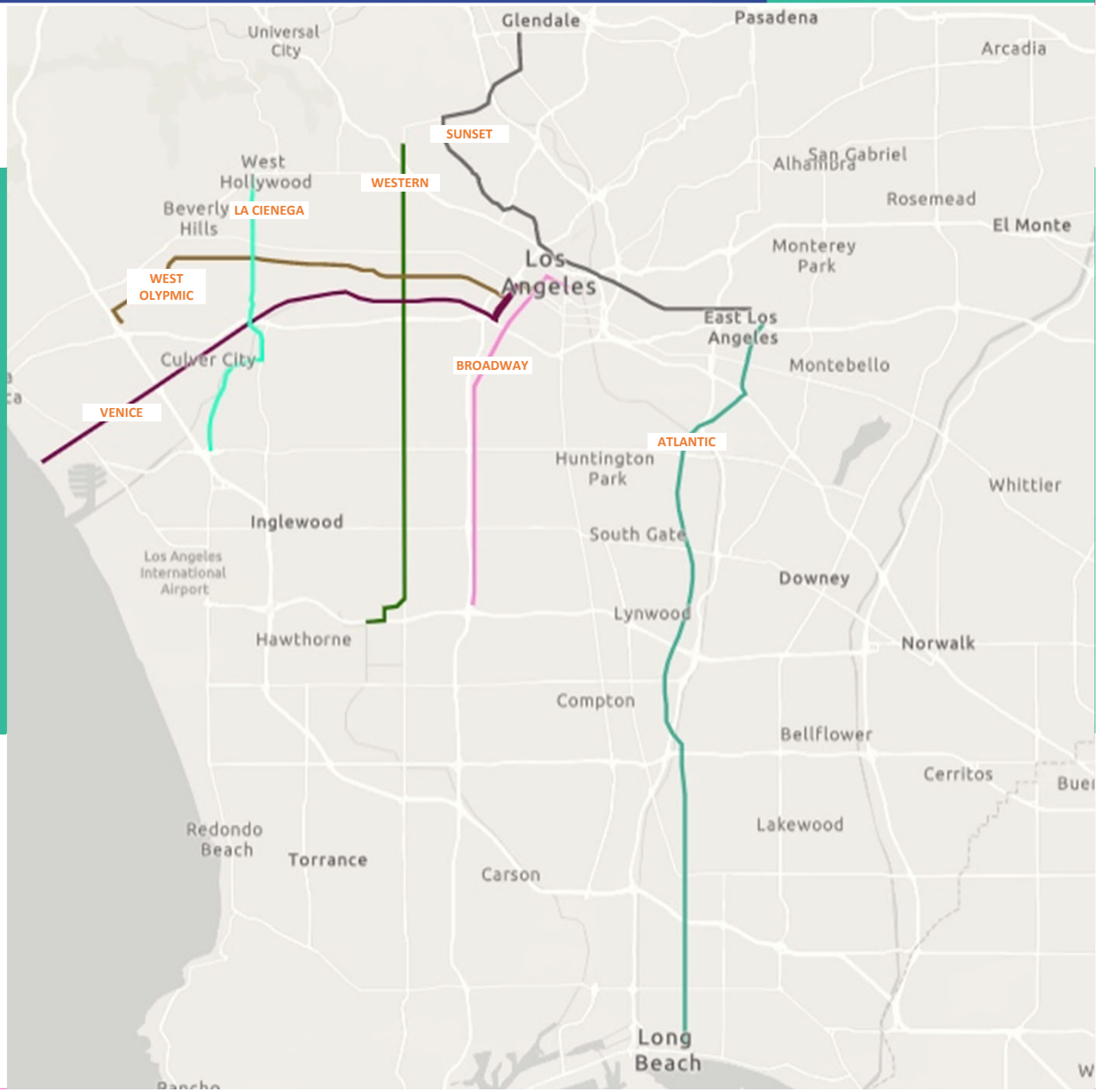
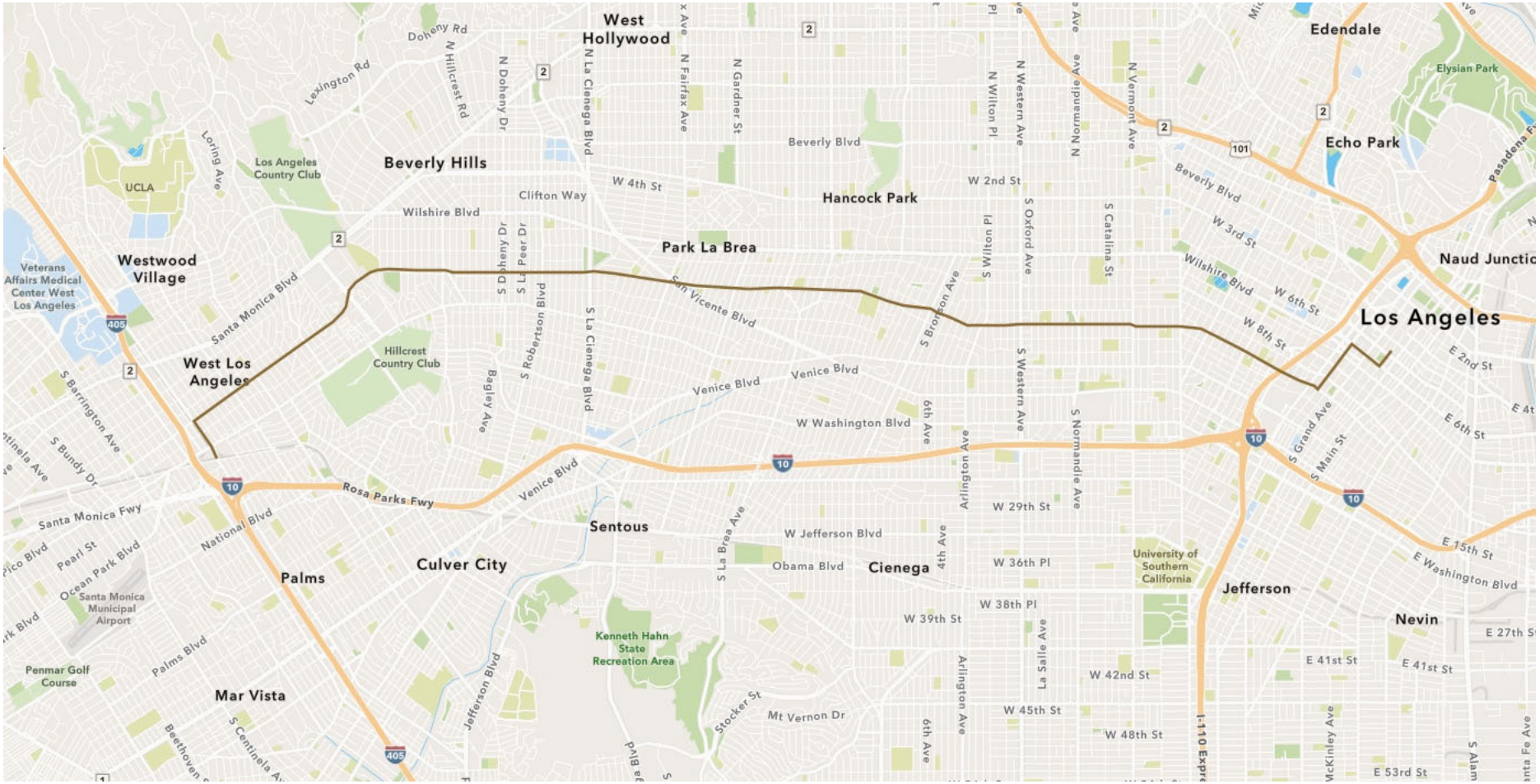


West Olympic



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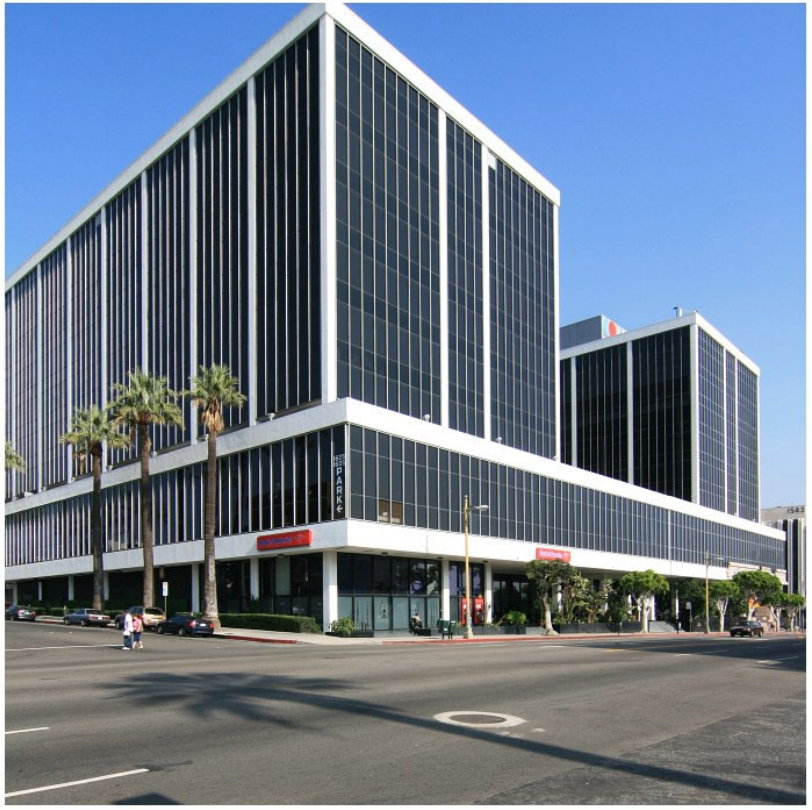
West Olympic

- Very high network connectivity
- Very high ridership
- High opportunity to build BRT-friendly infrastructure and realize travel time savings
- Parallel to and ½ mile from the Purple Line extension
- Potential to extend the corridor further west via Pico



Metro

Venice

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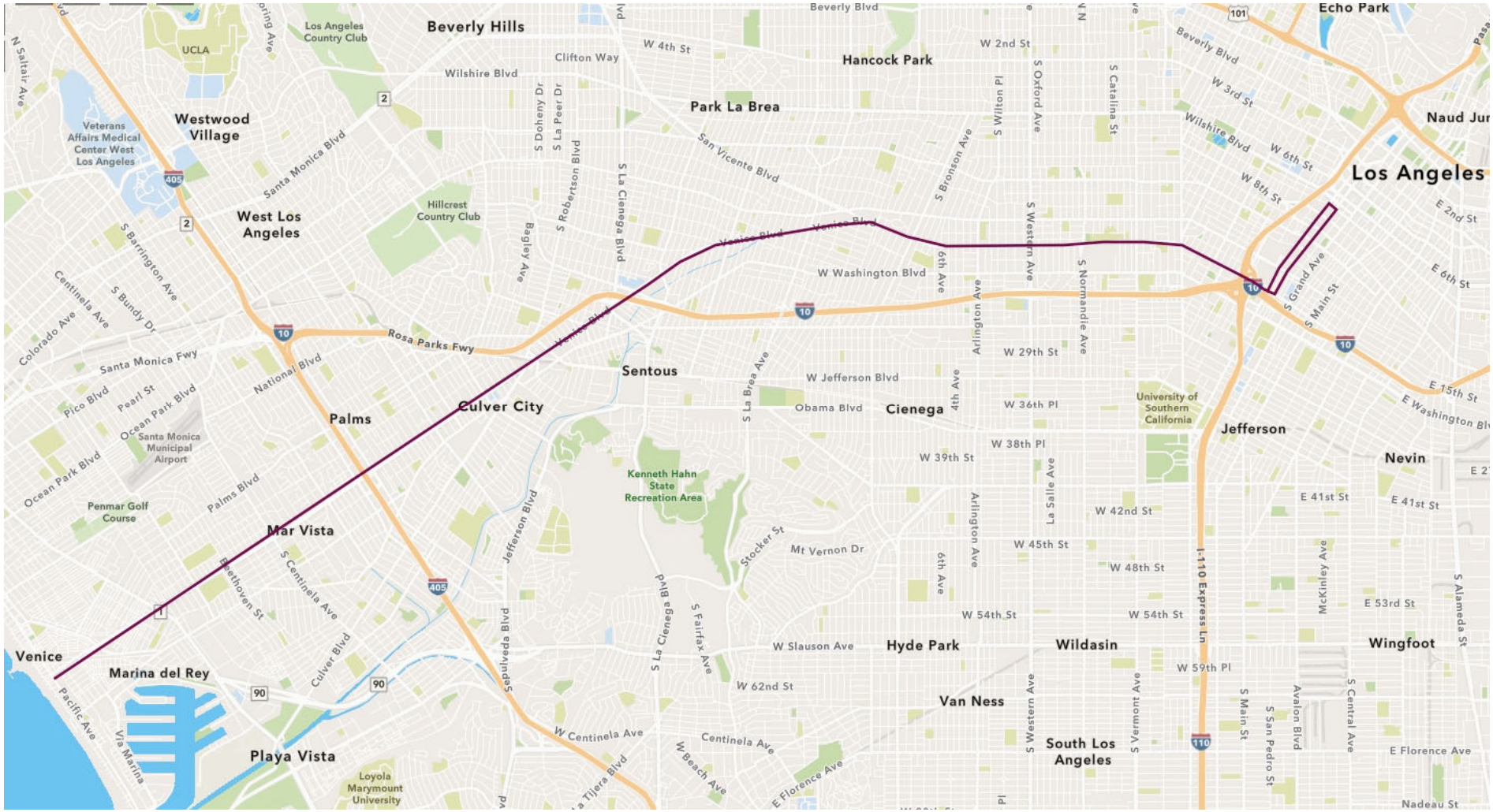


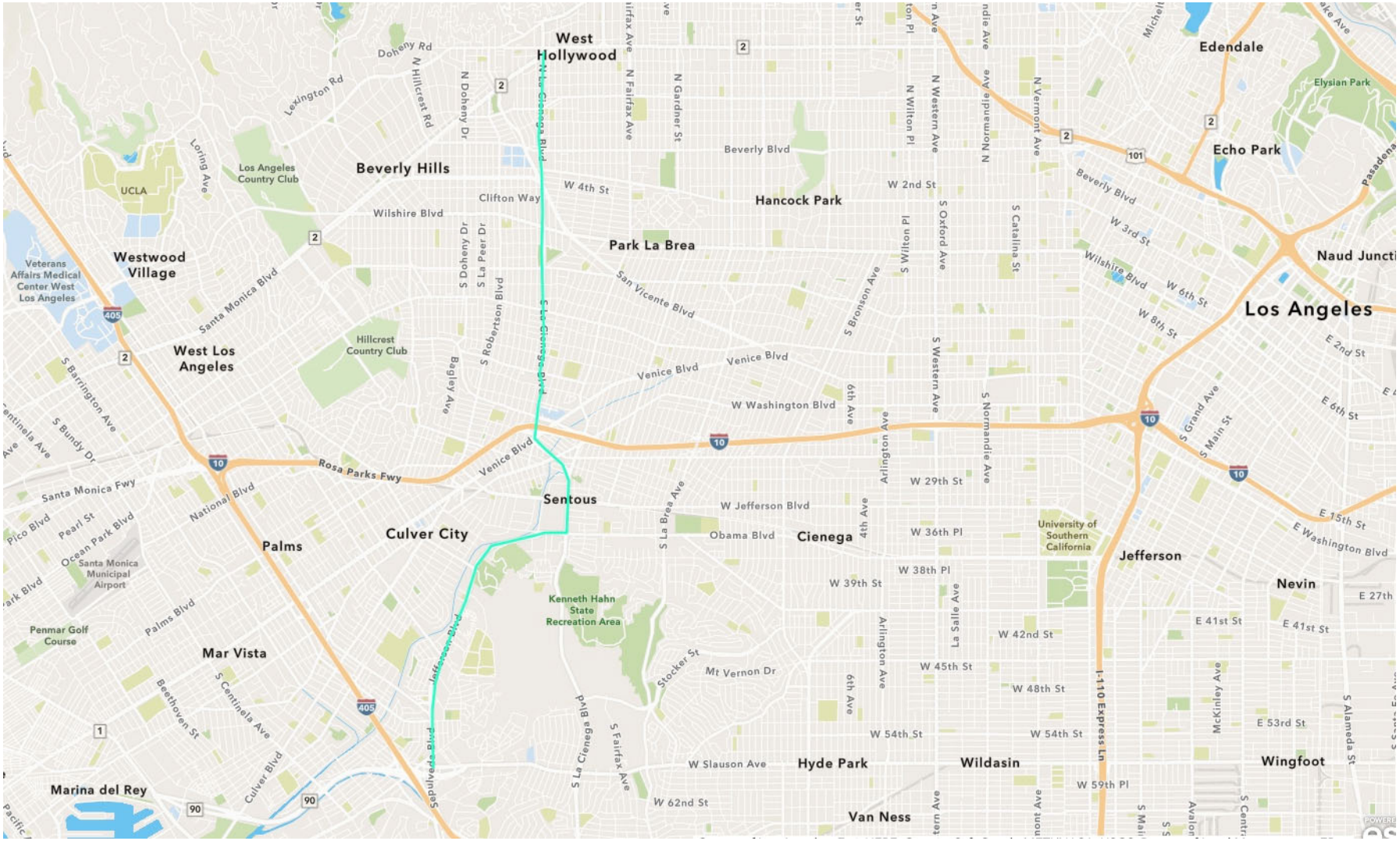
Metro

Venice

- Very high network connectivity
- Very high ridership
- High opportunity to build BRT-friendly infrastructure and realize travel time savings
- Pedestrian-friendly and street-oriented land uses
- Transit supportive policies including City of LA Community Plans and Culver City
- Strong transit-supportive policies along corridor
- Neighborhood sensitivity related to the Great Street Initiative

Metro

La Cienega

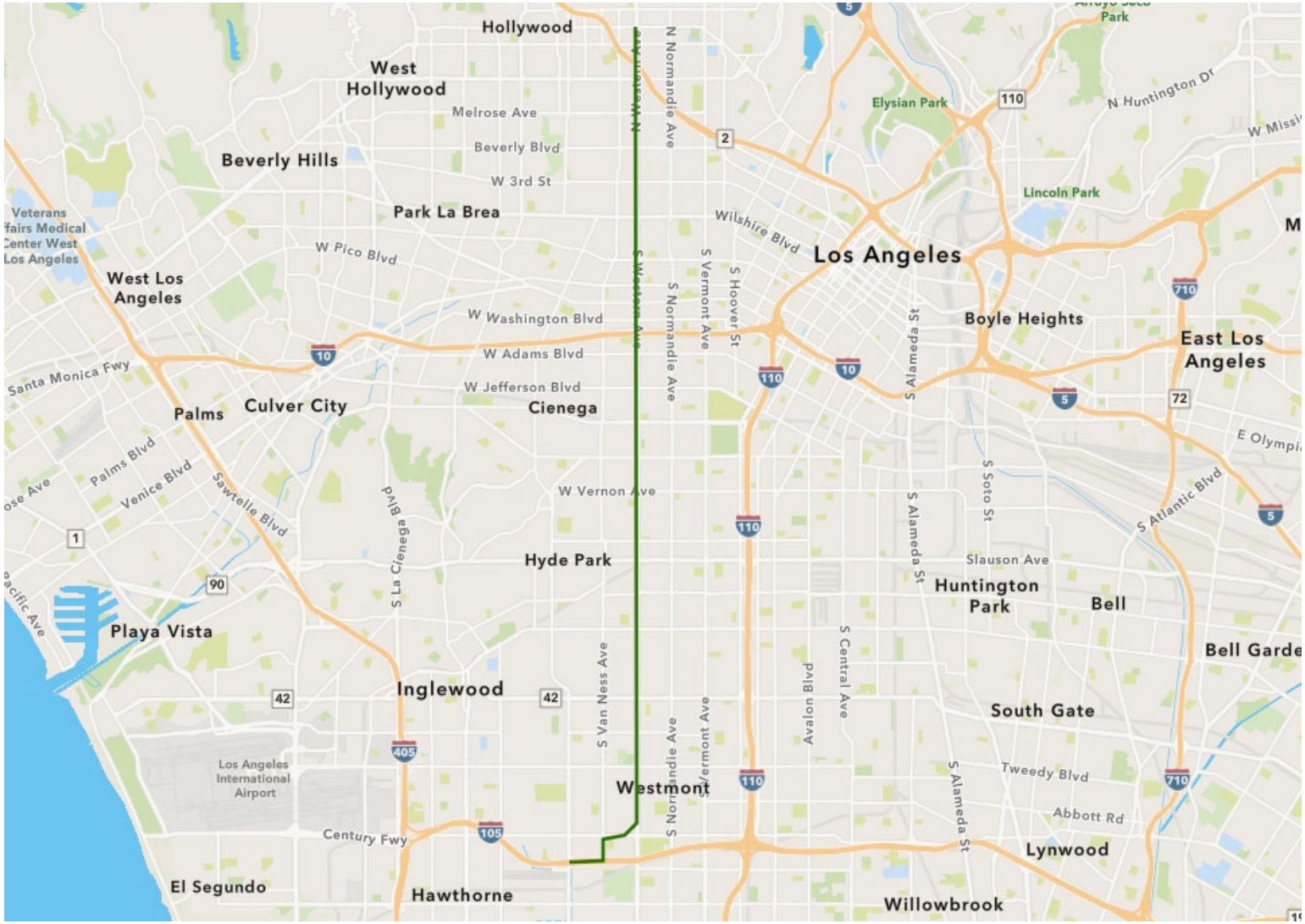

West Hollywood
Beverly Hills
Hancock Park
Park La Brea
Westwood Village
West Los Angeles
Culver City
Palms
Mar Vista
Sentous
Cienega
Jefferson
Nevin
Hyde Park
Wildasin
Wingfoot
Van Ness
Marina del Rey
Los Angeles
Edendale
Echo Park
Elysian Park
Naud Junct
Los Angeles Country Club
UCLA
Veterans Affairs Medical Center West Los Angeles
Hillcrest Country Club
Santa Monica Municipal Airport
Penmar Golf Course
Kenneth Hahn State Recreation Area
University of Southern California
Doheny Rd
Lexington Rd
N Hillcrest Rd
N Doheny Dr
Loring Ave
Wilshire Blvd
Clifton Way
W 4th St
Beverly Blvd
W 2nd St
W 3rd St
Wilshire Blvd
W 6th St
W 8th St
San Vicente Blvd
Venice Blvd
W Washington Blvd
Santa Monica Blvd
S Barrington Ave
S Bundy Dr
Centinela Ave
Rosa Parks Fwy
National Blvd
Santa Monica Fwy
Pico Blvd
Pearl St
Ocean Park Blvd
Palms Blvd
Beethoven St
S Centinela Ave
Culver Blvd
Jefferson Blvd
Sepulveda Blvd
Bagley Ave
S Robertson Blvd
S La Peer Dr
S Doheny Dr
N La Cienega Blvd
N Fairfax Ave
N Gardner St
N Wilton Pl
N Western Ave
N Normandie Ave
N Vermont Ave
S Wilton Pl
S Oxford Ave
S Catalina St
S Bronson Ave
S Western Ave
S Normandie Ave
Arlington Ave
6th Ave
4th Ave
S La Brea Ave
W Jefferson Blvd
Obama Blvd
W 29th St
W 36th Pl
W 38th Pl
W 39th St
W 42nd St
W 45th St
W 48th St
W 54th St
W 59th Pl
W 62nd St
W Slauson Ave
Mt Vernon Dr
Stocker St
S La Cienega Blvd
S Fairfax Ave
S La Brea Ave
La Salle Ave
Arlington Ave
6th Ave
I-110 Express Ln
McKinley Ave
S Grand Ave
S Main St
E 2nd St
E 6th St
E 15th St
E Washington Blvd
E 27th
E 41st St
E 53rd St
S Alameda St
Avalon
S Central
Michel
Alvarado St
Pasadena
101
10
405
90
1
2

La Cienega

- Provides high-capacity north-south network coverage on the Westside
- Transit supportive policies including City of LA Community Plans and Culver City
- Interest from Culver City and Westside Cities COG
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings
- May overlap with future Crenshaw North project
- Low network connectivity
- Low ridership
- Low potential equity benefit

Metro

Western



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Western

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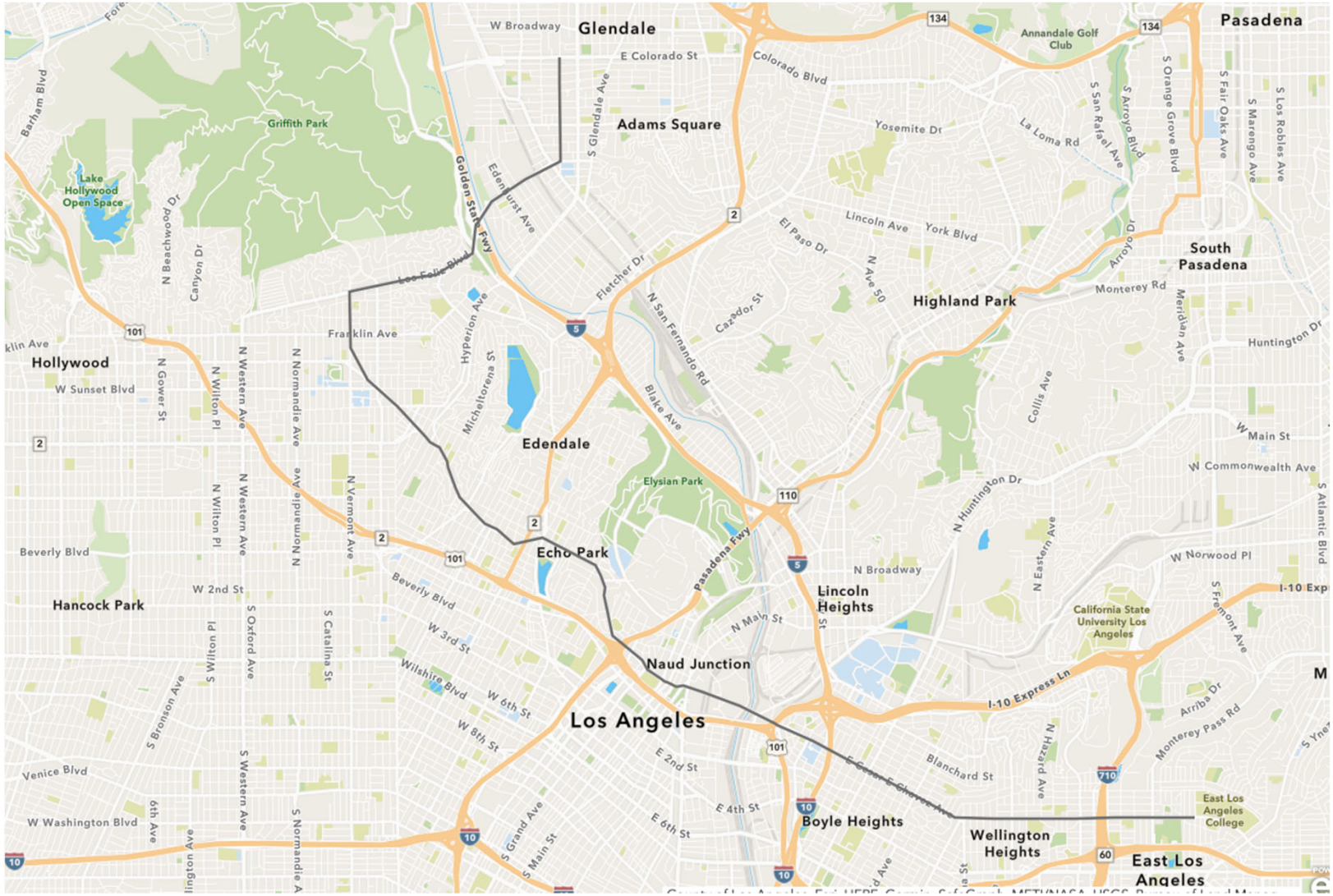
- Very high equity benefit
- Connects to 4 existing rail lines; moderate network connectivity for other services
- Currently Metro's 5th highest ridership corridor with 28,000 average weekday riders
- Good mix of land uses and several TOC-supportive areas along corridor
- Runs through 3 City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies
- The City of Hawthorne and the unincorporated West Athens-Westmont community also has TOC-supportive policies in place
- High-priority corridor per LADOT
- Limited opportunity to build BRT-friendly infrastructure and realize travel time savings

Metro

Cesar Chavez/Sunset



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Cesar Chavez/Sunset

- Very high network connectivity
- Connects downtown Los Angeles with the San Fernando Valley
- Runs through 6 City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies
- Moderate ridership
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings

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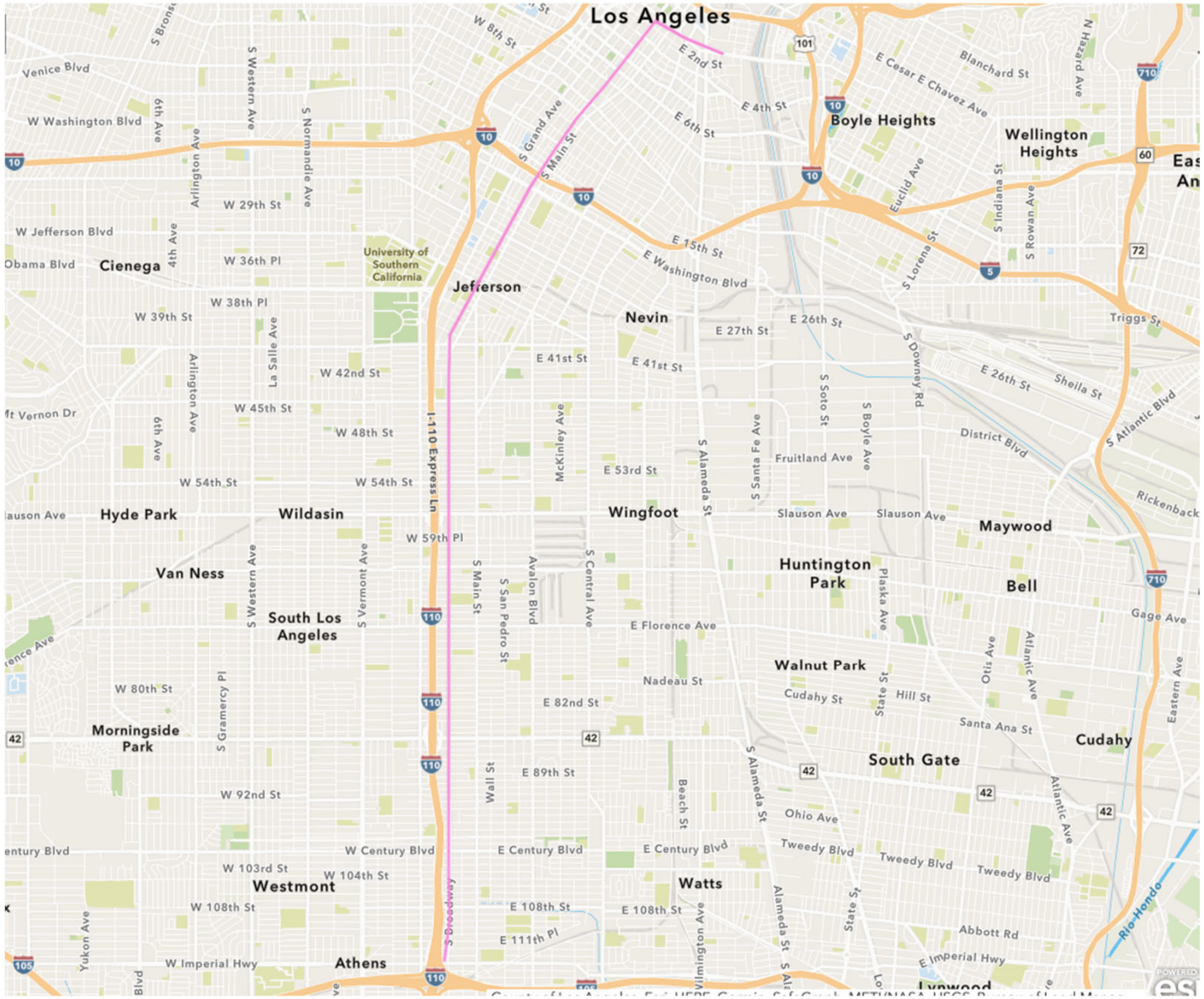
Broadway



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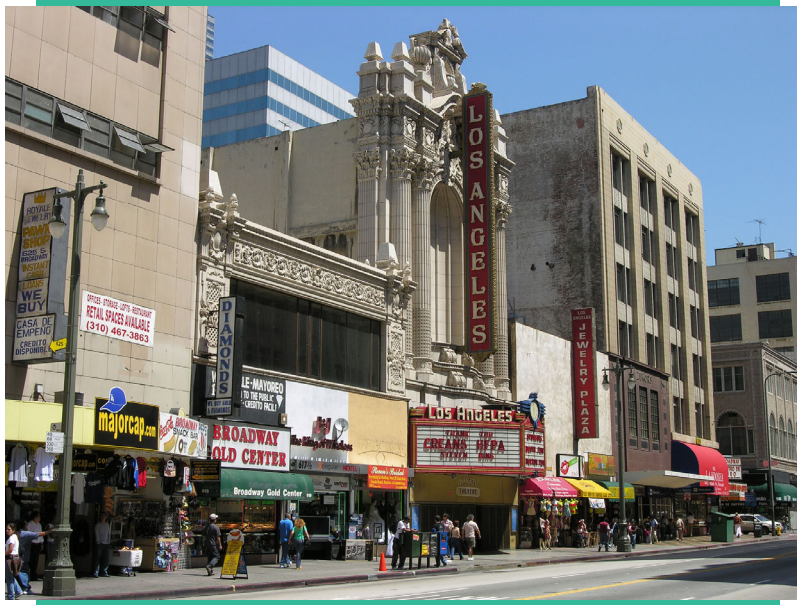
Broadway

- Very high network connectivity
- Very high equity benefit
- High-priority corridor per LADOT
- Runs through 2 City of LA Community Plan areas which feature TOC and transit-supportive policies
- Moderate ridership
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings
- A future Alternatives Analysis could consider both Broadway and Figueroa, which closely parallel each other and perform comparably



Metro

Atlantic

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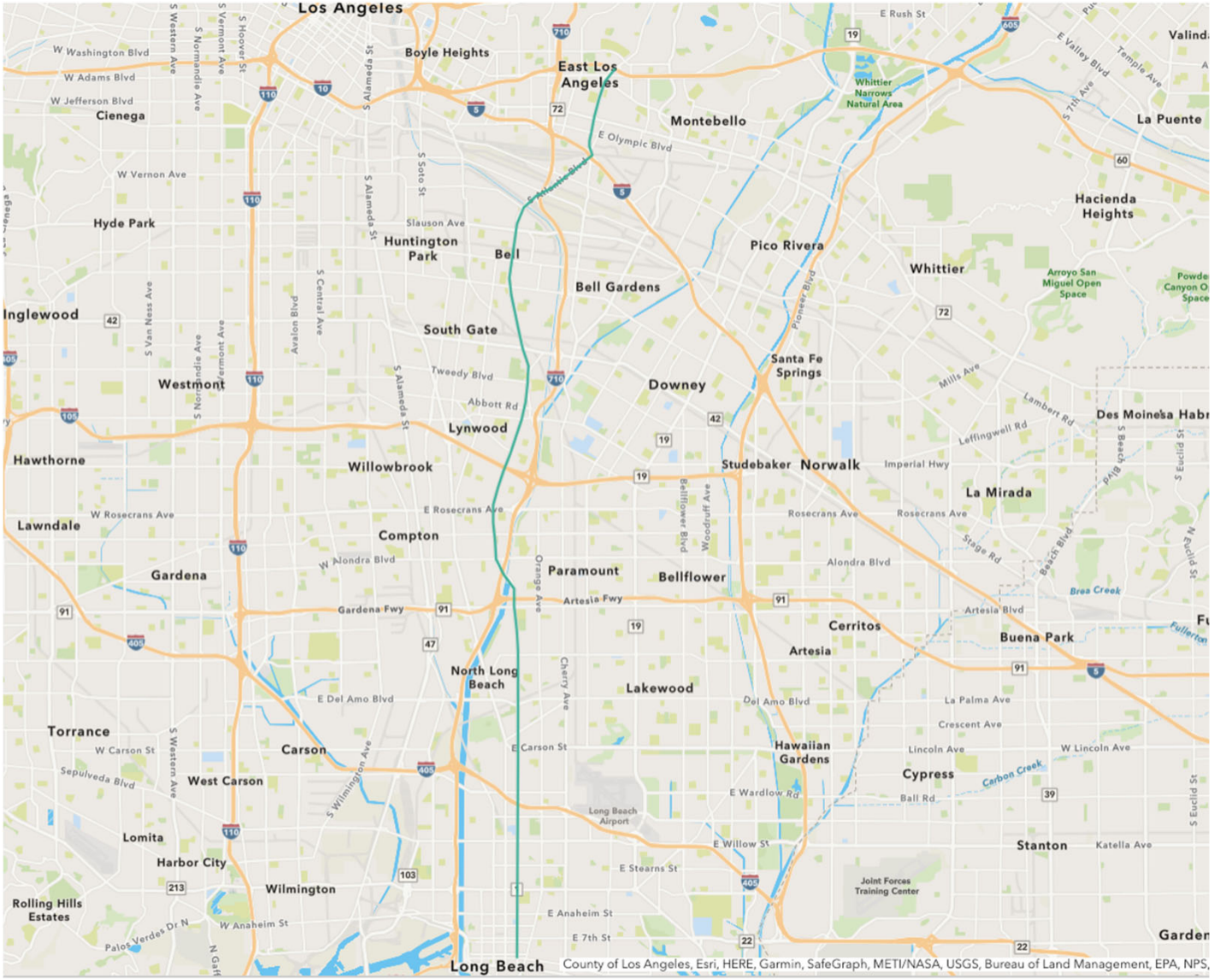

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Atlantic

- Connects East LA to Long Beach
- Interest from the Gateway Cities COG
- Moderate network connectivity
- Moderate activity for time savings
- Wide sidewalks provide good opportunity to build stations and passenger amenities
- Low ridership, but does provide access to industrial jobs for lower-income workers, addressing equity goals

Metro

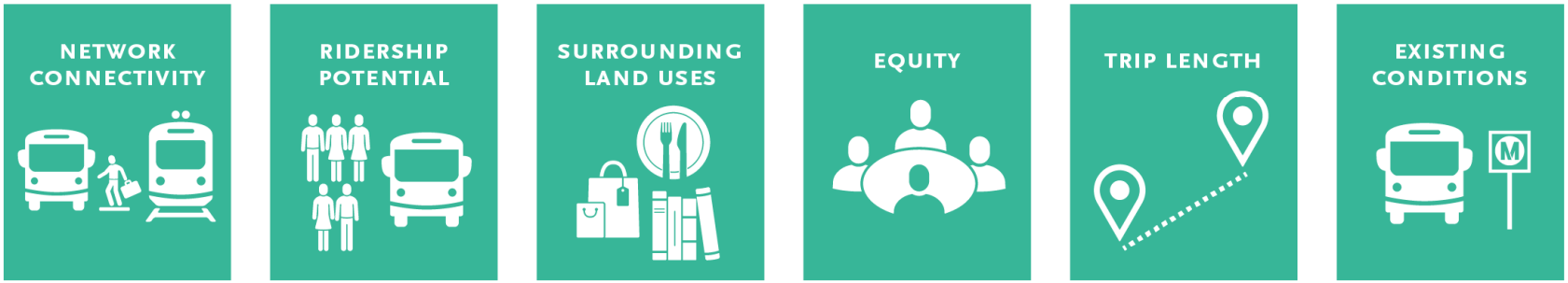
Open Discussion

Questions or Comments?

Metro

Future BRT Network

Build upon strong candidate corridors identified in a multi-step screening process that used the following criteria:



Utilize a gap analysis that:

> Considers existing and planned rail/BRT network

> Identifies gaps in coverage

> Connects future BRT corridors to one another and the Metro rail network

> Leverages corridors identified and screened through the project study

Future BRT Network Map

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Next Steps

Stakeholder Input and Engagement

- TAC #12 on 9/3
- Ongoing stakeholder briefings(COG's, Electeds, Cities)

Fall 2020

- Finalize design manual and final report
- Narrow down to 3-5 priority corridors
- Future unfunded network
- Present recommendations to Board in October

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Contact Us

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Thank you!

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Project Manager
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Fabian Gallardo
Transportation Planner
GallardoFa@Metro.Net

Metro

Metro BRT Vision & Principles Study Stakeholder Workshop February 7, 2020 LA Metro Headquarters 9:30 – 11am	
Attendance	16 Key Project Stakeholders were in attendance
Comments	• 3 written comment card submissions • 12 GIS mapping tool submissions • 2 online map comments • **17 Total Comments**
Key Stakeholders	• Armando Flores, Valley Industry Commerce Association (VICA) • Arthur Sohikian, North County Transportation Coalition • Dora Armenta, Pacoima Beautiful • Hilary Norton, California Transportation Commission (CTC) • Eli Lipmen, Move LA • Jerard Wright, BizFed • Laura Raymond, Alliance for Community Transit-LA • Nancy Pfeffer, Gateway Cities Council of Governments • Peggy Kuo, Temple City Youth Committee • Reed Alvarado, Fast Link DTLA • Bob Wolfe, Citizens Advisory Committee • Tom Chavez, Mayor Pro Tem, City of Temple City • Gloria Ohland, Move LA • Brian Bowens, Citizens Advisory Committee • Riley O'Brien, Westside Cities Council of Governments • Betina Cervantes, Cal State Los Angeles
Input Highlights	• BRT criteria should be tied to Metro Transit Oriented Communities (TOC) outcomes. BRT design criteria of stops and stations should align with implementation policies of TOC. • Design features of future BRT stops and stations should increase the efficiency and access of bus boarding and exiting. • BRT routes should intersect with and/or connect to existing major transit hubs like LAX, Union Station, Metro Transit Stations, etc. • BRT routes should connect with Metro Rail lines. • Very important for Metro to facilitate community development opportunities along BRT routes. These programs must include affordable housing programs.

	• BRT currently has a negative connotation within LA County due to North San Fernando Valley and North Hollywood to Pasadena projects. A project objective should be to improve this sentiment. • This project must consistently interact and collaborate with municipal operators to avoid service inefficiencies. • As BRT design criteria and operating standards are established and upgraded through this study, information technology support must be elevated as well. Support systems onboard buses and at stations will support future network efficiency.

Metro BRT Vision & Principles Study
Stakeholder Workshop
May 20, 2020
Meeting streamed online via Lifesize platform
10:00 – 11:15am

Attendance	28 Project Stakeholders were in attendance	
Comments	• 2 GIS online map comment submissions (post workshop) • 12 questions/comments related to the presentation or study were submitted in the live chat and all were addressed during the course of the workshop.	
Key Stakeholders	• Alexander Fung, SGVCOG, • Amy Wong • Angela Babcock, SFVCOG • Armando Flores, VICA • Arthur Sohikian, NCTC • Carmen Gapuchin, Cal State LA • Chase Engelhardt • Coby King, VICA • David Leger, SBCCOG • Denny Zane, Move LA • Dora Armenta, Pacoima Beautiful • Hilary Norton, FASTLinkDTLA, CTC • Eli Kaufman, LACBC • Eli Lipmen, Move LA	• Gloria Ohland, Move LA • Jamal White • John Yi, LA Walks • Josie, SLATE-Z • Jerard Wright, BizFed • Kendal Ascunsion, LA Chamber • Kevin Shin, LACBC • Marisa Creter, SGVCOG • Reed Alvarado, FASTLinkDTLA • Riley O'Brien, WCCOG • Veronica Padilla, Pacoima Beautiful • Wilma Franco, SELA • Winnie Fong, WCCOG • Yvette Kirrin, GCCOG
Questions & Comment Highlights	• The Atlantic Corridor and Florence-Whittier corridors are the subject of GCCOG Complete Street Studies that are on-going, and therefore we will specifically be seeking additional input regarding the viability of the BRT system on these Corridors, which we can report back via our study. • To what extent will TOC/community development and opportunities for affordable housing play a role in corridor selection? • Are you looking to other Metro areas (like Houston or even San Bernardino County) for examples of how other "car-centric" cities have approached BRT?	

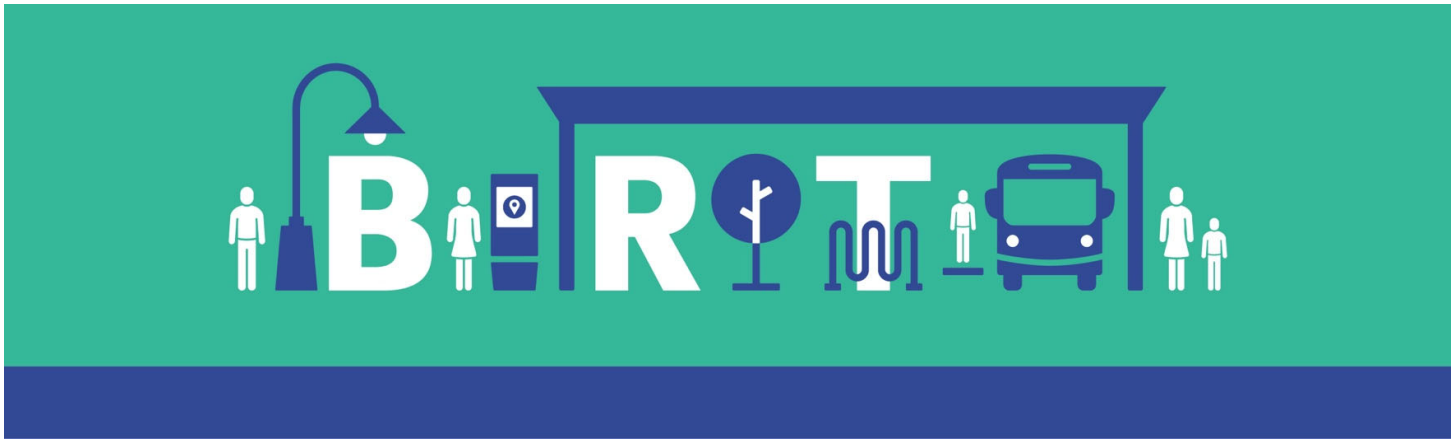
	• Do any of the 1st priority, 15 corridors include recent Metro Board actions such as the SR60 alternative replacement to the Eastside Gold Line LRT? • How much money was set aside in M for BRT? • How has COVID-19 impacted BRT analysis? For instance, certain lines have seen level boardings or even increases. This indicates lifeline and essential riders need these services. Is there an opportunity to use new data to assess these lines? • I like that Metro is making the connection between BRTs and TOCs. Since the state is supposed to be applying VMT standards starting July 1st, is Metro going to seek federal funding to support the nexus between affordable housing and BRT? • What has Metro done to dismiss the negative connotations of BRT in the community, especially in the San Gabriel Valley? • Are there any plans for future BRT projects in the San Gabriel Valley or the Gateway Cities subregions? • There are "complete streets" studies underway, e.g., Venice Blvd and Atlantic. To what extent do you see that as opportunity? • What type of existing room is needed for BRT infrastructure to be implemented? • While I understand that your top 15 is data-driven, it is striking that none of them are north or east of downtown. The eastside and San Fernando, Conejo, Santa Clarita, and San Gabriel Valleys are all shut out. Are the criteria too narrow? • Is there room in the funding to enable bus layover zones, transit centers and mobility hubs? Because with the region focused on increasing density, these zones will become increasingly scarce for operators to rest the bus and get their breaks.

Metro BRT Vision & Principles Study
Stakeholder Workshop
September 1, 2020
Meeting streamed online via Lifesize platform
10:00 – 11:15am

Attendance	28 Project Stakeholders were in attendance	
Comments	• 15 questions related to the presentation or study were submitted in the live chat and all were addressed during the course of the workshop. • 4 comments were submitted in the live chat (marked below in grey)	
Key Stakeholders	• Alexander Fung, SGVCOG • Yazdan Emrani, City of Glendale • Andrew Ross, LACDPW • Ann Wilson, AVJPA • Reed Alvarado, FASTLinkDTLA • Gloria Ohland, Move LA • John Yi, LA Walks • Armando Flores, VICA • Carmen Gachupin, Cal State LA • Edward Hitti, City of La Canada Flintridge • Eric Haack, Access Services • Laura Cornejo, City of Pasadena	• Dora Frietze-Armenta, Pacoima Beautiful • Angela Babcock, SFVCOG Jerard Wright, BizFed • Mark Yamarone, Metro • David Leger, SBCCOG • Eli Lipmen, Move LA • Daniel Tabor, LATTC • Riley O'Brien, WCCOG • Cynthia Cortez, SELA • Hilary Norton, FASTLinkDTLA • Arthur Sohikian, NCTC • David Kriske, City of Burbank • Elizabeth Hannon, Sutra • Jody Litvak, Metro • Maria Manzano, Best Start LA • Martha D'Andrea, LADOT
Questions & Comment Highlights	1. Was there any further clarification on the assignment of costs for BRT? a. This is more "the study before the study", but we are currently on our final report, where we will be studying a high-level range of costs 2. Is survey data available to be broken down by neighborhoods? a. Some data has the zip-codes available, but it was optional 3. What role do quality of experience standards play here? Cleanliness, safety, etc?	

	4. Can we get a copy of the list of the standard details mentioned? Particularly, can the breakdown include the difference in standard between light and full BRT? a. Yes, we can certainly make this available. 5. Given that most of the parametric screenings in levels 1 and 2 were conducted before COVID, are there any considerations to review the trip length, travel delays, and transit suitability for corridors that were not selected for prioritization? a. The analysis that was conducted was not affected by COVID, although ridership has plummeted. 6. Why did La Cienga not continue south to the LAX Crenshaw Line? 7. How is network connectivity measured? It seems like La Cienga would have higher network connectivity due to the lack of north/south Rail/BRT in Westside Cities. a. That is a good question; would imagine because there is probably some redundancies and overlap, but we have to look at this in detail. 8. If you connected to the Greenline Station at Imperial, you may incentivize the South Bay ridership from Lomita, Torrance, and other beach cities. 9. The irony and dilemma are that the highest-ranked corridors are poor candidates to actually build the needed BRT infrastructure like the dedicated lanes, queue jumpers, etc. Given the analysis that only 2 of the Top 7 corridors you can actually build the infrastructure on, how do corridors 8 through 14 measure in terms of actually building infrastructure to given the needed bus speed improvements? a. All of the top 7 have strong opportunities, but some are simply better than others. Some of the corridors have some restraints. 10. With the 7 corridors prioritized for further studies, how does Metro plan on moving forward with this study? a. To get down to the final 3-5, with the public engagement process we are going through. 11. Would love to get a copy of the survey by neighborhood and gender. 12. What is the average per mile cost for these BRT corridors? A range is helpful.

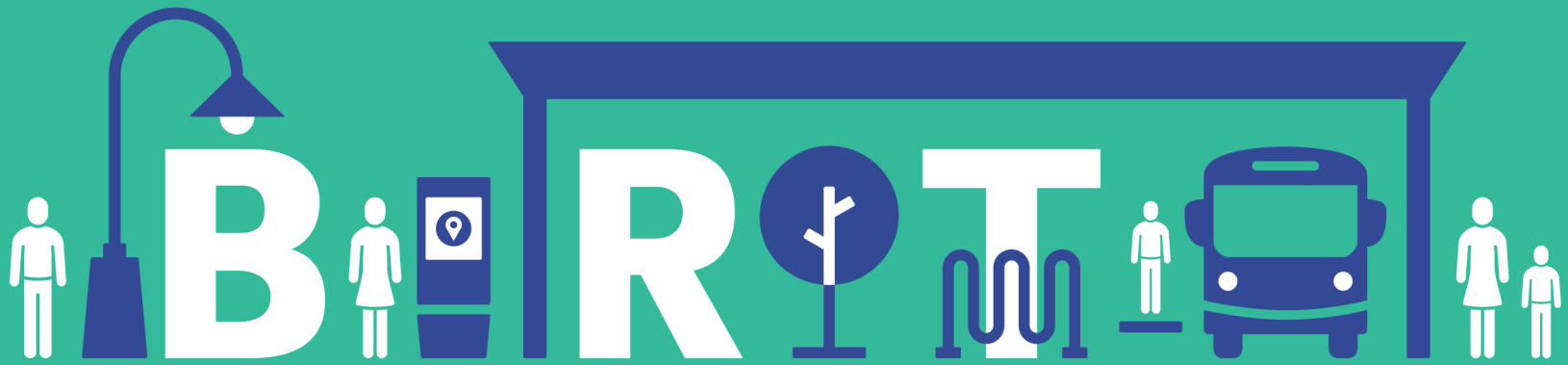
	a. These numbers will be available in the final report. Typically, $100M - $300M for any of the given corridors. 13. If you had all the money you needed, how much would that be and how many lines would that fund? 14. How is equity and job access prioritized in the weighting of prioritizing funding for these BRT corridors? Are all BRT corridors planned to be served by EV buses? 15. Does Metro plan on incorporating BRT as an alternative to future Rail projects (considering the relative cost savings vs. Rail)? a. Not something we are looking at in this study; that is more of a Board decision. 16. Are you considering additional BRT service as part of the expansion of the ExpressLane network to build on the success of the Silver Line and use tolling as a funding sources to increase BRT service? a. There may be opportunities to fund some of these projects to compliment a tolling process. It is in consideration but still need to be studied through 17. Will you be available to make this presentation to community groups, if asked? a. Yes, we can do some presentations, if needed.



Appendix D

Stakeholder Briefings:

Full Presentation



visioning BRT

BUS RAPID TRANSIT STUDY

Metro

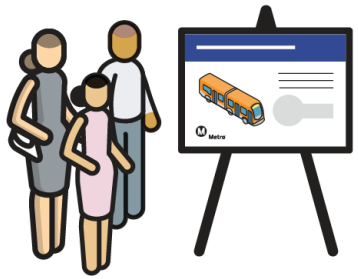
August 24, 2020

BRT Vision & Principles Study Overview

- **Study Purpose**
  - Define BRT
  - Provide the foundation for the assignment of Measure M BRT program funds
  - Support Measure M BRT projects
- **Study Outcomes**
  - BRT standards
  - Design criteria
  - Identify and prioritize BRT corridors
  - Future BRT network

Public and Stakeholder Input

BUS RAPID TRANSIT VISION & PRINCIPLES STUDY



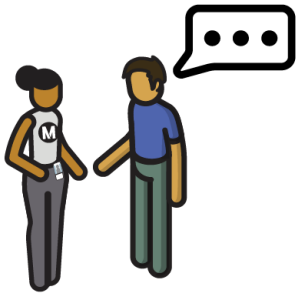
STAKEHOLDER WORKSHOPS

STAKEHOLDER PRESENTATIONS

BRT TAC INPUT

NEXTGEN Bus Plan

PUBLIC WORKSHOPS



COUNTYWIDE SURVEY ENGAGEMENT

BRT Standards

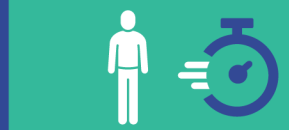
Full BRT and BRT lite

- Accommodate the complex geographical and political constraints of LA County

BRT standards

- Use both performance and prescriptive standards
- TAC discussion on thresholds for each standard

BRT Standards

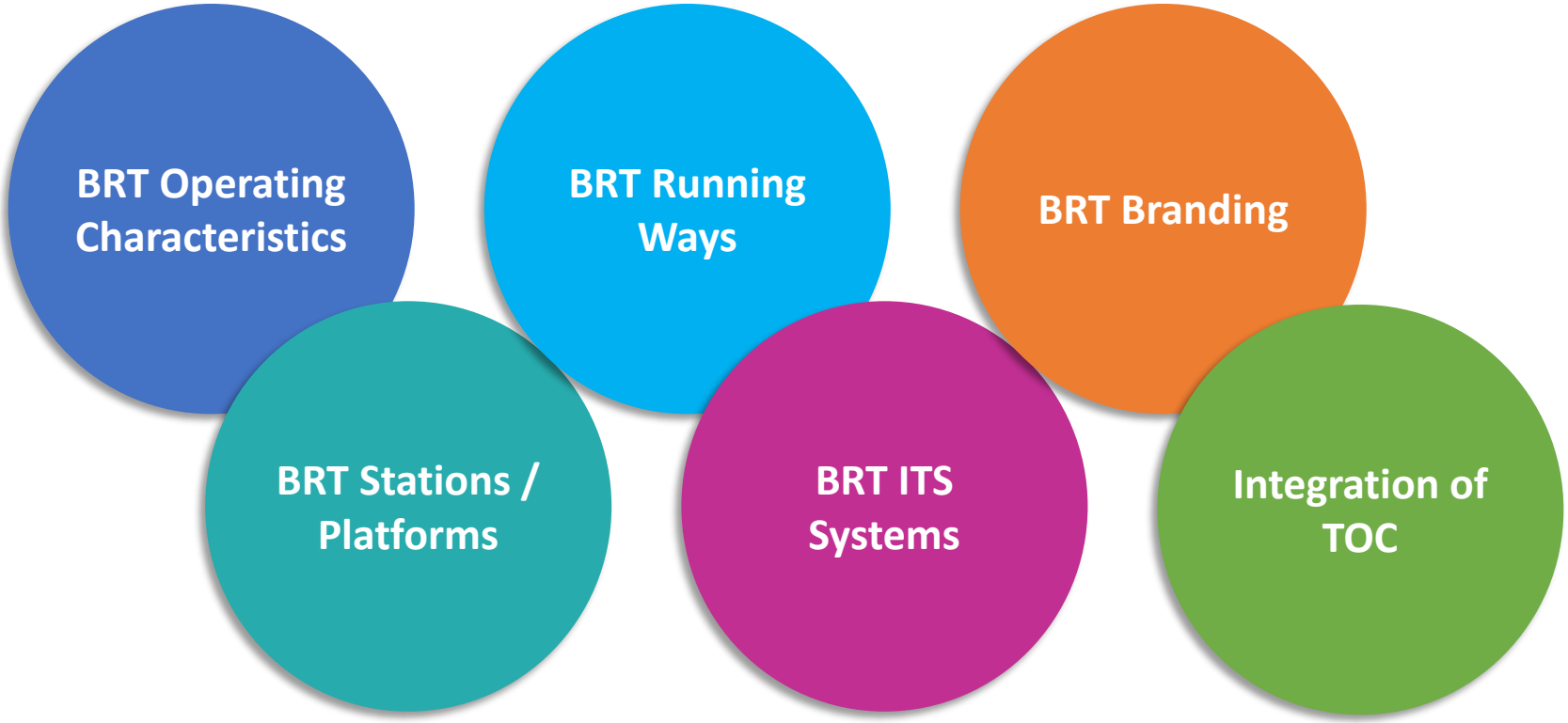


- Dwell Time
- Speed
- On-Time Performance / Reliability
- Headway
- All-Door Boarding
- Intersection Priority (TSP)
- Dedicated Lanes
- Branding
- Station Amenities

Metro

BRT Elements of Design

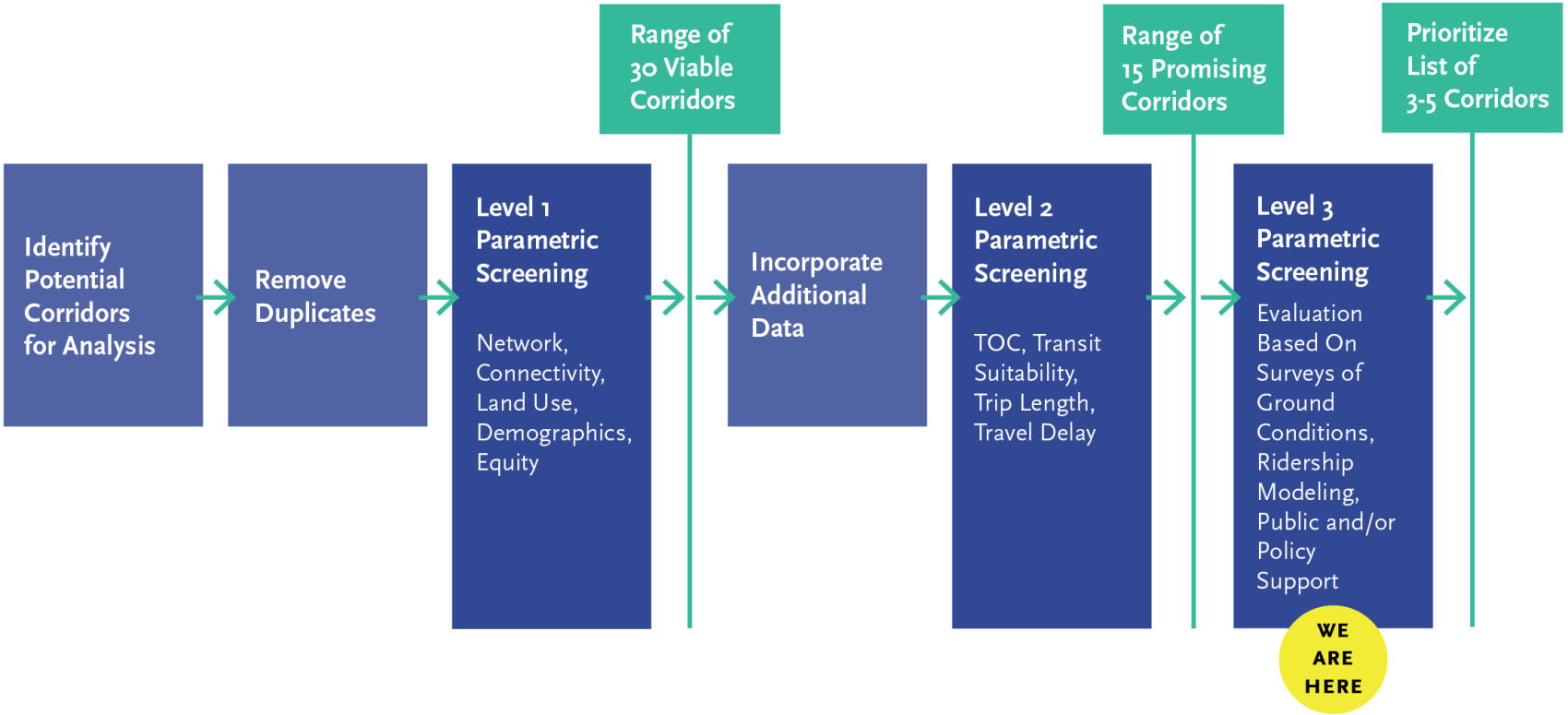
visioning BRT
BUS RAPID TRANSIT STUDY



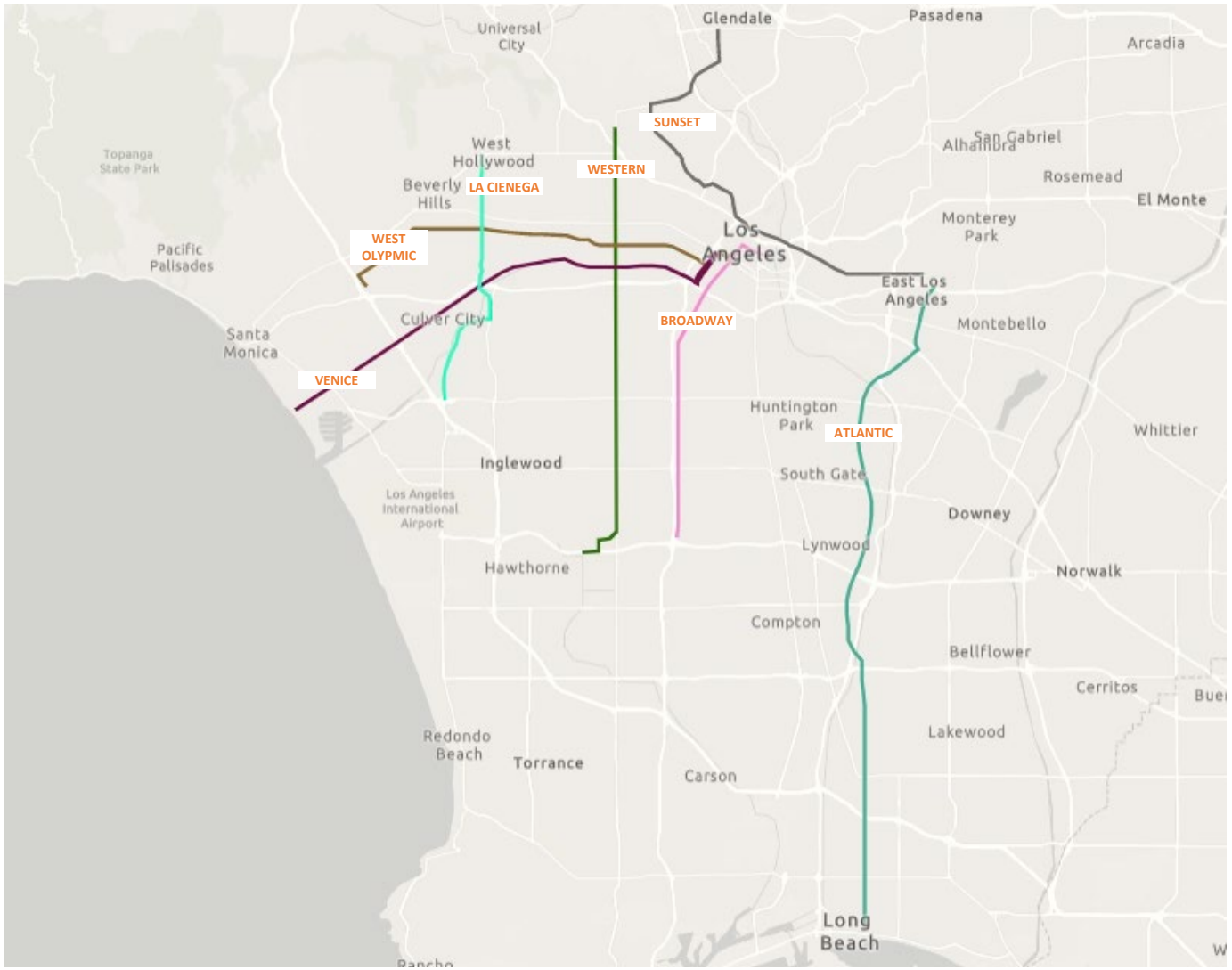
Metro

BRT Stations

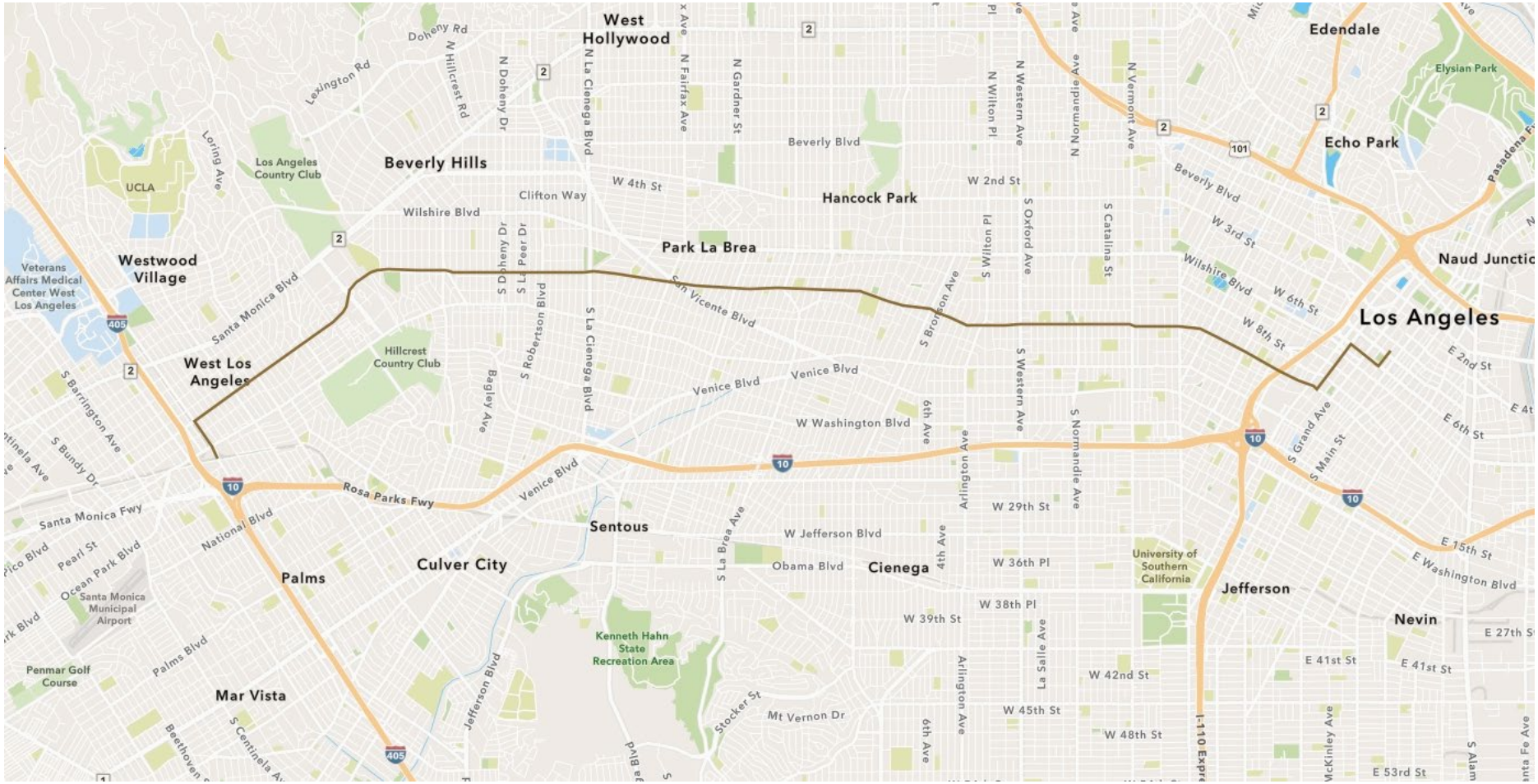
Corridor Prioritization Methodology



Top 7 Corridors – Map Overview



West Olympic



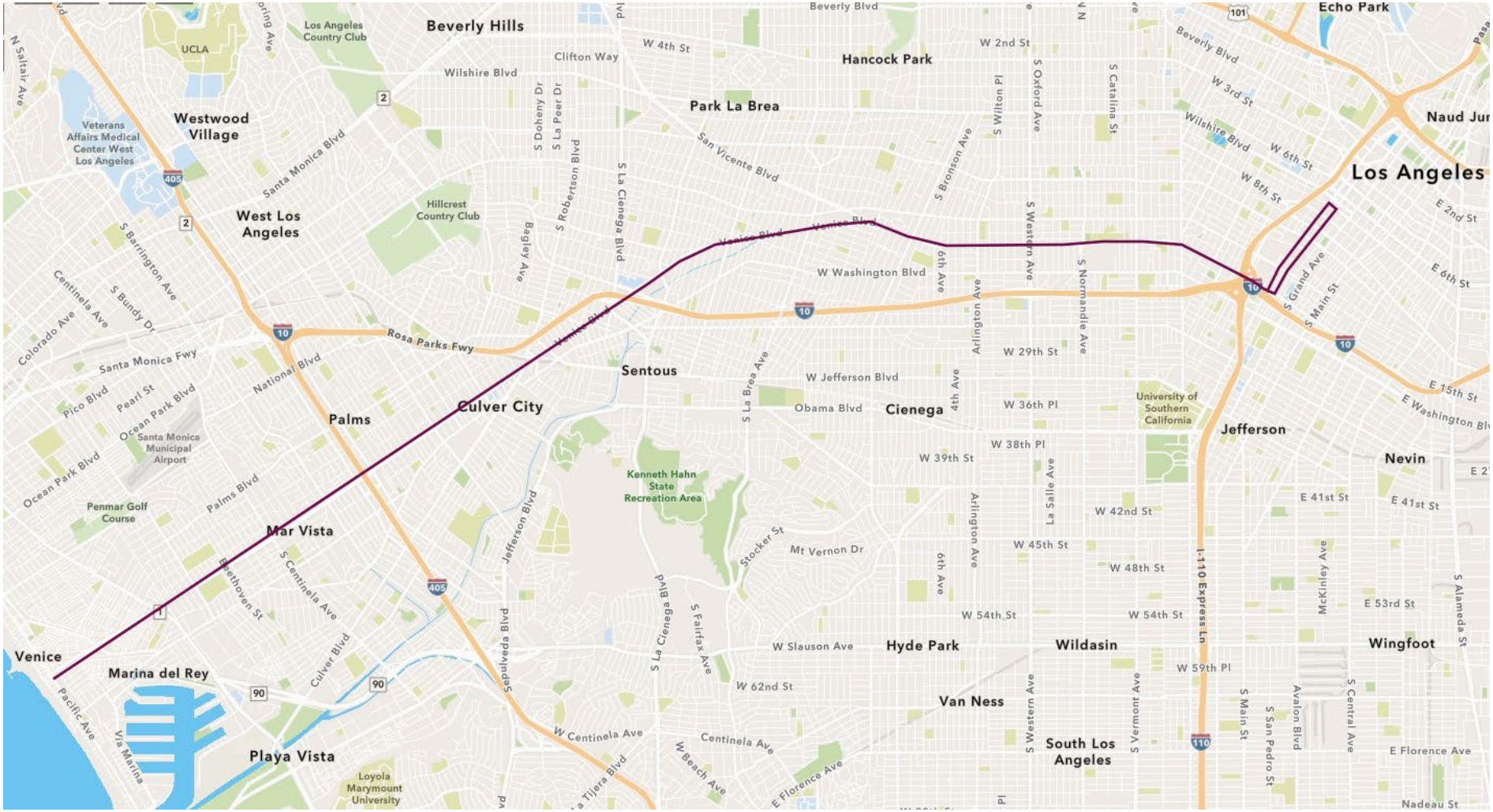
West Olympic

- Very high network connectivity
- Very high ridership
- High opportunity to build BRT-friendly infrastructure and realize travel time savings
- Parallel to and ½ mile from the Purple Line extension
- Potential to extend the corridor further west via Pico

Metro

Venice

visioning BRT
BUS RAPID TRANSIT STUDY



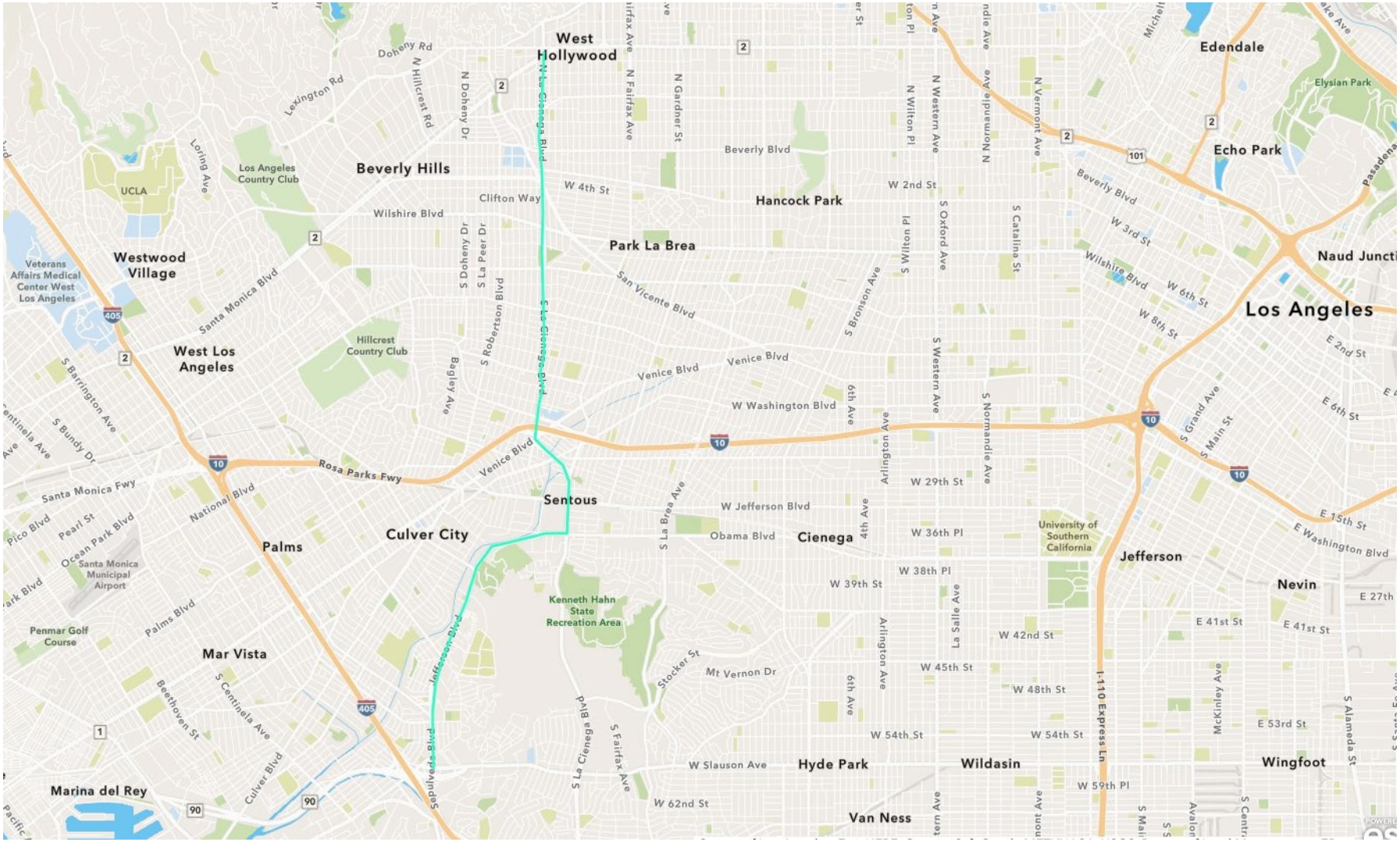
Metro

Venice

- Very high network connectivity
- Very high ridership
- High opportunity to build BRT-friendly infrastructure and realize travel time savings
- Pedestrian-friendly and street-oriented land uses
- Transit supportive policies including City of LA Community Plans and Culver City
- Strong transit-supportive policies along corridor
- Neighborhood sensitivity related to the Great Street Initiative

Metro

La Cienega



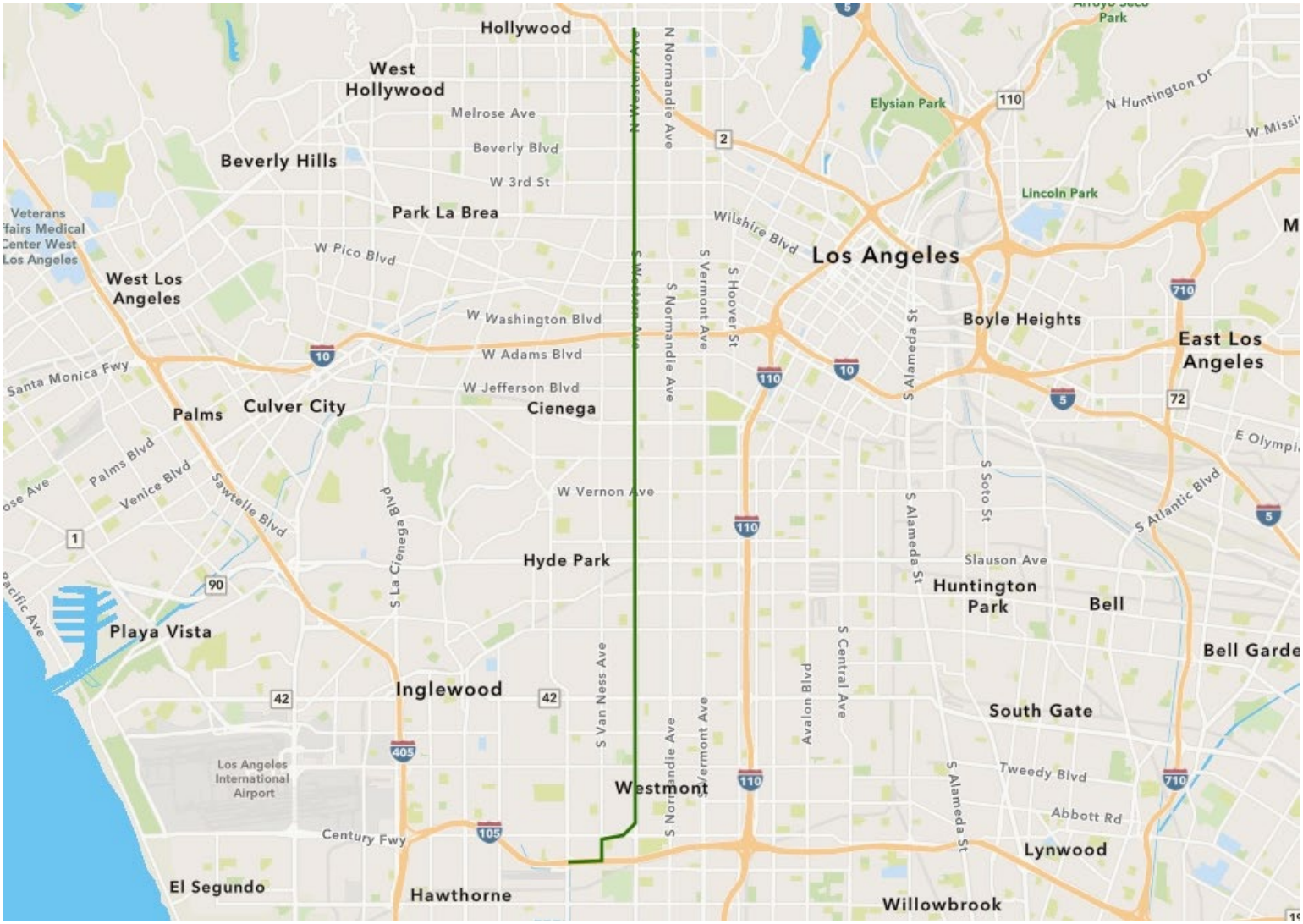
West Hollywood
Edendale
Elysian Park
Echo Park
Beverly Hills
Los Angeles Country Club
UCLA
Westwood Village
Veterans Affairs Medical Center West Los Angeles
West Los Angeles
Hillcrest Country Club
Park La Brea
Hancock Park
Naud Juncti
Los Angeles
Sentous
Culver City
Palms
Santa Monica Municipal Airport
Penmar Golf Course
Mar Vista
Marina del Rey
Kenneth Hahn State Recreation Area
Cienega
University of Southern California
Jefferson
Nevin
Hyde Park
Wildasin
Wingfoot
Van Ness
Beverly Blvd
Wilshire Blvd
Clifton Way
W 4th St
W 2nd St
W 3rd St
W 6th St
W 8th St
San Vicente Blvd
Venice Blvd
W Washington Blvd
Rosa Parks Fwy
Santa Monica Fwy
National Blvd
Santa Monica Blvd
Palms Blvd
W 29th St
W Jefferson Blvd
Obama Blvd
W 36th Pl
W 38th Pl
W 39th St
W 42nd St
W 45th St
W 48th St
W 54th St
W Slauson Ave
W 62nd St
W 59th Pl
E 2nd St
E 6th St
E 15th St
E Washington Blvd
E 41st St
E 53rd St
Mt Vernon Dr
Stocker St
Jefferson Blvd
Sepulveda Blvd
Culver Blvd
Beethoven St
S Centinela Ave
S La Cienega Blvd
S Fairfax Ave
S La Brea Ave
Arlington Ave
S Normandie Ave
S Western Ave
S Oxford Ave
S Catalina St
S Wilton Pl
S Bronson Ave
S Grand Ave
S Main St
S Alameda St
McKinley Ave
I-110 Express Ln
N Fairfax Ave
N Gardner St
N Wilton Pl
N Western Ave
N Normandie Ave
N Vermont Ave
N Hillcrest Rd
N Doheny Dr
S Doheny Dr
S La Peer Dr
S Robertson Blvd
Bagley Ave
Loring Ave
Lexington Rd
Doheny Rd
S Barrington Ave
S Bundy Dr
Pico Blvd
Pearl St
Ocean Park Blvd
Beethoven St
Pacific

La Cienega

- Provides high-capacity north-south network coverage on the Westside
- Transit supportive policies including City of LA Community Plans and Culver City
- Interest from Culver City and WSCOG
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings
- May overlap with future Crenshaw North project
- Low network connectivity
- Low ridership
- Low potential equity benefit

Metro

Western



Metro

Western

visioning BRT
BUS RAPID TRANSIT STUDY

- Very high equity benefit
- Connects to 4 existing rail lines; moderate network connectivity for other services
- Currently Metro's 5th highest ridership corridor with 28,000 average weekday riders
- Good mix of land uses and several TOC-supportive areas along corridor
- Runs through 3 City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies
- The City of Hawthorne and the unincorporated West Athens-Westmont community also has TOC-supportive policies in place
- High-priority corridor per LADOT
- Limited opportunity to build BRT-friendly infrastructure and realize travel time savings

Metro

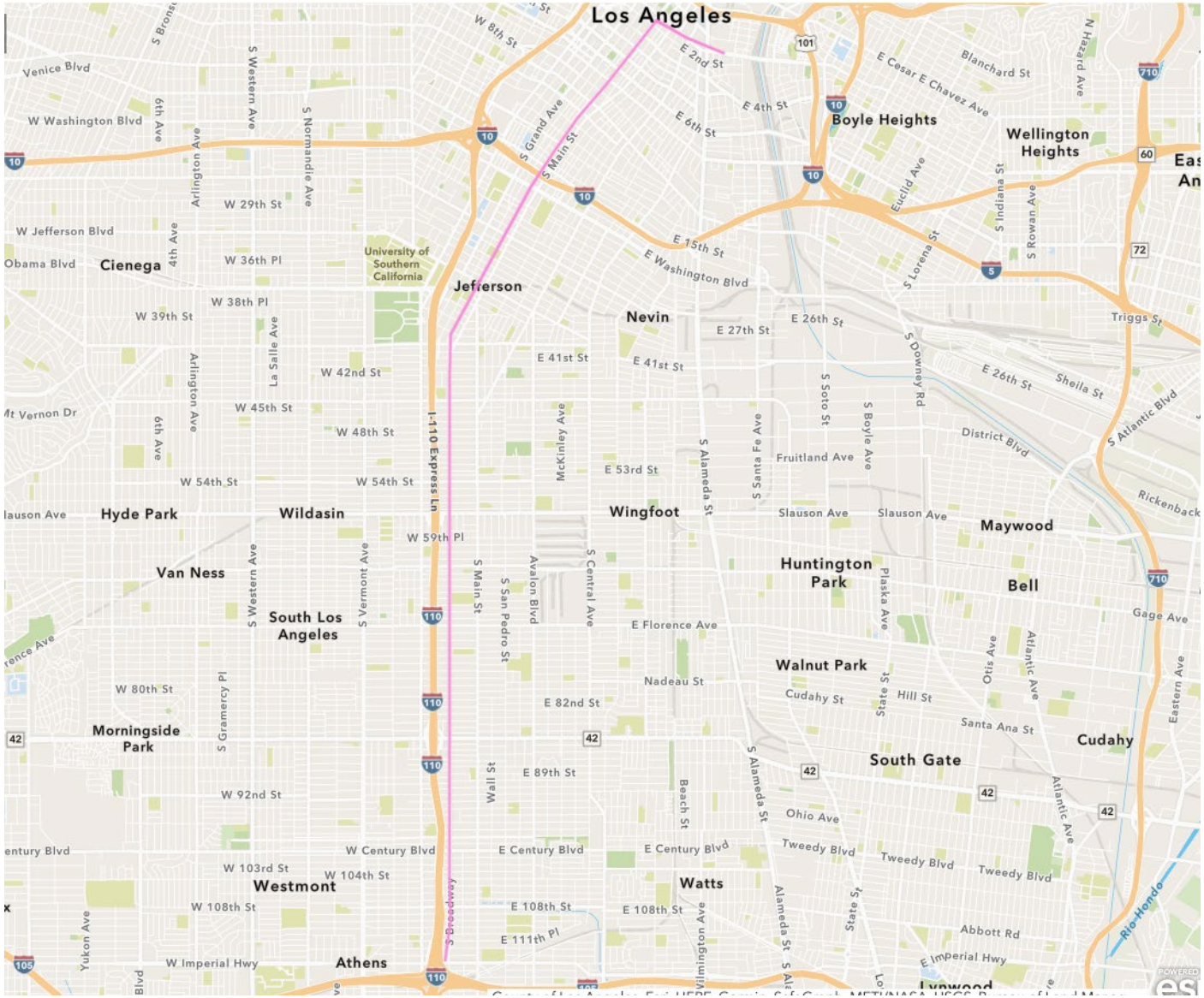
Cesar Chavez/Sunset

Cesar Chavez/Sunset

- Very high network connectivity
- Connects downtown Los Angeles with the San Fernando Valley
- Runs through 6 City of LA Community Plan areas which feature or are being updated to feature TOC and transit-supportive policies
- Moderate ridership
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings

Metro

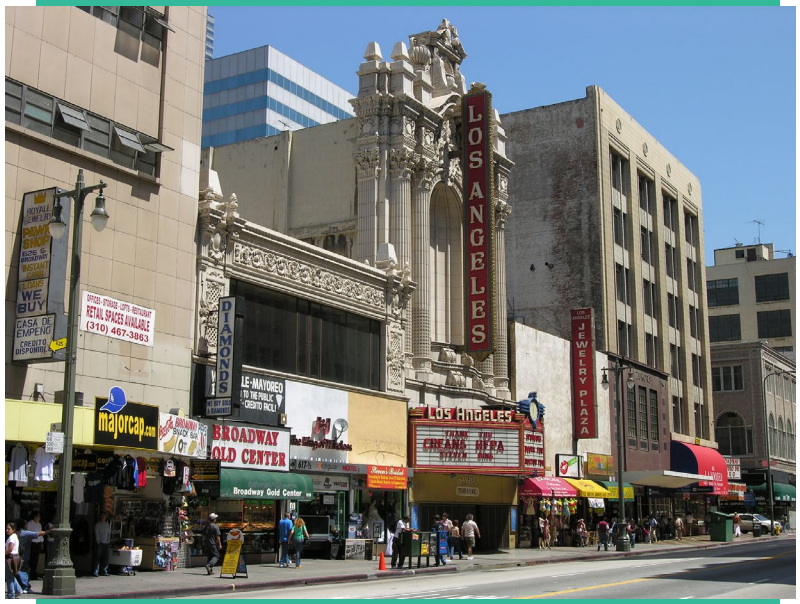
Broadway



Metro

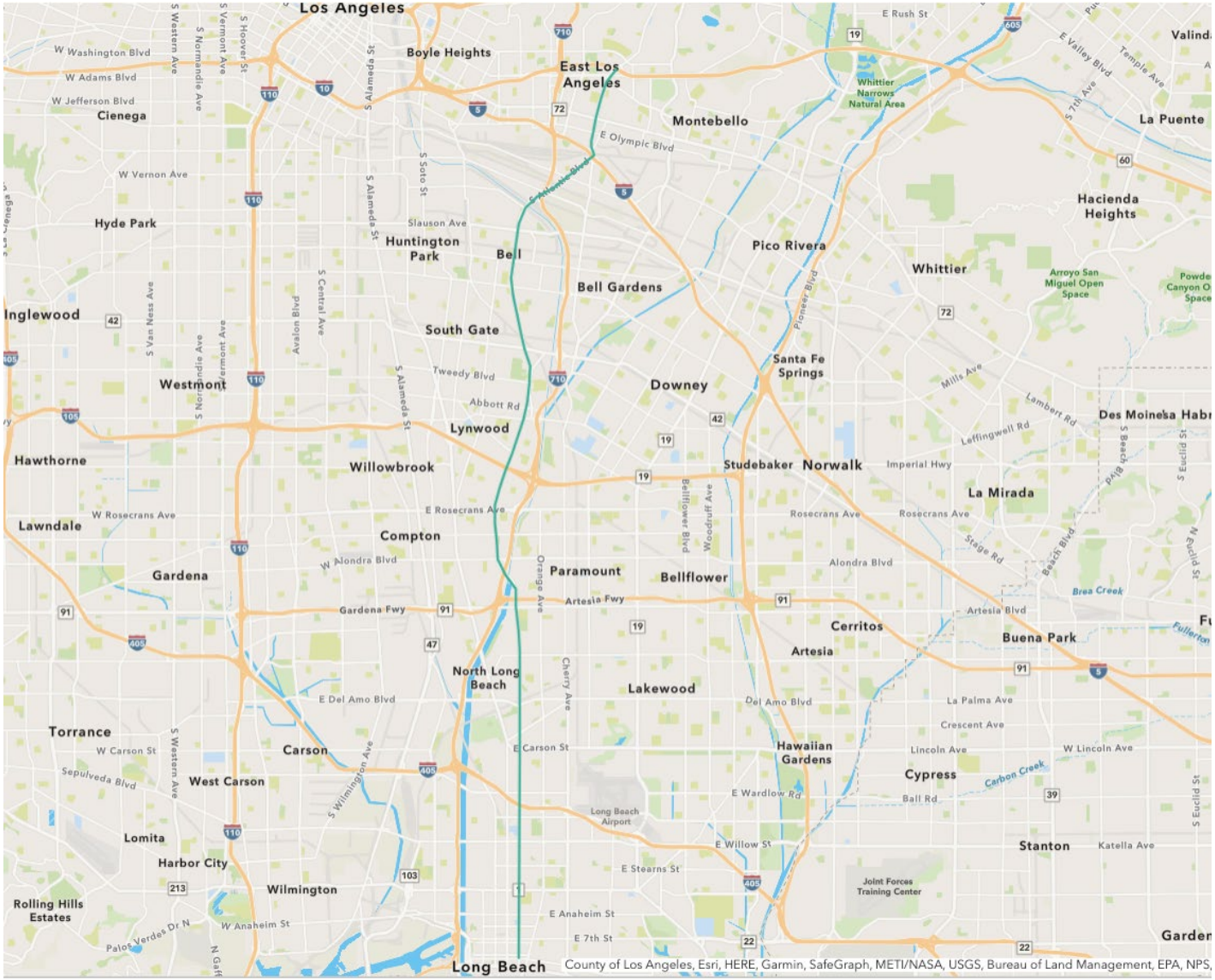
Broadway

- Very high network connectivity
- Very high equity benefit
- High-priority corridor per LADOT
- Runs through 2 City of LA Community Plan areas which feature TOC and transit-supportive policies
- Moderate ridership
- Moderate opportunity to build BRT-friendly infrastructure and realize travel time savings
- A future Alternatives Analysis could consider both Broadway and Figueroa, which closely parallel each other and perform comparably



Atlantic

visioning BRT
BUS RAPID TRANSIT STUDY



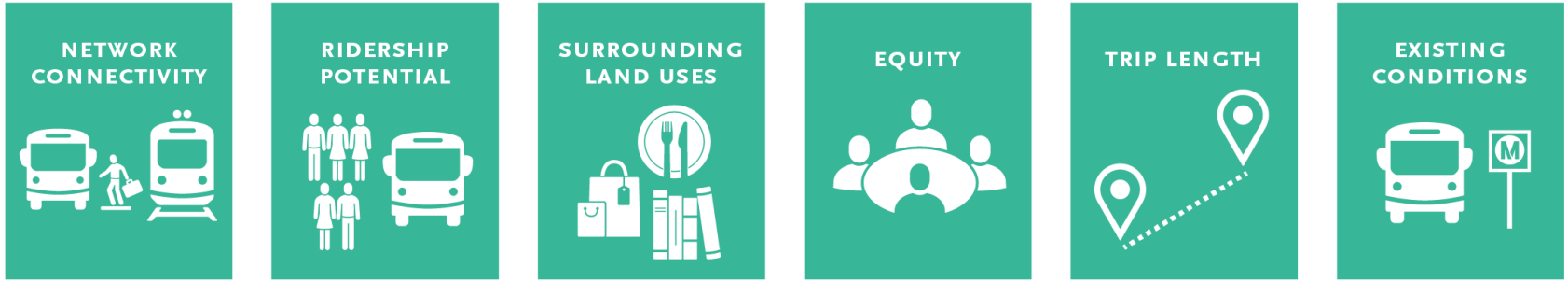
Metro

Atlantic

- Connects East LA to Long Beach
- Interest from the Gateway Cities COG
- Moderate network connectivity
- Moderate activity for time savings
- Wide sidewalks provide good opportunity to build stations and passenger amenities
- Low ridership, but does provide access to industrial jobs for lower-income workers, addressing equity goals

Future BRT Network

Build upon strong candidate corridors identified in a multi-step screening process that used the following criteria:



Utilize a gap analysis that:

> Considers existing and planned rail/BRT network

> Identifies gaps in coverage

> Connects future BRT corridors to one another and the Metro rail network

> Leverages corridors identified and screened through the project study

Metro

Contact Us

Thank you!

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Deputy Project Manager
BackstromP@Metro.Net

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2021-0147, **File Type:** Motion / Motion Response **Agenda Number:** 16.1.

PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

Motion by:

DIRECTORS BONIN, SOLIS, AND HAHN

Related to Item 16: BRT Vision & Principles Study

Measure M catalyzed Metro's Bus Rapid Transit (BRT) network by funding multiple lines identified by subregions through a bottoms-up planning process and by creating a new countywide BRT program. The BRT Vision & Principles Study advances Measure M's commitment to build out a unified countywide BRT network. While ambitious, the proposed pace of one BRT project per decade is simply not fast enough to meet the region's mobility, sustainability, and equity goals. Bus riders stuck in traffic today deserve rapid transit now. Metro needs a BRT Early Action Program to accelerate the benefits of BRT to more corridors more quickly.

In parallel with the BRT Vision & Principles Study, Metro completed and has begun implementing the NextGen Bus Plan to realign and speed up bus service systemwide. NextGen's Tier 1 bus network provides high-frequency, all-day service along Metro's highest ridership routes. The NextGen Speed & Reliability Working Group has already begun delivering bus priority projects on particularly congested bus routes. These routes are also targeted for customer experience improvements, including bus stop amenities, real-time arrival information, and all-door boarding. These features are a core subset of the "BRT-Lite" standards in the Vision & Principles Study.

Metro should align its BRT work program with NextGen and the Better Bus Initiative to deliver bus improvements at scale as quickly as possible across the entire network. This approach should roll out BRT features systemwide whenever feasible, starting with high-ridership lines. Where there is alignment between the Vision & Principles strategic BRT network and NextGen's Tier 1 network, the BRT program should develop early action projects that can be delivered immediately by leveraging Measure M with other Metro and municipal funds. Metro should pilot this early action/quick build approach on the Top 7 Corridors identified in the Vision & Principles Study.

SUBJECT: AMENDMENT TO BRT VISION & PRINCIPLES STUDY

RECOMMENDATION

We, therefore move, that the Board adopt the recommendations of the BRT Vision & Principles Study staff report (Item 16).

WE, FURTHER, MOVE that the Board direct the Chief Executive Officer to report back to the Board in June 2021 with a BRT Early Action Program that includes the following:

1. Advancing the Broadway corridor as a first decade Measure M project, as recommended by staff.

2. Identifying the essential elements of a “quick build” approach to BRT, based on the BRT Vision & Principles Study and experience from the NextGen Bus Speed & Reliability Working Group.

3. Consulting with Metro Operations, the Office of Equity and Race, local jurisdictions, and municipal operators to identify which of the Top 7 Corridors would be suitable for a quick build approach, including consideration of parallel NextGen Tier 1 corridors. **Hahn Amendment:** Additionally, evaluate extending the Western Ave BRT corridor to San Pedro.

4. Pursuing a near-term delivery strategy for each of the identified early action corridors, with emphasis on quick build transit priority improvements and leveraging city and county partnerships to provide BRT features, including pavement, striping, signal priority, and street furniture.

5. Systemwide implementation of All Door Boarding, starting with NextGen Tier 1 lines.

6. Estimated costs and staffing needed and opportunities to leverage Measure M dedicated Countywide BRT funding to accomplish the above work.

###

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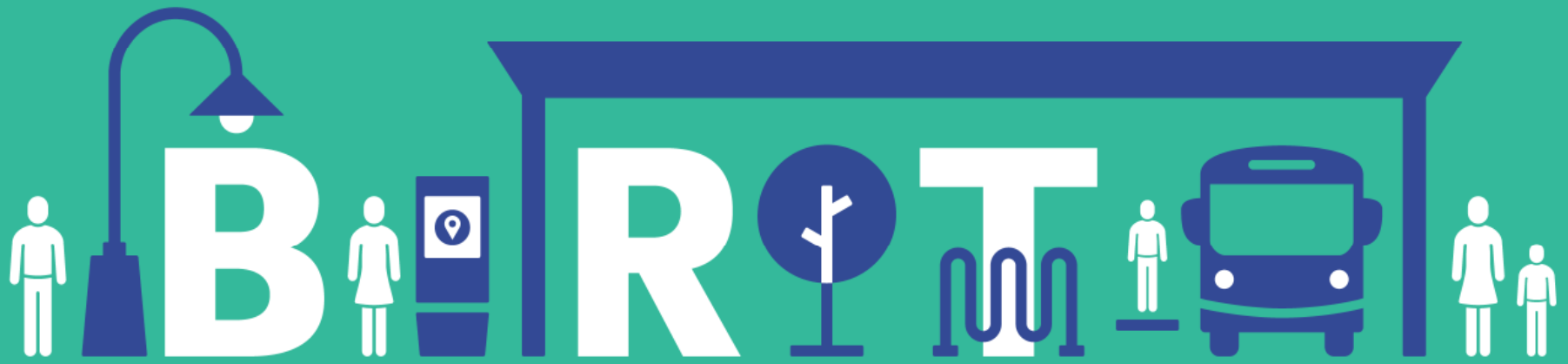


visioning BRT

BUS RAPID TRANSIT STUDY

Planning & Programming Committee

March 17, 2021

Metro

Visioning BRT Study Overview

Study Purpose - Consistent with Measure M Countywide BRT Expansion Guidelines

- Define BRT
- Evaluate potential BRT corridors
- Provide the foundation for the assignment of Measure M BRT program funds

Study Outcomes

- BRT Standards
- Design Guidelines
- Identify and prioritize BRT corridors

What We Heard

- Connectivity is essential
- Coordinate with municipal operators and cities
- Benefits of BRT not well understood
- Leverage Metro policies
- Operational and design details should be sharpened
- The fundamentals matter

Metro

BRT Standards

Provides the foundational definition of BRT

- Tiered to provide flexibility
- Use both prescriptive- and performance-based criteria

- Dwell Time
- Speed
- On-Time Performance / Reliability
- Headway
- All-Door Boarding
- Intersection Priority (TSP)
- Dedicated Lanes
- Branding
- Station Amenities

Metro

BRT Design Guideline Manual

BRT Operating Characteristics

BRT Running Ways

BRT Branding

Integration of TOC

BRT ITS Systems

BRT Stations / Platforms

Metro

Top 5 BRT Corridors

Corridor Prioritization

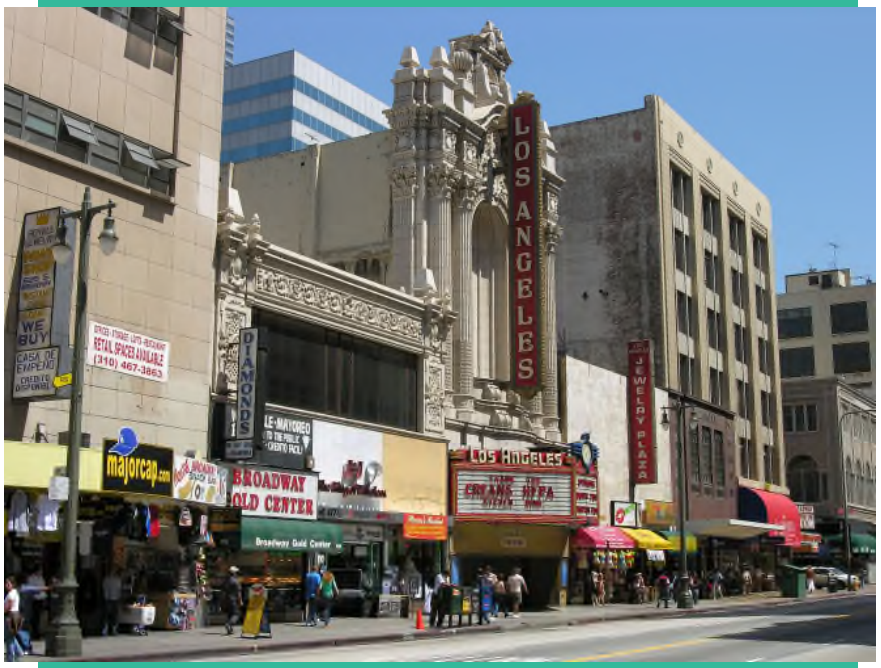
- Three-Step Screening Process
  - Demographics
  - Connectivity
  - Land Use
  - Equity
  - TOC
  - Transit Suitability
  - Trip Length
  - Travel Delay
  - Ridership
  - Field Checks
  - Public and/or Policy Support

Recommended Top Corridor

visioning BRT
BUS RAPID TRANSIT STUDY

Broadway - 1st St to Imperial Hwy

- High network connectivity
- High equity score
- Next Gen Tier 1 corridor with five-minute frequencies
- Identified need to address bus delays due to congestion
- Opportunity to leverage planned city initiatives
- A future Alternatives Analysis could consider parallel corridors on both Figueroa and Main



Next Steps

- Continued coordination with current BRT corridor projects to ensure consistent application of standards and design guidelines
- Further refinement of the design guidelines into design criteria
- Return to the Board with a programming recommendation to advance the Broadway corridor into project development

Metro

File #: 2020-0902, **File Type:** Agreement **Agenda Number:** 17.

PLANNING AND PROGRAMMING COMMITTEE
MARCH 17, 2021

SUBJECT: EXPO/CRENSHAW STATION JOINT DEVELOPMENT AND FIRST/LAST MILE PLAN

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

1. AUTHORIZING the Chief Executive Officer to execute an amendment to the Exclusive Negotiation Agreement and Planning Document with WIP-A, LLC, a wholly-owned subsidiary of Watt Companies, Inc., and the County of Los Angeles to extend the term for 12 months, and provide for an additional 12-month administrative extension, which agreement is in regards to the joint development of 1.77 acres of Metro-owned property and 1.66 acres of County-owned property at the Expo/Crenshaw Station in partnership with West Angeles Community Development Corporation; and

2. ADOPTING the Expo/Crenshaw First/Last Mile Plan.

ISSUE

Metro, the County of Los Angeles (County) and WIP-A, LLC, a wholly-owned subsidiary of Watt Companies, Inc., a California corporation (Developer) are parties to an Exclusive Negotiation Agreement and Planning Document (ENA) regarding the development of a mixed-use project (Project) adjacent to the Expo/Crenshaw Station (See Attachment A - Site Map) which will be delivered and operated in partnership with West Angeles Community Development Corporation (WACDC). An extension of the ENA term, which is set to expire in April 2021, is necessary to allow the Developer sufficient time to secure Project financing, fully entitle and environmentally clear the Project with the City of Los Angeles (City) and finalize negotiations of the Joint Development Agreement (JDA) and Ground Lease (GL) terms, which terms shall be subject to Metro Board of Directors (Metro Board) and County Board of Supervisors (County Board) approval.

Additionally, staff have completed a First/Last Mile (FLM) Plan for the E Line (Expo) and Crenshaw/LAX Transit Project's Expo/Crenshaw Stations. The FLM Plan proposes streetscape and roadway improvements in the area surrounding this key transfer point, focusing on enhancing safety, comfort, and access.

BACKGROUND

Following a competitive solicitation process, in late 2017/early 2018, the Metro Board and County Board approved entering into a six-month ENA with the Developer for the joint development of Metro- and County-owned parcels (collectively, the Site) located adjacent to the Expo/Crenshaw Station. The six-month ENA provided an interim period before executing a long-term ENA so that the community could provide input on the Project and the Developer could identify a community-based organization to partner with on the development of the Project. In the spring of 2018, the Developer entered into an agreement with West Angeles Community Development Corporation (WACDC) to partner in the execution and operation of the Project. In September 2018 the County and Metro Boards took actions authorizing the execution of a 14-month ENA with the Developer and the County. In November 2019 the Metro Board approved a 12-month ENA extension with the ability to administratively extend an additional four months.

Metro's Transit Oriented Communities (TOC) Demonstration Program which was launched in 2015 identified changes to the Joint Development (JD) process as well as a "TOC Toolkit" to promote a more expansive approach to integrating transit into surrounding communities. The TOC Demonstration Program included an emphasis on examining how to leverage JD projects to advance other goals such as improving safety and access to transit from the surrounding community. The Expo/Crenshaw Station was selected as one of the TOC Demonstration Program sites, and in 2019, staff identified an opportunity to conduct a focused FLM plan in collaboration with the proposed joint development Project adjacent to the Expo/Crenshaw Station. As required under the ENA, the Developer contributed $50,000 in funding for the FLM Plan.

DISCUSSION

The Developer has diligently performed its obligations under the ENA including performing extensive, on-going community outreach, refining the conceptual development plan, and submitting the Project for entitlements to the City as further described below.

Community Outreach
After the 14-month ENA was executed, WIP-A, LLC and WACDC held several meetings with local residents, community organizations and government officials to provide updates on the proposed Project. An online survey aimed at gathering input on the Project was circulated and over 200 responses were received. Through 2020, WIP-A, LLC and WACDC conducted outreach to more than a dozen community groups including neighborhood councils, block clubs and other local stakeholder organizations.

Concept Development
Metro and the County, with support from an urban design consultant, reviewed the Developer's Project plans and provided feedback on the design. The review focused on advancing the community vision as outlined in the Metro Board-adopted Expo/Crenshaw Station Joint Development Guidelines, responsiveness to community input received, and ensuring compatibility between the Project and Metro transit infrastructure. In April 2020, Metro and the County approved the Project's conceptual design.

The current ENA contemplates a project with:

1. At least four hundred (400) residential for-rent units, at least twenty percent (20%) of which shall be designated as affordable for households earning between thirty and eighty percent (30-80%) of Area Median Income (AMI) with at least fifteen percent (15%) total units designated as affordable for households earning at or below fifty percent (50%) of AMI;
2. At least forty thousand (40,000) square feet of commercial/community space, including a grocery store; and
3. Parking limited to the greater of one (1) parking space for each market-rate residential unit plus one-half (½) parking space for each affordable residential unit, and three (3) parking spaces for each one thousand (1,000) square feet of commercial/retail space or community-serving space.

In late 2019, some members of the public and the Metro Board expressed an interest in the Developer increasing the number of income-restricted residential units in the Project. The Developer is exploring the feasibility of restricting an additional 30% of the units to very low to moderate income households. As an incentive to making at least 50% of the Project units income-restricted, in October 2020, the County Board approved a motion that allocated $2M in Proposition A funds to the Project. The Developer will pursue funding sources to support additional affordable units which may require adjustments to unit sizes, total unit count and number of parking spaces. Staff will present the final Project scope for Metro Board and County Board consideration once the recommended JDA and GL terms are finalized.

Entitlements

The Developer submitted its application for land use entitlements and California Environmental Quality Act (CEQA) clearance to the City of Los Angeles in September 2019. Metro JD Policy and applicable environmental laws do not allow the Metro Board to approve JDA and GL terms nor authorize Metro to enter into related agreements until a project has received an environmental clearance under CEQA. The recommended 12-month ENA term extension (with an ability to extend an additional 12 months at staff's determination) will allow the Developer to complete the entitlements process, environmentally clear the Project, and begin to assemble the Project's financing sources. Metro staff, with support from a financial consultant and County Counsel, have been diligently negotiating a term sheet outlining the JDA and GL terms, subject to Metro and County Board approval.

First/Last Mile Plan

The Expo/Crenshaw FLM Plan differs slightly from previous Metro FLM plans in that it focuses more closely on the area immediately proximate to the Expo/Crenshaw Station and the Site, utilizing quarter-mile and one-mile radii for walking and biking projects, respectively. The FLM Plan also recognizes and builds upon the prior planning work conducted in the area in anticipation of the Crenshaw/LAX Transit Project. Key proposed improvements include elements to improve pedestrian and bicyclist comfort, safety, and connectivity in reaching the stations. Comfort-oriented improvements include additional shade trees and pedestrian lighting, and safety improvements such as enhanced crosswalks and bulb-outs. Bicycle facilities, including protected bike lanes, are also recommended on key access streets where safe bicycling facilities are not present.

FLM Plan recommendations are the culmination of a focused outreach process. In the winter of 2019 with the support of WACDC, Metro staff held three roundtable meetings with local youth, representatives from neighborhood organizations, and bicycle and pedestrian advocates to discuss local barriers and identify priorities for improvements. Metro staff also held an interactive "pop-up" event in February 2020 at the Crenshaw Farmers Market and distributed an online survey to gather input. Review and coordination with City of Los Angeles staff took place in 2019 and 2020 to ensure the FLM Plan supports the City's active transportation priorities. The full FLM Plan is included as Attachment B.

Equity Platform

Consistent with the Equity Platform pillar "listen and learn," the Project has gone through a lengthy community engagement process beginning with the creation of Development Guidelines which set the vision for these publicly-owned properties. The Developer continues to maintain a commitment to engaging with stakeholders and has refined the Project in response to feedback. The FLM Plan's final recommendations were heavily informed through community engagement. Both the joint development Project and eventual implementation of the FLM Plan present opportunities to "focus and deliver" by adding much needed, transit-oriented affordable housing and other community benefits in the Crenshaw community.

DETERMINATION OF SAFETY IMPACT

Approval of this item will have no adverse impact on safety as it only seeks a time extension for the ENA period during which no improvements will be constructed. An analysis of safety impacts will be completed and presented to the Metro Board for consideration if and when negotiations result in proposed terms for a JDA and GL.

FINANCIAL IMPACT

Funding for joint development activities related to the ENA and the Project is included in the adopted FY21 budget in Cost Center 2210, Project 401045.

Impact to Budget

There is no impact to the FY21 budget. The ENA executed in October 2018 required the Developer to pay Metro a non-refundable fee of $25,000, as well as a $50,000 deposit to cover third-party expenses. The Developer must replenish that deposit when it reaches a balance of less than $25,000.

Adoption of this FLM Plan has no impact to the budget. Staff will continue to work with City of Los Angeles to identify suitable funding opportunities for implementation of Plan-recommended projects.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

These recommendations support the Strategic Plan Goal to "enhance communities and lives through mobility and access to opportunity", specifically Initiative 3.2 which states "Metro will leverage its transit investments to catalyze transit-oriented communities and help stabilize neighborhoods where

these investments are made." The proposed Project will deliver several community benefits, including transit-accessible housing and new commercial/community space.

The FLM Plan supports the Strategic Plan Goal 2 to "deliver outstanding trip experiences" by recognizing that the trip experience includes the time traveling to and from transit stations. The Plan recommends projects that make those trip experiences safer, more comfortable, and more accessible. The FLM Plan also supports Goal 4, "Transform LA County through collaboration and leadership." By adopting the FLM Plan, Metro can help facilitate implementation by local jurisdictions.

ALTERNATIVES CONSIDERED

The Board could choose not to extend the ENA term, in which case the ENA would expire in April 2021. Metro could then choose to solicit a new developer and proposal for the Site. Staff does not recommend this alternative because the Developer, WACDC, Metro, and the County have worked diligently and in good faith as partners to advance the Project. Furthermore, the recommended actions build upon the significant community input and procurement process that has transpired thus far. Additionally, the Board could decide to not adopt the FLM Plan. This is not recommended as previous Board action (Motion 14.1) directs FLM projects to be incorporated into transit corridor project delivery.

NEXT STEPS

Upon approval of the recommended actions, staff will execute an amendment to the ENA extending the term for 12 months, with the ability to administratively extend the term an additional 12 months at staff's determination. Metro staff, with support from a financial consultant, will continue working with the Developer and the County to finalize negotiations for a JDA and GL. Following the Developer's completion of the entitlements and environmental clearance process with the City of Los Angeles and before the end of the ENA period, staff will return to the Metro Board and County Board with recommended JDA and GL terms. The Developer and WACDC, together with Metro and County staff, will continue to engage with the community as the Project advances. During the ENA period the Developer will begin to assemble financing for the Project including affordable housing resources. Staff will continue to work with the City of Los Angeles to identify suitable funding opportunities for implementation of the FLM Plan recommendations and will conduct further outreach to the community as needed. Staff will also provide updates to the Board to the extent that the FLM Guidelines are applicable to the Expo/Crenshaw FLM Plan.

ATTACHMENTS

Attachment A - Site Map
Attachment B - Expo/Crenshaw Station First/Last Mile Plan

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Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

SITE MAP

SITE A

Owner: Los Angeles County
Site: 1.66 acres
Use: County Probation Department

SITE B

Owner: Metro
Site: 1.77 acres
Use: Construction staging

ATTACHMENT B

Next stop: our healthy future.

Expo/Crenshaw First/Last Mile Plan

August 28, 2020

Metro

Acknowledgments

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Preface

The Expo/Crenshaw First/Last Mile Plan presents key pathways for improving safety and access to the Metro station, along public streets within the City of LA. Plan context, graphics, and narrative are designed to be used in support of funding applications from a variety sources, such as active transportation and streetscape grants. The recommended projects in this plan are high level concepts - specific design elements are not included nor specified. Further design investigation and ongoing community conversations are critical. Likewise, it is important that ownership, installation, and maintenance responsibilities of projects and project elements are established as project design moves forward. Further coordination among the City of Los Angeles, Metro, and community stakeholders will be necessary to identify and move forward priority first/last mile projects. Since projects are located on public streets, the City of Los Angeles should take the lead on project implementation moving forward.

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Want more?

Appendix A: The Toolkit
Appendix B: Cost Estimate Detail
Appendix C: Existing Plans & Projects
Appendix D: Outreach Summary

Introduction

Introducing the Project Area.

The **Expo/Crenshaw station** is uniquely situated as a key transfer station, connecting regional trips to and from **LAX, Santa Monica, Downtown Los Angeles,** and farther to other key employment centers and destinations throughout the City.

The Expo/Crenshaw station will be the terminus of the Crenshaw/LAX line, currently under construction. Once open, the light rail line will run from the existing E Line (Expo Line) at Crenshaw and Exposition Boulevards, 8.5 miles south to the C Line (Green Line). The line will serve the cities of Los Angeles, Inglewood, El Segundo and parts of unincorporated Los Angeles County. The Expo/Crenshaw station will be a major transfer point for Crenshaw/LAX Line, E Line (Expo Line), and bus riders. This Plan identifies and prioritizes First/Last Mile (FLM) improvements to enhance the transit experience for all people.

The Expo/Crenshaw station will draw new local & regional riders.

The Expo/Crenshaw station is located near several regional destinations. These key attractions mean that many people recreating, shopping, working, and living in the area will be traveling through this station in the future.

Crenshaw Crossing

The Crenshaw Crossing project proposes a transit oriented, mixed-use community adjacent to the Expo/ Crenshaw station. With new community and commercial space, the areas around the transit station will be activated and energized.

West Angeles Church

The West Angeles Church currently occupies approximately 3.5 acres just north of the Expo/Crenshaw station. With a congregation of 24,000 people, this regional destination will also contribute to the activity at the station, for churchgoers.

Commercial Center

The commercial area to the south of the station includes big-box stores such as Walgreens, Big 5, Verizon, Chase, Starbucks, etc. Access to these stores from the station will require intuitive wayfinding as both patrons and store employees may pass through the station on their way to the commercial center.

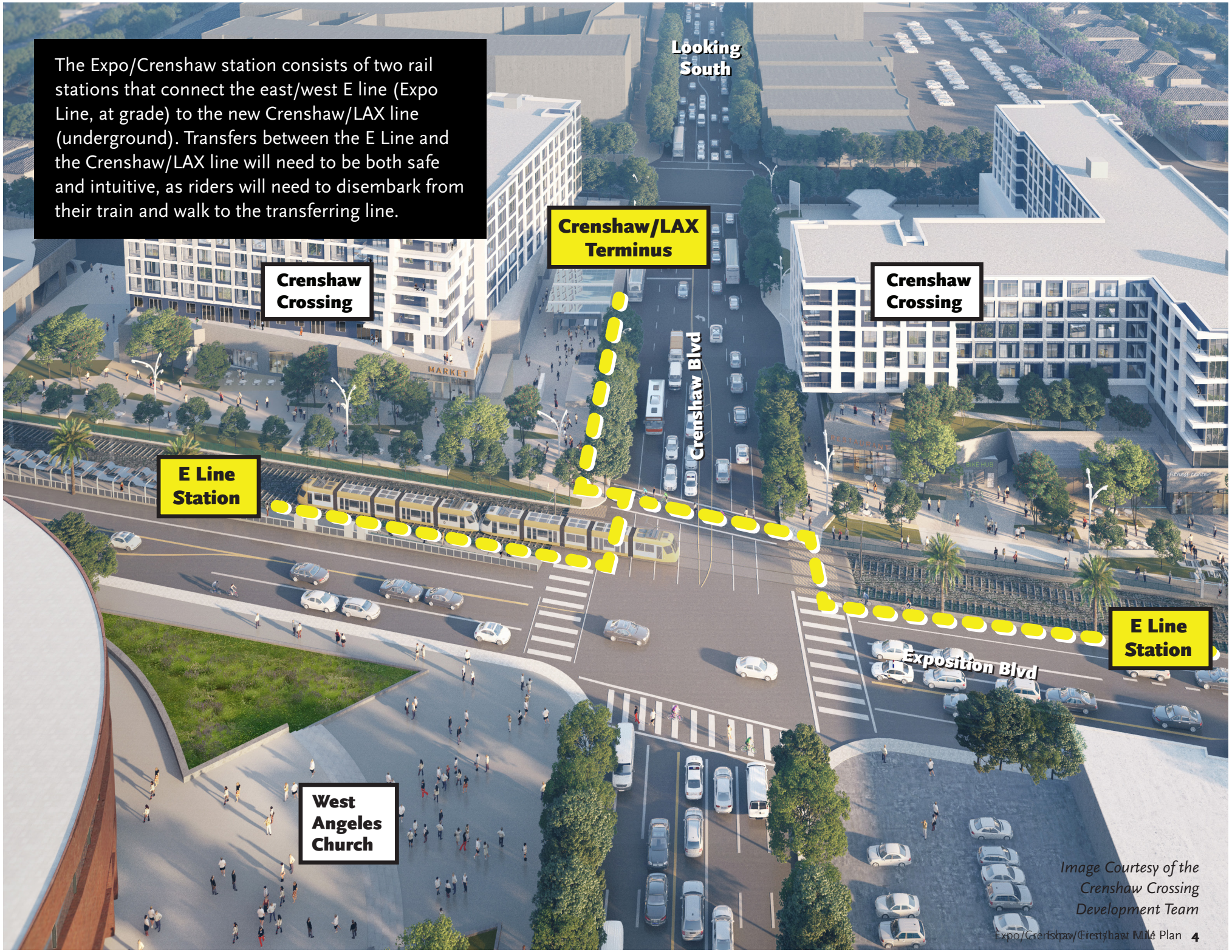


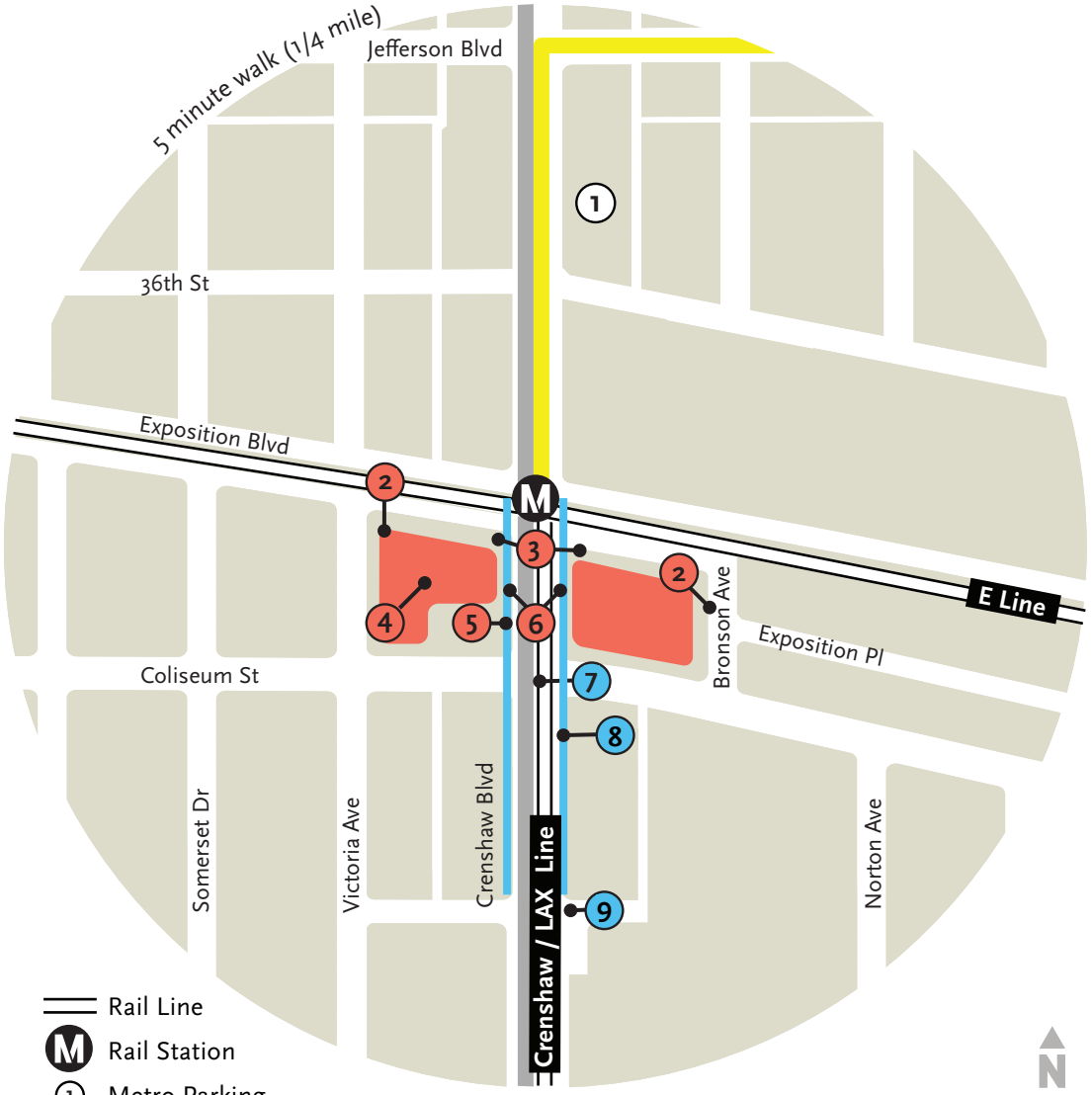
Image Courtesy of the Crenshaw Crossing Development Team

Significant planning has already been completed. We've integrated these ideas into the Plan.

Over the last two decades, a significant amount of planning has been completed for the area surrounding the Expo/Crenshaw station. The increased attention to the area is indicative both of the need for enhancements and an energetic and activated community. Further description of all plans can be found in Appendix C.

Relevant plans and projects include:

- **Crenshaw Blvd Streetscape Plan**
- **Crenshaw Corridor Specific Plan**
- **Destination Crenshaw**
- **Expo/Crenshaw Joint Development Guidelines & proposed Crenshaw Crossing project**
- **Great Streets Challenge Grant**
- **Metro NextGen Study**
- **Metro Active Transportation Strategic Plan**
- **Metro First/Last Mile Strategic Plan**
- **Prop 1C Improvements**
- **Vision Zero Crenshaw Safety Improvements**
- **West Adams/Baldwin Hills/Leimert Community Plan**



Prop 1C Improvements

Improvements include elements like: new trees, pedestrian lighting, sidewalk repairs, & curb ramps

Crenshaw Crossing Project

2. Drop-off zone
3. Street vacation
4. Bike hub
5. Future additional portal to Crenshaw/LAX line
6. Bus turnouts

Crenshaw Blvd Streetscape Plan

Crenshaw/ LAX Transit Project

7. New crosswalk & dual curb ramps
8. New street trees
9. New single curb ramps

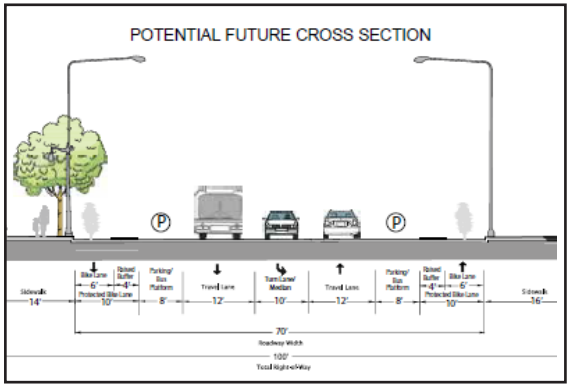
Let's Dive into Some of Those Plans.

Crenshaw Crossing Project

The Crenshaw Crossing rendering above shows the southwest corner of Exposition Blvd and Crenshaw Blvd.

The Metro Joint Development sites, in partnership with the County of Los Angeles, are located south of Exposition Blvd, on either side of Crenshaw Blvd. The western site is currently the LA County Probation Department Office, while the eastern site is being used as a staging area for the Crenshaw/LAX light-rail project. The sites include a set of buildings and spaces with mixed uses, consisting of residential over commercial and community space, and the Metro station entrance portal (see image of the proposed project, left). The new development will provide a key connection for transit riders who are transferring between the E Line (Expo Line) and the Crenshaw/LAX Line. Transfers between the two lines will require coordination and enhanced safety measures for the high pedestrian volumes anticipated through the Crenshaw Blvd / Exposition Blvd intersection.

Crenshaw Boulevard Streetscape Plan



The Crenshaw Blvd Streetscape Plan details roadway reconfiguration concepts and recommended streetscape improvements along Crenshaw Blvd between the 10 Freeway and 79th St. Although recommendations vary throughout the corridor, the design concepts establish "unifying streetscape elements that are intended to tie the corridor together visually, and unique district streetscape elements that differentiate the corridor's many distinct neighborhoods." The Crenshaw Blvd Streetscape Plan describes community support for a protected bicycle facility along Crenshaw Blvd, north of 48th St. Significant right-of-way changes would need to occur to accommodate a protected bicycle lane (see illustration from the Streetscape Plan, left).

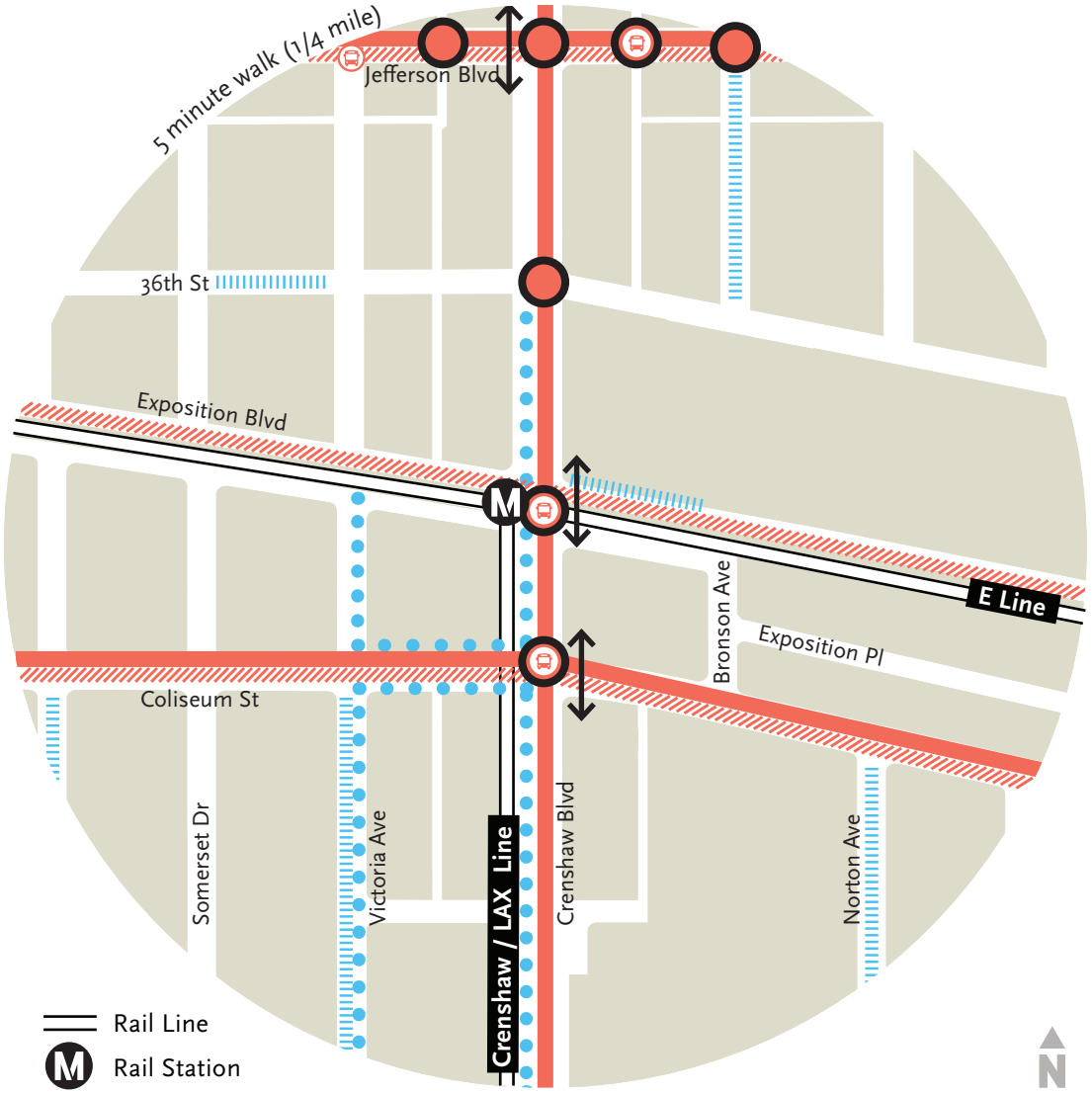
Further description of all plans can be found in Appendix C.

Summing it Up.

Existing walking, biking, and "rolling" conditions were studied to understand barriers and opportunities for improvement, relating to the First/Last Mile. The First/Last Mile refers to the parts of an individual's transit trip, before and after boarding or disembarking from the Metro line. While bus and rail services often form the core of a trip, riders complete the first and last portion on their own, for example by walking, biking, driving, or rolling themselves to and from the nearest station. This is referred to as the First/Last Mile.

The analysis looked at community destinations, the transit network, safety, pedestrian amenities, street conditions, and the bicycle network. In the station area, existing signalized crossings are critical in providing safe crossings, especially across east/west thoroughfares. Shade and a mature tree canopy are present on some residential streets, but absent on commercial corridors. East/west streets around the station often act as barriers to north/south movement, as there are often over 1,300 feet between crossings. Wide streets in the area encourage high vehicular speeds and contribute to an unpleasant pedestrian environment. High collisions occur on Crenshaw Blvd and Jefferson Blvd, and the transit environment around the station is consistently poor, with little to no amenities.

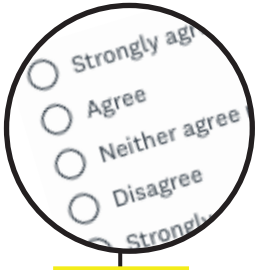
Detailed mapping and analysis can be found in Appendix C.



Active Listening

Project Process

The project followed Metro's First/ Last Mile methodology.



Stakeholder Conversations | **Pop-Up** | **Survey**

2019 **Summer** **Fall** 2020 **Winter** **Spring**

Gather Background Data

Existing plans and projects were analyzed to understand how they will impact and can inform first/last mile planning. Existing urban conditions were analyzed and mapped. This initial analysis set the stage for fruitful community conversations and draft design concepts.

Active Listening

The Plan involved multiple conversations with the community, including 3 stakeholder meetings, an online survey, and a community pop-up. Community members helped identify problem areas and locations for improvements. The findings from these conversations helped lay the foundation for first/last mile design concepts.

Metro's Equity Platform

In 2018, the Metro Board approved the Metro Equity Platform Framework, which calls on the agency to address equity in multiple ways. This Plan uses the Equity Platform as a guide, identifying recommendations that derive from a diverse range of local voices. The West Angeles Community Development Corporation (CDC), a community based non-profit organization, was a key partner throughout the process. This section describes community conversations on which Plan recommendations are based. For each project design, most of the elements requested by the community have been included, and if not, explanations as to why are provided on the costing sheets.

Prepare Design Concepts

Pathways were identified for people to walk, bike, and roll the Expo/ Crenshaw station. Streetscape enhancements and recommendations were identified for each pathway, with a focus on the 1/4 mile around the station.

Compile Final Plan Report

Background data, community conversations, and refined design concepts were compiled into this Plan.

Meeting with Stakeholders.

Three stakeholder meetings were assembled during the winter of 2019. All three meetings were held in the study area and included conversations with:

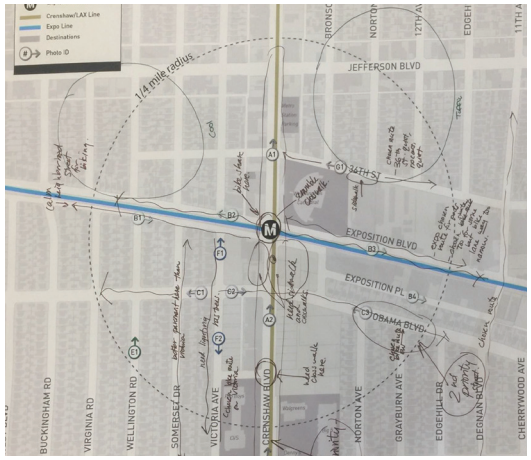
- **A local church youth group (Nov 14, 2019)**
- **Representatives from Neighborhood Councils and an HOA (Dec 9, 2019)**
- **Bicycle and pedestrian advocates (Dec 17, 2019)**

In discussions, community members, many of whom are transit dependent, focused almost exclusively on ways to improve the walking and biking environment around the station. Several participants urged the design and planning team to 'think big' and consider streets improvements that would provide significant improvements to the walking, biking, and rolling experience. Examples included protected bike lanes, Complete Streets, and a consistent landscaped parkway with curvilinear sidewalks. Crenshaw Blvd and Exposition Blvd rose to the top as the streets most in need of an overhaul for people walking, biking, and rolling. Street trees, pedestrian lighting, enhanced crosswalks, and improved bike facilities were noted overall as the most needed elements throughout the station area.

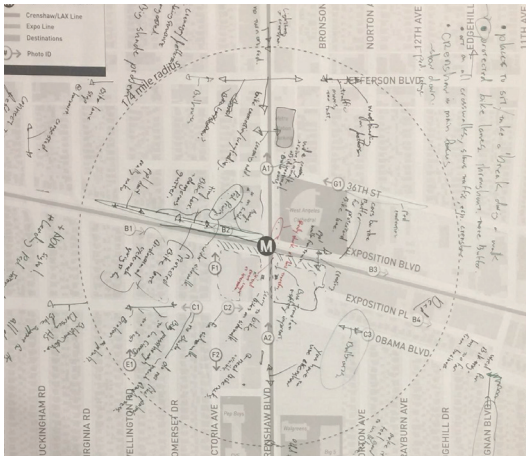
A detailed overview of findings can be found in Appendix D.

Neighborhood Representatives Notes

Youth Group Notes



Bicycle and Pedestrian Advocates Notes



Popping Up at the Crenshaw Farmers' Market

A community pop-up workshop was held to gather feedback from the public at the Crenshaw Farmers' Market on February 28, 2020.

The pop-up included educational information and a playful activity that used an oversized "Connect 4" game for feedback. Participants were shown a menu of possible improvements and were instructed to choose the three streets they felt needed improvements the most. Participants placed corresponding improvement chips into the game board for their chosen streets. A blank chip was included for participants who wanted to write in their own idea or comment.

A detailed overview of findings can be found in Appendix D.

Participants

141 comments

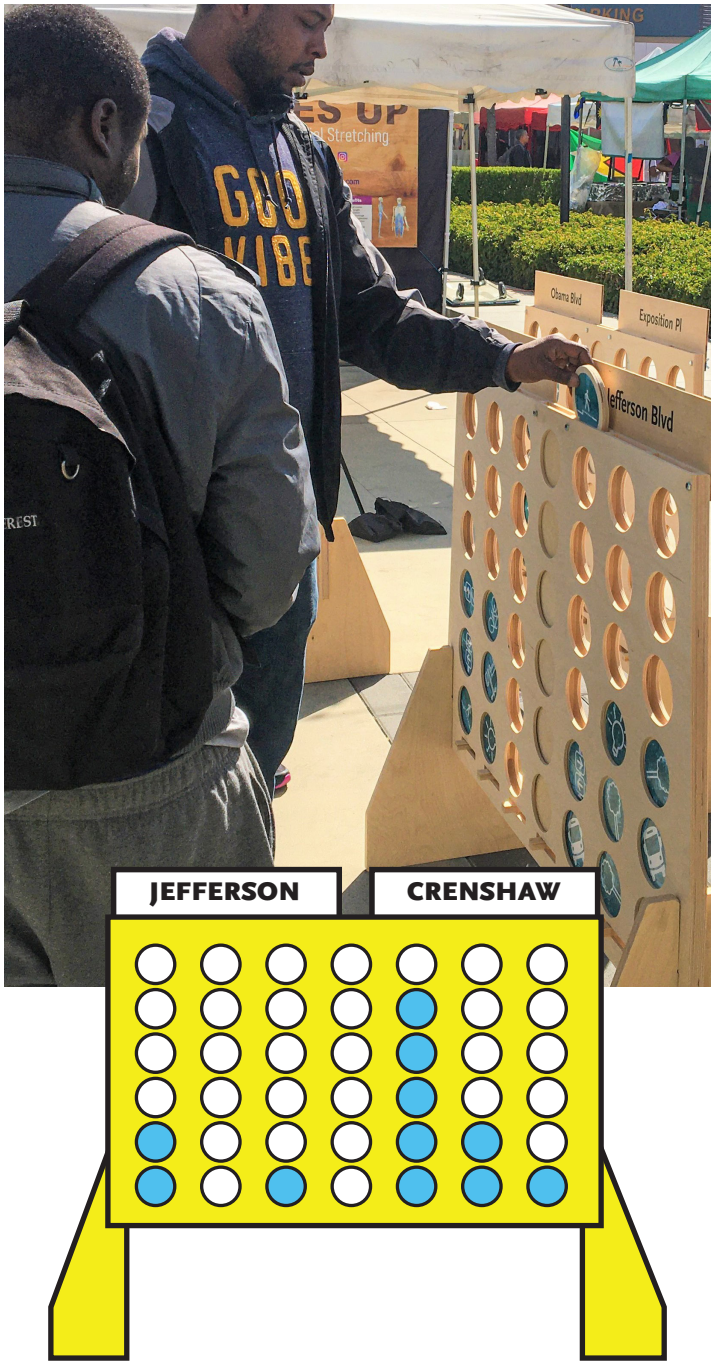
Most voted streets

Crenshaw Blvd, Obama Blvd, & Jefferson Blvd

Most important improvements

Street trees, enhanced crosswalks, & pedestrian lighting

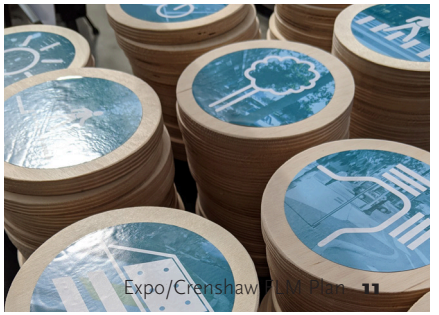
Voting for sidewalk improvements on Jefferson Blvd



Crenshaw snapshot

Voting for trees on Crenshaw Blvd

First/Last Mile voting chips



Community Survey

The purpose of the online survey was to allow additional community members to have a chance to share their thoughts regarding improvements needed around the Expo/Crenshaw station. The questions on the survey aligned with the questions asked during the pop-up; the goal was to gather feedback to help prioritize first/last mile improvements within the 1/4 mile around the station. The survey, which was online for 3 weeks, was distributed via Metro social media, listservs, and through community members and organizations who had previously participated in stakeholder roundtable meetings. Respondents submitted 130 survey entries. 72% of respondents reported that they live within the study area.

Similar to the findings from the pop-up and the input received from the stakeholder meetings, **Crenshaw Blvd, Obama Blvd, Exposition Blvd,** and **Jefferson Blvd** were the top 4 streets that were brought up by survey participants.

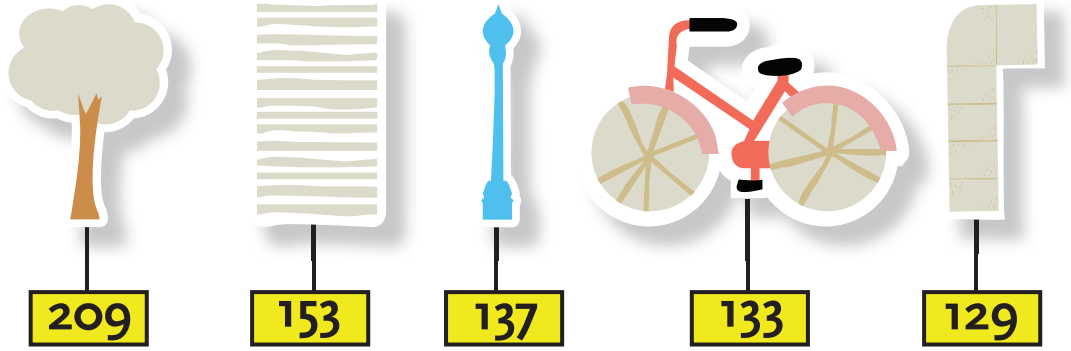
130 Survey Entries

Top 3 streets that need improvements

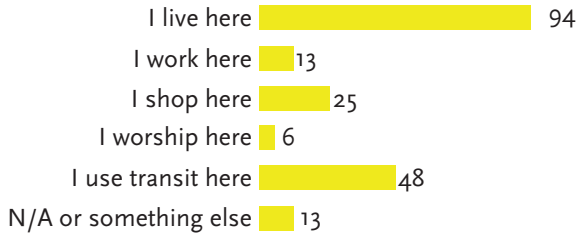
Crenshaw Blvd
Obama Blvd
Exposition Blvd

Top Improvements Needed

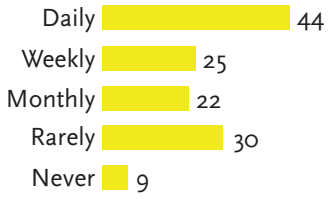
(Total number of votes for each improvement in yellow boxes; top 5)



What draws people to the study area?



Participants use the bus/train...



The Pathway Strategy

Improving station access means improving a complete network of streets, enhanced for multiple modes.

Understanding the Recommendations

Take a look first at the First/Last Mile Pedestrian Pathway Network and Wheels Pathway Network maps to understand the streets that have been chosen for improvement. These streets were selected as a result of community conversations - each street was recommended for inclusion by the community, except in one case, where Somerset Dr was added to the network because it solves a particular issue that was identified by participants (providing a safe alternative to Crenshaw Blvd for people who are biking and walking). The **Pedestrian Pathway Network** map includes streets that are within a comfortable walking distance from the station (1/4 mile), while the **Wheels Pathway Network** map looks further out (1 mile), given the longer distance people are willing to bike or scoot, compared to those walking.

In recognition of the importance of safe and visible, street crossings, an **Intersections Treatment Diagram** is included, illustrating recommended improvements for intersections near the Expo/Crenshaw station, as being able to cross frequently and regularly is important for station access.

Note: Recommended dimensions provided are for guidance purposes only to showcase desired spatial allocation. Actual dimensions will vary based on on-the-ground conditions and detailed study.

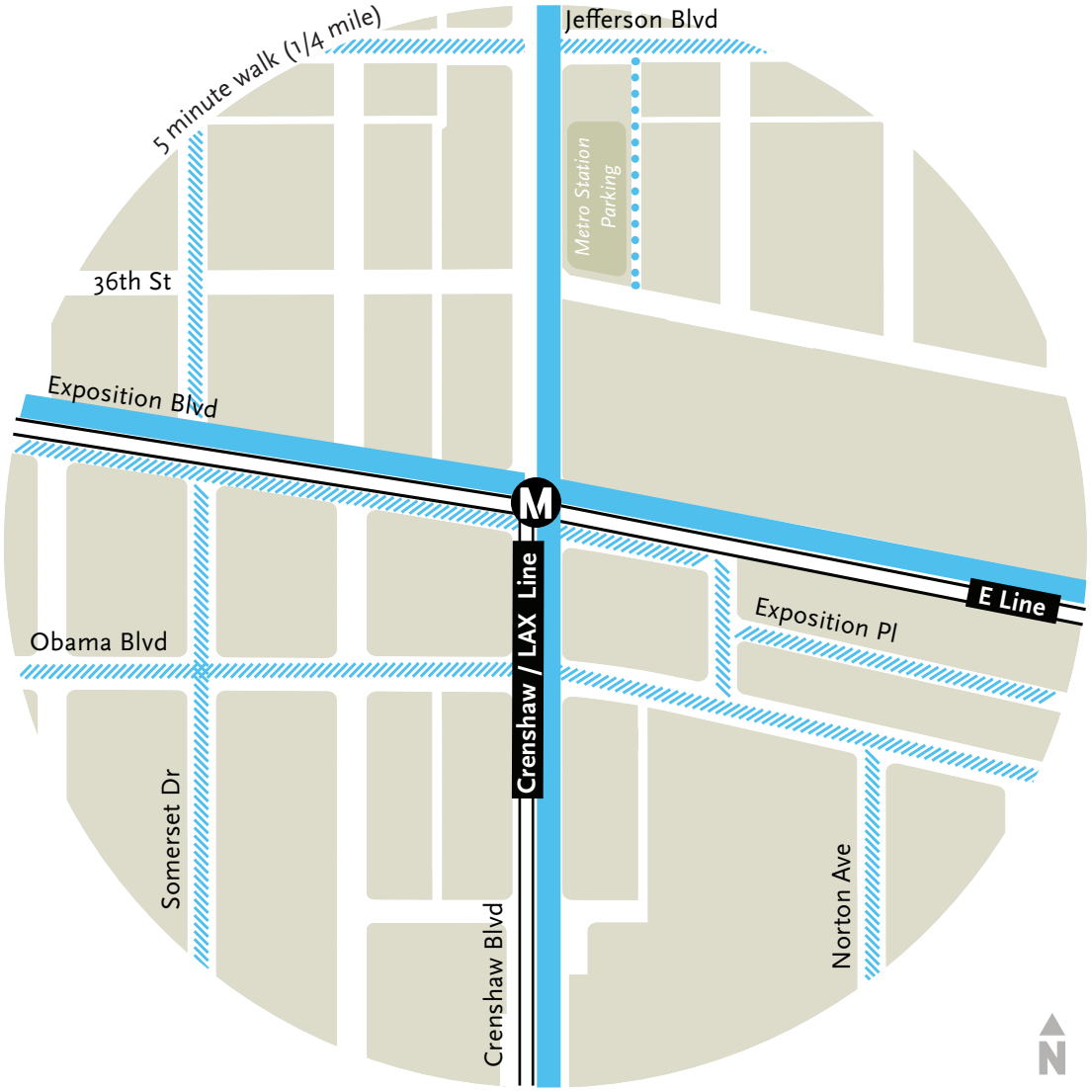
While all streets should be comfortable for people walking, the First/ Last Mile Pedestrian Pathway Network highlights streets that are especially critical for access.

Pedestrian Pathway Network

The First/Last Mile Pedestrian Pathway Network includes streets, primarily identified by the community, which are critical for station access for people walking. Streetscape improvements should be focused along these streets.

The Network is composed of three different types of pathways:

1. **Pathway Arterials** are primary routes that connect directly to the station. Here they include Exposition Blvd and Crenshaw Blvd.
2. **Pathway Collectors** are secondary routes that connect to the two Pathway Arterials
3. **Pathway Cut-Throughs** are additional shortcut routes or pathways to improve access to key destinations.



Note: Coliseum St and Buckingham Rd are not within the 1/4 mile study area, but are included in this Plan as key transit access streets.

For bike-related improvements, let's look beyond the 1/4 mile, at new bike facilities that can link in with the regional network.

Wheels Pathway Network

The goal for the proposed Wheels Pathway Network is to optimize access for people riding, scooting, and otherwise rolling to and from the station. Proposed 'wheels' facilities connect to existing and city-proposed bike lanes and help to close gaps. See the Toolkit in Appendix A for example photos of each type of proposed facility. All proposed facilities should be friendly for both expert and novice riders of all ages. This means that on major streets, bike facilities should be protected, vertically separated from vehicle lanes, and well-delineated. On slower neighborhood streets, bike facilities should be enhanced with traffic calming measures and streetscape improvements.

In addition, Bicycle Friendly Intersections (BFIs) and a Green Zone are recommended. BFIs can include bike boxes, conflict striping, and bike signage, as appropriate. The Green Zone can include transfer amenities such as a drop off zone, electric vehicle charging, bike share stations, micro-mobility parking, and a mobility hub.

See Appendix A and the FLM Strategic Plan for more information.

Using Metro's First/ Last Mile suite of improvements, the recommendations for each key street are summarized here.*

Community stakeholders additionally expressed interest in **engaging local artists** to design public art, gateways, and other streetscape elements to reinforce the cultural identity of the corridor. Although specific locations for public art are not identified in this Plan, visual enhancements are supported within the study area. As an example, artists can be commissioned to enhance the character of commercial corridors by artfully painting blank building facades.

Name	*Type*	Enhanced Crosswalks	Speed Cushions	Corner Curb Extensions	Directional Ramps	Improved Sidewalks	Street Trees	Street Furniture	Wayfinding **	Enhanced Bus Stops	Pedestrian Lighting	Bike Facility (e.g. lane or other)
Crenshaw Blvd	*Arterial*	○			○	○	○	○	○	○	○	○
Obama Blvd	*Collector*	○		○	○		○		○		○	○
Exposition Blvd	*Arterial*	○		○	○		○		○		○	○
Exposition Blvd (S of Expo Line)	*Collector*	○		○	○		○				○	○
Jefferson Blvd	*Collector*	○		○	○	○	○		○	○	○	○
Somerset Dr	*Collector*	○	○	○	○		○		○		○	○
Norton	*Collector*	○	○	○	○		○		○		○	○
Coliseum	*Collector*	○		○	○		○		○	○	○	○
Exposition Pl	*Collector*						○	○	○		○	○
Alley (E of Crenshaw)	*Cut-Through*								○		○	

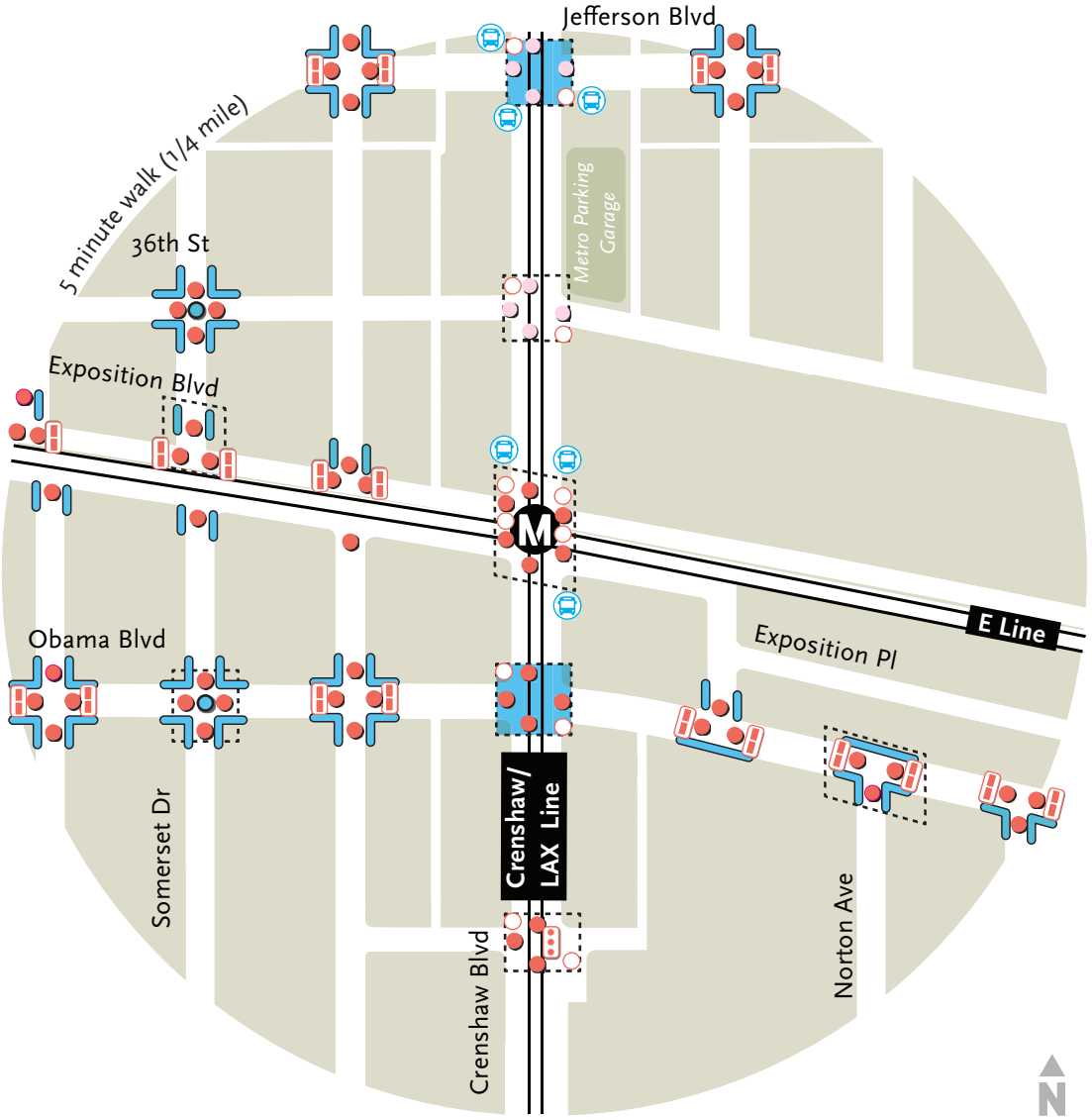
** Not all improvements recommended in the Plan are included in this matrix. See project pages for details.*

** * The design of wayfinding and signage as it relates to Metro Rail needs to follow Metro's Trailblazing Signage Standards to ensure that Metro wayfinding is consistent and recognizable to riders accessing the system across LA County.*

Facilitating easy and pleasant crossings at intersections is key for First/Last Mile access.

Improving intersections for First/Last Mile access can take many forms. Usually the intent is to make crossing the street easier and safer, through increased visibility, shorter crossing distances, slowing or stopping traffic, or bike-friendly design.

Corner curb extensions with directional curb ramps and enhanced crosswalks are recommended at various locations along many First/Last Mile Pathways throughout the 1/4 mile study area. Traffic circles are added at key intersections along Somerset Dr, Norton Ave, and Buckingham Rd to transform them into Neighborhood Greenways. New rectangular rapid flashing beacons are recommended along Jefferson Blvd and Obama Blvd to allow for more frequent crossings on these busy streets. Bicycle signals are recommended at intersections along Crenshaw Blvd.



Project Specifics

Recommendations consider the full experience - what it feels, smells, looks, and sounds like around the station.

Here we present **recommendations for a network of key streets*** that can be used to safely and pleasantly walk, bike, and "roll" to and from the Metro station. Recommendations include public realm improvements, taking into consideration the full experience of getting to and from the station - what does it feel like, what does it look like, what does it sound like? Adding trees and shade can make it **feel** more comfortable and **smell** more pleasant with cleaner air, adding sidewalk lighting can make it **look** nicer and easier to navigate, and slowing traffic or moving vehicles away from the sidewalk, can make it **sound** calmer, quieter, and more welcoming for people not in vehicles.

Streetscape enhancements are presented for each key street within a 1/4 mile of the station. The order in which the streets are presented in this section reflects the streets that were ranked the highest in response to the following online survey question: "Which street needs improvement the most?" Crenshaw Blvd received the most votes (122), followed by Obama Blvd (74), Exposition Blvd (69), Jefferson Blvd (65), Coliseum St (32), and Exposition Pl (18). Norton and Somerset were not options for this question. This ranking is supported by the Project Prioritization presented in the final section of this Plan.

Tear out the pages for the street you are interested in.

This packet can be used for funding applications or to build community support. Street recommendations follow the same organization:

1. Overview of goals
2. ID of community-identified issues & opportunities
3. Illustration of improvements, via a plan view, street sections, and in some cases 3D before/after renderings
4. Costing information

* *Recommendations in this Plan are compatible with or complement already-planned or proposed improvements by the City of LA and others, as noted in the Relevant Plans and Projects Memo. (See Appendix C)*

1

Crenshaw Blvd is a major north-south commercial corridor that connects directly to the Expo/Crenshaw station. There is strong community support* for both pedestrian and bicycle improvements along the street. Currently, Crenshaw serves various Metro bus lines and has up to three lanes of traffic in each direction and a center turn lane. When it comes to walking and biking, the street is fairly uncomfortable. Adding a protected bike lane would make it much nicer for cyclists and also for pedestrians, since vehicles would be further away from the sidewalk. This proposal aligns with the "Aspirational Bike Lane" concept designed in the City's *Crenshaw Blvd Streetscape Plan.*

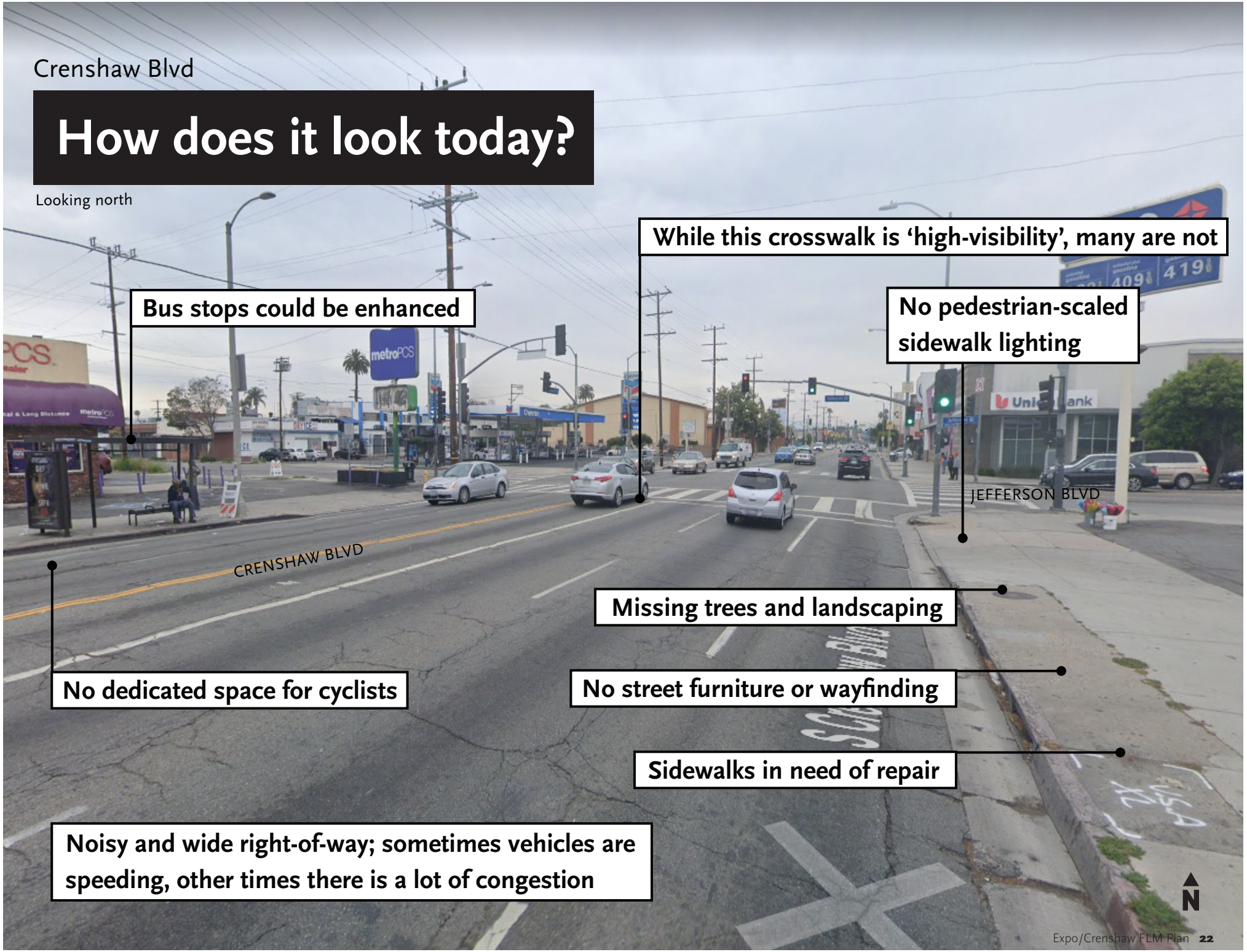
** Crenshaw Blvd, especially the segment north of Exposition Blvd, was the most commented upon street during the stakeholder meetings, community pop-up, and the online survey. It also rose to the top for both pedestrian- and wheels- project prioritization.*

Crenshaw Blvd

Crenshaw Blvd

How does it look today?

Looking north



What's needed the most?

Top 3 Requested Improvements *

Street Trees

Crosswalks

Sidewalk Improvements

Other Items that Need Attention **

A direct connection is needed for people riding their bikes to the station, it is generally unpleasant to walk on the street due to the heat and lack of shade, swiftly moving vehicles, and sidewalks in need of repair. The street is also missing wayfinding signage, which would be very helpful in this area. The improvements from the Crenshaw Blvd Streetscape Plan should be implemented.

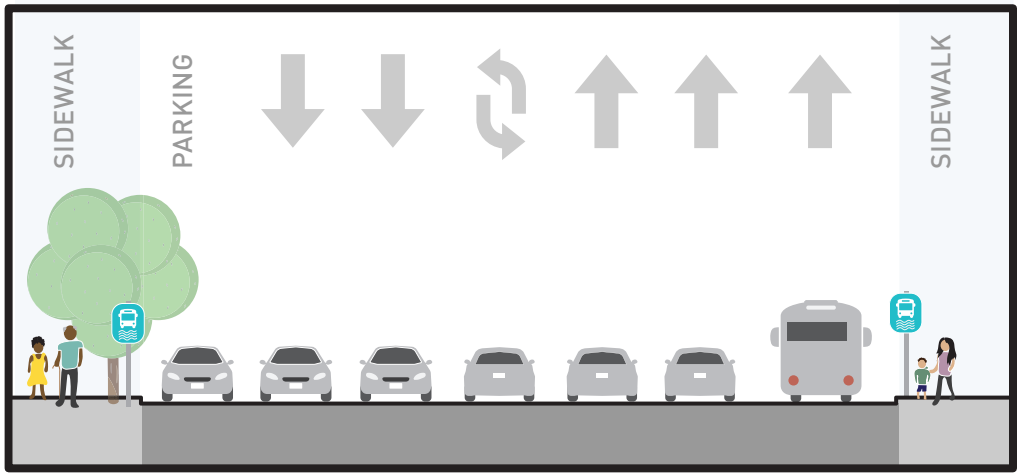
* *From the online survey*

** *As discussed by community stakeholders*

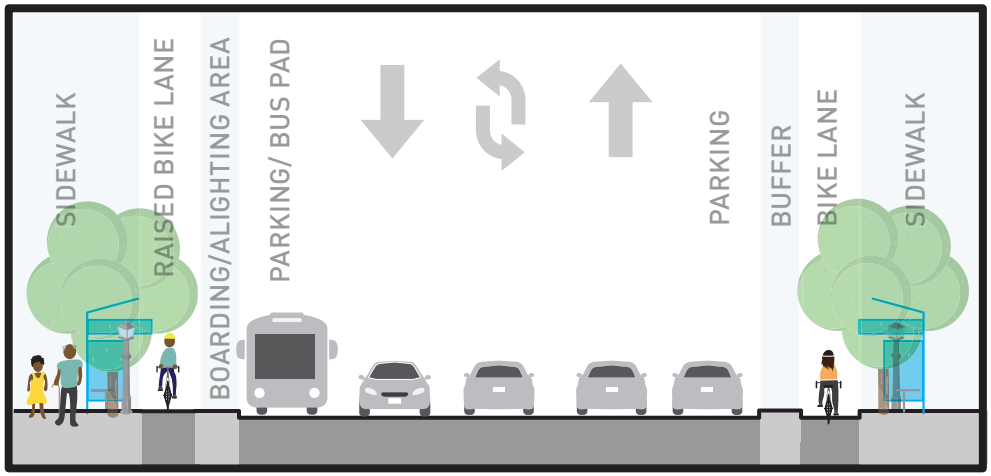
Crenshaw Blvd

Roadway Changes

Existing Street



Proposed Street



Summary

Major traffic impacts - remove 2 northbound travel lanes and 1 southbound travel lane

Retain parking on west side and add parking on the east side

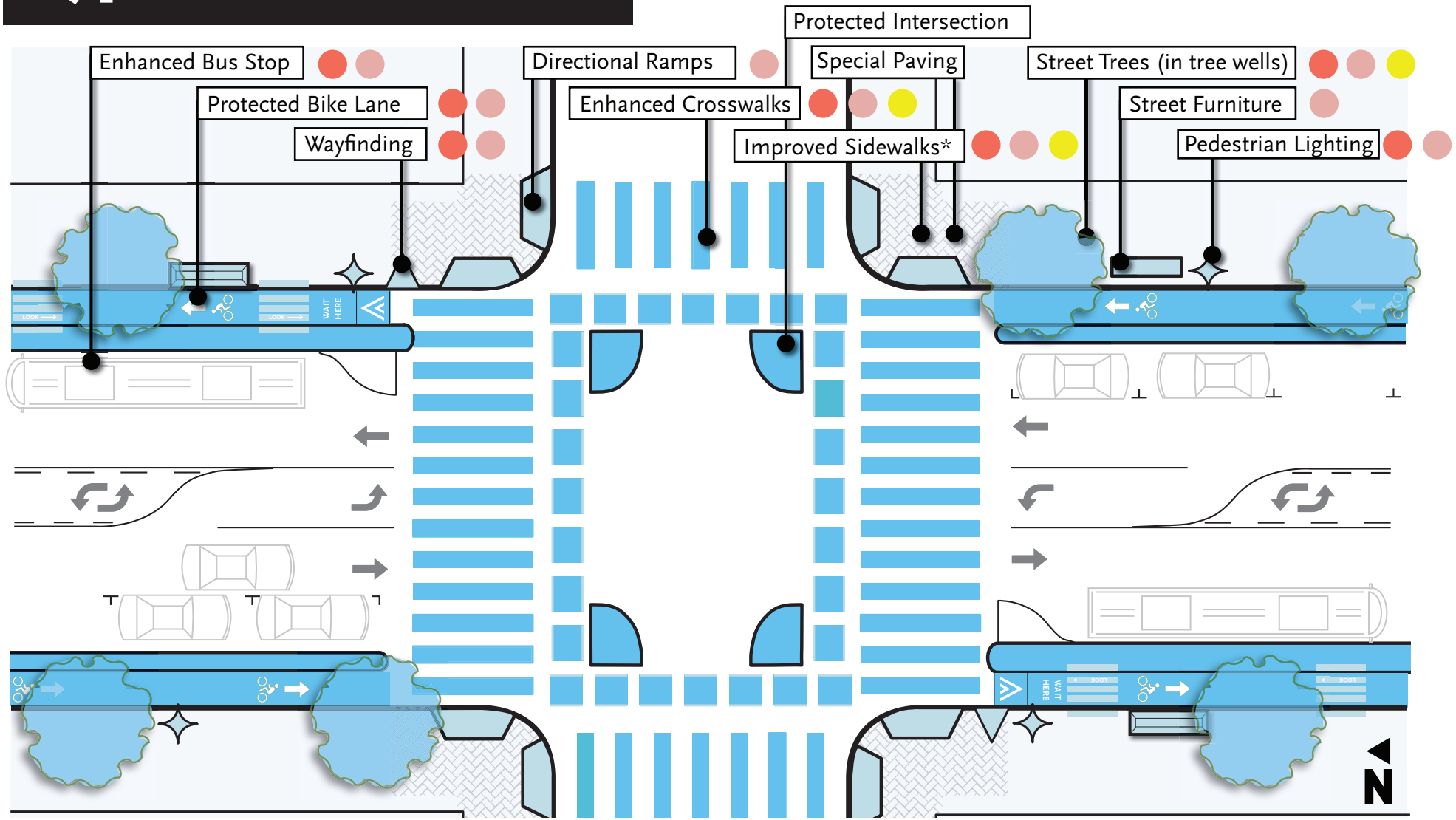
Add in protected bike lane

Introduce raised bike lane with narrow boarding/alighting area at bus stops

Add Protected Intersections where feasible (see illustration, next page)

Crenshaw Blvd

Typical Intersection

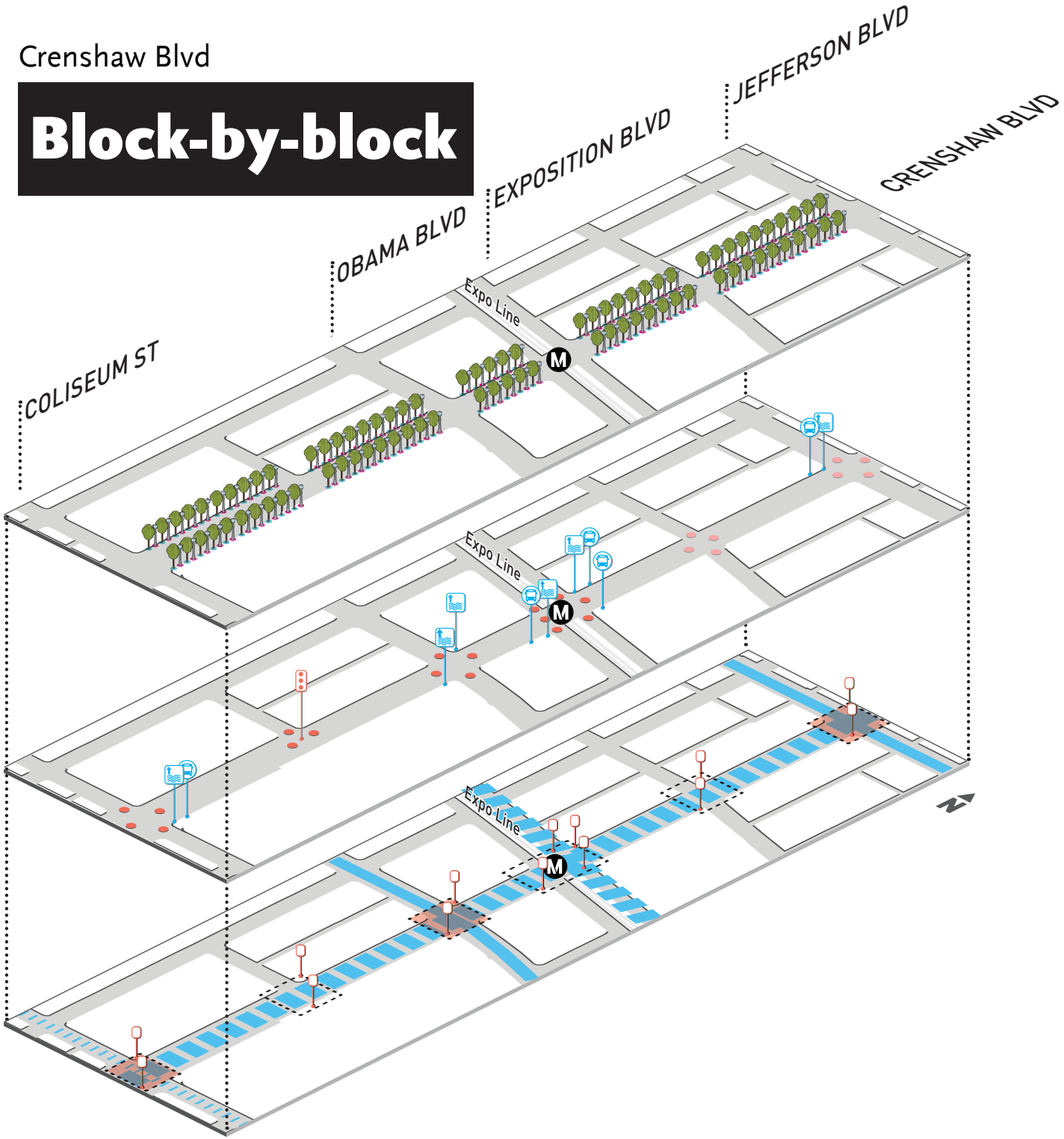


- *Recommended during a stakeholder meeting*
- *Recommended during the community pop-up*
- *Element in the top 3 of those supported in the online survey*

* *Further study needed to identify specific spot locations for sidewalk improvements. Not included in cost estimate.*

Crenshaw Blvd

Block-by-block



Comfort

- Street Tree Infill* (30' on center)
- Pedestrian Scaled Lighting* (30' on center)

Access

- Enhanced Crosswalks
- Existing Crosswalks
- New Traffic Signal
- Enhanced Bus Stop
- Wayfinding

Mobility

- Bike Friendly Intersection (e.g. bike boxes, conflict striping, bike signage, etc)
- Protected Intersection
- Bike Signal
- 8-80 Protected Bike Lane (Class IV)
- Bike Lane (Class II)
- Greenway (Class III)
- Advisory Bike Lane (Class III)

*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

Crenshaw Blvd

Before-and-After

How much will this cost?

Pedestrian Projects

Street trees (in tree well)	$407,000
Pedestrian lighting	$945,000
Sidewalk paving enhancements	$588,000
Enhanced crosswalks	$93,240
Outboard bus platforms	$210,000
Wayfinding	$12,600
Signal modifications	$315,000
Green zone	$60,000
Misc/contingency/construction/soft costs	$3,535,000
Total (rounded)	**$6,166,000**

Wheels Projects

Bike signals	$350,000
Bike friendly intersections	$270,000
8-80 protected bike lane (Class IV)	$2,120,000
Protected intersections	$1,500,000
Misc/contingency/construction/soft costs	$5,689,000
Total (rounded)	**$9,929,000**

Other items recommended by the community, which were not integrated into the design plans:
All recommendations provided by the community were folded into the Plan. Traffic calming will result from the reduction in lanes due to the addition 8-80 protected bike facility (Class IV).

2

Obama Blvd is as a key east-west residential route located south of the Expo/Crenshaw station. Obama Blvd is often used as a vehicular cut-through and it therefore sees high traffic speeds. Curb extensions with enhanced crosswalks will help to calm traffic and facilitate pedestrian and bicyclist movement across and along the street. A bike lane is recommended, requiring removal of one travel lane in each direction. The goal is to make Obama Blvd more people-oriented and friendly to use while walking to and from the station.

Obama Blvd

Obama Blvd

How does it look today?

Looking west

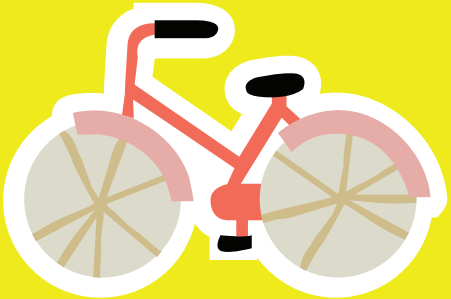
Obama Blvd

What's needed the most?

Top 3 Requested Improvements *

Street Trees

Crosswalks



Bike Amenities

Other Items that Need Attention **

Dark at night, long blocks, and the wide street encourage speeding traffic.

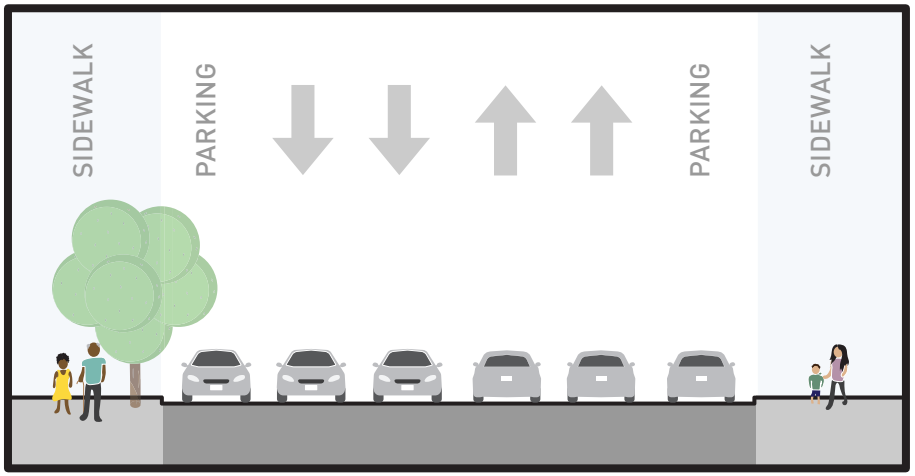
* *From the online survey*

** *As discussed by community stakeholders*

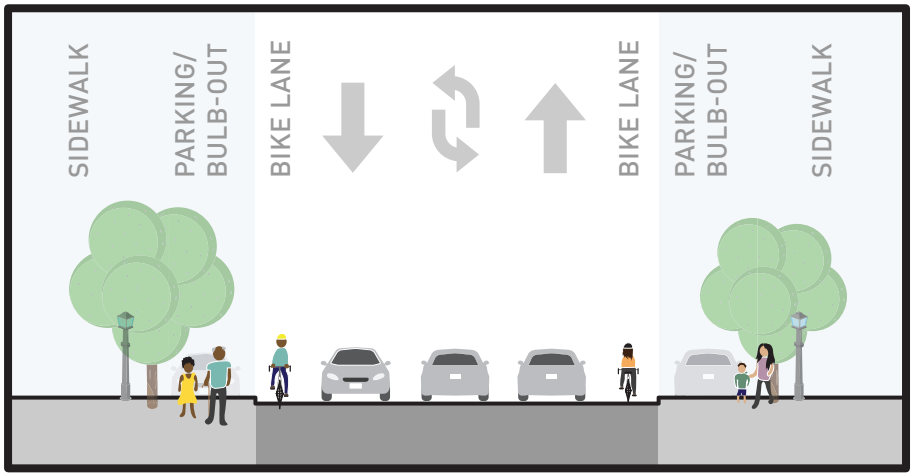
Obama Blvd

Roadway Changes

Existing Street



Proposed Street



Summary

Remove one travel lane in each direction

Introduce center turn lane

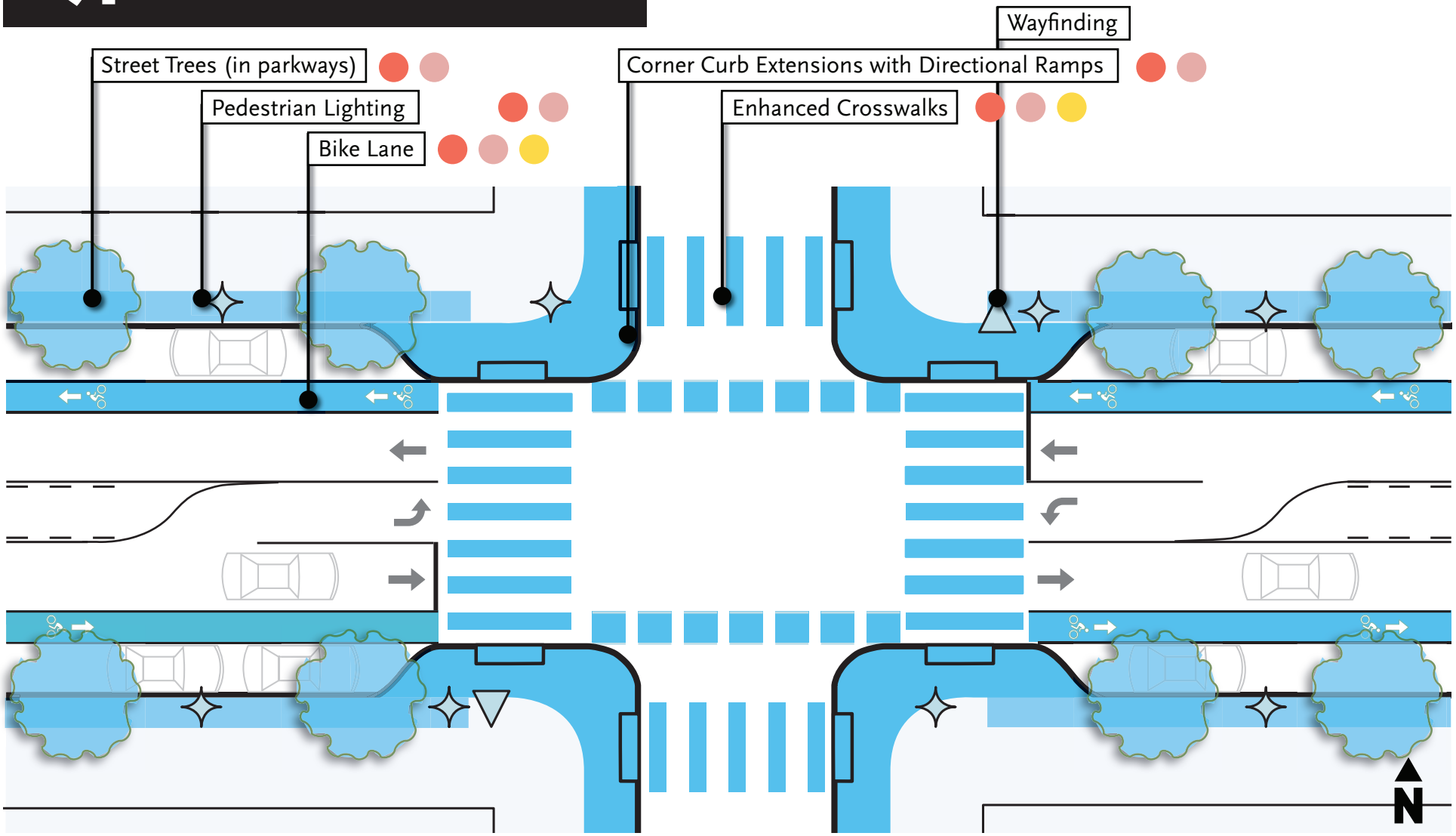
Retain parking

Add corner curb extensions

Add bike lane

Obama Blvd

Typical Intersection



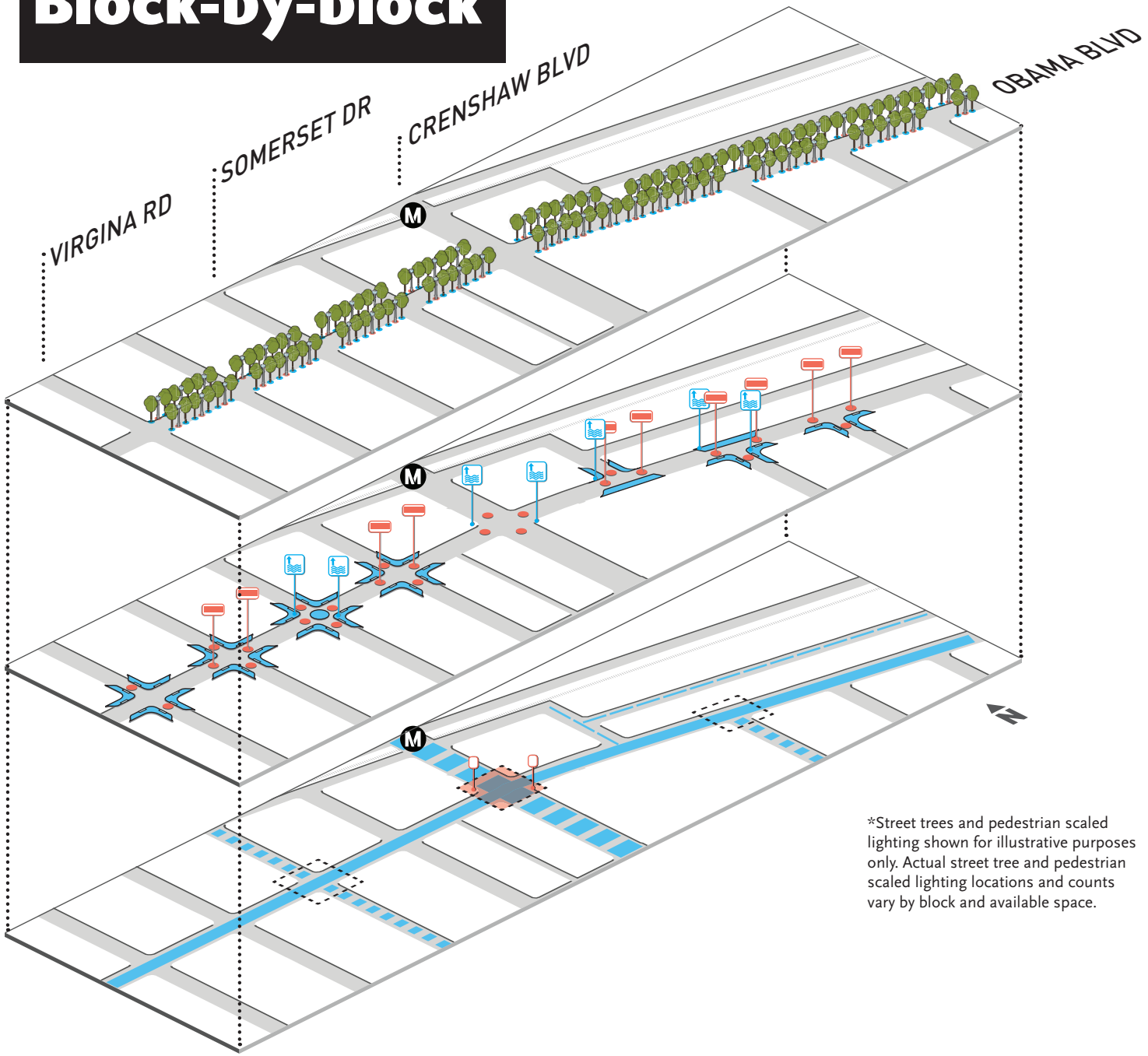
Recommended during a stakeholder meeting

Recommended during the community pop-up

Element in the top 3 of those supported in the online survey

Obama Blvd

Block-by-block



*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

Comfort

- Street Tree Infill* (30' on center)
- Pedestrian Scaled Lighting* (60' on center)

Access

- Enhanced Crosswalks
- Rectangular Rapid Flashing Beacon & Reflective Raised Pavement Markers
- Wayfinding
- Corner Curb Extensions with Directional Curb Ramps
- Traffic Circle

Mobility

- Bike Friendly Intersection (e.g. bike boxes, conflict striping, bike signage, etc)
- Protected Intersection
- Bike Signal
- 8-80 Protected Bike Lane (Class IV)
- Bike Lane (Class II)
- Greenway (Class III)
- Sharrow (Class III)

Obama Blvd

How much will this cost?

Pedestrian Projects

Street trees (in parkway)	$112,000
Street trees (in tree well)	$133,200
Pedestrian lighting	$491,400
Bulb-outs with directional curb ramps	$672,000
Enhanced crosswalks	$82,880
Wayfinding	$14,700
Rectangular rapid flashing beacons	$400,000
Misc/contingency/construction/soft costs	2,564,000
Total (rounded)	**$4,471,000**

Wheels Projects

Bike signals	$50,000
Bike friendly intersections	$150,000
Bike lane (Class II)	$324,000
Misc/contingency/construction/soft costs	$711,000
Total (rounded)	**$1,235,000**

Other items recommended by the community, which were not integrated into the design plans: All recommendations provided by the community were folded into the Plan except ideas for street furniture and bus stop improvements. Because of the residential character of the streets and because there are not currently any buses that run along the street, these elements are not included.

Regarding traffic calming (recommended by the community), while not overtly included in the Plan via elements like speed humps, traffic calming will result from the proposed lane reduction and new corner bulb-out extensions.

3

Exposition Blvd runs east-west, immediately adjacent to the Expo Line. It is separated by a landscaped buffer from the Metro tracks and currently has a narrow bike lane. The street is pleasant to walk down, because of the street's narrow width, the trees and new landscaping, and the nice sidewalks. The long Expo Line tracks offer a great opportunity to introduce a bi-directional protected bike lane to improve the experience for those riding a bicycle along the street.

Exposition Blvd

How does it look today?

Looking west

What's needed the most?

Top 3 Requested Improvements *

Street Trees

Crosswalks

Sidewalk Improvements

Other Items that Need Attention **

Narrow bike lane along tracks, dark at night, no wayfinding

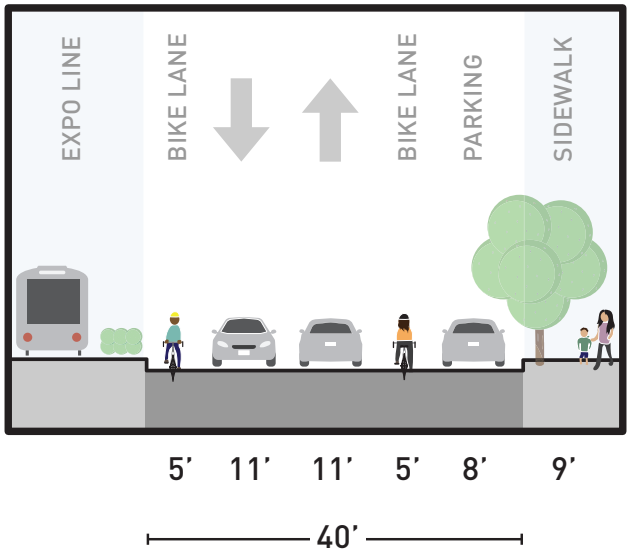
* *From the online survey*

** *As discussed by community stakeholders*

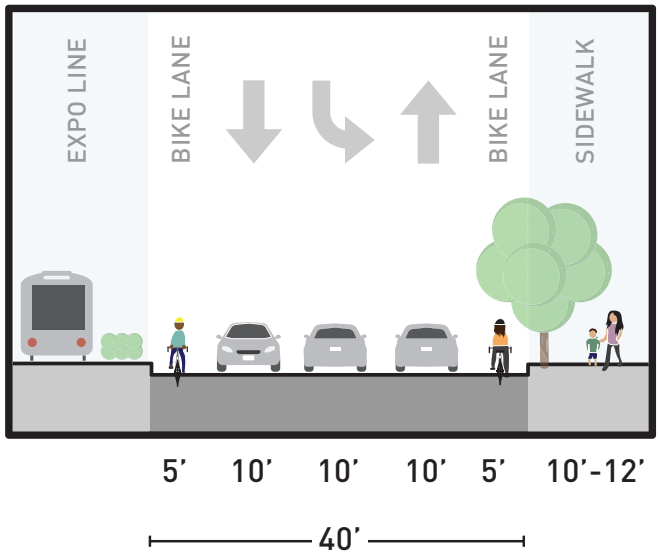
Exposition Blvd

Roadway Changes

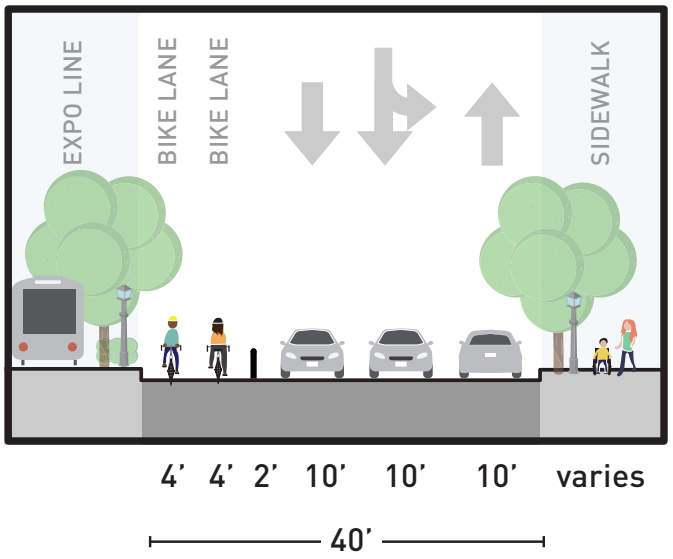
Existing Street (West of Crenshaw)



Existing Street (East of Crenshaw)



Proposed Street



Summary

Retain travel lanes

Remove parking lane west of Crenshaw Blvd

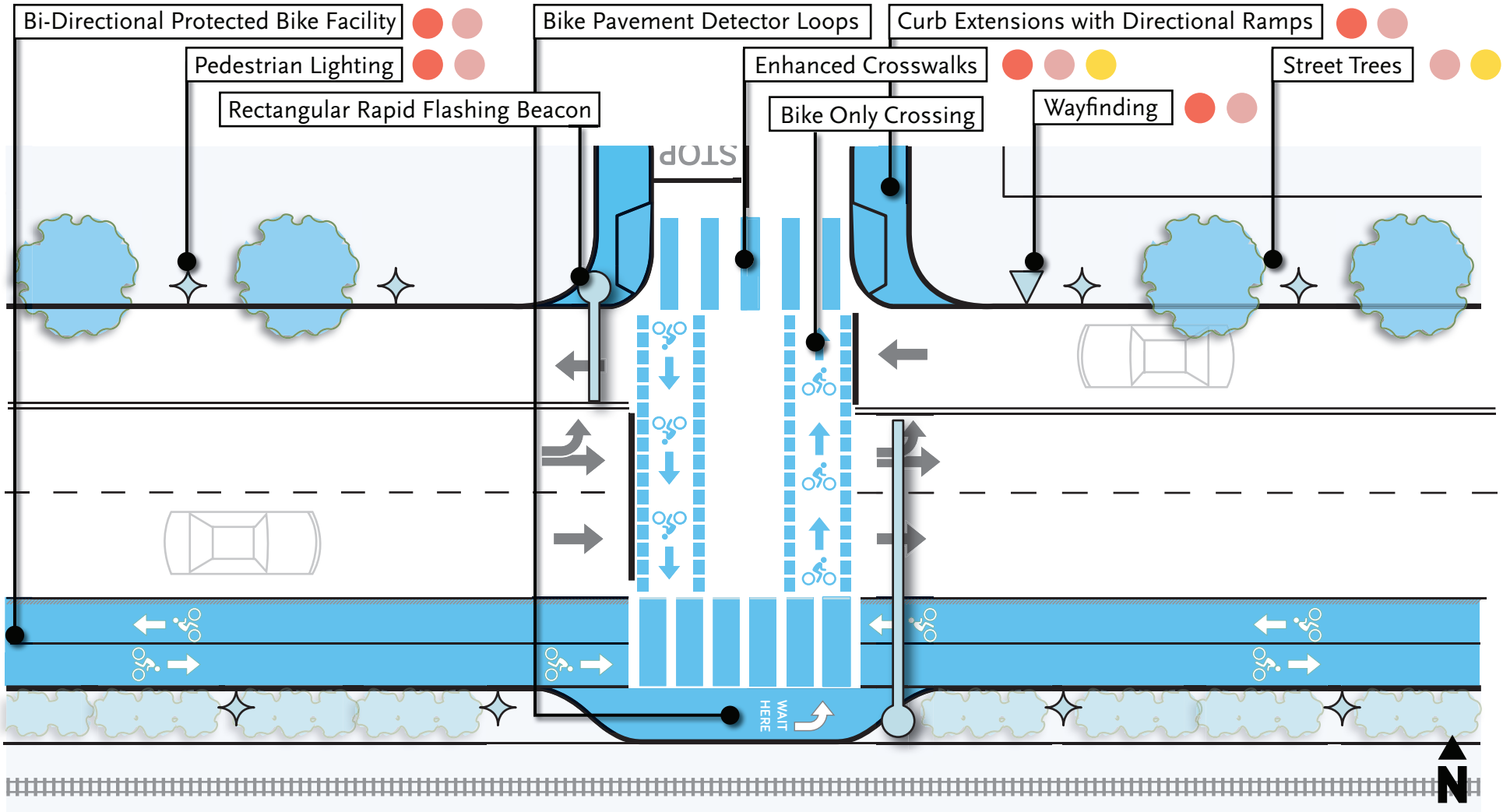
Add a seamless and protected bike facility

A Note on Implementation:

Adding a two-way protected bike lane along Exposition Blvd will require careful design and engineering. Additional space may be required from the existing landscape median along the tracks, especially in areas where safe north-south turning movements must be accommodated for cyclists. Access in and out of the protected bike lane should be provided frequently and should be clearly indicated. Additional pinch points, where the right-of-way and available space for roadway re-allocation is minimal, would need to be thoughtfully designed so as to maintain as much protection as possible for cyclists. Likewise, service gates that are used to access the tracks must be considered along the bike lane and not obstruct the bike lane when open. Removal of any trees within the landscape median to accommodate the protected bike lane, will require a 2-to-1 tree replacement.

Exposition Blvd

Typical Intersection



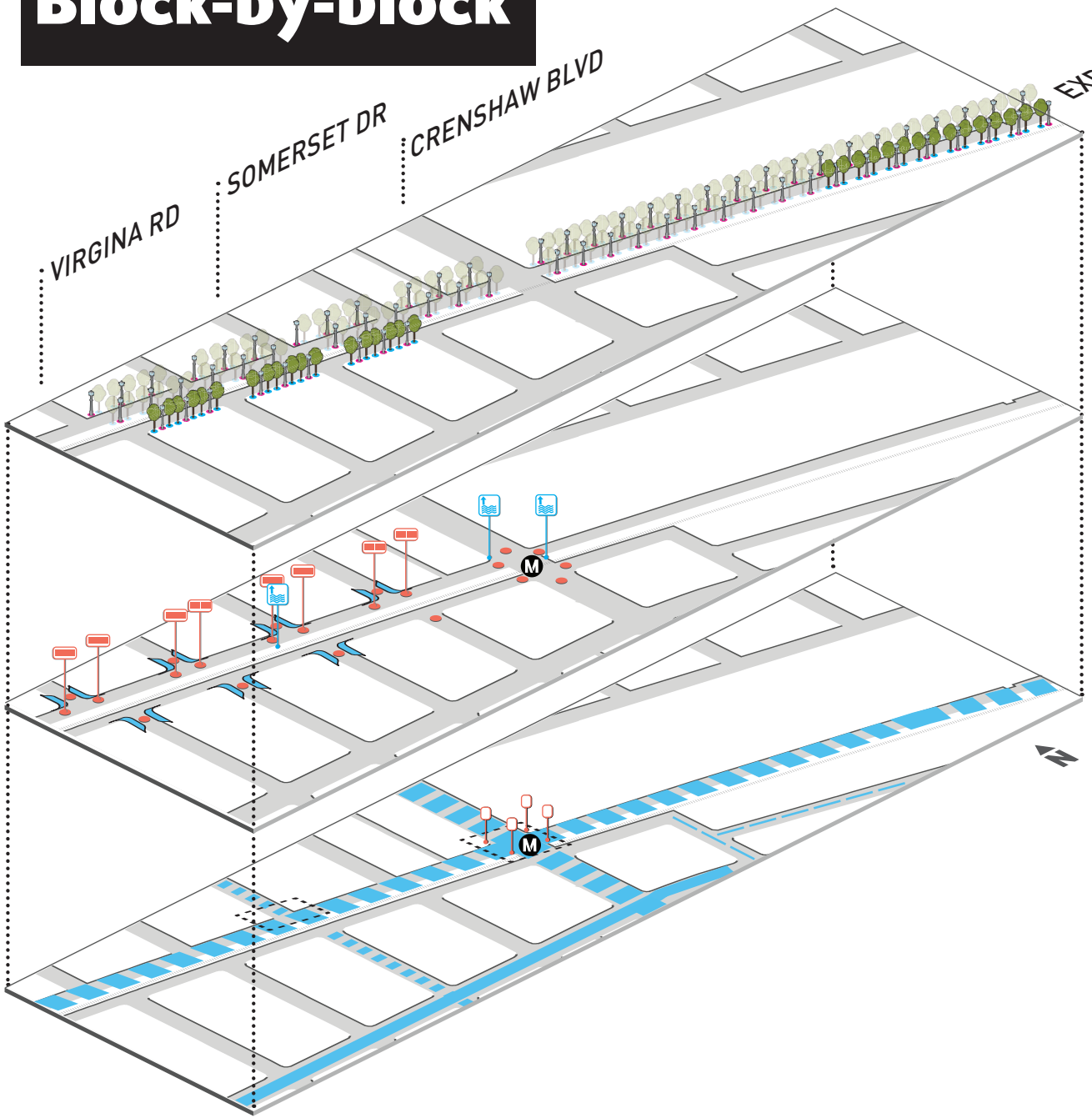
Recommended during a stakeholder meeting

Recommended during the community pop-up

Element in the top 3 of those supported in the online survey

Exposition Blvd

Block-by-block



Comfort

New Street Trees*
(30' on center)

Pedestrian Scaled Lighting*
(60' on center)

Access

Enhanced Crosswalks

Rectangular Rapid Flashing Beacon & Reflective Raised Pavement Markers

Wayfinding

Corner Curb Extensions with Directional Curb Ramps

Mobility

Bike Friendly Intersection
(e.g. Bike boxes, conflict striping, bike signage, etc)

Bike Signal

8-80 Protected Bike Lane (Class IV)

Bike Lane (Class II)

Greenway (Class III)

Sharrow (Class III)

*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

Exposition Blvd

Before-and-After

Today

Tomorrow: Envisioning the Improvements on Exposition Blvd

How much will this cost?

Pedestrian Projects

Street trees (in parkway)	$64,000
Street trees (in tree well)	$37,000
Pedestrian lighting	$554,400
Bulb-outs with directional curb ramps	$416,000
Enhanced crosswalks	$51,800
Wayfinding	$6,300
Misc/contingency/construction/soft costs	$1,520,000
Total (rounded)	**$2,650,000**

Wheels Projects

Bike signals	$800,000
Bike friendly intersections	$90,000
8-80 Protected bike lane (Class IV)	$1,050,000
Left turns onto Exposition	$360,000
Rectangular rapid flashing beacons	$1,600,000
Misc/contingency/construction/soft costs	$5,232,000
Total (rounded)	**$9,132,000**

Other items recommended by the community, which were not integrated into the design plans: The community also recommended new/improved sidewalks, street furniture, and bus stop enhancements on this street. The existing sidewalks are high-quality and the width of the sidewalk cannot be extended while also accommodating a protected bike lane. Street furniture is not recommended due to the residential and industrial character of the street. Finally, Exposition Blvd does not have an existing bus route to warrant bus stop enhancements.

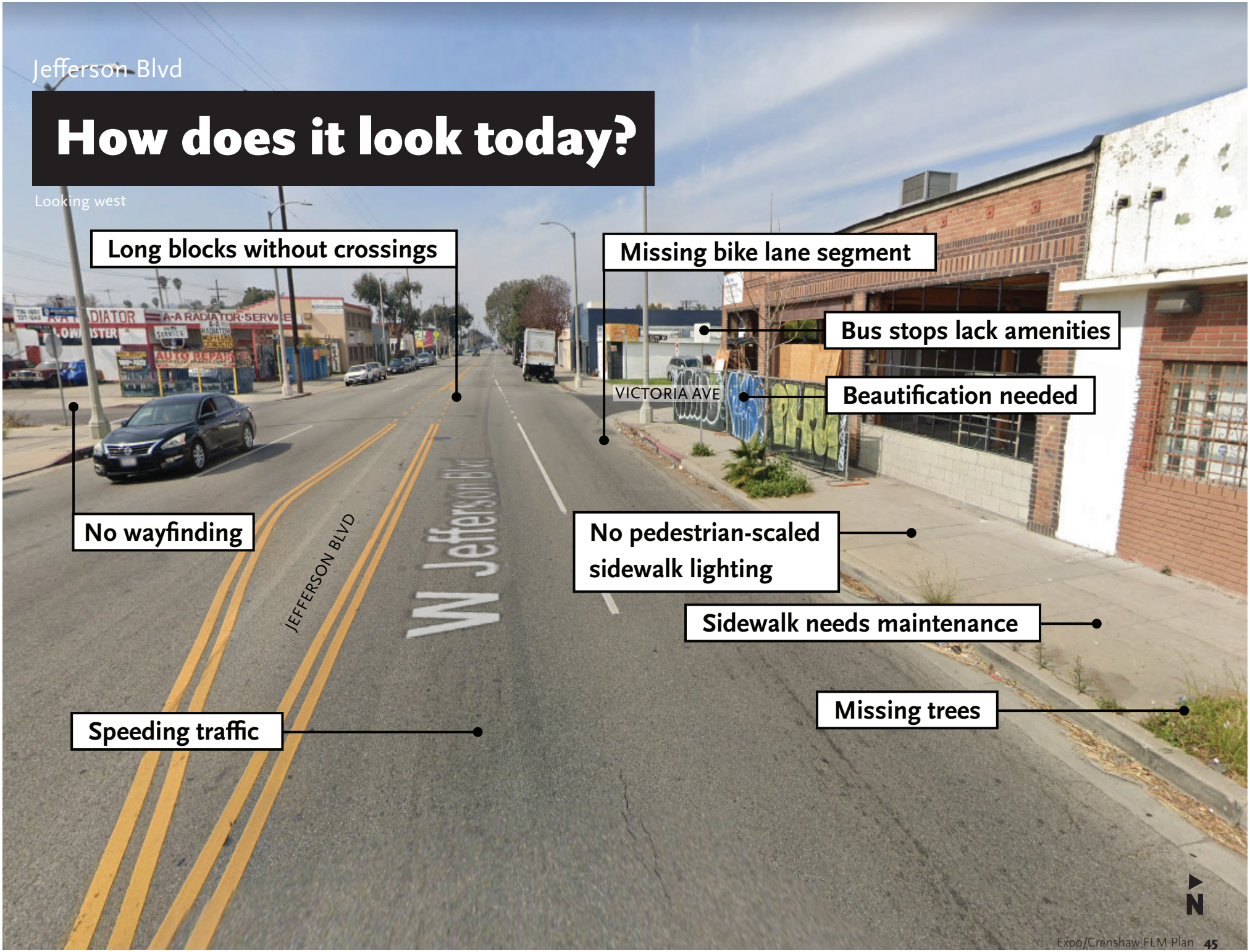
4

Jefferson Blvd is a key east-west commercial and bus corridor, north of the station. First/Last Mile recommendations include pedestrian improvements, amenities for bus riders, and a new bike lane, which aligns with proposals in the City of LA's *Mobility Plan 2035*. The new bike lane would connect to the existing bike lane on Jefferson Blvd, west of Harcourt Ave. Jefferson should feel more welcoming for people walking as well. Adding corner curb extensions, new crosswalks to shorten blocks, trees, and pedestrian lighting will help people feel comfortable and safe.

Jefferson Blvd

How does it look today?

Looking west



Jefferson Blvd

What's needed the most?

Top 3 Requested Improvements *

Street Trees

Crosswalks

Pedestrian Lighting

Other Items that Need Attention **

Speeding traffic, discontinuous bike lane, beautification needed, bus stops without much-needed amenities, dark at night, no wayfinding, sidewalks are unimproved.

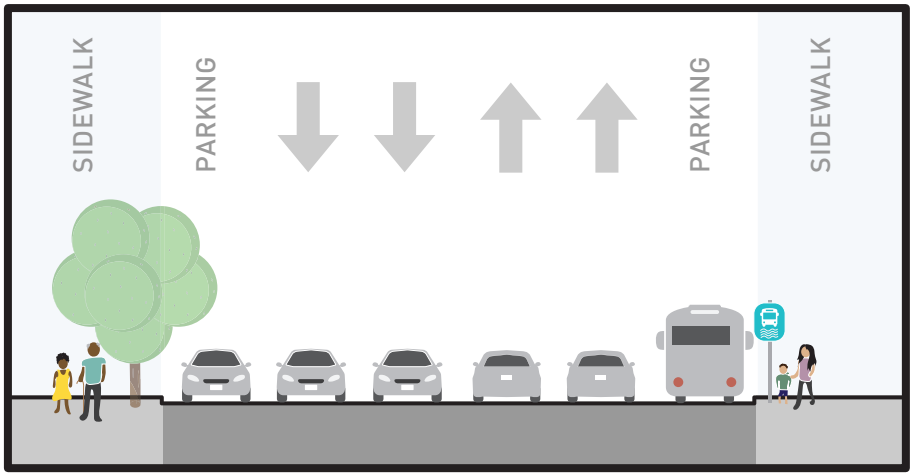
* *From the online survey*

** *As discussed by community stakeholders*

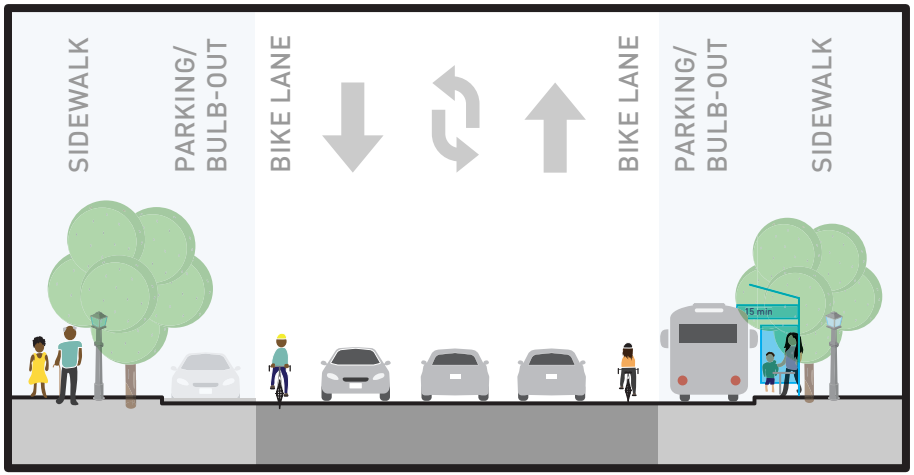
Jefferson Blvd

Roadway Changes

Existing Street



Proposed Street



Summary

Remove one travel lane in each direction

Introduce center turn lane

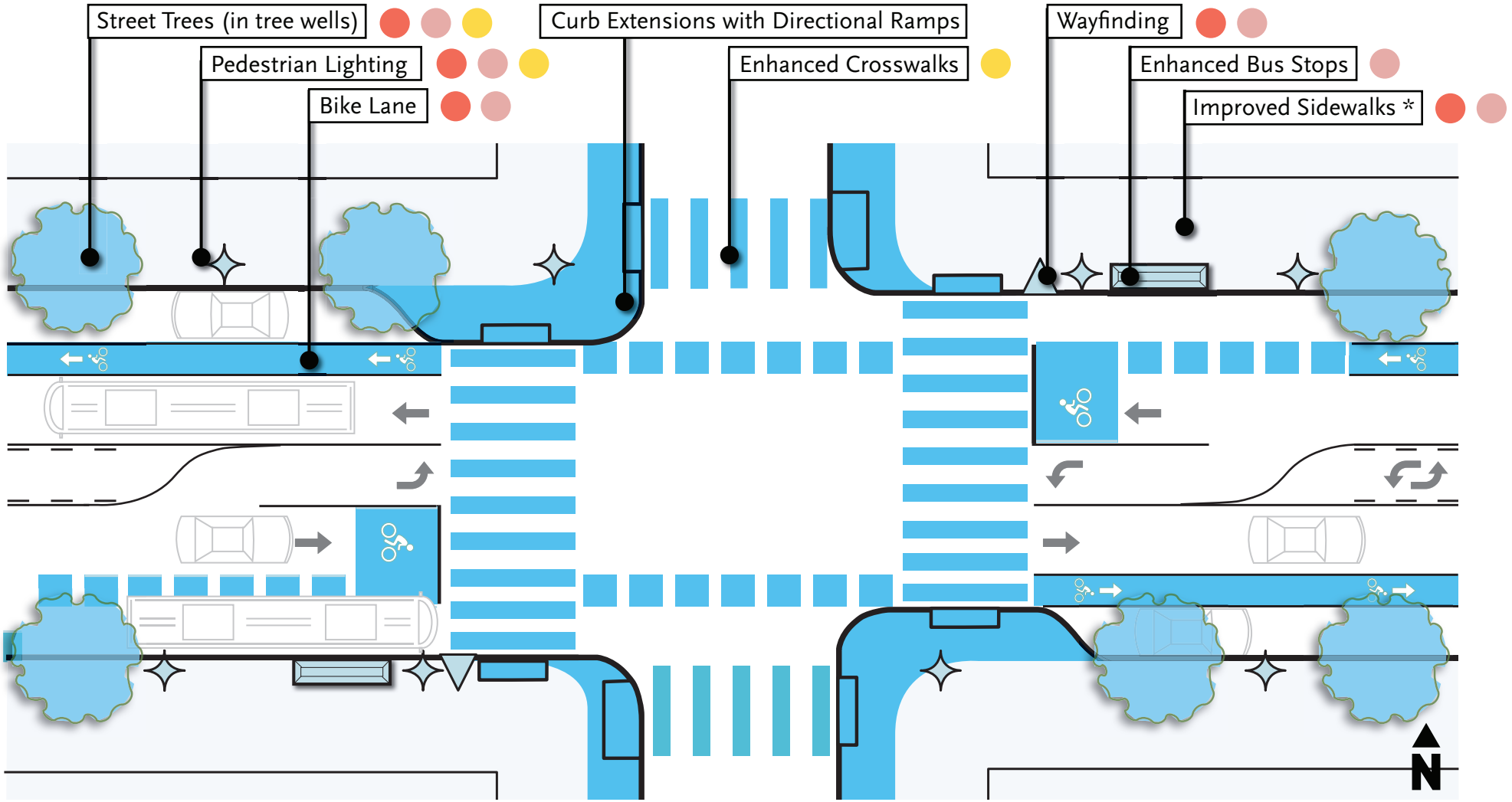
Retain parking

Add corner curb extensions

Add bike lane

Jefferson Blvd

Typical Intersection

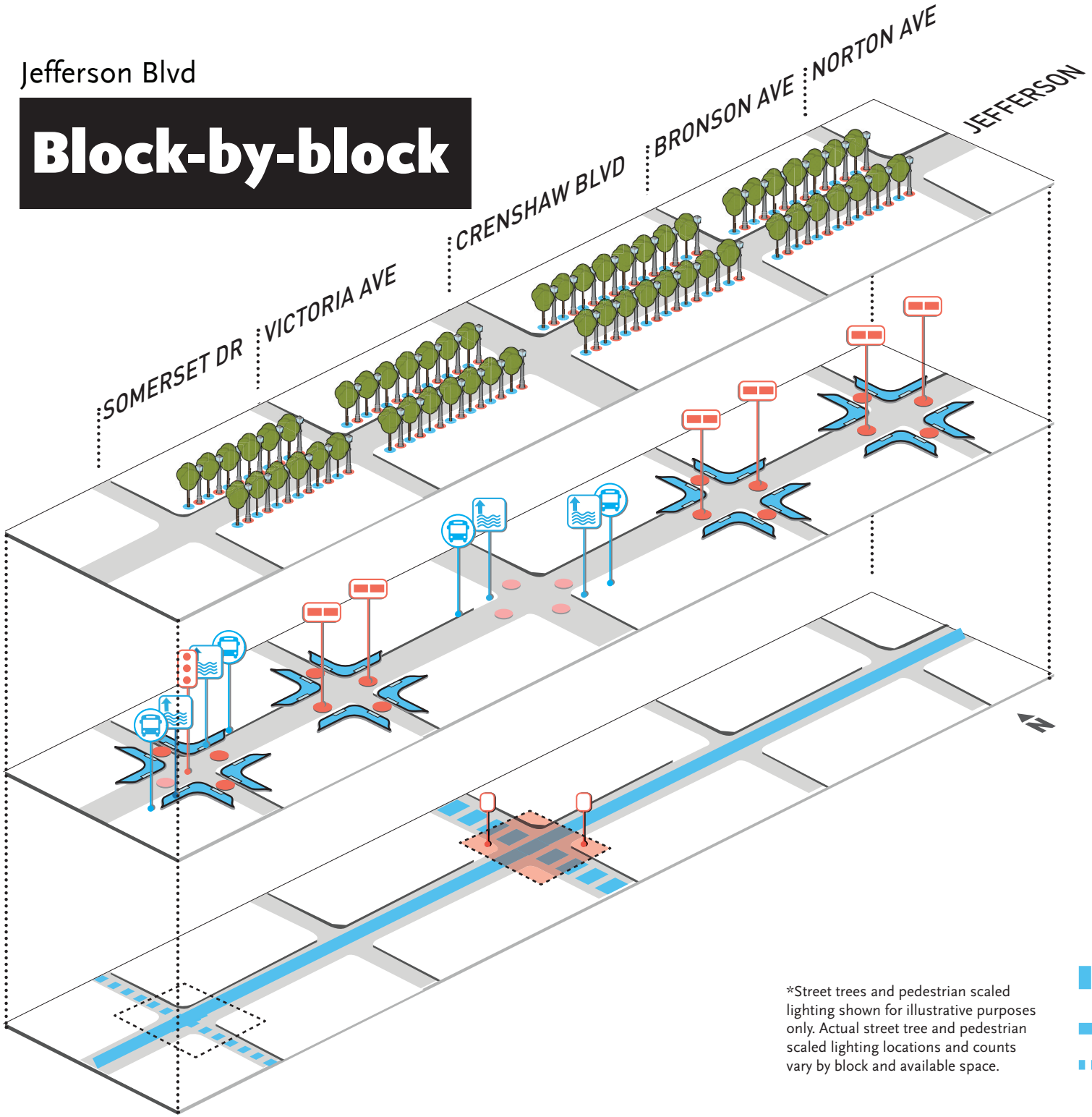


- *Recommended during a stakeholder meeting*
- *Recommended during the community pop-up*
- *Element in the top 3 of those supported in the online survey*

* *Further study needed to identify specific spot locations for sidewalk improvements. Not included in cost estimate.*

Jefferson Blvd

Block-by-block



*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

Comfort

- Street Tree Infill* (30' on center)
- Pedestrian Scaled Lighting* (30' on center)

Access

- Enhanced Crosswalks
- Existing Crosswalks
- New Traffic Signal
- Rectangular Rapid Flashing Beacon & Reflective Raised Pavement Markers
- Enhanced Bus Stop
- Wayfinding
- Corner Curb Extensions with Directional Curb Ramps

Mobility

- Bike Friendly Intersection (e.g. Bike boxes, conflict striping, bike signage, etc)
- Protected Intersection
- Bike Signal
- 8-80 Protected Bike Lane (Class IV)
- Bike Lane (Class II)
- Greenway (Class III)

How much will this cost?

Pedestrian Projects

Street trees (in parkway)	$32,000
Street trees (in tree well)	$74,000
Pedestrian lighting	$592,200
Bulb-outs with directional curb ramps	$512,000
Enhanced crosswalks	$44,400
Enhanced bus stops	$112,000
Wayfinding	$8,400
Signal modifications	$315,000
Rectangular rapid flashing beacons	$300,000
Misc/contingency/construction/soft costs	$2,673,000
Total (rounded)	**$4,663,000**

Wheels Projects

Bike friendly intersections	$120,000
Bike lane (Class II)	$315,000
Protected intersection	$500,000
Misc/contingency/construction/soft costs	$1,258,000
Total (rounded)	**$2,193,000**

Other items recommended by the community, which were not integrated into the design plans: Traffic calming, which was recommended during stakeholder meetings. While specific measures such as speed humps are not appropriate on major vehicular thoroughfares such as Jefferson Blvd (and thus not recommended), other recommended improvements such as curb extensions and a lane reduction will likely have a traffic calming effect.

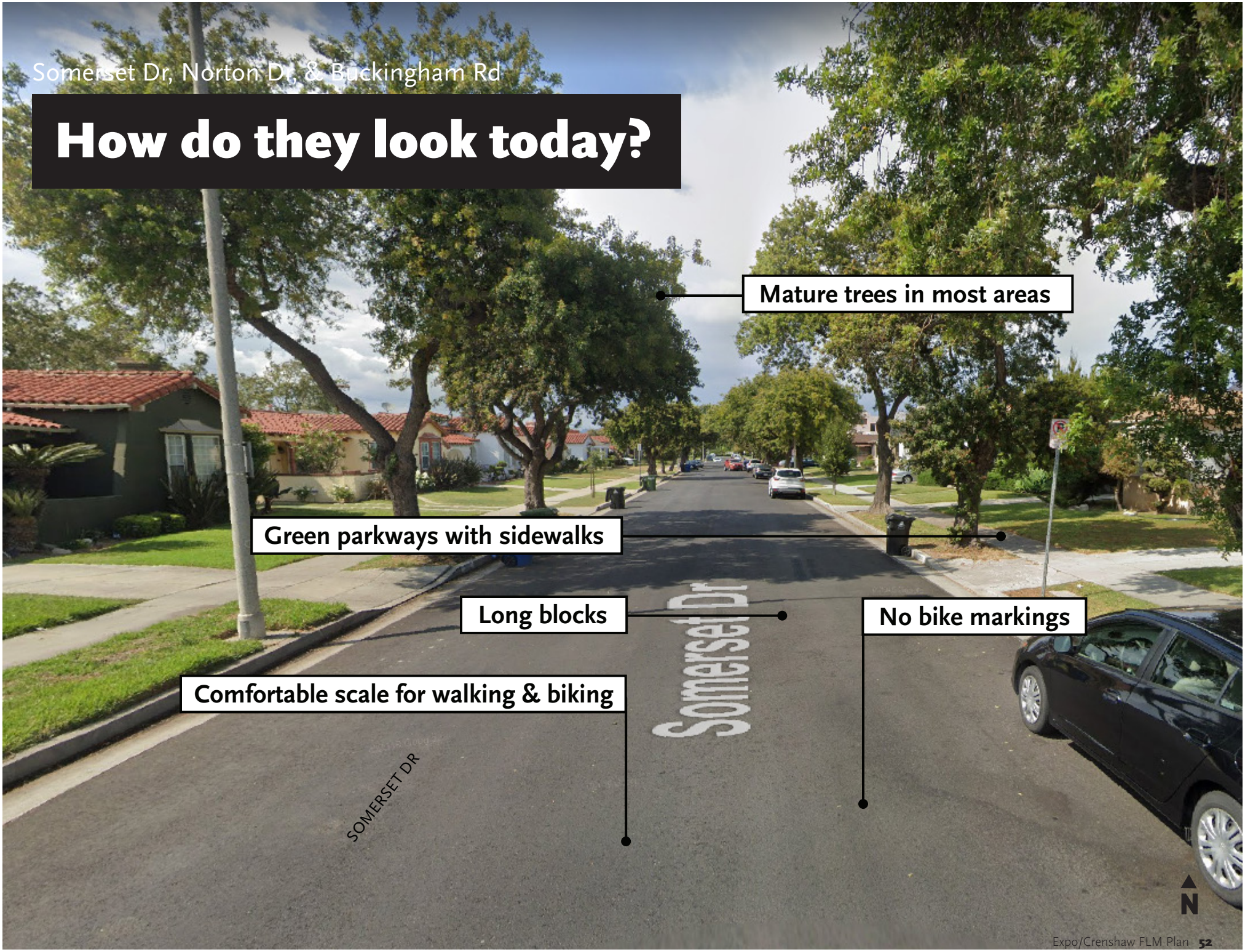
5

Somerset Dr is a residential street that runs parallel to Crenshaw Blvd. Currently, vehicles often use it as a cut through, but if the street was transformed into a safe and calm "Neighborhood Greenway" it would be great for walking and biking in a pleasant "low-stress" environment.

Norton Ave also runs parallel to Crenshaw Blvd and provides the most direct connection to the Metro station coming from the southeast on a bike. This street would also benefit from Greenway improvements to make it easier to bike and walk to and from the station.

Buckingham Rd facilitates north/south movement through the study area with existing traffic signals at major intersections, including a crossing at Exposition Blvd over the Expo Line tracks. Greenway improvements and traffic calming on Buckingham Rd would enhance the experience for people rolling to the station.

Somerset Dr, Norton Dr, & Buckingham Rd

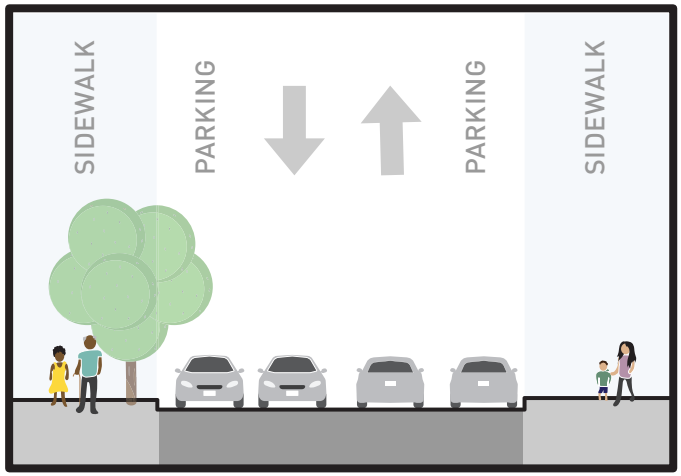

Somerset Dr, Norton Dr, & Buckingham Rd
How do they look today?
Mature trees in most areas
Green parkways with sidewalks
Long blocks
No bike markings
Comfortable scale for walking & biking
Somerset Dr
SOMERSET DR
N

Somerset Dr, Norton Dr, & Buckingham Rd

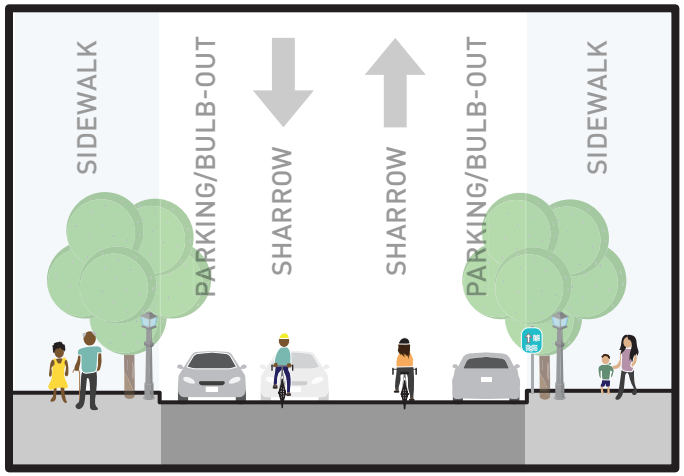
Roadway Changes

Somerset, Norton, & Buckingham* have similar character width and would generally benefit from the same suite of improvements, which is why they are grouped together in this Plan. These streets could be transformed into comfortable and desirable alternatives to Crenshaw Blvd for people walking and biking to and from the station via transformation into Neighborhood Greenways.

Existing Street



Proposed Street



Summary

No change to street right-of-way, lanes, or parking

Add in sharrow markings and Neighborhood Greenway improvements

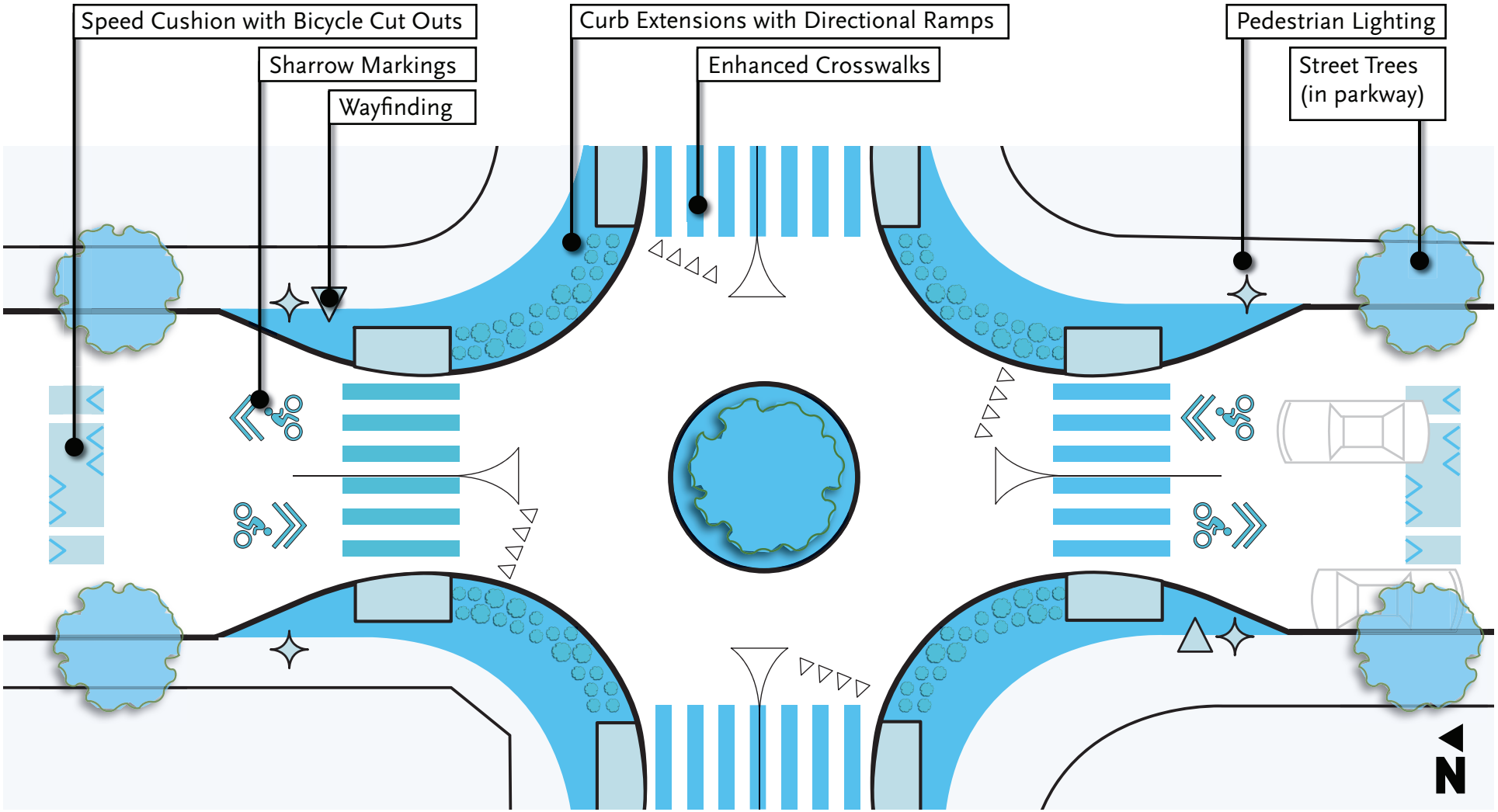
Traffic calming through corner curb extensions and speed cushions

Traffic circles are recommended along Somerset Dr and Buckingham Rd

* *Buckingham Rd width increases to 40' north of Exposition Blvd. The same suite of improvements still apply, with special emphasis on traffic calming.*

Somerset Dr, Norton Dr, & Buckingham Rd

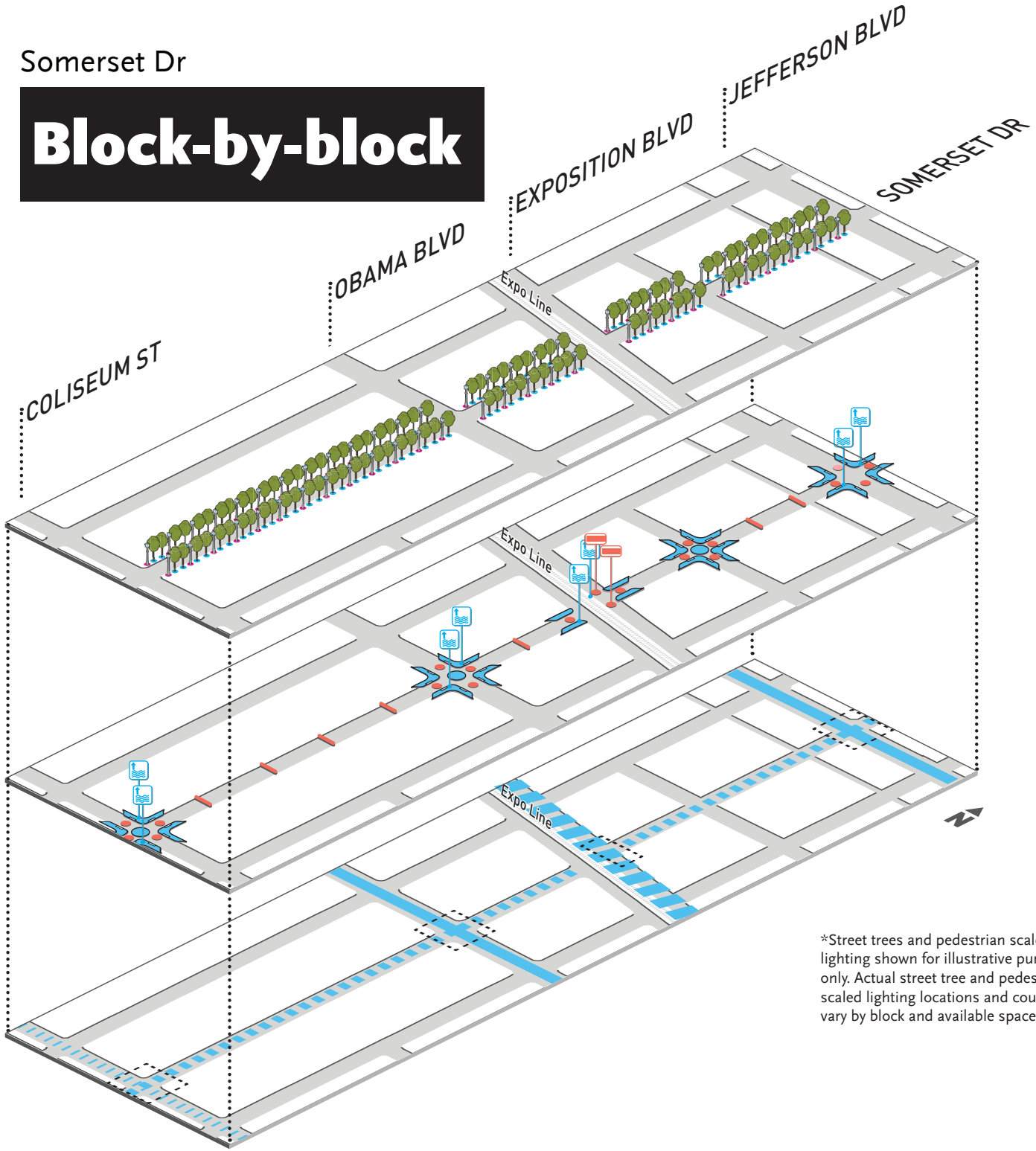
Typical Intersection



* *Note: Norton was identified by the community as a candidate for Greenway improvements. Somerset and Buckingham were not specifically identified as such, however, community members discussed the need for a north-south bicycle / Greenway connection, that could be used as a safe, slower alternative to Crenshaw Blvd. Based on this feedback, Somerset and Buckingham were identified as viable options for pedestrians and cyclists, based on their location, character, and current daily vehicular traffic. Victoria was not chosen, because of its proximity to Crenshaw (it would duplicate north/south bike movement). In addition, the character of part of the east side of Victoria is 'back of house' commercial, which is less appropriate for a Greenway.*

Somerset Dr

Block-by-block



*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

Comfort

- Street Tree Infill* (30' on center)
- Pedestrian Scaled Lighting* (60' on center)

Access

- Enhanced Crosswalks
- Existing Crosswalks
- Wayfinding
- Corner Curb Extensions with Directional Curb Ramps
- Traffic Circle
- Speed Humps
- Rectangular Rapid Flashing Beacon & Reflective Raised Pavement Markers

Mobility

- Bike Friendly Intersection (e.g. Bike boxes, conflict striping, bike signage, etc)
- 8-80 Protected Bike Lane (Class IV)
- Bike Lane (Class II)
- Greenway (Class III)
- Advisory Bike Lane (Class III)

How much will this cost?

Somerset Dr

Pedestrian Projects

Street trees (in parkway)	$134,400
Pedestrian lighting	$522,900
Bulb-outs with directional curb ramps	$640,000
Enhanced crosswalks	$39,220
Wayfinding	$16,800
Signal modifications	$315,000
Speed cushions	$29,600
Misc/contingency/construction/soft costs	$2,281,000
Total (rounded)	**$3,979,000**

Wheels Projects

Bike signals	$25,000
Bike friendly intersections	$150,000
Neighborhood Greenway (Class III)	$115,000
All pedestrian projects (above), and traffic circles for full 1 mile*	$5,296,160
Misc/contingency/construction/soft costs	$7,498,000
Total (rounded)	**$13,085,000**

Somerset Dr was not a focus of conversations during stakeholder meetings and was not explicitly discussed in the pop-up or online survey. Somerset Dr was added by the design team as a key corridor, because of the community-stated desire for a north-south alternative to Crenshaw Blvd, for walking and biking.

Somerset links to the Metro station via Exposition Blvd - either along the proposed two-way protected bike facility on the north side of the Expo Line tracks, or along the south side of the tracks.

**Because Somerset Dr is identified as a Neighborhood Greenway, pedestrian improvements should accompany any wheel improvements that are constructed. For this costing breakdown, all pedestrian improvements (extended to the bicycle 1-mile radius) are accounted for in the Wheels Projects costing.*

How much will this cost?

Norton Dr

Pedestrian Projects

Street trees (in parkway)	$76,800
Pedestrian lighting	$403,200
Bulb-outs with directional curb ramps	$96,000
Enhanced crosswalks	$14,800
Wayfinding	$10,500
Rectangular rapid flashing beacons	$100,000
Speed cushions	$14,800
Misc/contingency/construction/soft costs	$965,000
Total (rounded)	**$1,682,000**

Wheels Projects

Bike friendly intersections	$90,000
Neighborhood Greenway (Class III)	$60,800
All pedestrian projects (above) for full 1 mile*	$2,720,820
Misc/contingency/construction/soft costs	$3,856,000
Total (rounded)	**$6,728,000**

The City of LA's *Crenshaw Blvd Streetscape Plan* has identified Degnan Blvd as a proposed bike lane and this First/Last Mile plan adds Norton Ave as a Neighborhood Greenway for First/Last Mile access. It was selected as a key pathway due its proximity to the station, its residential and friendly character, and because it provides a more direct connection to the Expo/ Crenshaw station compared to Degnan, for people traveling from the southeast neighborhoods. Norton Ave also connects to the existing bike lane on Degnan Blvd south of MLK Blvd.

**Because Norton Dr is identified as a Neighborhood Greenway, pedestrian improvements should accompany any wheel improvements that are constructed. For this costing breakdown, all pedestrian improvements (extended to the bicycle 1-mile radius) are accounted for in the Wheels Projects costing.*

How much will this cost?

Buckingham Rd

Pedestrian & Wheels Projects

Street trees (in parkway)	$432,000
Street trees (in tree well)	$251,600
Pedestrian lighting	$3,496,500
Bulb-outs with directional curb ramps	$1,760,00
Enhanced crosswalks	$176,120
Wayfinding	$50,400
Signal modifications	$315,000
Speed cushions	$103,600
Traffic circle	$157,500
Bike signals	$675,000
Bike friendly intersections	$60,000
Bike lane (Class II)	$15,000
Neighborhood Greenway (Class III)	$131,200
Misc/contingency/construction/soft costs	$9,804,000
Total (rounded)	**$17,113,000**

Buckingham Rd was not a focus of conversations during stakeholder meetings and was not explicitly discussed in the pop-up or online survey. Buckingham Rd was added by the design team as a key corridor, because of the community-stated desire for a north-south bike connections.

Buckingham Rd links to the Metro station via Exposition Blvd - either along the proposed two-way protected bike facility on the north side of the Expo Line tracks, or along the south side of the tracks.

**Because Buckingham Rd is identified as a Neighborhood Greenway, pedestrian improvements should accompany any wheel improvements that are constructed. Buckingham Rd runs outside of the 1/4 mile radius. For this costing breakdown, all pedestrian and wheels improvements (extended to the bicycle 1-mile radius) are accounted for.*

6

Coliseum St is an east-west residential corridor just beyond the ¼-mile,* south of the Metro station. Coliseum is identified as a Bike Blvd (Class III) in the City of LA's *Mobility Plan* and would connect to the existing bike lane west of MLK Blvd. The First/Last Mile recommendation in this Plan is to upgrade this street to an "Advisory Bike Lane" in both directions and add pedestrian improvements. Since an Advisory Bike Lane is currently an FHWA Experimental Facility, two other design options are included, in case the preferred option is not feasible.

** Although Coliseum St is just outside the 1/4 mile radius from the station, it is included in detail here, because it was brought up many times in community conversations and represents a key street for station access.*

Coliseum St

Coliseum St

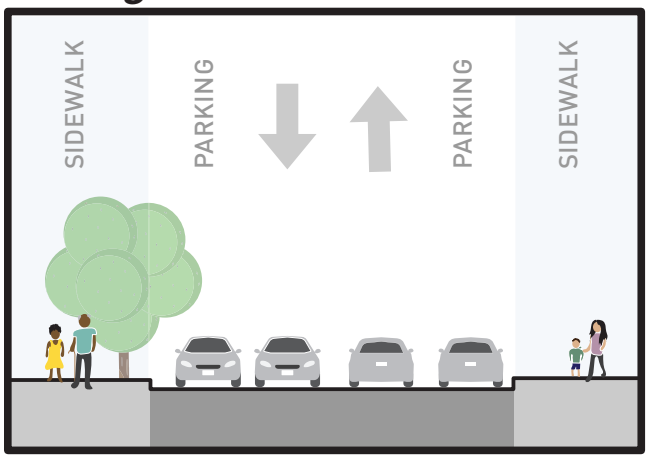
How does it look today?

Looking west

Coliseum St

Roadway Changes

Existing Street



Summary

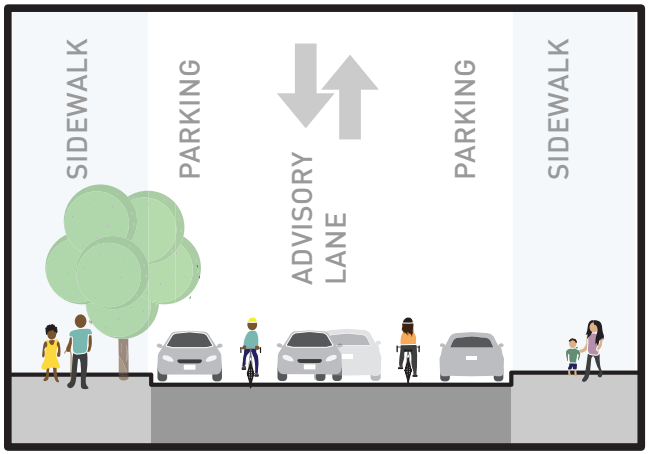
Preferred Concept A: Add Advisory Lane and introduce a shared travel lane

Option B: Introduce corner curb extensions and sharrow markings

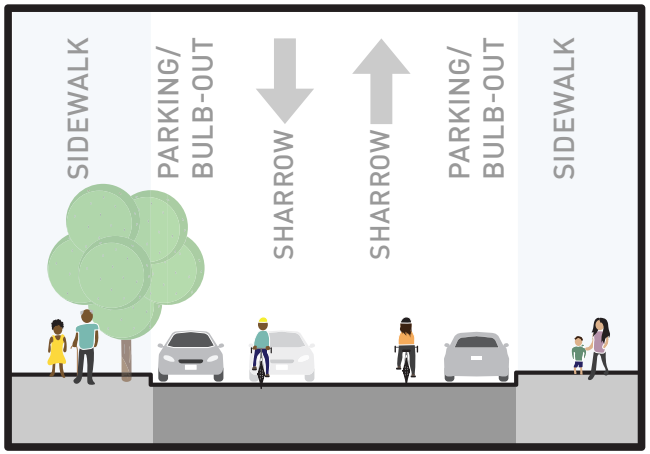
Option C: Replace parking with a buffered bike lane along the curb

Retain all parking in Options A and B

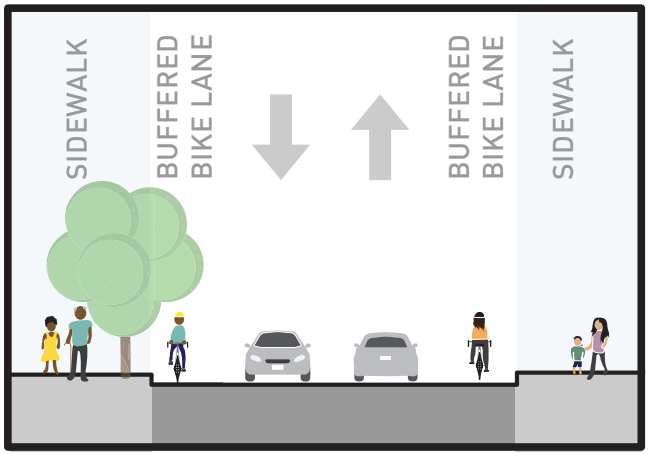
Proposed Street: Preferred (A)



Proposed Street: Option B



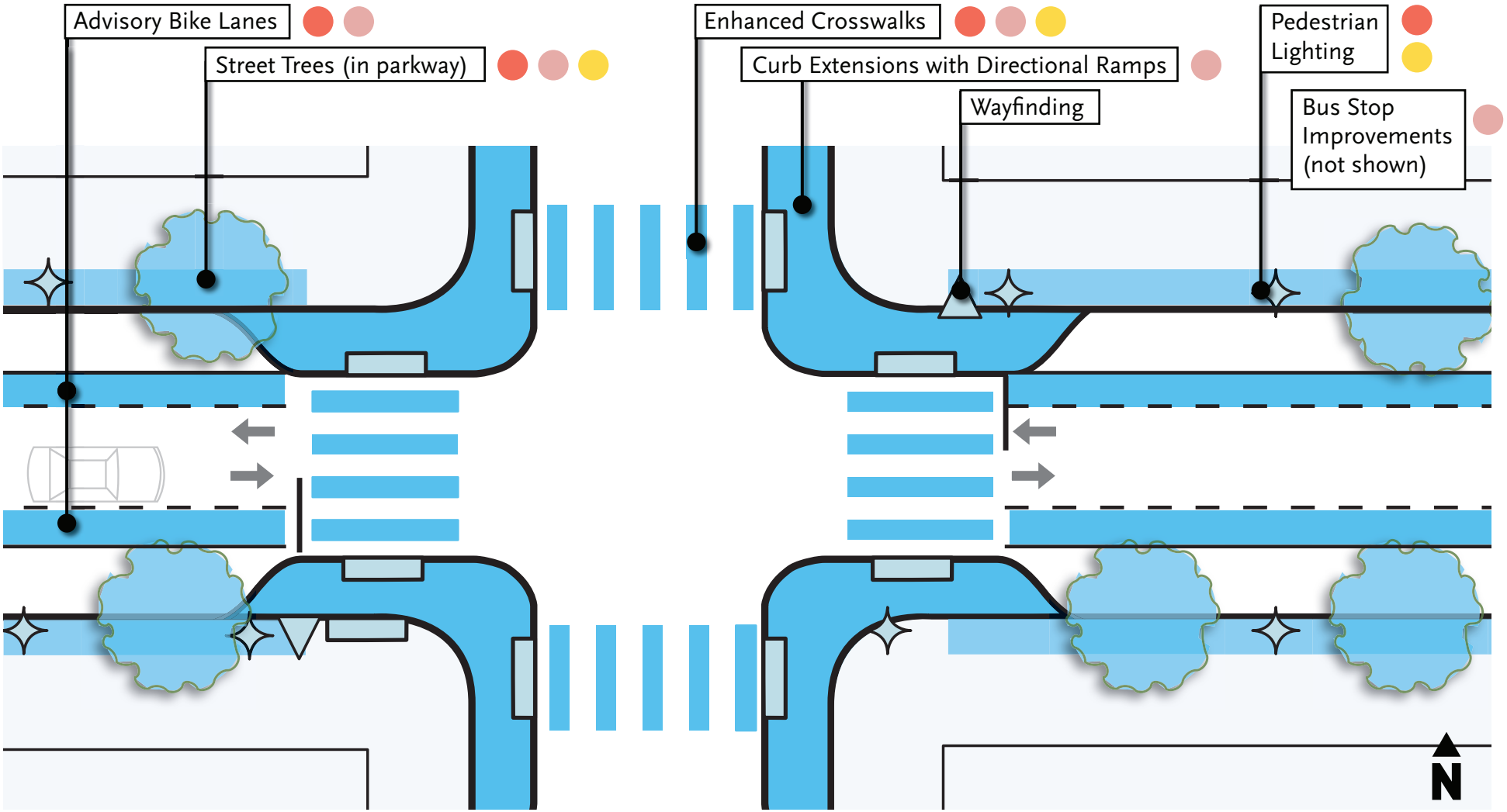
Proposed Street: Option C



Coliseum St

Typical Intersection

(Preferred Concept: Advisory Bike Lanes)



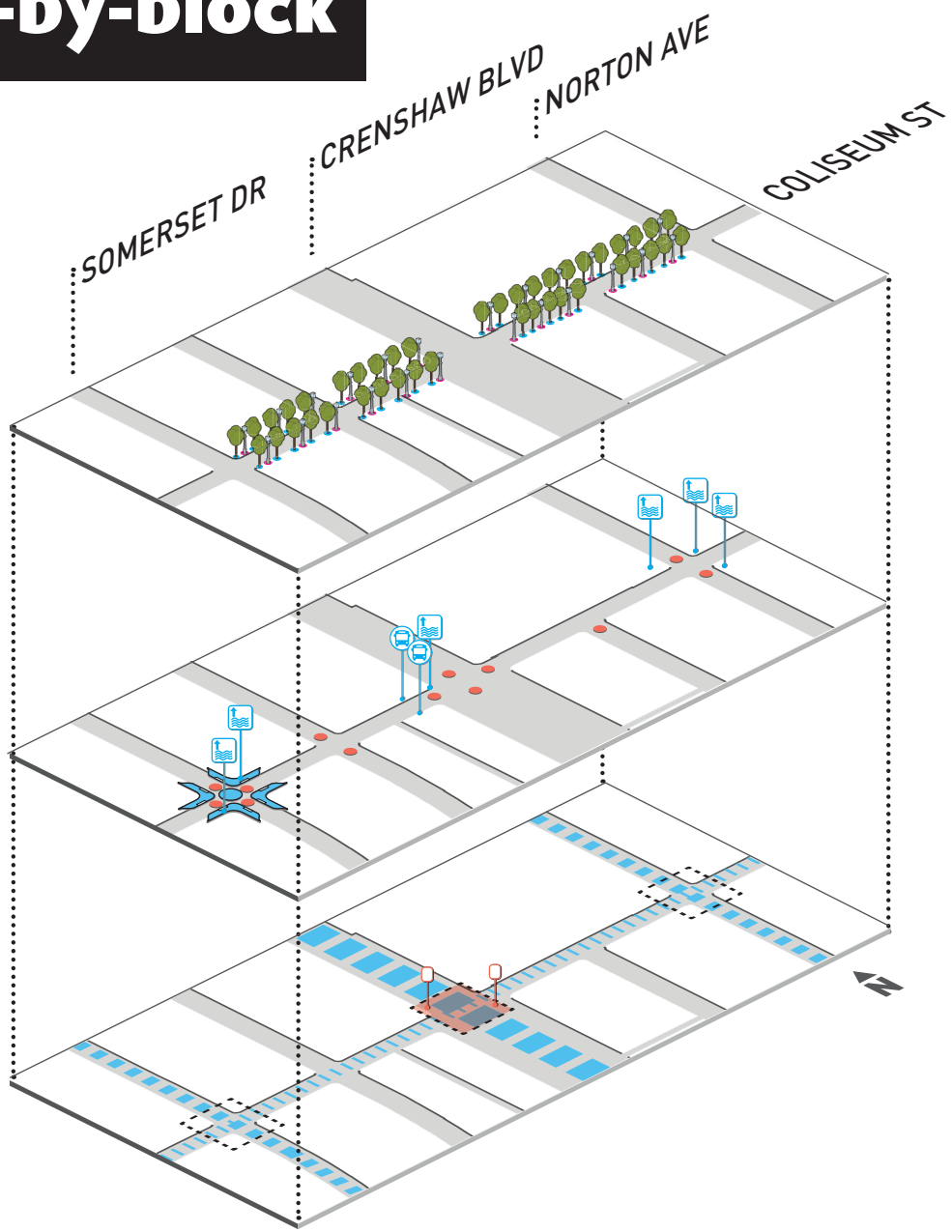
Recommended during a stakeholder meeting

Recommended during the community pop-up

Element in the top 3 of those supported in the online survey

Coliseum St

Block-by-block



Comfort

- Street Tree Infill* (30' on center)
- Pedestrian Scaled Lighting* (60' on center)

Access

- Enhanced Crosswalks
- Enhanced Bus Stop
- Wayfinding
- Corner Curb Extensions with Directional Curb Ramps
- Traffic Circle

Mobility

- Bike Friendly Intersection (e.g. Bike boxes, conflict striping, bike signage, etc)
- Protected Intersection
- Bike Signal
- 8-80 Protected Bike Lane (Class IV)
- Greenway (Class III)
- Advisory Bike Lane (Class III)

*Street trees and pedestrian scaled lighting shown for illustrative purposes only. Actual street tree and pedestrian scaled lighting locations and counts vary by block and available space.

How much will this cost?

Pedestrian Projects

Street trees (in parkway)	$38,400
Street trees (in tree well)	$114,700
Pedestrian lighting	$478,800
Bulb-outs with directional curb ramps	$128,000
Enhanced crosswalks	$55,870
Enhanced bus stops	$56,000
Wayfinding	$12,600
Misc/contingency/construction/soft costs	$1,192,000
Total (rounded)	**$2,077,000**

Wheels Projects

Bike signals	$50,000
Bike friendly intersections	$150,000
Advisory bike lane (Class III experimental facility)*	$158,400
Misc/contingency/construction/soft costs	$484,000
Total (rounded)	**$843,000**

**Consult existing best practices and literature on Advisory Bike Lanes. Resources such as "FHWA Guidance - Dashed Bicycle Lanes" along with the website www.advisorybikelanes.com may be helpful. Special experimental approval is required, which requires time and attention from City staff.*

Other items recommended by the community, which were not integrated into the design plans: Traffic calming, which was recommended during stakeholder meetings, will likely result from the redesign of travel lanes, however specific measures such as speed humps have not been included. Street furniture was also recommended by the community, however is not recommended due to the residential character of the existing street.

The preferred concept for Coliseum St includes an Advisory Bike Lane, which is currently an FHWA Experimental Facility.*

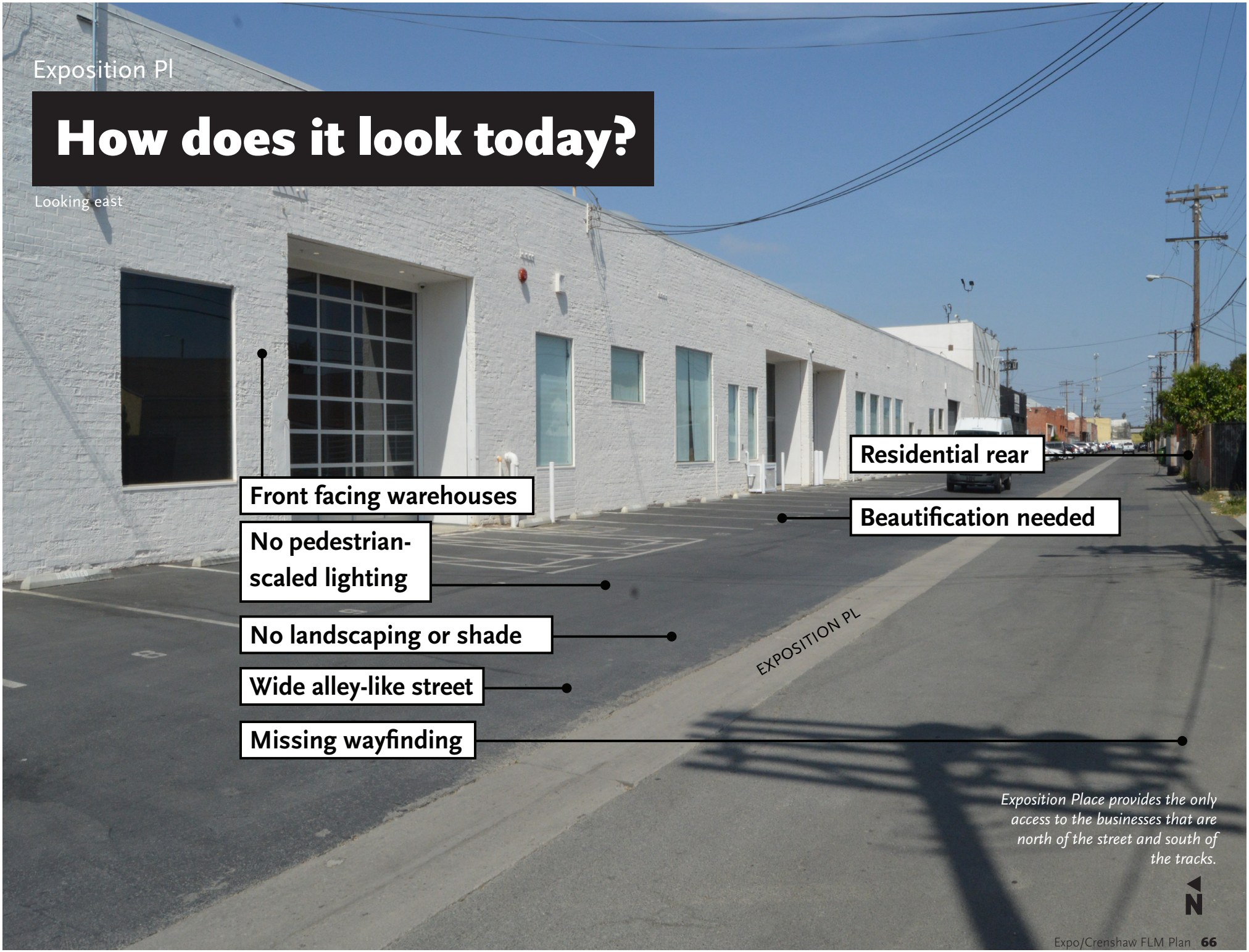
7

Exposition Pl is currently an alley-like street that separates commercial from residential areas. This Plan recommends that Exposition Pl is transformed into a "Shared Street" offering an alternative, "low-stress" route for people walking and biking. Green spaces can be introduced along the corridor, by converting a few parking spaces into mini-parks and planted areas. Walk, bike, and drive areas are all at the same grade and can have permeable paving.

Exposition Pl

How does it look today?

Looking east

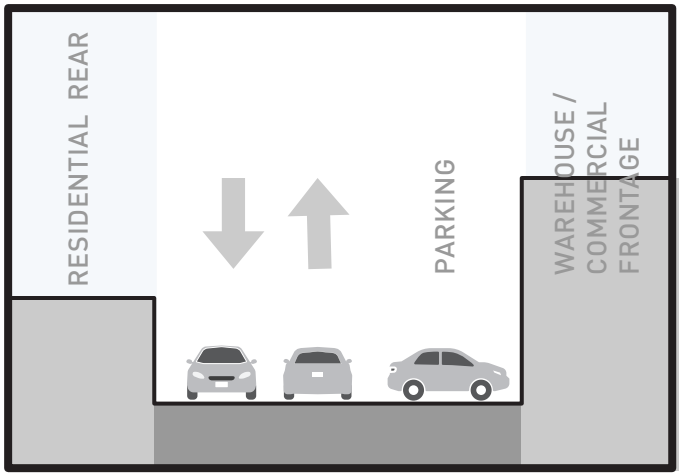


Exposition Place provides the only access to the businesses that are north of the street and south of the tracks.

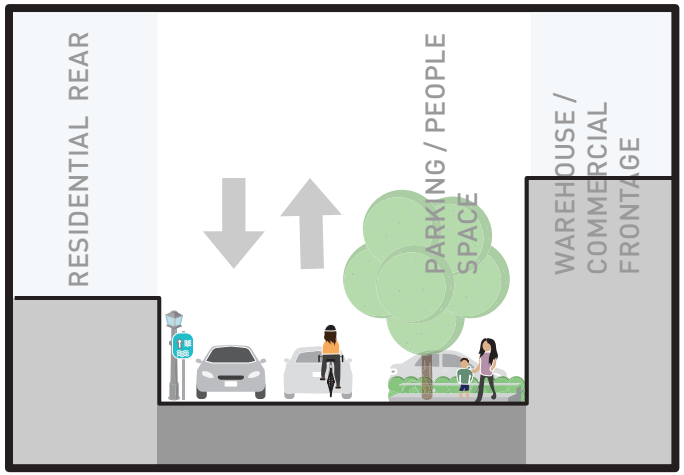
N

Roadway Changes

Existing Street



Proposed Street



Summary

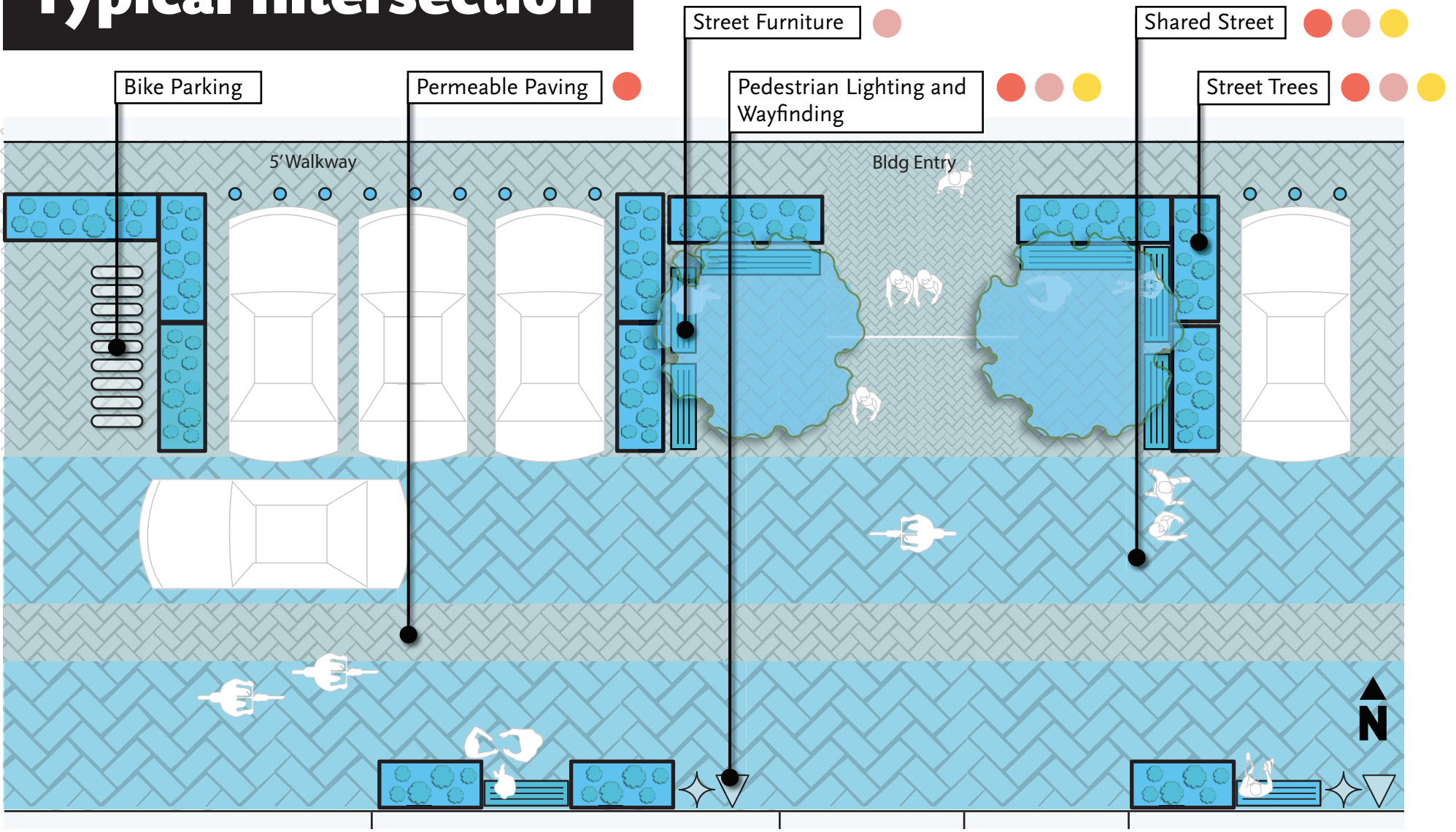
No change to street right-of-way width

Integrate permeable paving in the full right-of-way

Convert a few of the parking spaces to people paces

(e.g. mini parks, bike parking corrals, seating, landscaping, etc.)

Typical Intersection



Recommended during a stakeholder meeting

Recommended during the community pop-up

Element in the top 3 of those supported in the online survey

Exposition Pl

Before-and-After

Today

Tomorrow: Envisioning the Improvements on Exposition Pl

How much will this cost?

Pedestrian Projects

Street trees (in tree well)	$74,000
Pedestrian lighting	$264,600
Wayfinding	$4,200
Parking/people spaces	$1,488,000
Movement space	$1,488,000
Street furniture clusters	$300,000
Misc/contingency/construction/soft costs	$4,857,000
Total (rounded)	**$8,476,000**

Other items recommended by the community, which were not integrated into the design plans: Traffic calming, which was recommended during stakeholder meetings. The reconfiguration of the street into a "Shared Street" will help to calm traffic.

Wheels Projects

Neighborhood Greenway (Class III)	$19,840
Bike parking (arranged in 5 clusters)	$30,000
Misc/contingency/construction/soft costs	$74,000
Total (rounded)	**$124,000**

Project Prioritization

The scoring system to prioritize projects takes into consideration how well each project improves safety, comfort, community input, & connectivity.

How it Shakes Out

Each project was scored out of 100 possible points for Pedestrian Projects and 100 possible points for Wheels Projects. To ensure a consistent prioritization method across all of Metro's first/last mile plans and projects, the scoring criteria followed Metro's First/Last Mile Prioritization Framework, and referenced the recent East San Fernando Valley Transit Corridor Prioritization Methodology. The Framework is designed with clear categories: **Safety, Comfort, Community input, and Connectivity,** and within these categories the framework can be tweaked and refined based on the parameters of the particular Plan. The weighting criteria selected for this Plan is shown on the following page and then the Prioritized Project Lists are contained on pages 73 and 74.

If the project contains the elements listed in each category or satisfies the criteria, then that project receives the corresponding points. The projects with the most points rise to the top as "prioritized."

Community input weighs up to 25% for pedestrian and wheels project prioritization scores.

Pedestrian Projects Total Possible Points: 100

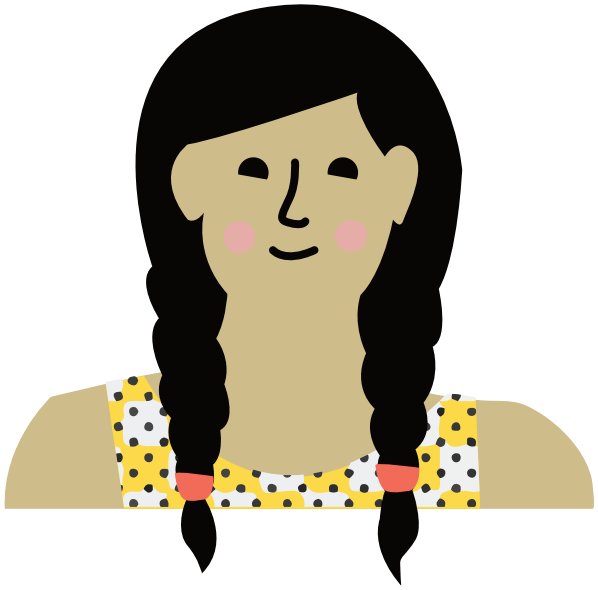
Safety	**35**
New or Improved Crosswalks	6
Pedestrian Lighting	6
Curb Extensions	6
ADA Access Ramps	6
Traffic Calming	6
Pedestrian/Vehicle Collisions (SWITRS, 2013-2017) > 10 collisions ..... 5 pts 5-10 collisions ..... 3 pts <5 collisions ..... 1 pt	5
Comfort	**25**
Landscaping & Shade	10
Bus Stop Enhancements	7
Street Furniture	4
Wayfinding	4
Community Input	**25**
Weighted Formula (Total # of votes/Highest # of votes x 25)	25
Connectivity	**15**
Located on Pathway Arterial	15

Wheels Projects Total Possible Points: 100

Safety & Comfort	**60**
Bicycle/Vehicle Collisions (SWITRS, 2013-2017) > 10 collisions ..... 5 pts 5-10 collisions ..... 3 pts <5 collisions ..... 1 pt	5
NACTO Guidelines 8 to 80 Facility (vertical buffer / protected).... 25 pts Greenway ..... 20 pts (Class III enhanced for bikes and peds) Other bike facility ..... 15 pts	25
Controlled Crossings Yes ..... 10 pts No ..... 0 pts	10
Connection to the Station Directly to the station ..... 10 pts Within one block (500 feet) of the station..... 5 pts	10
Connected the Existing Network Yes ..... 10 pts No ..... 0 pts	10
Community Input	**25**
Weighted Formula (Total # of votes/Highest # of votes x 25)	25
Connectivity	**15**
On Pathway Arterial or on a parallel street that is within 1/4 mi of that Arterial	10
Project connects station (within 500 ft) to regional destination	5

Pedestrian Priorities

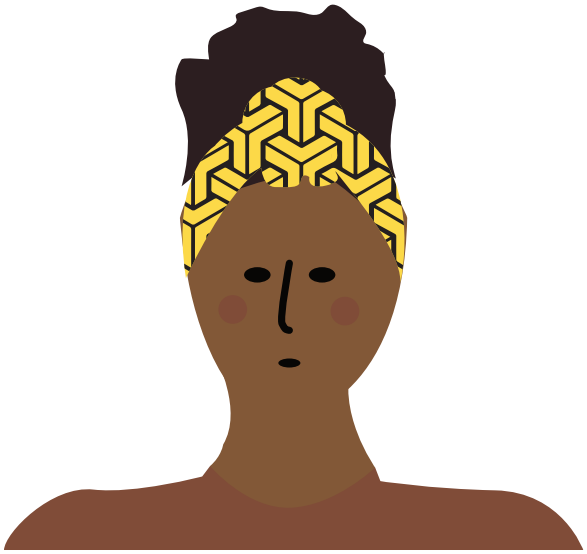
For Pedestrian Projects, the three top ranked streets are **Crenshaw Blvd, Exposition Blvd,** and **Jefferson Blvd.**



Name	*Type*	Safety Score (35 max)	Comfort Score (25 max)	Community Input Score (25 max)	Connectivity Score (15 max)	Total Pedestrian Score (100 max)
Crenshaw Blvd	*Arterial*	23	25	25	15	**88.0**
Exposition Blvd	*Arterial*	25	14	13	15	**67.5**
Jefferson Blvd	*Collector*	29	21	13	0	**62.9**
Coliseum St	*Collector*	33	21	6	0	**60.5**
Obama Blvd	*Collector*	27	14	15	0	**55.5**
Somerset Dr	*Collector*	31	14	0	0	**45.0**
Norton Ave	*Collector*	25	14	0	0	**39.5**
Exposition Pl	*Collector*	7	14	4	0	**24.5**
Alley Improvements (E of Crenshaw)	*Cut-Through*	7	4	0	0	**11.0**

Wheels Priorities

For Wheels Projects, the three top ranked streets are **Crenshaw Blvd, Exposition Blvd,** and **Obama Blvd.**



Name	*Type*	Safety & Comfort Score (60 max)	Community Input Score (25 max)	Connectivity Score (15 max)	Total Wheels Score (100 max)
Crenshaw Blvd	*Arterial*	60	25	15	**100.0**
Exposition Blvd	*Arterial*	58	12	15	**85.0**
Obama Blvd	*Collector*	41	18	15	**73.7**
Jefferson Blvd	*Collector*	40	12	10	**62**
Somerset Dr	*Collector*	46	0	10	**56.0**
Norton Ave	*Collector*	41	1	10	**52.0**
Exposition Pl	*Collector*	31	4	10	**44.6**
Coliseum St	*Collector*	38	6	0	**43.7**
Alley Improvements (E of Crenshaw)	*Cut-Through*	N/A	N/A	N/A	**N/A**

This Plan lays out a vision for the future - a vision which needs to be actively pursued by multiple parties to make it a reality.

Looking to the Future

The content in this plan is designed to be used in support of funding applications from a variety sources, such as active transportation and streetscape grants. Recommended projects are high level concepts - specific design elements are not included nor specified. Further design investigation and ongoing community conversations are critical. Likewise, it is important that ownership, installation, and maintenance responsibilities of projects and project elements are established as project design moves forward. Further coordination among the City of Los Angeles, Metro, and community stakeholders will be necessary to identify and move forward priority first/last mile projects.

Since projects are located on public streets, the City of Los Angeles should take the lead on project implementation moving forward. As conversations and ideas evolve for the projects, street surveys and advanced designs should be undertaken on select priority streets. Any project proposed to reallocate travel lanes will need to undergo further evaluation prior to final decisions to fund or implement a project. Streetscape improvements should be vetted through the City of LA's *Street Working Group Committee* in order to receive and address additional feedback. Final approval will be needed from other City departments represented in the committee. In addition, designs for the Advisory Bike Lane would need to be presented to LADOT's *Complete Streets Committee*. Best practices relating to the elements proposed, along with existing City guidance and procedures should be followed, for example for lane reallocation projects (*Roadway Reconfiguration Guidelines*). Ongoing community participation should take place throughout the life of the project and should be a central part of the process.

Metro

Appendix A

The Toolkit

Images are illustrative only - design specification is not intended.

Corner Curb Extensions

Shared Street (Woonerf)

RRFB

Reflective Raised Pavement Markers

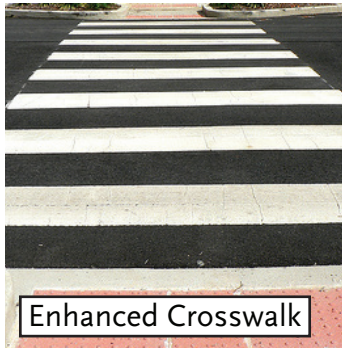
Street Trees & Landscaping

Pedestrian Lights

Wayfinding Signage

Street Furniture

Bus Stop Improvements


Enhanced Crosswalk

Real-Time Signage

Directional Ramps

Toolkit (Continued)

Protected Bike Lane

Bi-Directional Bike Facility

Bike Lane

Neighborhood Greenway

Sharrow Markings

Protected Intersection

Bike Box

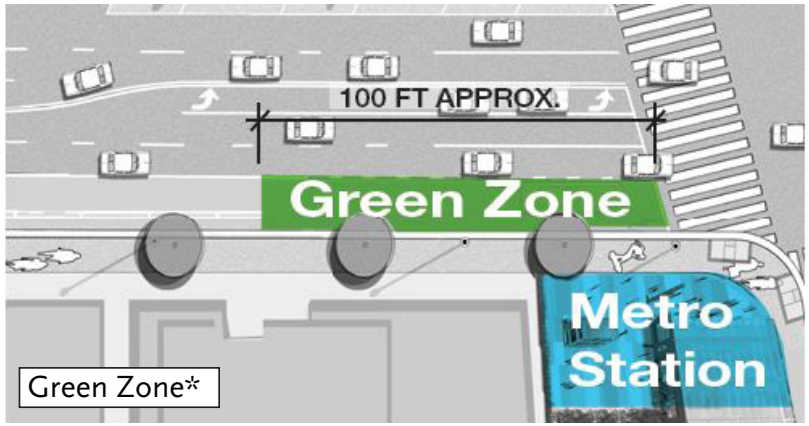
Bike share

Neighborhood Traffic Circle

Speed Cushion

Toolkit (Continued)

Bike Conflict Striping



Green Zone*

** From LA Metro's First/Last Mile Strategic Plan*

Appendix B

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Jefferson Blvd - Ped Project

Description

Somerset Dr to S Norton Ave

Link Length LF 1,560

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	20	EA	$1,600	$32,000
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	20	EA	$3,700	$74,000
	Ped lighting 2 sides @ 30 FT OC	94	EA	$6,300	$592,200
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	16	EA	$32,000	$512,000
	Enhanced crosswalks	600	LF	$74	$44,400
	Enhanced Bus stops	4	EA	$28,000	$112,000
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	4	EA	$2,100	$8,400
	Signal modifications	1	EA	$315,000	$315,000
	Rectangular Rapid Flashing Beacons	6	EA	$50,000	$300,000
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0
	Estimated Cost Subtotal				**$1,990,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$100,000
	Mobilization (10% of Estimated Cost Subtotal)				$199,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$199,000
	Contingencies (35% of Estimated Cost Subtotal)				$697,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$3,185,000**
	Planning (2% of Estimated Construction Cost Total)				$64,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$160,000
	Final Design Services (8% of Estimated Construction Cost Total)				$255,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$287,000
	CM (5% of Estimated Construction Cost Total)				$160,000
	Legal, Permits, 3rd Parties etc. (4%)				$128,000
	SOFT COSTS TOTAL				**$1,054,000**
	Unallocated Contingecy (10%)				$424,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$424,000** $2,673,000
	TOTAL ESTIMATED PROJECT COST:				**$4,663,000** $4,663,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Jefferson Blvd - Wheel Project

Description

S. Rimpau Bld junction to Arlington Ave.

Link Length LF 10,500

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signal	0	EA	$25,000	$0
	Bicyle Friendly Intersections	4	EA	$30,000	$120,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	21000	LF	$15	$315,000
	Greenway with Sharrows (Class III) inc markings, signs	0	LF	$16	$0
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Protected Intersection	1	EA	$500,000	$500,000
	Estimated Cost Subtotal				**$935,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$47,000
	Mobilization (10% of Estimated Cost Subtotal)				$94,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$94,000
	Contingencies (35% of Estimated Cost Subtotal)				$328,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$1,498,000**
	Planning (2% of Estimated Construction Cost Total)				$30,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$75,000
	Final Design Services (8% of Estimated Construction Cost Total)				$120,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$135,000
	CM (5% of Estimated Construction Cost Total)				$75,000
	Legal, Permits, 3rd Parties etc. (4%)				$60,000
	SOFT COSTS TOTAL				**$495,000**
	Unallocated Contingecy (10%)				$200,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$200,000** $1,258,000
	TOTAL ESTIMATED PROJECT COST:				**$2,193,000** $2,193,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Obama Blvd - Ped Project

Description

Virginia Rd to Edgehill Dr

Link Length LF 2600

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	70	EA	$1,600	$112,000
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	36	EA	$3,700	$133,200
	Ped lighting 2 sides @ 75 FT OC	78	EA	$6,300	$491,400
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	21	EA	$32,000	$672,000
	Enhanced crosswalks	1120	LF	$74	$82,880
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	7	EA	$2,100	$14,700
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacons	8	EA	$50,000	$400,000
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0

	Estimated Cost Subtotal	**$1,907,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)	$96,000
	Mobilization (10% of Estimated Cost Subtotal)	$191,000
	Utility Allowance (10% of Estimated Cost Subtotal)	$191,000
	Contingencies (35% of Estimated Cost Subtotal)	$668,000
	ESTIMATED CONSTRUCTION COST TOTAL	**$3,053,000**
	Planning (2% of Estimated Construction Cost Total)	$62,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)	$153,000
	Final Design Services (8% of Estimated Construction Cost Total)	$245,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)	$275,000
	CM (5% of Estimated Construction Cost Total)	$153,000
	Legal, Permits, 3rd Parties etc. (4%)	$123,000
	SOFT COSTS TOTAL	**$1,011,000**
	Unallocated Contingecy (10%)	$407,000
	UNALLOCATED CONTINGENCY COST TOTAL	**$407,000** $2,564,000
	TOTAL ESTIMATED PROJECT COST:	**$4,471,000** $4,471,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Obama Blvd - Wheel Project

Description

Martin Luther King to Arlington Ave

Link Length LF 10800

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	2	EA	$25,000	$50,000
	Bicyle Friendly Intersections	5	EA	$30,000	$150,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	21600	LF	$15	$324,000
	Greenway with Sharrows (Class III) inc markings, signs	0	LF	$16	$0
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Protected Intersection	0	EA	$500,000	$0

	Estimated Cost Subtotal	**$524,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)	$27,000
	Mobilization (10% of Estimated Cost Subtotal)	$53,000
	Utility Allowance (10% of Estimated Cost Subtotal)	$53,000
	Contingencies (35% of Estimated Cost Subtotal)	$184,000
	ESTIMATED CONSTRUCTION COST TOTAL	**$841,000**
	Planning (2% of Estimated Construction Cost Total)	$17,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)	$43,000
	Final Design Services (8% of Estimated Construction Cost Total)	$68,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)	$76,000
	CM (5% of Estimated Construction Cost Total)	$43,000
	Legal, Permits, 3rd Parties etc. (4%)	$34,000
	SOFT COSTS TOTAL	**$281,000**
	Unallocated Contingecy (10%)	$113,000
	UNALLOCATED CONTINGENCY COST TOTAL	**$113,000** $711,000
	TOTAL ESTIMATED PROJECT COST:	**$1,235,000** $1,235,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Exposition Blvd - Ped Project

Description

Virginia Rd to 11th Ave

Link Length LF 3,000

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	40	EA	$1,600	$64,000
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	10	EA	$3,700	$37,000
	Ped lighting 2 sides @ 75 FT OC	88	EA	$6,300	$554,400
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	13	EA	$32,000	$416,000
	Enhanced crosswalks	700	LF	$74	$51,800
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	3	EA	$2,100	$6,300
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0
	Estimated Cost Subtotal				**$1,130,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$57,000
	Mobilization (10% of Estimated Cost Subtotal)				$113,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$113,000
	Contingencies (35% of Estimated Cost Subtotal)				$396,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$1,809,000**
	Planning (2% of Estimated Construction Cost Total)				$37,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$91,000
	Final Design Services (8% of Estimated Construction Cost Total)				$145,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$163,000
	CM (5% of Estimated Construction Cost Total)				$91,000
	Legal, Permits, 3rd Parties etc. (4%)				$73,000
	SOFT COSTS TOTAL				**$600,000**
	Unallocated Contingecy (10%)				$241,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$241,000** $1,520,000
	TOTAL ESTIMATED PROJECT COST:				**$2,650,000** $2,650,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Exposition Blvd - Wheel Project

Description

Harcourt Ave to Arlington Ave

Link Length LF 10,500

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	32	EA	$25,000	$800,000
	Bicyle Friendly Intersections	3	EA	$30,000	$90,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	10500	LF	$100	$1,050,000
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	0	LF	$16	$0
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Left turns on Exposition	18	EA	$20,000	$360,000
	Rectangular Rapid Flashing Beacons*	32	EA	$50,000	$1,600,000
	*RRFBs could include push buttons or bike pavement detector loops. Cost includes push buttons only.				
	Estimated Cost Subtotal				**$3,900,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$195,000
	Mobilization (10% of Estimated Cost Subtotal)				$390,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$390,000
	Contingencies (35% of Estimated Cost Subtotal)				$1,365,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$6,240,000**
	Planning (2% of Estimated Construction Cost Total)				$125,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$312,000
	Final Design Services (8% of Estimated Construction Cost Total)				$500,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$562,000
	CM (5% of Estimated Construction Cost Total)				$312,000
	Legal, Permits, 3rd Parties etc. (4%)				$250,000
	SOFT COSTS TOTAL				**$2,061,000**
	Unallocated Contingecy (10%)				$831,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$831,000** $5,232,000
	TOTAL ESTIMATED PROJECT COST:				**$9,132,000** $9,132,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Crenshaw Blvd - Ped Project

Description

Jefferson Blvd t Coliseum St

Link Length LF 2,900

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	0	EA	$1,600	$0
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	110	EA	$3,700	$407,000
	Ped lighting 2 sides @ 30 FT OC	150	EA	$6,300	$945,000
	Sidewalk paving enhancements	28000	SF	$21	$588,000
	Bulb out with directional curb ramp	0	EA	$32,000	$0
	Enhanced crosswalk	1260	LF	$74	$93,240
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	5	EA	$42,000	$210,000
	Wayfinding - fingerposts	6	EA	$2,100	$12,600
	Signal modifications	1	EA	$315,000	$315,000
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0
	Green Zone - drop off zone + 4 EV charging spaces	1	EA	$60,000	$60,000
	Estimated Cost Subtotal				**$2,631,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$132,000
	Mobilization (10% of Estimated Cost Subtotal)				$264,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$264,000
	Contingencies (35% of Estimated Cost Subtotal)				$921,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$4,212,000**
	Planning (2% of Estimated Construction Cost Total)				$85,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$211,000
	Final Design Services (8% of Estimated Construction Cost Total)				$337,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$380,000
	CM (5% of Estimated Construction Cost Total)				$211,000
	Legal, Permits, 3rd Parties etc. (4%)				$169,000
	SOFT COSTS TOTAL				**$1,393,000**
	Unallocated Contingecy (10%)				$561,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$561,000** $3,535,000
	TOTAL ESTIMATED PROJECT COST:				**$6,166,000** $6,166,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Crenshaw Blvd - Wheel Project

Description

W 23rd St to Stocker St

Link Length LF 10600

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	14	EA	$25,000	$350,000
	Bicyle Friendly Intersections	9	EA	$30,000	$270,000
	8-80 Facility (Class IV Protected Bike Facility)	21200	LF	$100	$2,120,000
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	0	LF	$16	$0
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Protected Intersections	3	EA	$500,000	$1,500,000
	Estimated Cost Subtotal				**$4,240,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$212,000
	Mobilization (10% of Estimated Cost Subtotal)				$424,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$424,000
	Contingencies (35% of Estimated Cost Subtotal)				$1,484,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$6,784,000**
	Planning (2% of Estimated Construction Cost Total)				$136,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$340,000
	Final Design Services (8% of Estimated Construction Cost Total)				$543,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$611,000
	CM (5% of Estimated Construction Cost Total)				$340,000
	Legal, Permits, 3rd Parties etc. (4%)				$272,000
	SOFT COSTS TOTAL				**$2,242,000**
	Unallocated Contingecy (10%)				$903,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$903,000** $5,689,000
	TOTAL ESTIMATED PROJECT COST:				**$9,929,000** $9,929,000

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High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Somerset Dr - Ped Project

Description

Somerset Drive - Jefferson Blvd to Coliseum St

Link Length LF 2,800

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	84	EA	$1,600	$134,400
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	0	EA	$3,700	$0
	Ped lighting 2 sides @ 75 FT OC	83	EA	$6,300	$522,900
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	20	EA	$32,000	$640,000
	Enhanced crosswalks	530	LF	$74	$39,220
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	8	EA	$2,100	$16,800
	Signal modification	1	EA	$315,000	$315,000
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushions / bumps inc signs	8	EA	$3,700	$29,600
	Traffic Circle	0	EA	$31,500	$0
	Estimated Cost Subtotal				**$1,698,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$85,000
	Mobilization (10% of Estimated Cost Subtotal)				$170,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$170,000
	Contingencies (35% of Estimated Cost Subtotal)				$595,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$2,718,000**
	Planning (2% of Estimated Construction Cost Total)				$55,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$136,000
	Final Design Services (8% of Estimated Construction Cost Total)				$218,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$245,000
	CM (5% of Estimated Construction Cost Total)				$136,000
	Legal, Permits, 3rd Parties etc. (4%)				$109,000
	SOFT COSTS TOTAL				**$899,000**
	Unallocated Contingecy (10%)				$362,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$362,000** $2,281,000
	TOTAL ESTIMATED PROJECT COST:				**$3,979,000** $3,979,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Somerset Dr - Wheel Project

Description

W Somerset Dr - Martin Luther King to Adams Blvd

Link Length LF 7,200

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	1	EA	$25,000	$25,000
	Bicyle Friendly Intersections	5	EA	$30,000	$150,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	7200	LF	$16	$115,200
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	257	EA	$1,600	$411,200
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	14	EA	$3,700	$51,800
	Ped lighting 2 sides @ 30 FT OC	456	EA	$6,300	$2,872,800
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	38	EA	$32,000	$1,216,000
	Enhanced crosswalks	1140	LF	$74	$84,360
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	17	EA	$2,100	$35,700
	Signal modification	1	EA	$315,000	$315,000
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushions / bumps inc signs	24	EA	$3,700	$88,800
	Traffic Circles	7	EA	$31,500	$220,500
	Estimated Cost Subtotal				**$5,587,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$280,000
	Mobilization (10% of Estimated Cost Subtotal)				$559,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$559,000
	Contingencies (35% of Estimated Cost Subtotal)				$1,956,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$8,941,000**
	Planning (2% of Estimated Construction Cost Total)				$179,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$448,000
	Final Design Services (8% of Estimated Construction Cost Total)				$716,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$805,000
	CM (5% of Estimated Construction Cost Total)				$448,000
	Legal, Permits, 3rd Parties etc. (4%)				$358,000
	SOFT COSTS TOTAL				**$2,954,000**
	Unallocated Contingecy (10%)				$1,190,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$1,190,000** $7,498,000
	TOTAL ESTIMATED PROJECT COST:				**$13,085,000** $13,085,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Norton Ave - Ped Project

Description

Obama Blvd to Coliseum St

Link Length LF 1,100

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	48	EA	$1,600	$76,800
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	0	EA	$3,700	$0
	Ped lighting 2 sides @ 75 FT OC	64	EA	$6,300	$403,200
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	3	EA	$32,000	$96,000
	Enhanced crosswalks	200	LF	$74	$14,800
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	5	EA	$2,100	$10,500
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacons	2	EA	$50,000	$100,000
	Traffic calming - Speed cushions / bumps inc signs	4	EA	$3,700	$14,800
	Traffic Circle	0	EA	$31,500	$0
	Estimated Cost Subtotal				**$717,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$36,000
	Mobilization (10% of Estimated Cost Subtotal)				$72,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$72,000
	Contingencies (35% of Estimated Cost Subtotal)				$251,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$1,148,000**
	Planning (2% of Estimated Construction Cost Total)				$23,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$58,000
	Final Design Services (8% of Estimated Construction Cost Total)				$92,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$104,000
	CM (5% of Estimated Construction Cost Total)				$58,000
	Legal, Permits, 3rd Parties etc. (4%)				$46,000
	SOFT COSTS TOTAL				**$381,000**
	Unallocated Contingecy (10%)				$153,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$153,000** $965,000
	TOTAL ESTIMATED PROJECT COST:				**$1,682,000** $1,682,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Norton Ave - Wheel Project

Description

Norton Ave - Martin Luther King Jr Blvd to Obama Blvd

Link Length LF 3800

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signal	0	EA	$25,000	$0
	Bicyle Friendly Intersections	3	EA	$30,000	$90,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility BI Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	3800	LF	$16	$60,800
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	224	EA	$1,600	$358,400
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	0	EA	$3,700	$0
	Ped lighting 2 sides @ 30 FT OC	242	EA	$6,300	$1,524,600
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	18	EA	$32,000	$576,000
	Enhanced crosswalks	480	LF	$74	$35,520
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	9	EA	$2,100	$18,900
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacons	2	EA	$50,000	$100,000
	Traffic calming - Speed cushions / bumps inc signs	12	EA	$3,700	$44,400
	Traffic Circles	2	EA	$31,500	$63,000
	Estimated Cost Subtotal				**$2,872,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$144,000
	Mobilization (10% of Estimated Cost Subtotal)				$288,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$288,000
	Contingencies (35% of Estimated Cost Subtotal)				$1,006,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$4,598,000**
	Planning (2% of Estimated Construction Cost Total)				$92,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$230,000
	Final Design Services (8% of Estimated Construction Cost Total)				$368,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$414,000
	CM (5% of Estimated Construction Cost Total)				$230,000
	Legal, Permits, 3rd Parties etc. (4%)				$184,000
	SOFT COSTS TOTAL				**$1,518,000**
	Unallocated Contingecy (10%)				$612,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$612,000** $3,856,000
	TOTAL ESTIMATED PROJECT COST:				**$6,728,000** $6,728,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Coliseum Street - Ped Project

Description

Somerset Dr to Norton Ave

Link Length LF 1,500

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	24	EA	$1,600	$38,400
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	31	EA	$3,700	$114,700
	Ped lighting 2 sides @ 30 FT OC	76	EA	$6,300	$478,800
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	4	EA	$32,000	$128,000
	Enhanced crosswalks	755	LF	$74	$55,870
	Enhanced Bus stops	2	EA	$28,000	$56,000
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	6	EA	$2,100	$12,600
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0

	Estimated Cost Subtotal	**$885,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)	$45,000
	Mobilization (10% of Estimated Cost Subtotal)	$89,000
	Utility Allowance (10% of Estimated Cost Subtotal)	$89,000
	Contingencies (35% of Estimated Cost Subtotal)	$310,000
	ESTIMATED CONSTRUCTION COST TOTAL	**$1,418,000**
	Planning (2% of Estimated Construction Cost Total)	$29,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)	$71,000
	Final Design Services (8% of Estimated Construction Cost Total)	$114,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)	$128,000
	CM (5% of Estimated Construction Cost Total)	$71,000
	Legal, Permits, 3rd Parties etc. (4%)	$57,000
	SOFT COSTS TOTAL	**$470,000**
	Unallocated Contingecy (10%)	$189,000
	UNALLOCATED CONTINGENCY COST TOTAL	**$189,000** $1,192,000
	TOTAL ESTIMATED PROJECT COST:	**$2,077,000** $2,077,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Coliseum Street - Wheel Project

Description

Martin Luther King to Obama Blvd

Link Length LF 6,600

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signal - 1 junction	2	EA	$25,000	$50,000
	Bicyle Friendly Intersections	5	EA	$30,000	$150,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	0	LF	$16	$0
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	13200	LF	$12	$158,400

	Estimated Cost Subtotal	**$359,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)	$18,000
	Mobilization (10% of Estimated Cost Subtotal)	$36,000
	Utility Allowance (10% of Estimated Cost Subtotal)	$36,000
	Contingencies (35% of Estimated Cost Subtotal)	$126,000
	ESTIMATED CONSTRUCTION COST TOTAL	**$575,000**
	Planning (2% of Estimated Construction Cost Total)	$12,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)	$29,000
	Final Design Services (8% of Estimated Construction Cost Total)	$46,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)	$52,000
	CM (5% of Estimated Construction Cost Total)	$29,000
	Legal, Permits, 3rd Parties etc. (4%)	$23,000
	SOFT COSTS TOTAL	**$191,000**
	Unallocated Contingecy (10%)	$77,000
	UNALLOCATED CONTINGENCY COST TOTAL	**$77,000** $484,000
	TOTAL ESTIMATED PROJECT COST:	**$843,000** $843,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Exposition PI - Ped Project

Description

S Bronson Avenue to Degnan Blvd

Link Length LF 1,240

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	0	EA	$1,600	$0
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	20	EA	$3,700	$74,000
	Ped lighting 1 sides @ 75 FT OC	42	EA	$6,300	$264,600
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb out with directional curb ramp	0	EA	$32,000	$0
	Enhanced crosswalk	0	LF	$74	$0
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	2	EA	$2,100	$4,200
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0
	Parking / People Space (paving & planting)	24800	SF	$60	$1,488,000
	Movement Space (paving)	37200	SF	$40	$1,488,000
	Street furniture clusters (seats, trash cans etc)	10	EA	$30,000	$300,000
	Estimated Cost Subtotal				**$3,619,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$181,000
	Mobilization (10% of Estimated Cost Subtotal)				$362,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$362,000
	Contingencies (35% of Estimated Cost Subtotal)				$1,267,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$5,791,000**
	Planning (2% of Estimated Construction Cost Total)				$116,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$290,000
	Final Design Services (8% of Estimated Construction Cost Total)				$464,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$522,000
	CM (5% of Estimated Construction Cost Total)				$290,000
	Legal, Permits, 3rd Parties etc. (4%)				$232,000
	SOFT COSTS TOTAL				**$1,914,000**
	Unallocated Contingecy (10%)				$771,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$771,000** $4,857,000
	TOTAL ESTIMATED PROJECT COST:				**$8,476,000** $8,476,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

Exposition PI - Wheel Project

Description

S Bronson Avenue to Degnan Blvd

Link Length LF 1,240

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signal junctions	0	EA	$25,000	$0
	Bicyle Friendly Intersection	0	EA	$30,000	$0
	B-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	B-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	1240	LF	$16	$19,840
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Bike Parking (arranged in 5 clusters)	30	EA	$1,000	$30,000
	Estimated Cost Subtotal				**$50,000**
	Miscellaneous Items (5% of Estimated Cost Subtotal)				$3,000
	Mobilization (10% of Estimated Cost Subtotal)				$5,000
	Utility Allowance (10% of Estimated Cost Subtotal)				$5,000
	Contingencies (35% of Estimated Cost Subtotal)				$18,000
	ESTIMATED CONSTRUCTION COST TOTAL				**$81,000**
	Planning (2% of Estimated Construction Cost Total)				$2,000
	Preliminary Engineering (5% of Estimated Construction Cost Total)				$5,000
	Final Design Services (8% of Estimated Construction Cost Total)				$7,000
	PM for Design & Construction (9% of Estimated Construction Cost Total)				$8,000
	CM (5% of Estimated Construction Cost Total)				$5,000
	Legal, Permits, 3rd Parties etc. (4%)				$4,000
	SOFT COSTS TOTAL				**$31,000**
	Unallocated Contingecy (10%)				$12,000
	UNALLOCATED CONTINGENCY COST TOTAL				**$12,000** $74,000
	TOTAL ESTIMATED PROJECT COST:				**$124,000** $124,000

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Buckingham Rd - Ped Project - NOT APPLICABLE

Description

Link Length LF

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	0	EA	$1,600	$0
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	0	EA	$3,700	$0
	Ped lighting 2 sides @ 30 FT OC	0	EA	$6,300	$0
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb out with directional curb ramp	0	EA	$32,000	$0
	Enhanced crosswalk	0	LF	$74	$0
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerpost	0	EA	$2,100	$0
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0

Estimated Cost Subtotal	**$0**
Miscellaneous Items (5% of Estimated Cost Subtotal)	$0
Mobilization (10% of Estimated Cost Subtotal)	$0
Utility Allowance (10% of Estimated Cost Subtotal)	$0
Contingencies (35% of Estimated Cost Subtotal)	$0
ESTIMATED CONSTRUCTION COST TOTAL	**$0**
Planning (2% of Estimated Construction Cost Total)	$0
Preliminary Engineering (5% of Estimated Construction Cost Total)	$0
Final Design Services (8% of Estimated Construction Cost Total)	$0
PM for Design & Construction (9% of Estimated Construction Cost Total)	$0
CM (5% of Estimated Construction Cost Total)	$0
Legal, Permits, 3rd Parties etc. (4%)	$0
SOFT COSTS TOTAL	**$0**
Unallocated Contingecy (10%)	$0
UNALLOCATED CONTINGENCY COST TOTAL	**$0**
TOTAL ESTIMATED PROJECT COST:	**$0**

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT
Buckingham Rd - Wheel Project

Description

Santa Rosalia Dr to W 23rd St

Link Length LF 9,200

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	27	EA	$25,000	$675,000
	Bicyle Friendly Intersections	2	EA	$30,000	$60,000
	8-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	8-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	1000	LF	$15	$15,000
	Greenway with Sharrows (Class III) inc markings, signs	8200	LF	$16	$131,200
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	270	EA	$1,600	$432,000
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	68	EA	$3,700	$251,600
	Ped lighting 2 sides @ 30 FT OC	555	EA	$6,300	$3,496,500
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	55	EA	$32,000	$1,760,000
	Enhanced crosswalks	2380	LF	$74	$176,120
	Enhanced Bus stops	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	24	EA	$2,100	$50,400
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushions / bumps inc signs	28	EA	$3,700	$103,600
	Traffic Circles	5	EA	$31,500	$157,500

Estimated Cost Subtotal	**$7,309,000**
Miscellaneous Items (5% of Estimated Cost Subtotal)	$366,000
Mobilization (10% of Estimated Cost Subtotal)	$731,000
Utility Allowance (10% of Estimated Cost Subtotal)	$731,000
Contingencies (35% of Estimated Cost Subtotal)	$2,559,000
ESTIMATED CONSTRUCTION COST TOTAL	**$11,696,000**
Planning (2% of Estimated Construction Cost Total)	$234,000
Preliminary Engineering (5% of Estimated Construction Cost Total)	$585,000
Final Design Services (8% of Estimated Construction Cost Total)	$936,000
PM for Design & Construction (9% of Estimated Construction Cost Total)	$1,053,000
CM (5% of Estimated Construction Cost Total)	$585,000
Legal, Permits, 3rd Parties etc. (4%)	$468,000
SOFT COSTS TOTAL	**$3,861,000**
Unallocated Contingecy (10%)	$1,556,000
UNALLOCATED CONTINGENCY COST TOTAL	**$1,556,000**
TOTAL ESTIMATED PROJECT COST:	**$17,113,000**

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

7th St - Ped Project - NOT APPLICABLE

Description

Link Length LF

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	0	EA	$1,600	$0
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	0	EA	$3,700	$0
	Ped lighting 2 sides @ 30 FT OC	0	EA	$6,300	$0
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb out with directional curb ramp	0	EA	$32,000	$0
	Enhanced crosswalk	0	LF	$74	$0
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerpost	0	EA	$2,100	$0
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushion / bump inc signs	0	EA	$3,700	$0
	Traffic Circle	0	EA	$31,500	$0

Estimated Cost Subtotal	**$0**
Miscellaneous Items (5% of Estimated Cost Subtotal)	$0
Mobilization (10% of Estimated Cost Subtotal)	$0
Utility Allowance (10% of Estimated Cost Subtotal)	$0
Contingencies (35% of Estimated Cost Subtotal)	$0
ESTIMATED CONSTRUCTION COST TOTAL	**$0**
Planning (2% of Estimated Construction Cost Total)	$0
Preliminary Engineering (5% of Estimated Construction Cost Total)	$0
Final Design Services (8% of Estimated Construction Cost Total)	$0
PM for Design & Construction (9% of Estimated Construction Cost Total)	$0
CM (5% of Estimated Construction Cost Total)	$0
Legal, Permits, 3rd Parties etc. (4%)	$0
SOFT COSTS TOTAL	**$0**
Unallocated Contingecy (10%)	$0
UNALLOCATED CONTINGENCY COST TOTAL	**$0**
TOTAL ESTIMATED PROJECT COST:	**$0**

High Level Cost Estimate & Project Cost

Project Expo Crenshaw First / Last Mile Strategic Plan

Agency Los Angeles Metro

Client Here LA

Prepared by Steer **Date:** 19-Jun-20 **ID No:** 23205201

Project Name Expo / Crenshaw Station **Status:** DRAFT

7th St - Wheel Project

Description

Obama Blvd to Adams Blvd

Link Length LF 5,150

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL
	Bicyle Signals	8	EA	$25,000	$200,000
	Bicyle Friendly Intersections	4	EA	$30,000	$120,000
	B-80 Facility (Class IV Protected Bike Facility)	0	LF	$100	$0
	B-80 Facility Bi Directional (Class IV Protected Bike Facility)	0	LF	$100	$0
	Bike Lane (Class II) inc markings, signs	0	LF	$15	$0
	Greenway with Sharrows (Class III) inc markings, signs	5150	LF	$16	$82,400
	Greenway with Advisory Bike Lane (Class III) inc markings, signs	0	LF	$12	$0
	Street Trees - in soft / existing well - 2 sides @ 30 FT OC	196	EA	$1,600	$313,600
	Street Trees - in hard + planting - 2 sides @ 30 FT OC	37	EA	$3,700	$136,900
	Ped lighting 2 sides @ 30 FT OC	296	EA	$6,300	$1,864,800
	Sidewalk pavng enhancements	0	SF	$21	$0
	Bulb outs with directional curb ramp	34	EA	$32,000	$1,088,000
	Enhanced crosswalks	1415	LF	$74	$104,710
	Enhanced Bus stop	0	EA	$28,000	$0
	Outboard platform inc bus shelter, street furniture etc	0	EA	$42,000	$0
	Wayfinding - fingerposts	17	EA	$2,100	$35,700
	Signal modifications	0	EA	$315,000	$0
	Rectangular Rapid Flashing Beacon	0	EA	$50,000	$0
	Traffic calming - Speed cushions / bumps inc signs	18	EA	$3,700	$66,600
	Traffic Circle	0	EA	$31,500	$0

Estimated Cost Subtotal	**$4,013,000**
Miscellaneous Items (5% of Estimated Cost Subtotal)	$201,000
Mobilization (10% of Estimated Cost Subtotal)	$402,000
Utility Allowance (10% of Estimated Cost Subtotal)	$402,000
Contingencies (35% of Estimated Cost Subtotal)	$1,405,000
ESTIMATED CONSTRUCTION COST TOTAL	**$6,423,000**
Planning (2% of Estimated Construction Cost Total)	$129,000
Preliminary Engineering (5% of Estimated Construction Cost Total)	$322,000
Final Design Services (8% of Estimated Construction Cost Total)	$514,000
PM for Design & Construction (9% of Estimated Construction Cost Total)	$579,000
CM (5% of Estimated Construction Cost Total)	$322,000
Legal, Permits, 3rd Parties etc. (4%)	$257,000
SOFT COSTS TOTAL	**$2,123,000**
Unallocated Contingecy (10%)	$855,000
UNALLOCATED CONTINGENCY COST TOTAL	**$855,000** $5,388,000
TOTAL ESTIMATED PROJECT COST:	**$9,401,000** $9,401,000

Appendix C

Expo/Crenshaw Station Connectivity Study

Relevant Plans and Projects Memo

October 16, 2019

Here LA

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1 Introduction

Relevant Plans and Projects

Introduction

The Expo/Crenshaw station is located in City of Los Angeles Council District 10 and at the epicenter of three Neighborhood Councils: West Adams, Empowerment Congress West, and United Neighborhoods. This light-rail station will act as a terminus of the Crenshaw/LAX line, will connect riders to the Expo Line, and will allow transit riders to access a wide range of regional destinations and jobs.

Over the last two decades, a significant amount of planning has been completed for the area surrounding the Expo/Crenshaw station. The increased attention to the area is indicative both of the need for enhancements and an energetic and activated community.

This study will consider the first/last mile needs of the 1/4-mile surrounding the Expo/Crenshaw station, while considering the design implications of the many adopted plans, policies, and anticipated development. Upon completion of a review of the relevant plans that are detailed in this memo, the team will make recommendations that seek to enhance the mobility network for all riders accessing transit in the area.

This memo presents a brief description of relevant City plans and projects and includes an overview of first/last mile implications that may result.

Relevant plans and projects include:

- Citywide and Relevant Plans/Projects
  - West Adams - Baldwin Hills - Leimert Community Plan
  - Crenshaw Corridor Specific Plan
  - Great Streets Challenge Grant
  - Crenshaw Blvd Streetscape Plan
  - Prop 1C Improvements
  - Crenshaw/LAX Transit Project
  - Destination Crenshaw
  - Vision Zero Crenshaw Safety Improvements
  - Metro NextGen Study
- Station Specific Plans/Projects
  - Expo/Crenshaw Station Joint Development Guidelines
  - Expo/Crenshaw Station Joint Development Project

The matrix below provides a brief snapshot of the plans and projects analyzed in this memo.

	Within 1/4 Mile of Rail Station	Includes ROW Improvements	Includes Streetscape Enhancements	Includes New Open Space	Includes New Development	Changes Circulation Patterns
West Adams - Baldwin Hills - Leimert Community Plan	✓					
Crenshaw Corridor Specific Plan	✓	✓	✓			
Crenshaw Blvd. Streetscape Plan	✓	✓	✓			✓
Prop 1C Improvements	✓		✓			
Crenshaw/LAX Transit Project	✓					✓
Destination Crenshaw		✓	✓	✓		✓
Vision Zero Crenshaw Safety Improvements	✓		✓			✓
Expo/Crenshaw Station Joint Development Project	✓		✓	✓	✓	✓
Expo/Crenshaw Station Joint Development Guidelines	✓					
Metro NextGen Study	✓					✓

2

Existing Plans & Projects

Citywide Plans

West Adams-Baldwin Hills-Leimert Community Plan
Crenshaw Corridor Specific Plan
Crenshaw Blvd Streetscape Plan

Completed

West Adams-Baldwin Hills-Leimert Community Plan (2012)

The West Adams-Baldwin Hills-Leimert Community Plan is an overarching document that was written with input from the community to guide future land use, urban design, and mobility improvements in the area. This Plan governs the entire 1/4-mile area surrounding the Exposition/Crenshaw transit station, but defers to the Crenshaw Corridor Specific Plan for plans regarding the area immediately surrounding the future Expo/Crenshaw station.

Crenshaw Corridor Specific Plan (2004, amended 2017)

The Crenshaw Corridor Specific Plan is a guiding document that specifies land use allowances along the Crenshaw Blvd. Corridor. For the purposes of this study, the Plan indicates that Crenshaw Blvd. from Victoria Ave. to Bronson Ave. and Exposition Blvd. from Victoria to 9th Avenue are a part of the "Subarea A" boundary (see image on the following page). This area is also classified as a Transit-Oriented Development Area, and has specific land use regulations that apply.

The Specific Plan lists land use allowances and defers to the Crenshaw Streetscape Plan for guidance on roadway recommendations.

Great Streets Challenge Grant (2017)

West Angeles CDC received a Great Streets Challenge Grant through the Great Streets Initiative. The grant provides support for community outreach to capture the community vision for enhancing public spaces around 54th St and Crenshaw Blvd through design, street furnishings, street trees, and public art.

Crenshaw Blvd Streetscape Plan (2016)

The Crenshaw Streetscape Plan details roadway reconfiguration concepts and recommended streetscape improvements along Crenshaw Blvd. between the 10 Freeway and 79th St. Although recommendations vary throughout the corridor, the design concepts aim to establish "unifying streetscape elements that are intended to tie the corridor together visually, and unique district streetscape elements that differentiate the corridor's many distinct neighborhoods."

The Streetscape Plan references the overarching Los Angeles Mobility 2035 Plan, which designates Crenshaw Blvd. as a Bicycle Enhanced Network and Bicycle Lane Network. The Plan recommends a bike lane to be added on Crenshaw Blvd. between 48th St. and 79th St., where it can be integrated without impacting the existing right-of-way or the lane configuration. The roadway between 48th St. to the north, however, cannot accommodate a bicycle facility without the reduction of either a travel lane

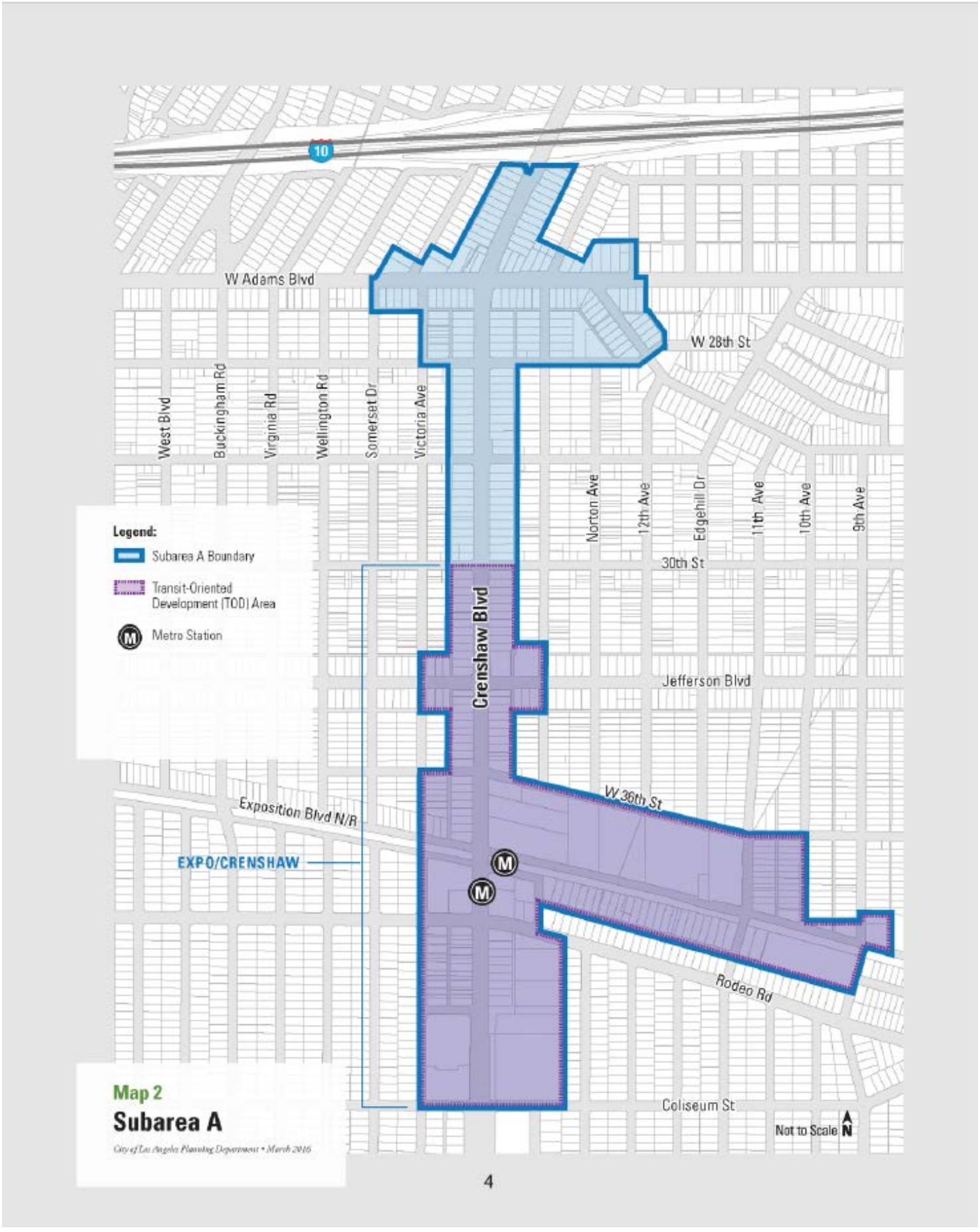


Diagram showcasing the boundaries of the Crenshaw Corridor Specific Plan

or parking lane. As such, the base Plan recommends a 'temporary' bike lane that would run along Degnan Blvd. (a parallel street that runs to the east of Crenshaw Blvd.) as an alternate north/south bicycle route.

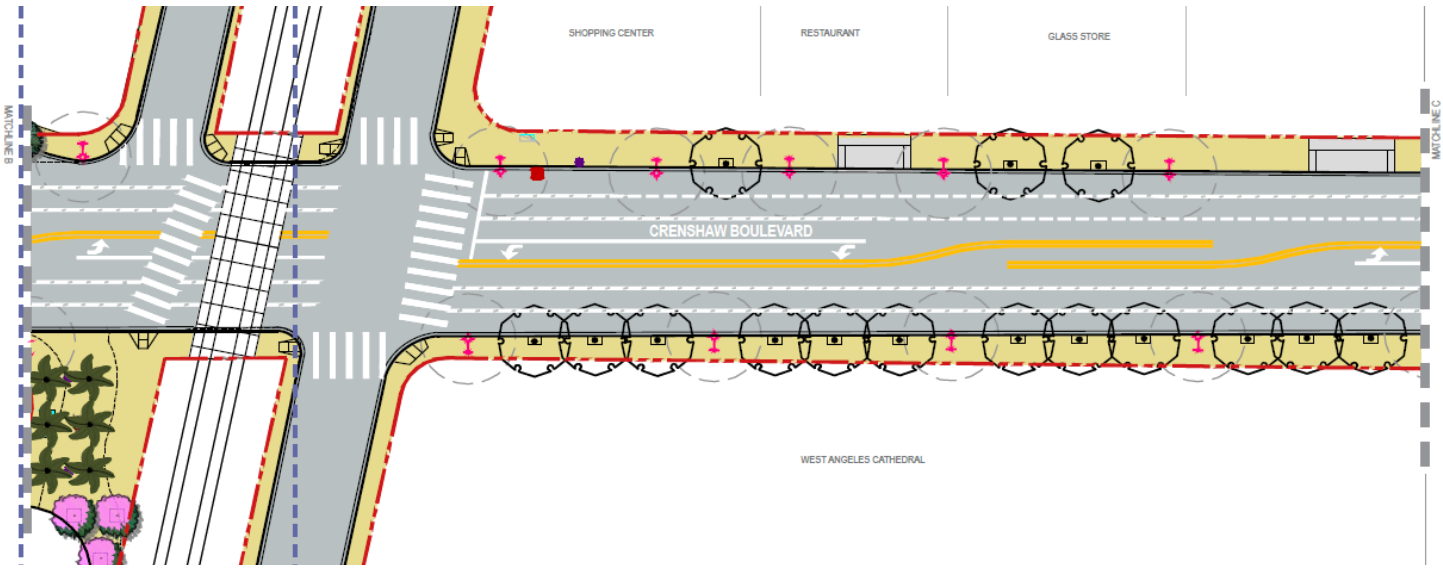
However, the narrative does indicate that during the community outreach conducted for the Plan, residents recommended additional changes to Crenshaw Blvd., north of 48th St. that would incorporate a protected bicycle lane. As a result of this desire, the City investigated the integration of a buffered bike lane with out-board bus islands (referred to as 'aspirational plans' (shown on the following page). This would require the conversion of the existing right-of-way from 6-lanes and a center turn lane to 2-lanes and center turn lane.

The community's request for these street changes should be considered for future first/last mile project recommendations, as a protected bike facility would provide safe connections for bicyclists accessing either of the two Metro stations, without jogging to the east onto Degnan Blvd.

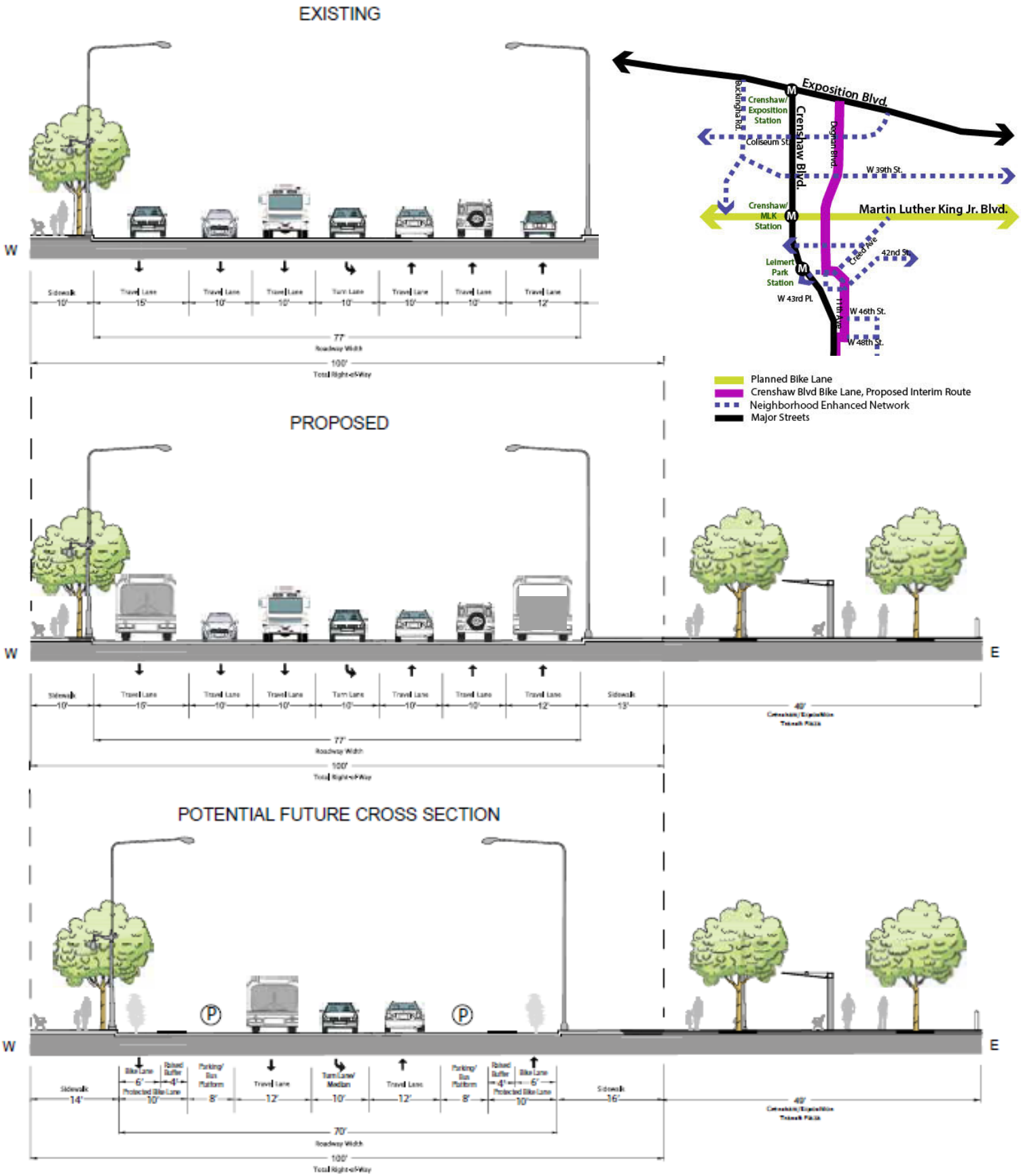
The Streetscape Plan also provides a series of improvements (some required, others suggested) that relate to streetscape characteristics. These include, but are not limited to: raised landscape medians, continental crosswalks, sidewalks with amenity zones, colored concrete, small curb radii, dual sidewalks, landscaping, and specific tree types.

First/Last Mile Implications

- The Crenshaw Streetscape Plan alludes to community support for a protected bicycle facility along Crenshaw Blvd., north of 48th St. Although significant right-of-way changes would need to occur to accommodate a protected bicycle lane, additional emphasis should be placed on investigating this option further to enhance multi-modal access.
- The collection of plans in this area indicates an activated community that must be involved in discussions for any multi-modal access improvements that are recommended as a part of this plan.
- The proposed protected bicycle facility in the 'aspirational plans' include outboard bus islands. Given the presence of the Crenshaw line and Metro's recasting of the bus network as part of the NextGen study, the street should be analyzed to understand if outboard bus platforms are needed in the context of the new transportation network.



Recommended plans for Crenshaw Blvd. The right-of-way recommendations do not include a bicycle lane in the base report. A protected bicycle lane is referenced as an 'aspirational plan'. A diagram of the potential right-of-way configuration for the protected bicycle lane proposal is shown on the following page.



Recommended and 'aspirational plans' for Crenshaw Blvd (above)

Map (top right) identifies the northern portion of the proposed 'interim' bicycle facility (in purple) that runs along Degnan Blvd. to avoid the right-of-way constraints on Crenshaw Blvd.

Prop 1C Improvements

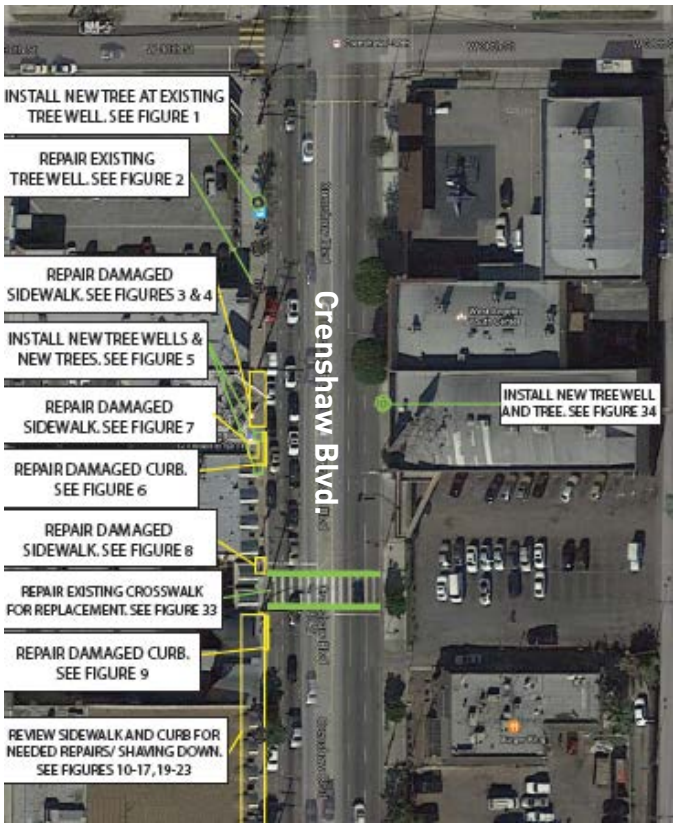
Ongoing

In 2009, a Prop 1C grant was awarded for the Crenshaw Mid-City Corridors Infill Infrastructure Project. The grant is managed by Mayor Garcetti's office and the LA Housing and Community Investment Department. The $14.6m grant includes improvements along Jefferson Blvd. and Crenshaw Blvd. Streetscape improvements include elements like:

- Repaired sidewalks, driveways, and treewell;
- Installation of new bus shelters
- Installation of new trees and tree wells
- Introduction of new ADA curb ramps and continental crosswalk legs
- Tree pruning

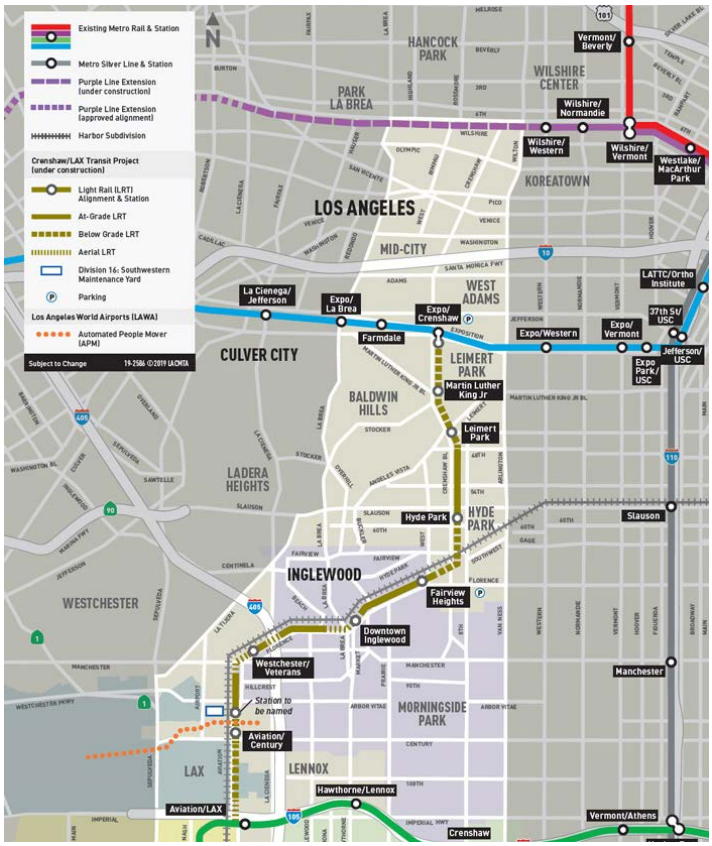
First/Last Mile Implications

- The improvements included in the grant will upgrade existing sidewalks and crossings (and improve the first/last mile environment) but will not reconfigure the streetspace.
- Bike facilities are not included.
- New crosswalks introduced are Continental, however they are not shown to include bi-directional curb ramps.
- Improvements extend the full length of Crenshaw Blvd., from Exposition Blvd. to 30th St. They also include Jefferson Blvd, from 8th Ave. to Bronson Ave. (ends two blocks east of Crenshaw Blvd.).

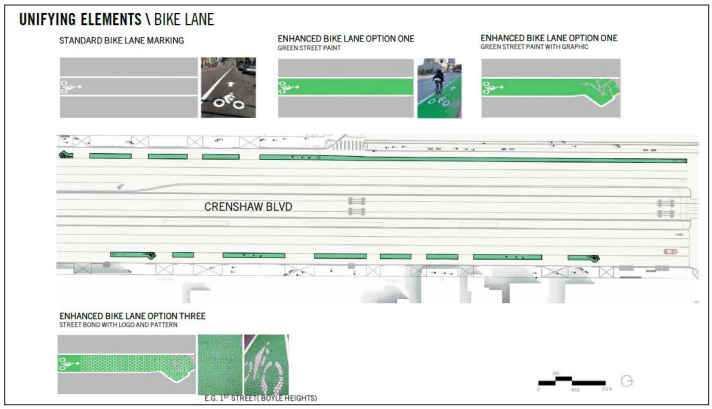


Diagrams from the Prop 1-C Overview Package
Crenshaw Blvd., south of Jefferson Blvd. (left) & Crenshaw Blvd., south of 30th St. (right)

[Other] Plans



Overview map of the Crenshaw/LAX Transit Project



Images from top to bottom: Crenshaw/LAX Transit Project map, bike lanes, and streetscape design language from Destination Crenshaw

Crenshaw/LAX Transit Project (Ongoing)

The Crenshaw/LAX Transit Project is the overarching impetus guiding this document. It will connect the existing Exposition Line to the Metro Green Line and will serve the cities of Los Angeles, Inglewood, El Segundo, and portions of unincorporated Los Angeles County. Within the Expo/Crenshaw study area, streetscape and roadway improvements are proposed on Crenshaw Blvd from Rodeo Pl to Exposition Blvd. Relevant components include street vacations, bus turn outs, street trees, and enhanced pedestrian and transit facilities. A knock out panel will also be included on the west side of Crenshaw Blvd to allow for a future second station portal north of the existing gas station. The second portal would improve transit access allowing riders to enter and exit on both sides of Crenshaw Blvd. See the Ongoing Plans/Projects Proposed Improvements map at the end of this document.

Destination Crenshaw (Ongoing)

The Destination Crenshaw Plan outlines a design approach to create a unified Crenshaw Blvd. with different character nodes that span from 59th St. to Vernon Ave. Improvements recommended include Crenshaw Park, sidewalk improvements, crosswalk improvements, special district-inspired paving patterns, bike furniture, shade structures, and lighting. Although the project extents do not touch the 1/4-mile area surrounding the Exposition/Crenshaw station, there have been early discussions about the possibility of extending the design language further north, to the station area.

Crenshaw Blvd Safety Improvements, LADOT Vision Zero Priority Corridors (Ongoing)

Crenshaw Blvd. has been identified as a Vision Zero Priority Corridor by the High Injury Network. LADOT is installing safety improvements on 5.7 miles of Crenshaw Blvd., between 79th St and Pico Blvd., including leading pedestrian intervals, continental and ladder crosswalk upgrades, protected left turns, and more. Implementation of further improvements will be revisited once construction on the Crenshaw Line has ceased.

Metro NextGen (Ongoing)

The Metro NextGen Plan is an ongoing effort to redefine the Metro bus network. Engineers and planners are analyzing the current bus system, performance, ridership, and demand to understand transportation needs throughout the County. The changes recommended as a part of the NextGen Plan will directly influence improvements recommended as they relate to bus infrastructure in the public realm. At this time, draft plans have not yet been released, but will be consulted as information becomes available.

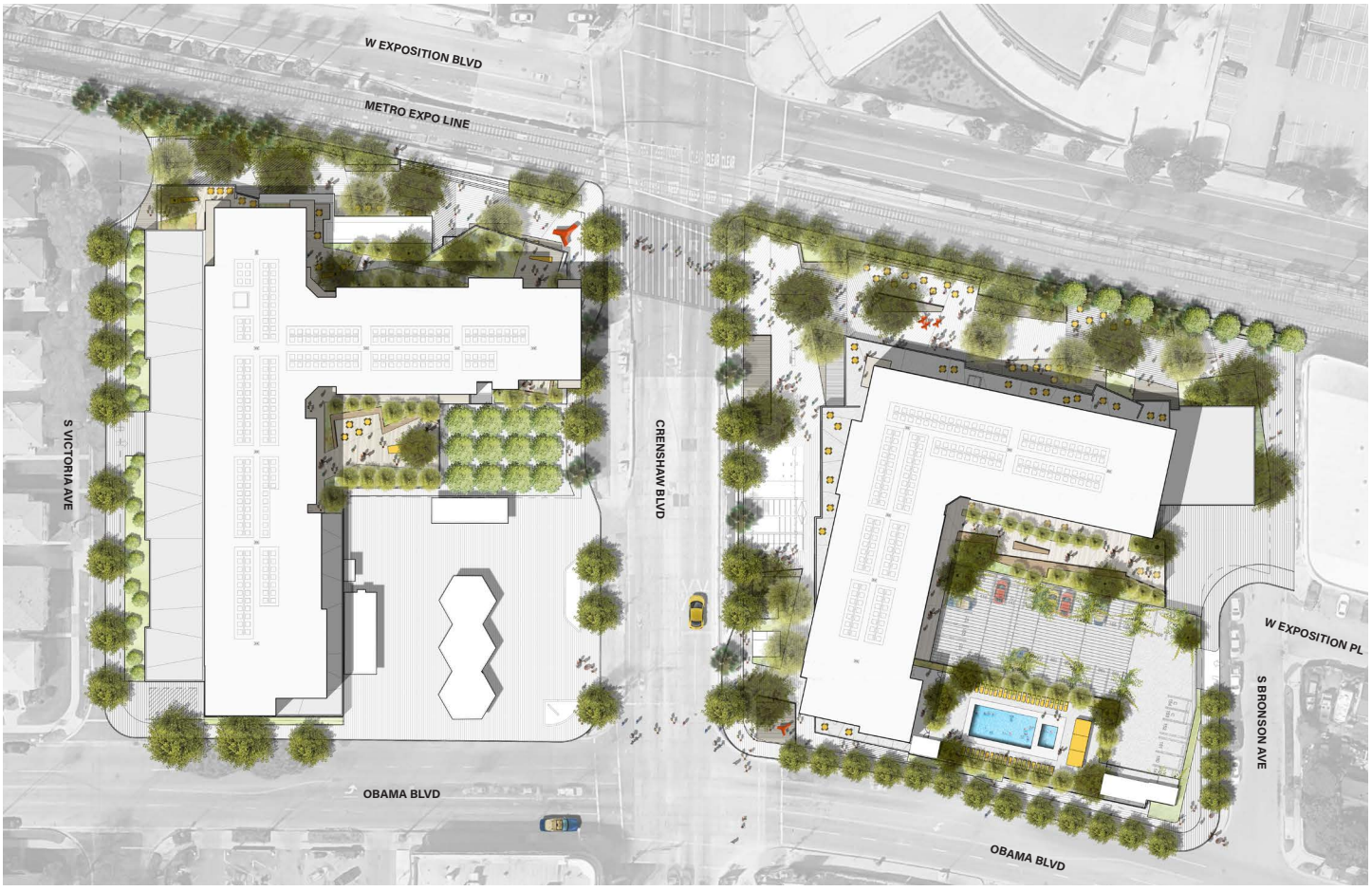
Expo/Crenshaw Joint Development & Expo/Crenshaw Joint Development Guidelines

Ongoing

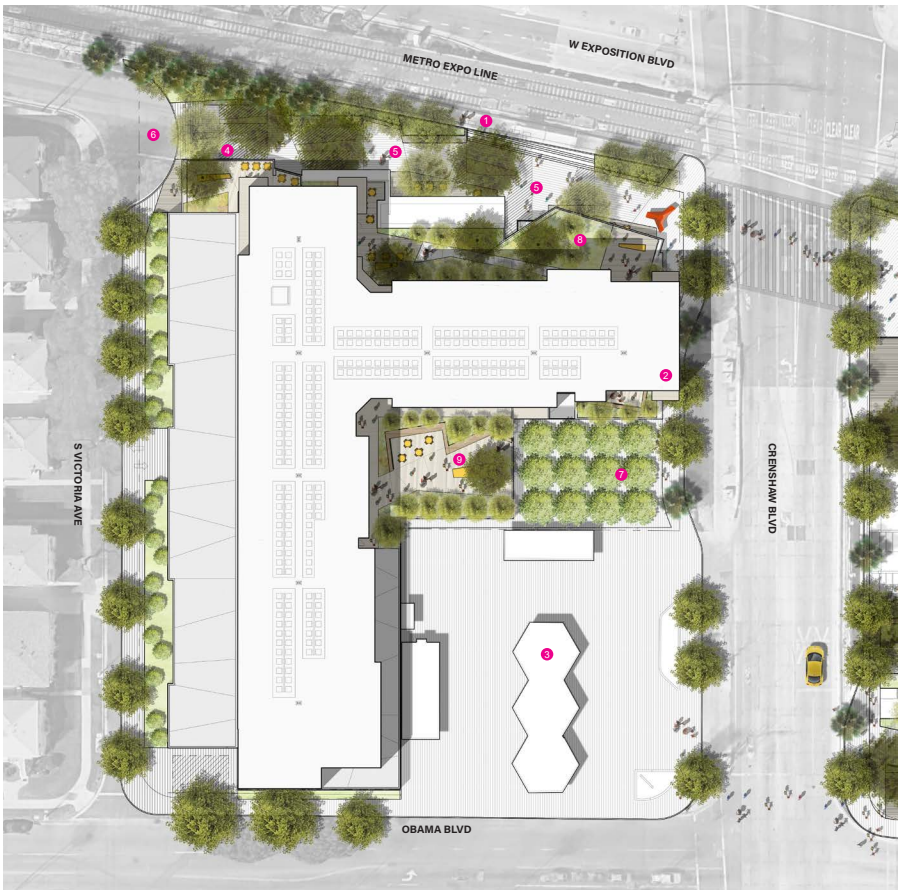
Expo/Crenshaw Joint Development Sites

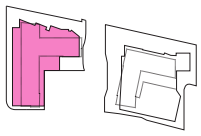
The Metro Joint Development sites are located south of Exposition Blvd., on either side of Crenshaw Blvd. (see illustrative plan below). The western site (Site A) is currently the LA County Probation Department Office, while the eastern site (Site B) is being used as a staging area for the Crenshaw/LAX light-rail project. The two sites will be transformed into two mixed-use, 7-story buildings that will include 400 housing units, 8,500 sq ft of retail space, 28,000 sq ft of retail space for a grocery store, and large public plazas.

The two joint development sites will provide a key connection for transit users who are transferring between the Expo Line and the Crenshaw Line. Transfers between the two transit lines will require coordination and enhanced safety measures for the high pedestrian volumes anticipated through the Crenshaw Blvd. and Exposition Blvd. intersection.



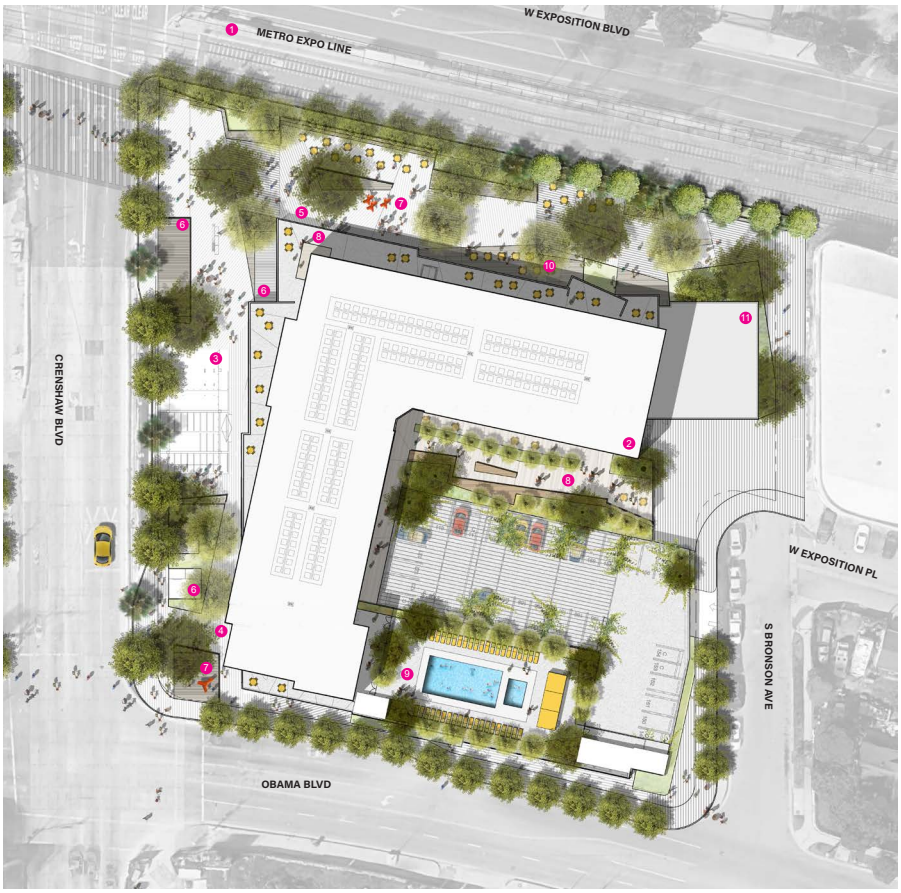
Joint Development Overview (from August 2019)

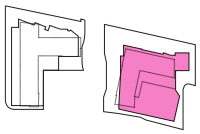




LEGEND

1. EXPO/CRENSHAW STATION
2. SITE A BUILDING
3. SHELL GAS STATION
4. RESIDENTIAL LOBBY
5. EXPO PARK PROMENADE
6. DROP OFF ZONE
7. BUS PLAZA
8. AMENITY DECK (L2)
9. AMENITY DECK (L3)





LEGEND

1. EXPO/CRENSHAW STATION
2. SITE B BUILDING
3. METRO PORTAL
4. RESIDENTIAL LOBBY
5. GROCERY PLAZA
6. METRO STRUCTURE
7. PUBLIC ART
8. AMENITY DECK L2
9. AMENITY DECK L3
10. OUTDOOR PATIO
11. SERVICE YARD (EXISTING)

The Crenshaw/LAX Transit Project has secured a street vacation north of Metro property (Site B) on Exposition Pl. between Crenshaw Blvd. and S. Bronson Ave. The developer is pursuing a street vacation north of the County property (Site A) on W. Exposition Blvd. between Crenshaw Blvd. and S. Victoria Ave. The vacation of these streets will allow for large 52' (north of Site B) and 39' (north of Site A) pedestrian plazas.

10 Metro ADA parking spots will be provided on site. Transit riders will also be able to utilize the West Angeles Cathedral parking structure which is located approximately one block north of Exposition Blvd. Quality access to and from this parking structure will be paramount to ensure the safety of transit riders accessing both stations.

To generate the latest development design concepts, several public meetings have been held with local residents regarding the future sites. According to the Watt Companies survey, when comments pertained to mobility and access, 78% of community members requested pedestrian enhancements and 49% requested"last mile" improvements in the area.

Expo/Crenshaw Joint Development Guidelines

The Metro Joint Development program provides background for and contextualizes the Expo/Crenshaw Joint Development sites. The document describes the conditions of the surrounding community as mostly low-scale residential with some commercial establishments along Crenshaw Blvd. and Exposition Blvd.

The Guidelines indicate that the combination of the two Metro stations will provide access to a total of 480,000 jobs in the region - connecting riders to Downtown Los Angeles, Santa Monica, and the LAX area.

To generate the Expo/Crenshaw Joint Development Guidelines, Metro held several community workshops from 2015 - 2016. Community members advocated for the following goals:

- Realize a culturally distinct and iconic gateway destination that serves residents and attracts visitors;
- Create a village experience that is a walkable and safe community place with green and open space;
- Incorporate high-quality and local-serving uses including retail, sit-down restaurants, and a neighborhood grocery store;
- Develop a range of housing types affordable to existing residents including seniors and families;
- Foster community job growth and opportunity during and after development;
- Offer sufficient parking for commuters and minimize parking impacts on surrounding communities; and
- Encourage and provide opportunities for ongoing community input in the Joint Development process and proposed project.

Beyond land use guidelines that include provisions for setbacks, height allowances, project orientation, and scale, the document defers to the City of Los Angeles Crenshaw Boulevard Streetscape Plan for Guidance regarding roadway and streetscape transformations (see citywide plans).

First/Last Mile Implications

- A large pedestrian plaza on the north side of Sites A and B will create ample gathering space for transit riders accessing both the Expo Line and the Crenshaw line.
- Access to/from the Metro shared parking with West Angeles Cathedral will be critical. High visibility crosswalks, leading pedestrian intervals, and tight curb radii will need to be maintained along Crenshaw Blvd. and Exposition Blvd. to ensure safe access across the street.
- As this station will serve as the current terminus of the Crenshaw line (although the line will extend to the north in future years), design concepts should take into account Metro's Transfer Design Guidelines and toolkit of improvements to create intuitive transfers for riders.

3

Mapping & Analysis

Opportunities & Constraints

This section analyzes the existing and proposed conditions within the 1/4 mile study area. The first diagram presents an overview of opportunities and constraints, which summarizes some of the main takeaways about the walking and biking environment. The following diagrams showcase the existing conditions in the study area, including: community destinations, the transit network, safety conditions, pedestrian amenities, street conditions, and the bicycle network. The final diagram shows ongoing plans, projects, and proposed improvements.

Selected Takeaways

Opportunities and Constraints

- There are little to no pedestrian and bicycle amenities on the streets in the area, such as trees, street furniture, bike racks, sidewalk lights, bike lanes, etc.
- East/west streets are barriers to north/south movement for people walking and biking because of limited street crossings along their lengths.
- Wide streets encourage speeding and downgrade the experience for people walking and biking.
- Connections across the Expo rail tracks are limited.

Community Destinations

- Destinations in the area are concentrated along Crenshaw Blvd. and secondarily along Jefferson Blvd.
- Large retail destinations in the area include the big box centers at Coliseum St. and Crenshaw Blvd.
- The West Angeles Cathedral is a major community destination at the center of the study area.

Transit Network

- Both Crenshaw Blvd. and Jefferson Blvd. carry bus lines, including both Metro and DASH service. The corner of Crenshaw Blvd. and Jefferson Blvd. has a cluster of bus stops.
- The two intersecting rail lines are a major asset for people walking, biking, and taking alternative forms of transportation.

Safety

- Both Crenshaw Blvd. and Jefferson Blvd. contain high number of collisions.
- In the study area, the corners of Jefferson Blvd. with Buckingham Rd., Crenshaw Blvd., and 11th Ave., along with the intersections of Crenshaw Blvd. with Obama Blvd., Coliseum St., and Exposition Blvd. show the highest rates of collisions between 2012-2016.
- Higher speed limits on major streets provide an unsafe and uncomfortable experience for people walking and biking.

Pedestrian Amenities

- Pedestrian amenities are limited in the study area with limited to no tree cover, limited crosswalks, missing bus stop amenities, and uni-directional (rather than bi-directional) curb ramps.
- Sidewalk quality ranges from average to extremely poor.

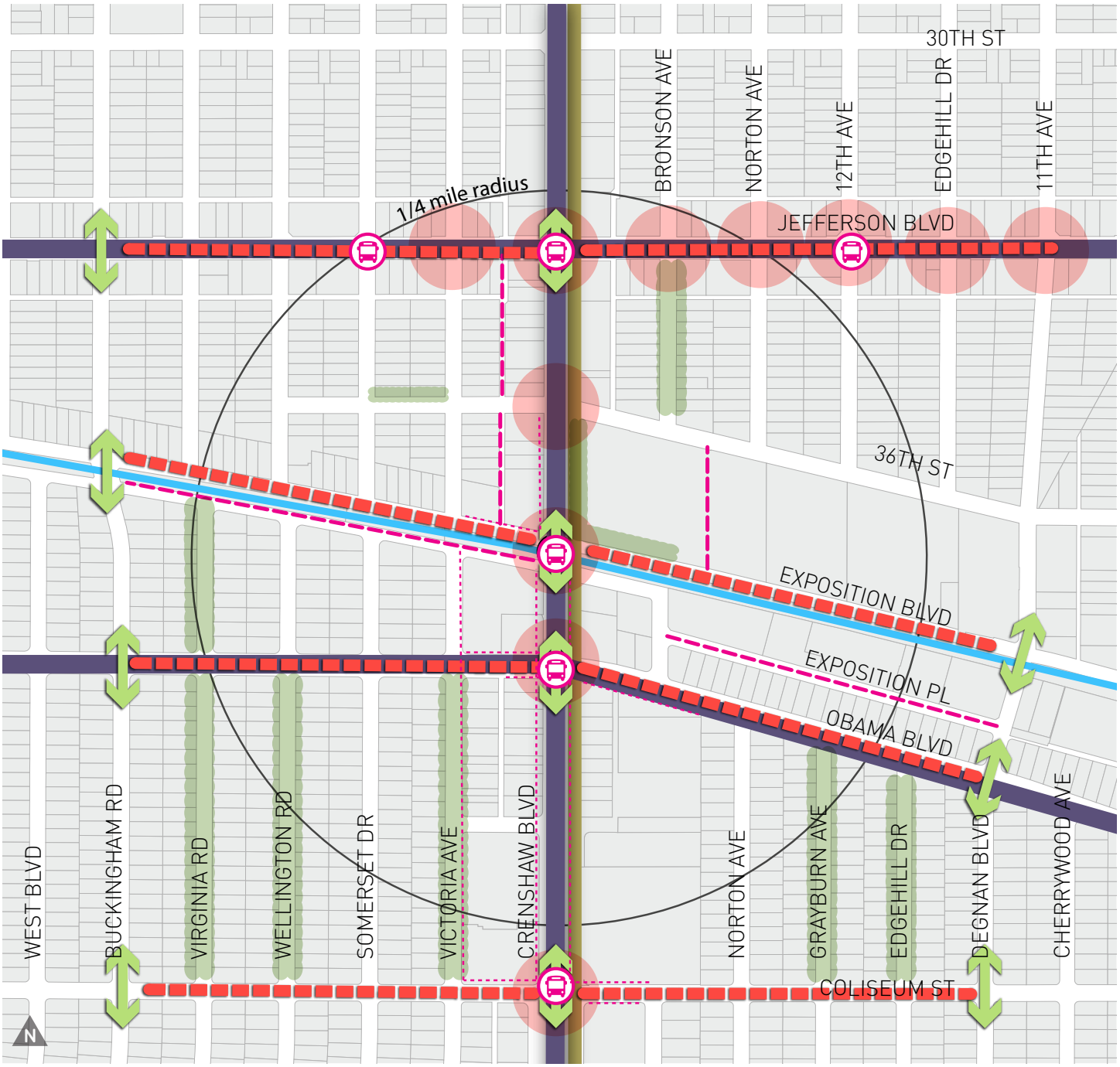
Street Conditions

- The streets in the area prioritize east-west vehicular movement.
- All east/west streets are 40ft and above in curb-to-curb width and have limited north/south crossings.
- Many streets have poor roadway quality because of paving issues.
- Signalized intersections are located along the major streets.

Bicycle Network

- Exposition Blvd., is one of the only streets in the study area, which has bicycle lanes. These lanes, however, are narrow at 4ft wide and are not buffered from traffic.
- There are two main proposed bicycle facilities in the study area: bike lanes on Jefferson Blvd. and Crenshaw Blvd. All other proposed facilities are sharrows.

Opportunities & Constraints



Existing signalized crossings are critical in providing safe crossings across E/W thoroughfares. Shade and good tree canopy is present in some residential streets. E/W streets around the station are barriers to N/S movement with over 1,300' between crossings. Wide street widths along arterials promote high vehicular speeds and an unpleasant pedestrian environment. High collisions occur on arterial streets of Crenshaw Blvd. and Jefferson Blvd. The transit environment around the station is consistently poor with little to no amenities. There are potential cut-through routes through alleyways and low vehicular streets such as Exposition Pl. A new cut-through through the West Angeles Cathedral parking lot could provided improved access to residential areas to the north. Pedestrian frontage improvements have also been identified at commercial areas with blank facades or strip mall character.

Strengths

- Signalized Crossings that permits north-south pedestrian movement
- Adequate Shade

Opportunities

- Potential Cut-through
- Pedestrian Frontage Improvements
- Poor Transit Environment

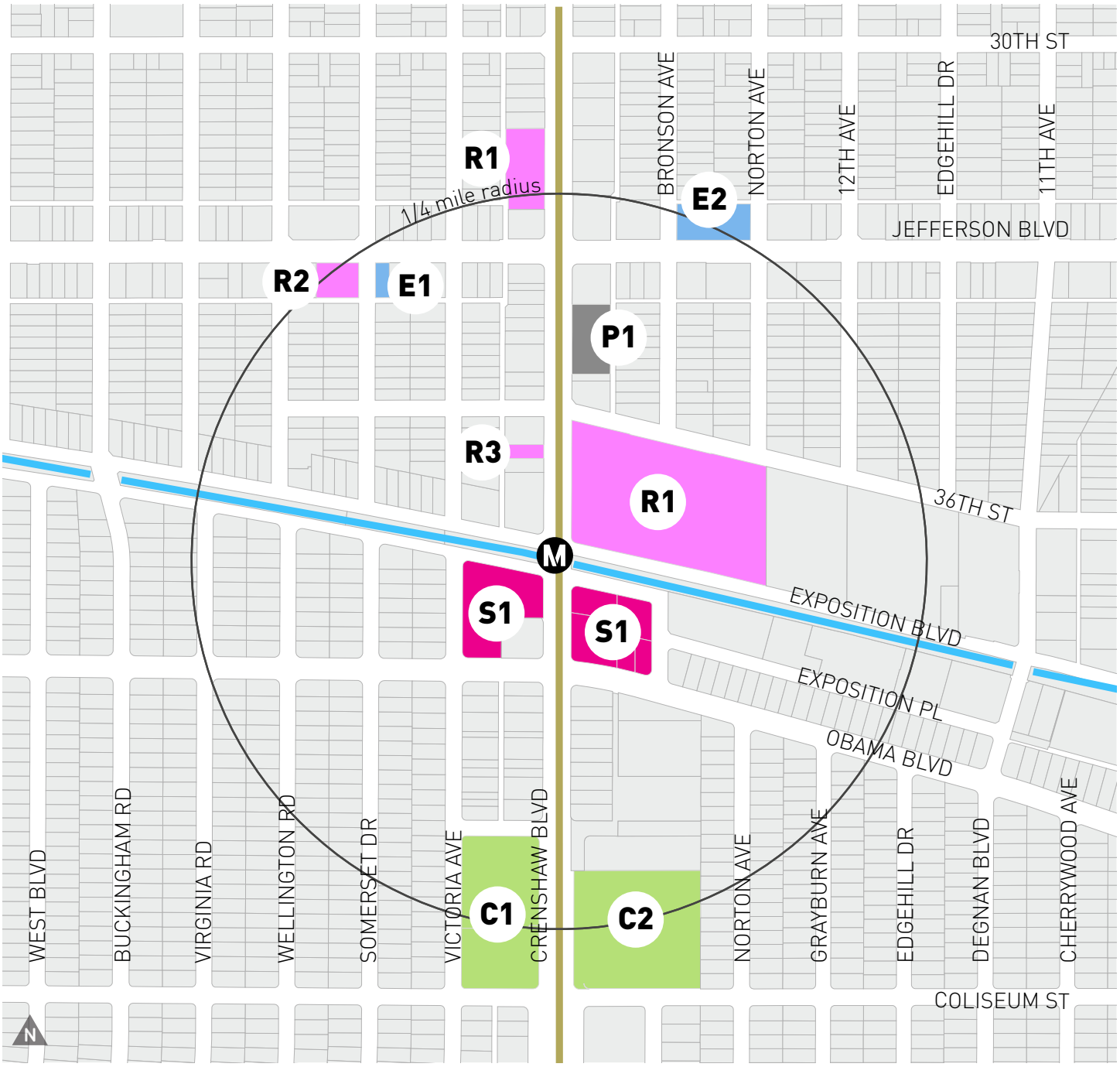
Constraints

- Barriers to North-South Movement
- Wide Right-of-Way
- High Collision Intersections

Other

- Metro Expo Line
- Metro Crenshaw/LAX Line

Community Destinations

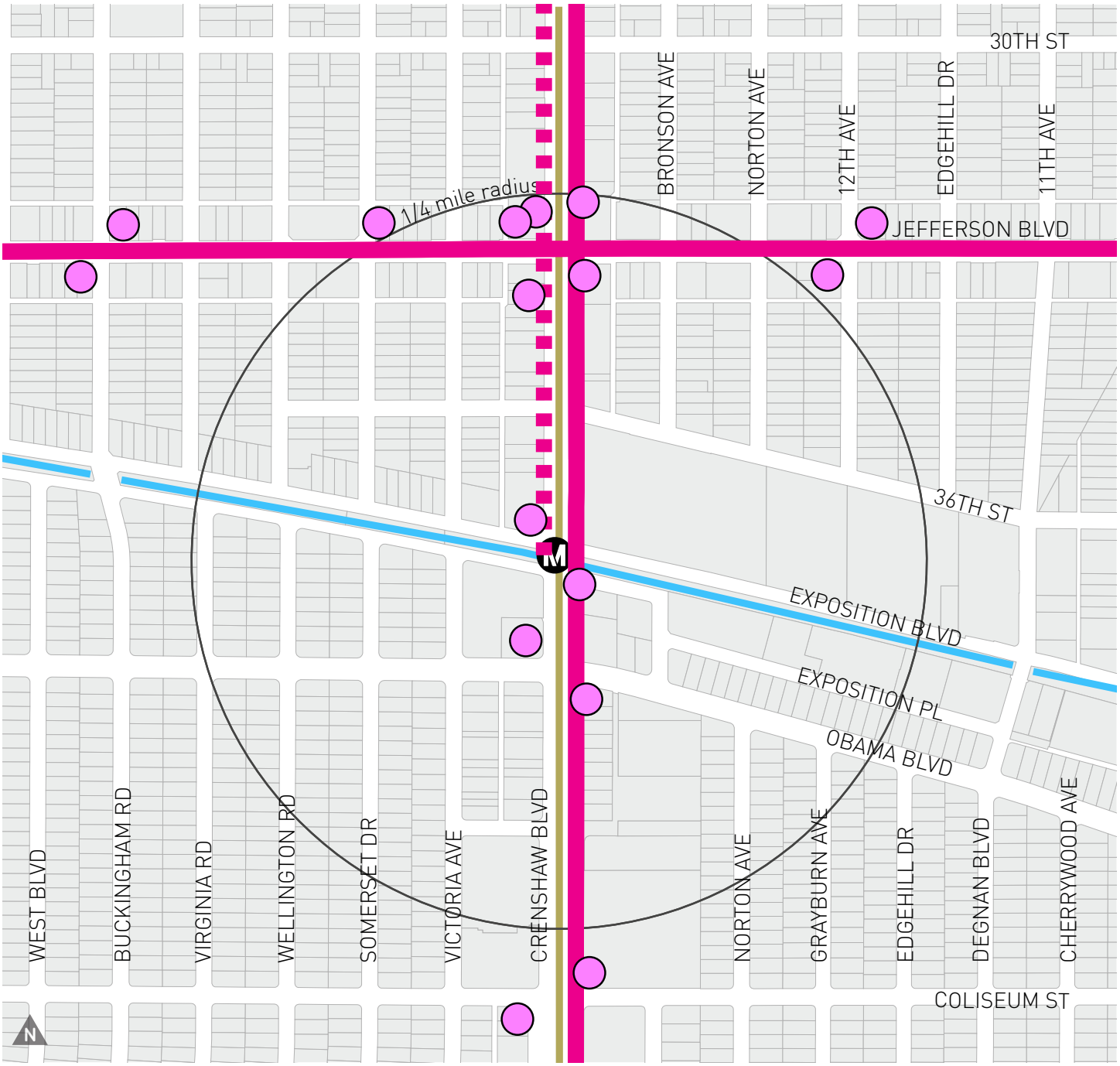


S1 Joint Development Sites
R1 West Angeles Cathedral
R2 Hope Memorial Lutheran Church
R3 Masjid Abu Bakr As Siddiq (Mosque)
E1 Head Start At Hope Memorial
E2 Celerity Nascent Charter School
C1 Commercial Center (CVS, Auto Club, RAC, etc.)
C2 Commercial Center (Walgreens, Big 5, etc.)
P1 Parking Structure

Metro Expo Line
Metro Crenshaw LAX Line

The West Angeles Cathedral is a major destination adjacent to the station.

Transit Network



Bus Lines & Stops
Lines 210, 710, 740, 35/38;
DASH Midtown, DASH Crenshaw

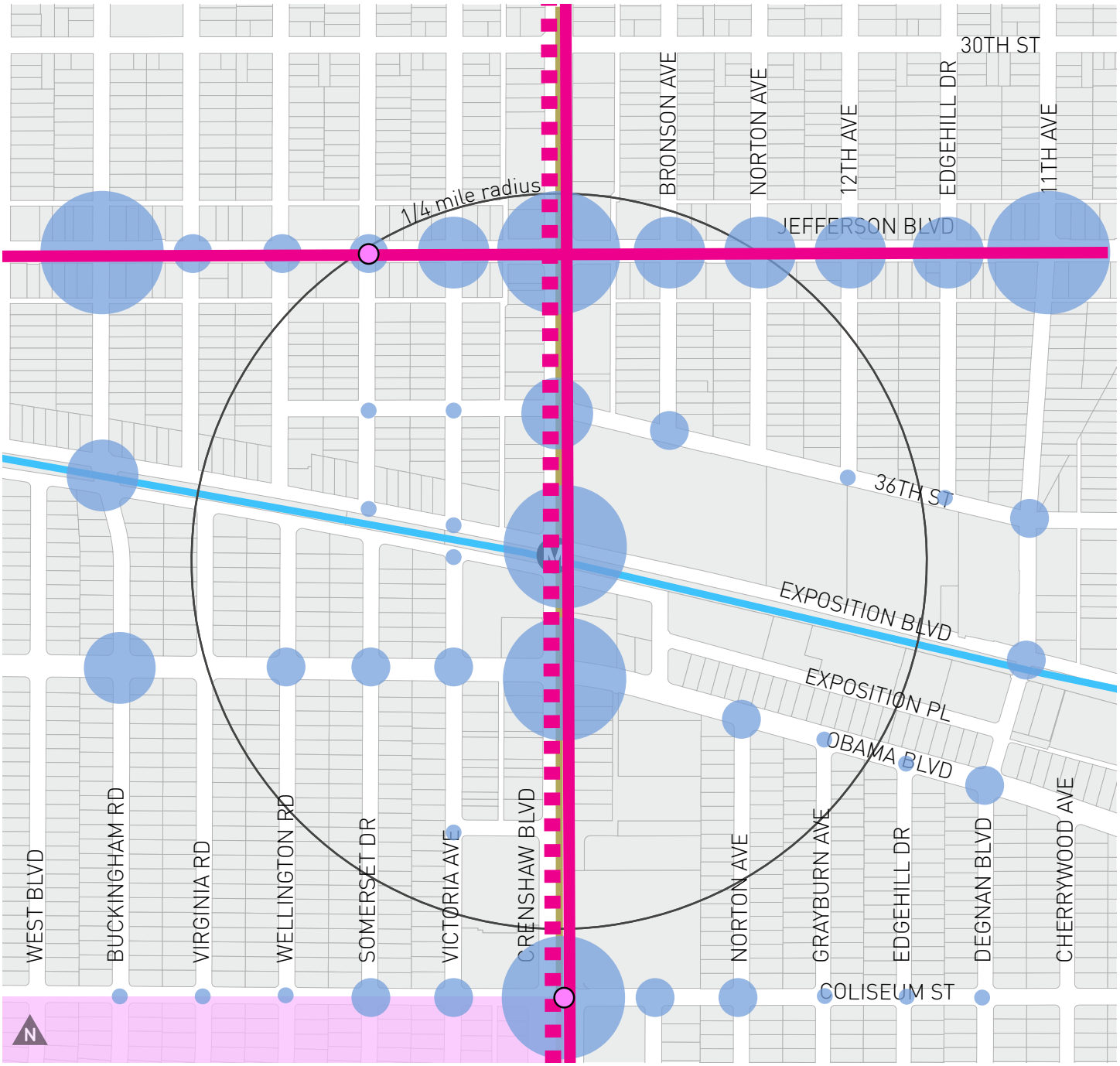
City of LA Mobility Plan Transit Enhanced Network

Metro Expo Line

Metro Crenshaw LAX Line

Both local and Rapid Metro bus routes travel along the two main streets within the study area: Crenshaw Blvd. and Jefferson Blvd. Metro's Rapid Line 740 connects south past the Green Line, through Inglewood, Lennox, Lawndale, and to Redondo Beach. The 710 Rapid travels up to Wilshire/Western and down to Redondo Beach as well. This bus follows a similar route to the 210 Local, however this bus also extends up past Wilshire/Western to Hollywood/Vine. The 35/28 travels east/west from the area near USC to La Cienega/Jefferson and Culver City. Most bus stops in the area are missing simple amenities like benches and shelters for people waiting.

Safety

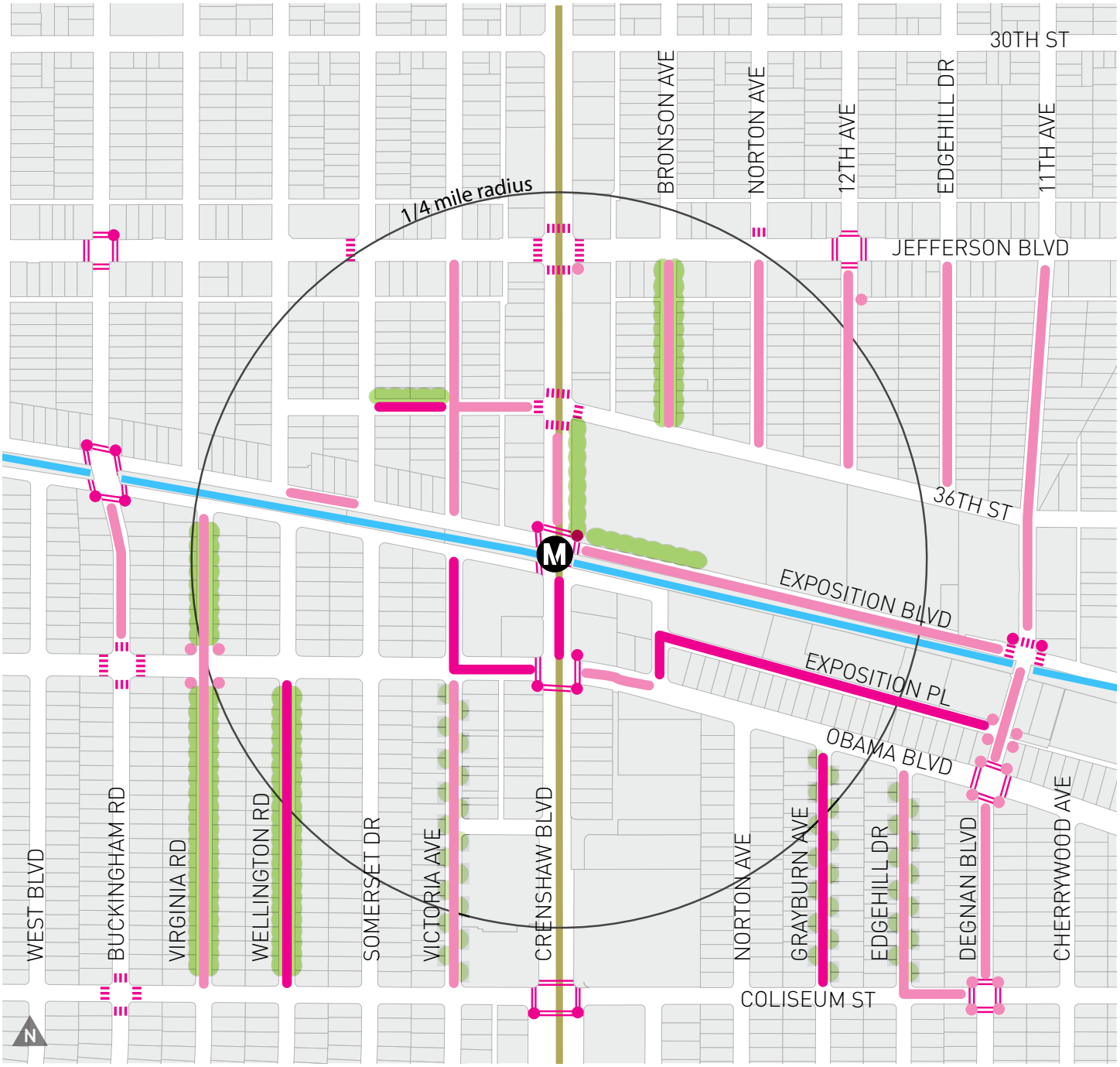


City of LA High Injury Network
Pedestrian Fatality (2012-2016)
11-25 Collisions (2012-2016)
5-10 Collisions (2012-2016)
2-4 Collisions (2012-2016)
1 Collision (2012-2016)
Crenshaw Blvd Safety Improvement Project
Baldwin Hills Senior Zone Project
Metro Expo Line
Metro Crenshaw LAX Line

The majority of collisions in the area between 2012-2016 were located on Jefferson Blvd. and Crenshaw Blvd., with the two most dangerous intersections being Jefferson/ Crenshaw (25 collisions) and Crenshaw/Obama (13 collisions). As expected, collisions are more prevalent in locations where there are higher posted speed limits.

Crenshaw Blvd	*35 mph*	*Obama Blvd*	*40 mph*
Jefferson Blvd	*35 mph*	*Coliseum St*	*30 mph*
Exposition Blvd	*35 mph*		

Pedestrian Amenities



The pedestrian conditions surrounding the station are average to poor. Long blocks are accompanied by little to no tree cover. Sidewalks are in various states of repair; many of the blocks that offer shade also have sidewalks that suffer from root intrusion. Standard curb ramps exist at the majority of intersections. In some instances ramps may be missing, or they have been enhanced to bi-directional ramps. Crosswalks are infrequent, particularly along Coliseum St. and Obama Blvd., and restrict NS movement.

Curb Ramps

Unless noted, standard curb ramps exist at all other intersections.

- Missing or damaged
- Bi-directional ramps

Crosswalks

- Standard crosswalk
- Continental crosswalk

Other

- Metro Crenshaw LAX Line
- Metro Expo Line

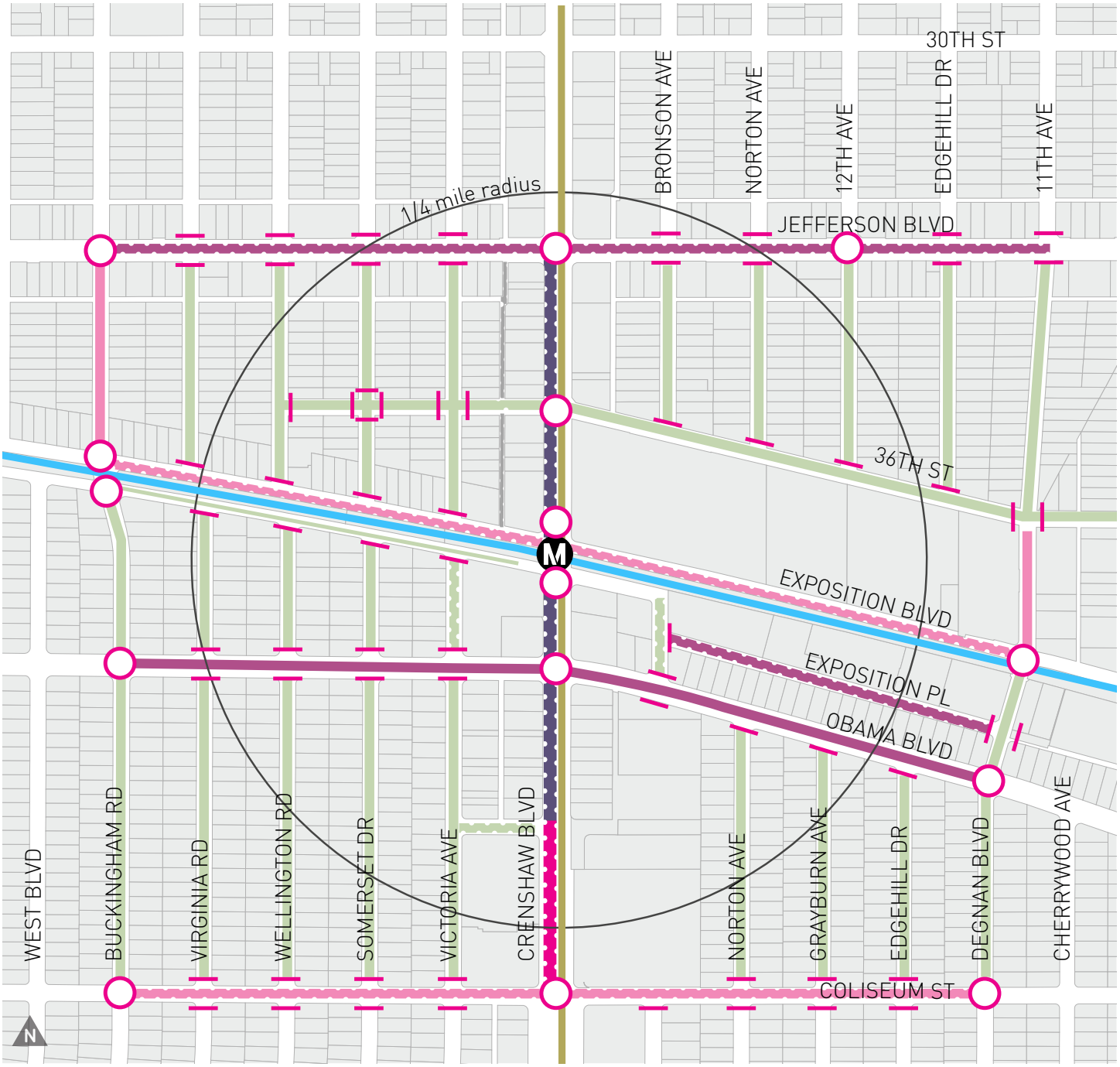
Sidewalk Quality

- Poor (*lifted slabs, cracked*)
- Extremely poor (*severe root intrusion, difficult to navigate*)

Tree Cover

- Dense tree cover
- Sporadic tree cover

Street Conditions



The street network in the area prioritizes east-west movement. All east-west streets are 40' and above, except for 36th St. Stop controls are also mainly north-south, further facilitating east-west movement. Because of the at-grade Expo Light Rail Line, Exposition Blvd. acts as a physical barrier for north-south movements. North-south crossings on Exposition Blvd. occur at Buckingham Rd., Crenshaw Blvd., and Degnan Blvd. Crenshaw Blvd. is the widest street at 70'-75' and increases to 95' south of Rodeo Pl. The major thoroughfares near the station have poor roadway quality with visible cracks and rough texture. Alleys also have observed poor roadway conditions.

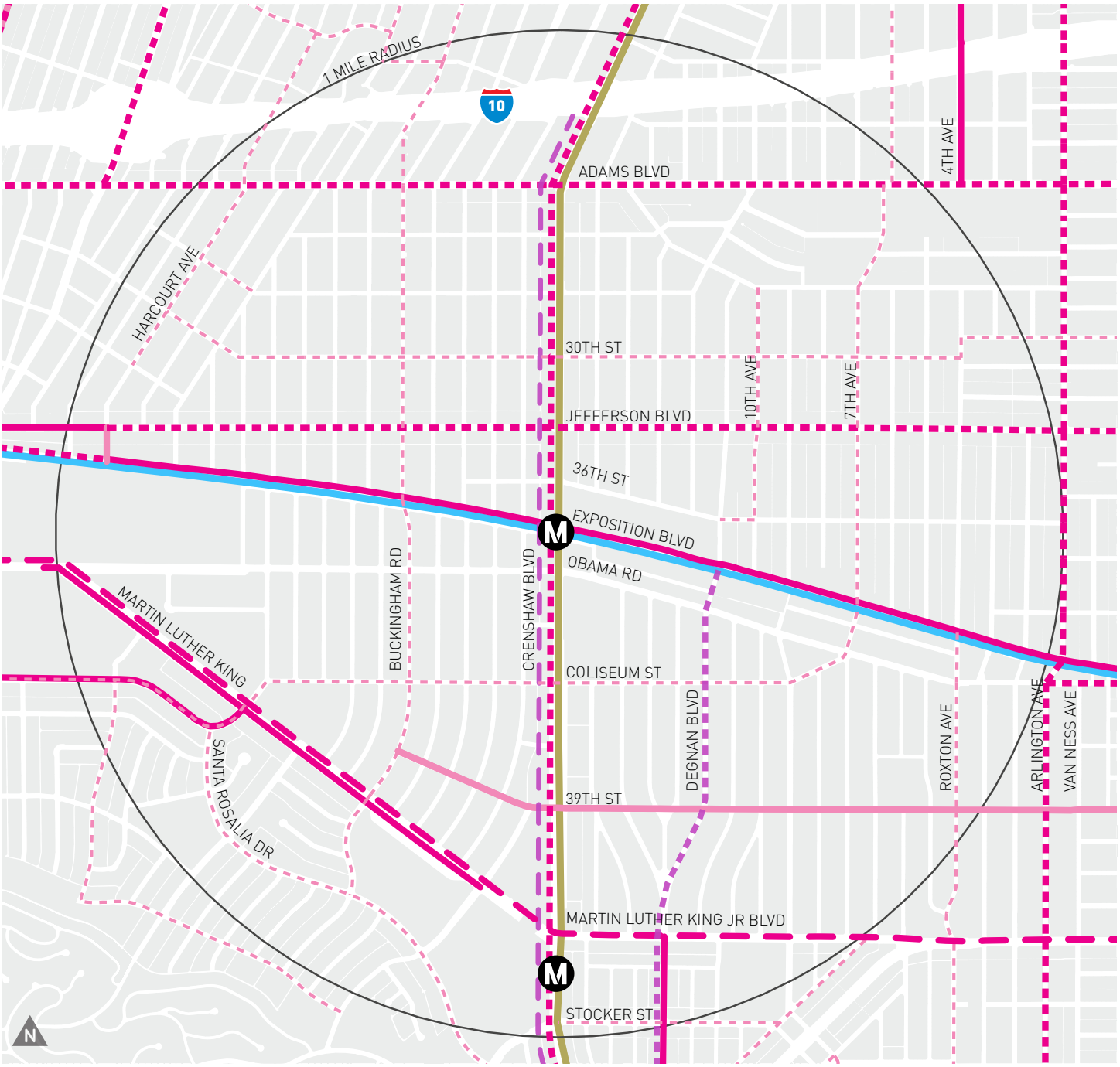
Intersection Stop Control

- Signalized intersection
- Four way stop
- North/south stop signs
- East/west stop signs
- Metro Expo Line
- Metro Crenshaw LAX Line

Roadway Width

- 30'-35'
- 40'
- 55'
- 70'-75'
- 95'
- Poor roadway quality

Bicycle Network



Existing bike lanes on Exposition Blvd. are narrow (4 ft), placed along the curb edge, and immediately adjacent to vehicular lanes (without a buffer). The lanes are located partially in the concrete gutter, creating a less-than-friendly experience for people riding bikes. City-proposed bike facilities include a bike lane along Crenshaw Blvd. and Jefferson Blvd. Coliseum St. and 30th St are city proposed bike-friendly streets. The Crenshaw Blvd. Streetscape Plan proposed an Aspirational protected bicycle lane on Crenshaw Blvd., with an Interim Bike Lane on Degnan Blvd.

Proposed Bike Facilities

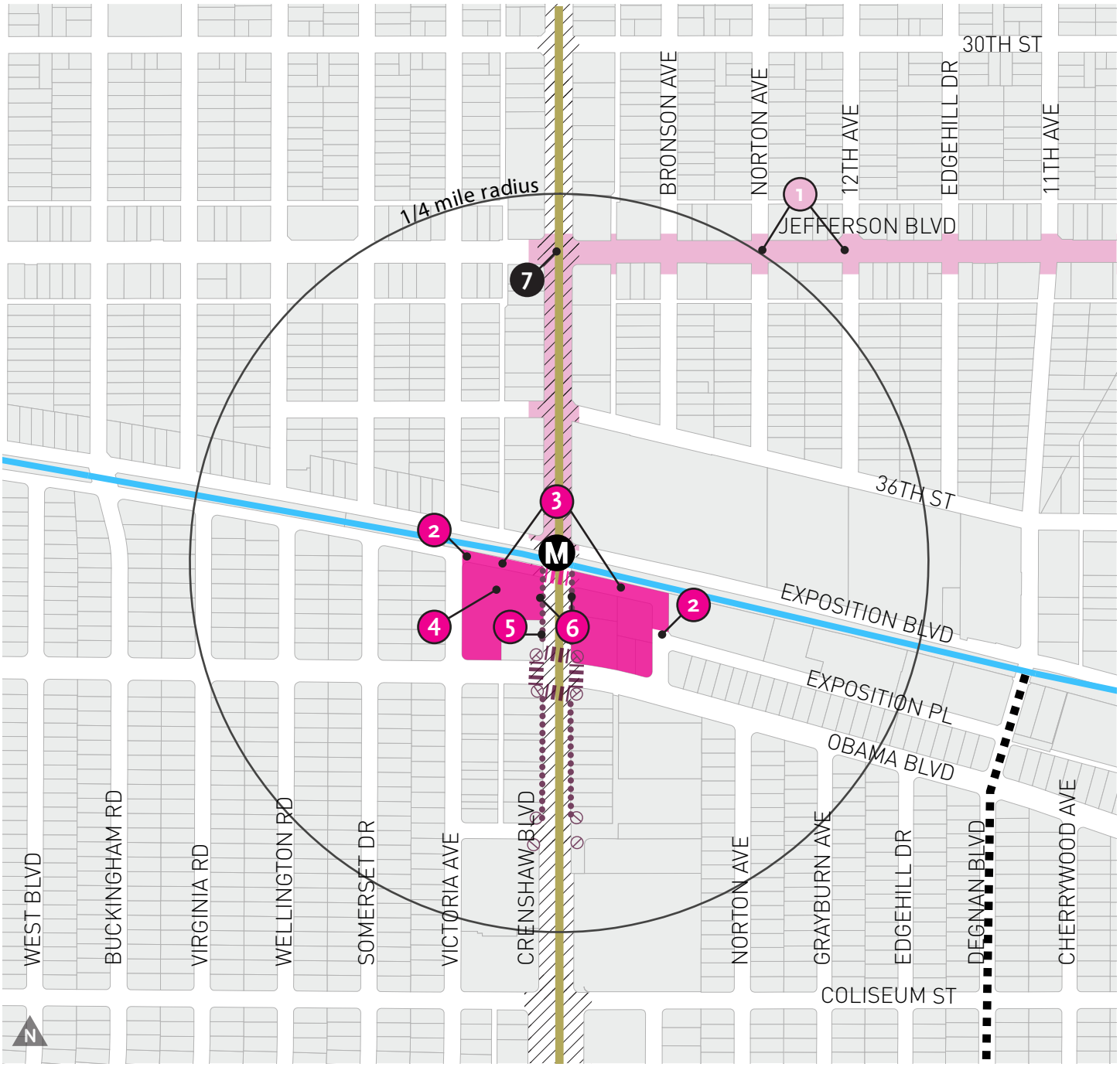
LA City Mobility Plan
- Class II Bike Lane
- Class III Bike Blvd
- Class IV Protected

Crenshaw Blvd Streetscape Plan
- Interim Bike Lane
- Aspirational Protected Bicycle Lane

Existing Bike Facilities
- Class II Bike Lane
- Class III Sharrow

Other
- Metro Expo Line
- Metro Crenshaw LAX Line

Ongoing Plans/Projects Proposed Improvements



Improvements (by project)

Metro JD Project
Improvements include bike racks, electric vehicle charging stations and ADA parking stalls.

- Continental crosswalk
- 2 Vehicle drop-off zone
- 3 Street vacation
- 4 Bike hub
- 5 Knock out panel
- 6 Bus turnouts

Crenshaw/LAX Transit Project

- Continental crosswalk
- Street trees, landscaping, street lighting
- Curb ramp
- Dual curb ramp

Prop 1C Improvements
Improvements include infill street trees, pedestrian lighting, sidewalk repairs and updated curb ramps.

- 1 Continental crosswalks

Crenshaw Streetscape Plan
Improvements include infill street trees, pedestrian and cobrahead lights, updated curb ramps and updated bus shelters.

- Degnan Blvd. Temporary Bike Lane *(Crenshaw Blvd Streetscape Plan)*
- 7 Protected left turn signal *(Crenshaw Blvd Safety Project)*
- Metro Expo Line
- Metro Crenshaw LAX Line

Appendix D

Community Voices
EXPO/CRENSHAW STAKEHOLDER MEETINGS SUMMARY

Overview

28
COMMUNITY MEMBERS

12
YOUTH GROUP MEMBERS

7
NEIGHBORHOOD AFFILIATES

9
BIKE & PEDESTRIAN ADVOCATES

Metro

CONTEXT

As part of the Expo/Crenshaw First/Last Mile Strategic Plan, 28 community members participated in three small-group conversations with the design and planning team, during the winter of 2019. All three meetings were held within the study area and included conversations with:

- A local Youth Group (held on November 14, 2019, at the West Angeles Youth Center, 3010 Crenshaw Blvd)
- Neighborhood Representatives from local Neighborhood Councils and an HOA (December 9, 2019, Crenshaw/LAX Project Office, 3699 Crenshaw Blvd)
- Bicycle and pedestrian advocates (December 17, 2019, Crenshaw/LAX Project Office)

The goals of the meetings were to introduce the First/Last Mile visioning project to community members and gather feedback about issue areas, priorities, and ideas for public realm improvement within the study area, which includes a 1/4 mile around the new Expo/Crenshaw station.

CONVERSATION STRUCTURE

Each meeting began with a brief presentation about the project. The design and planning team defined the 'First/Last Mile' and provided examples of issues and opportunities for First/Last Mile improvement, as food for thought. Following the presentation, the group gathered around large format maps to discuss their thoughts. Key feedback from these conversations is summarized in the next section and individual comments received are illustrated on the two maps that follow.

KEY FEEDBACK

Conversations focused almost exclusively on ways to improve the walking and bicycling environment around the station. The need to preserve parking was only mentioned twice during the three meetings and none of the comments recorded included ideas for widening vehicular lanes or increasing vehicular access (beside drop off areas and car share at the station), although several participants did note the traffic congestion that exists in the areas, especially during rush hour. Several participants urged the design and planning team to 'think big' and consider street improvements that would drastically improve conditions for people walking and biking, for example adding cycle tracks, transforming streets into Complete Streets, and adding consistent landscaping and an undulating planted parkway along entire stretches of streets.

The large majority of people emphasized the need for more pleasant and human-friendly streets, especially in terms of

KEY FEEDBACK

1 Think big! In general, prioritize the safety and comfort of people walking and biking.

2 Crenshaw and Expo are the streets most in need of an overhaul for people walking and biking.

3 Shade, lighting, enhanced crossings, and improved bicycle facilities are some of the biggest needs study area-wide.

more trees and shade, sidewalk lighting for pedestrian safety at night, calming speeding cars, and general beautification along the streets.

Many people suggested adding in bicycle lanes, especially those that are buffered or protected, noting the inadequate and unsafe conditions for people who are riding their bikes on many of the streets with the study area.

Generally speaking, wayfinding signage was recommended for the full study area, especially around key decision-making points, for example adjacent to the Metro parking garage or at the Crenshaw and Exposition intersection.

PROBLEM & IMPROVEMENT AREAS

Commentary focused on both identifying problem areas and areas were improvements should be located. Crenshaw Blvd, Exposition Blvd, & Obama Blvd rose to the top as "Problem Areas." Conversely Crenshaw Blvd and Exposition Blvd were corridors where participants recommended the most improvements.

Crenshaw Blvd, especially the segment north of Exposition Blvd, was identified almost exclusively as the top improvement area. Recommendations along Crenshaw Blvd included a full suite of changes: pedestrian lighting, a cycle track, landscaping and trees, enhanced crossings, traffic calming, bus stop enhancements (including real time signage, wifi, security call boxes, touch screen kiosks, and other technology), widened sidewalks, and cool pavement. Some people also recommended adding corner bulb-outs to make it easier to cross Crenshaw Blvd. Community members referenced the *Crenshaw Blvd Streetscape Plan* and would like to see the Plan's recommendations implemented within the study area.

Exposition Blvd was also brought up in every group as a priority street for improvements, including new pedestrian lighting, widened sidewalks, enhanced crossings with Leading Pedestrian Intervals, and introduction of a cycle track. Many people noted the inadequate condition of the bike lane on Exposition Blvd because of its width, proximity to vehicles, and location partially within the gutter.

Obama Blvd was identified as needing traffic calming, corner bulb-outs, pedestrian lighting, and enhanced crossings. Many of the intersections on the street do not have marked crosswalks.

Key streets recommended for bicycle connections included Crenshaw Blvd (protected facility), Exposition Blvd (protected facility), Jefferson Blvd (bike lane continuation), Coliseum St (bike lane), Norton Ave (Greenway), and Degnan Blvd (unspecified). As mentioned previously, safety for bicycles was a major topic of conversation. Some of the youth who regularly bicycle and ride their skateboards pointed out that it is much more pleasant to ride along side neighborhood streets, than along Crenshaw Blvd, Exposition Blvd, or Obama Blvd due to speeding traffic and noise. Coliseum St was generally preferred over Obama Blvd for an enhanced bicycle connection, due to the speed of traffic, character of the street, and regional connectivity.

Public art was brought up both in terms of its beautification potential and its potential to help calm traffic, when applied in crosswalks.

Amenities for seniors and children were also brought up; participants stressed the need to make the streets comfortable for all ages and abilities.

Several creative ideas were brought up that represented out of the box thinking, including:

- Transforming Exposition Pl into a Shared Street (or Woonerf) with permeable paving, new landscaping, seating areas, and bicycle-friendly conditions. The Annenberg Paseo in South LA was brought up as a precedent for the street.
- Improvements to the Exposition Blvd bicycle lane, including introduction of a cycle track, one or two way, which could potentially use some of the landscaped portion of the Metro rail right-of-way
- Transformation of Exposition Blvd into a Complete Street
- Introduction of technology such as wifi-enabled bus stops and touch-screen kiosks to make the First/Last Mile experience more seamless
- Transforming unused space along streets (for example on Crenshaw Blvd) into parklets or mini parks
- Adding neighborhood-scaled traffic circles in residential areas, for example along Coliseum St.

DESCRIPTIVE MAPS

The next pages present comments received from the three meetings, including both problem areas and improvement ideas. Notes are included at the top, when further description is needed.

Problem Areas

Notes

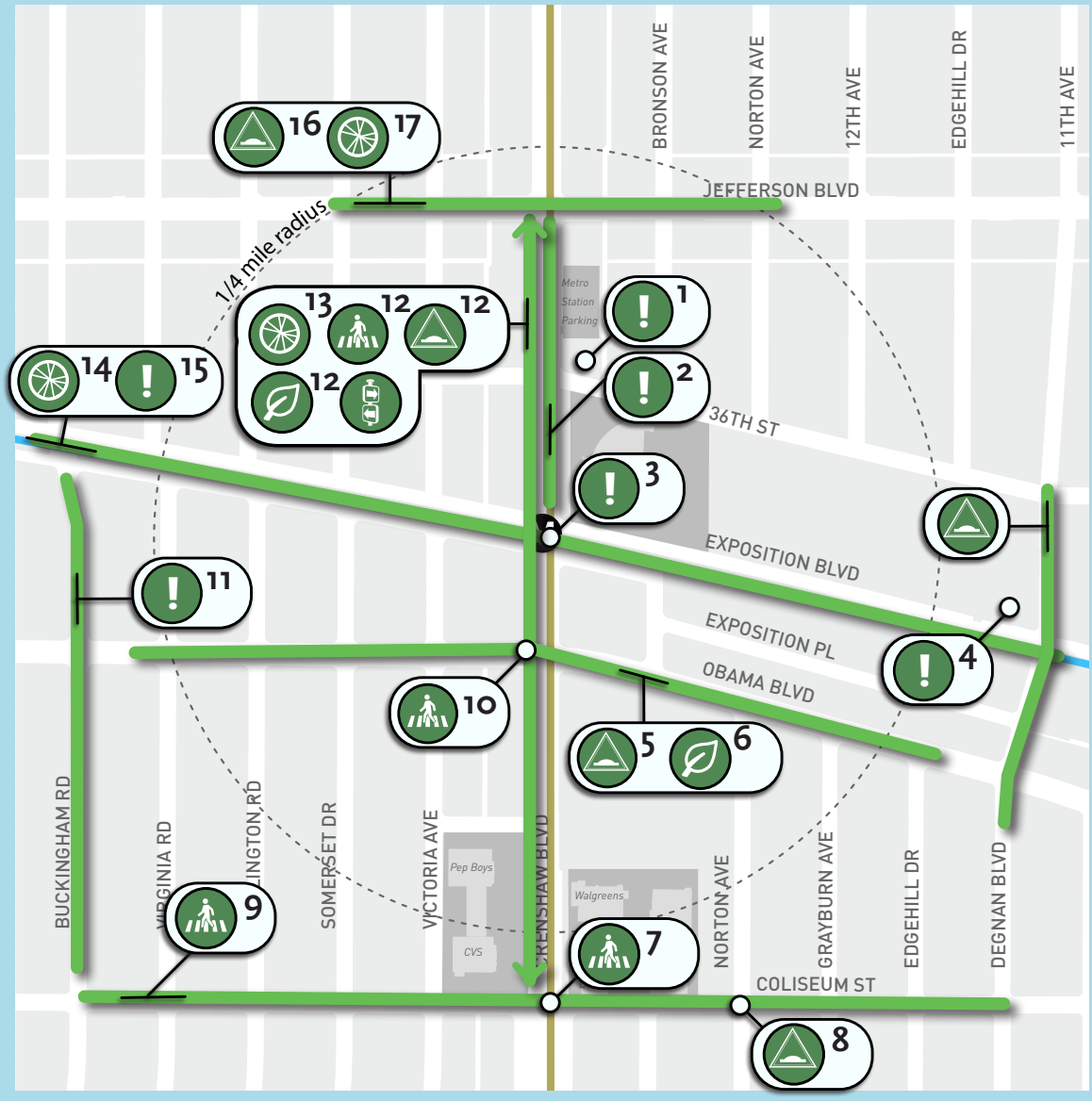
1. Blighted parcel can feel unsafe
2. Critical street segment in need of attention. Not pleasant to walk (or bike) here (Jefferson Blvd to Expo Blvd).
3. Traffic backups here often. In this area also consider pick up/drop off areas, car share access, and bus transfer ease and safety.
4. New development in the area will need connection to Metro stations
5. Lots of cut-through traffic
6. No shade
7. Difficult crossing
8. Many collisions occur here
9. Visibility is limited and therefore it is hard to cross the street
10. Problem intersection
11. Often congested
12. Generally busy, loud, lacking shade, and needs better crossings
13. Poor bike connectivity
14. Biking environment is not friendly (narrow lane, partly within the gutter, without buffer)
15. Crossing Exposition north/south is difficult and is an obstacle to pedestrian and bicycle movement
16. Traffic moves way too fast
17. Bike lane stops / does not continue

Safety Issues

- Missing or Inadequate Crosswalk
- Fast Traffic

Comfort Issues

- No Shade or Greenery
- Lacking Wayfinding
- Lacking Appropriate Bicycle Facility
- Other



Community-Identified Problem Area Map

Improvement Ideas

Notes

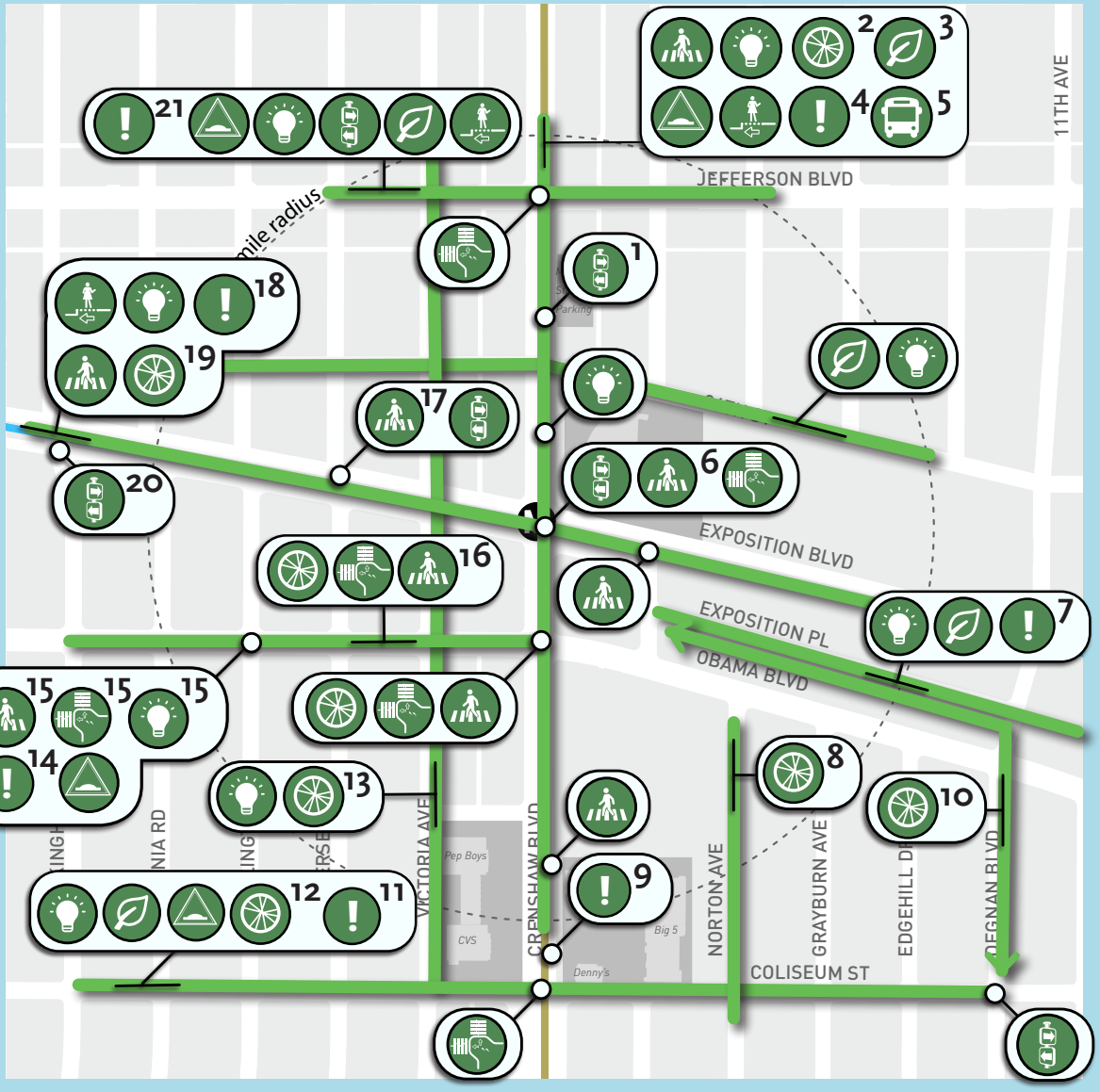
1. Add wayfinding - parking garage to station
2. Cycle track
3. Incorporate trees, landscaping, & bioswales
4. Be sure to coordinate with Destination Crenshaw. Also consider cool pavement.
5. Technology at bus stops (e.g. real time, etc.)
6. Scramble crosswalk
7. Permeably paved, shared-street (Woonerf) - See South LA Annenberg Paseo as referenced precedent
8. Sharrow
9. Unused space here could be used for parklets or public space
10. Good bike route option to and from station
11. Neighborhood-scaled traffic circles
12. Great potential regional bike connection (and better than Obama)
13. Greenway
14. Do not take away parking in residential areas
15. Crosswalk enhancements, corner bulb-outs, and pedestrian lighting on all residential streets
16. Enhance crosswalks adjacent to schools and big apartment buildings
17. Ability to cross tracks for pedestrians and bicyclists
18. Transform Exposition Blvd into a Complete Street. Consider Leading Pedestrian Intervals.
19. Buffered/protected bike lane. Can part of Metro setback area be used for bike lane? Some people also suggest a cycle track.
20. Add wayfinding and improve signal timing
21. Beautification generally needed

Safety Improvements

- New or Improved Crosswalks
- Traffic Calming
- Curb Extensions (bulb-outs)
- Widened or Enhanced Sidewalk

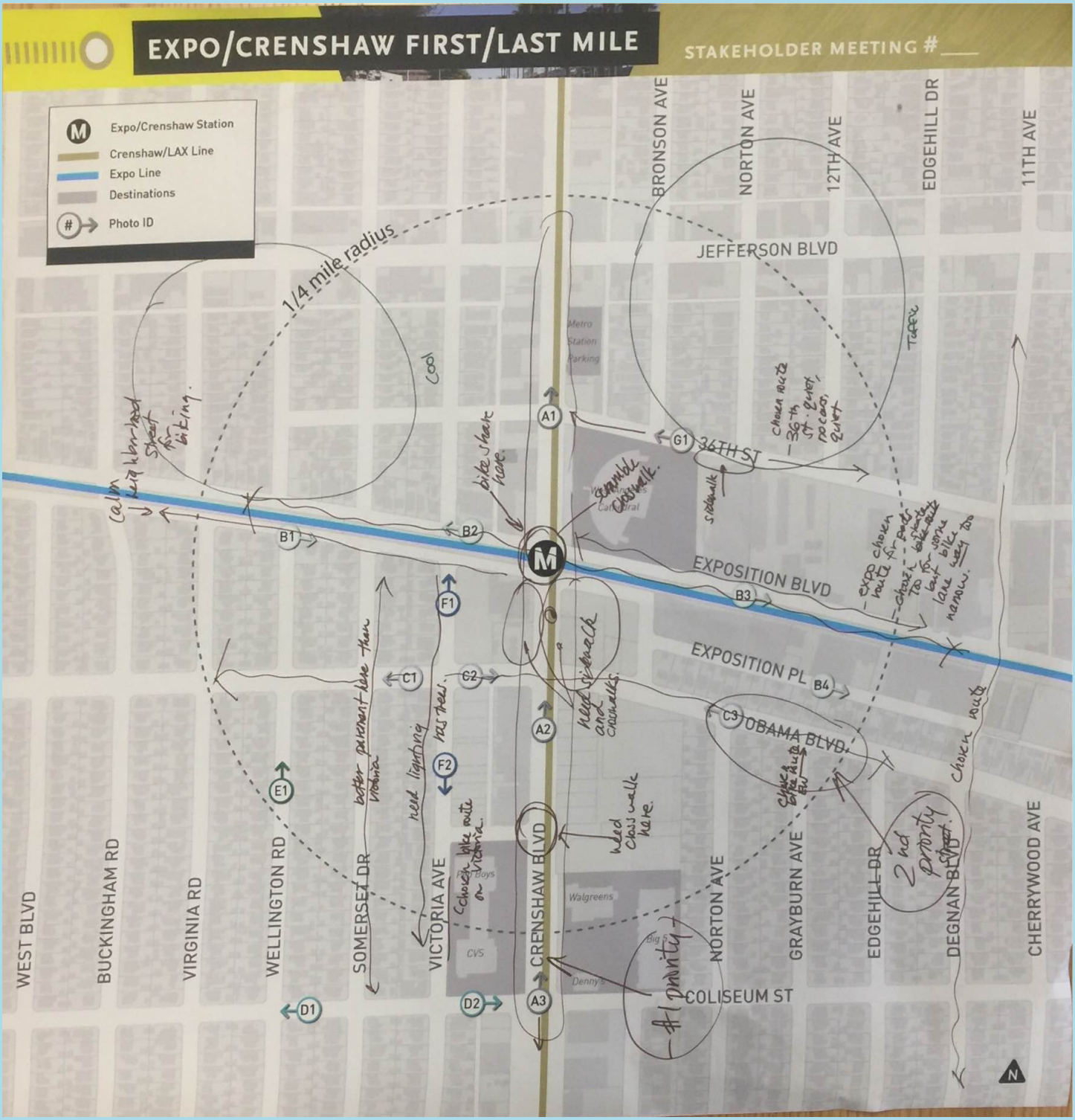
Comfort Improvements

- Landscaping & Shade
- Wayfinding
- Bus Stop Enhancements
- Pedestrian Lighting
- Bicycle Enhancement
- Other

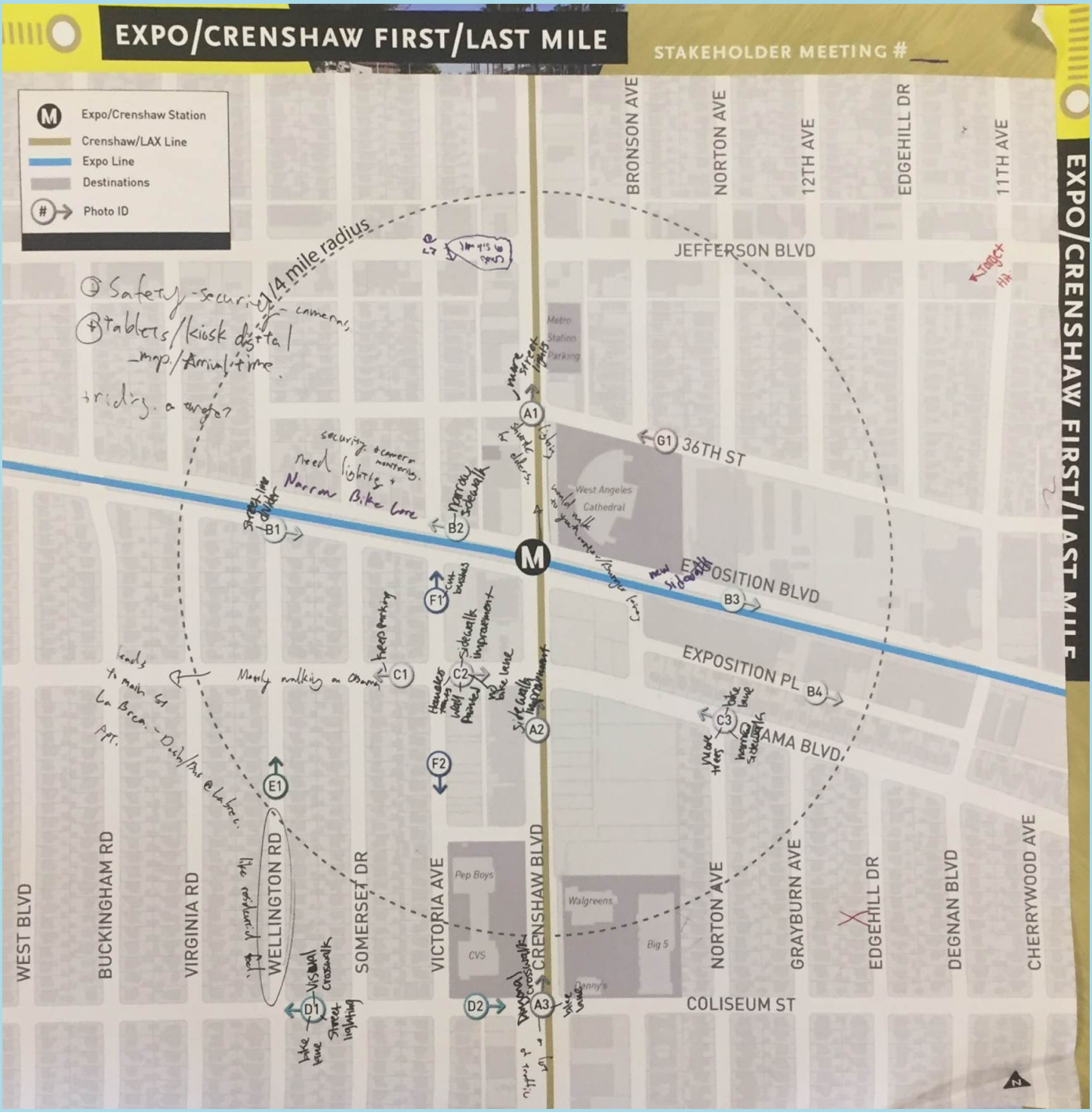


Community-Identified Improvement Idea Map

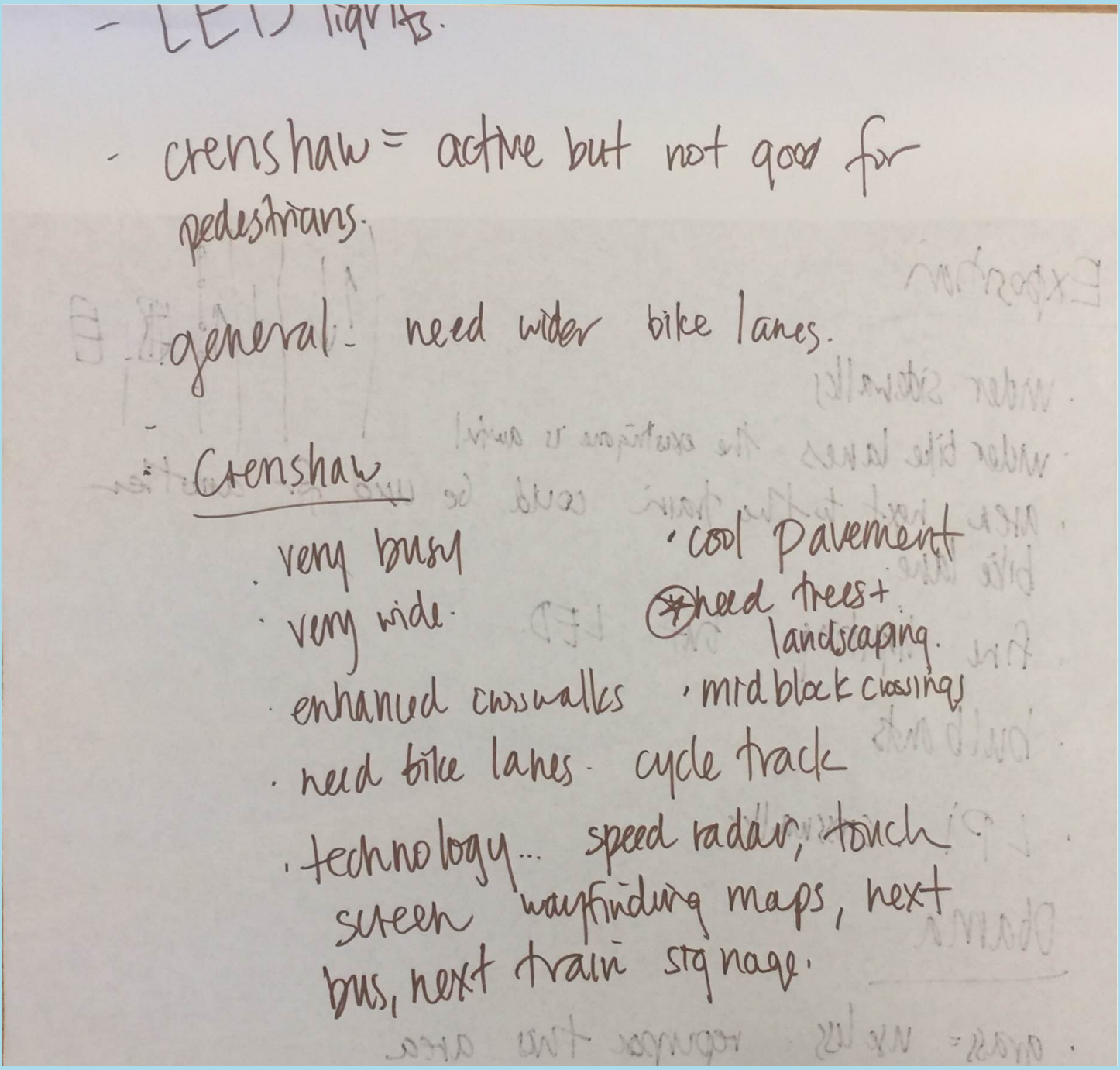
Youth Group Notes



Youth Group Notes



Youth Group Notes



- LED lights.

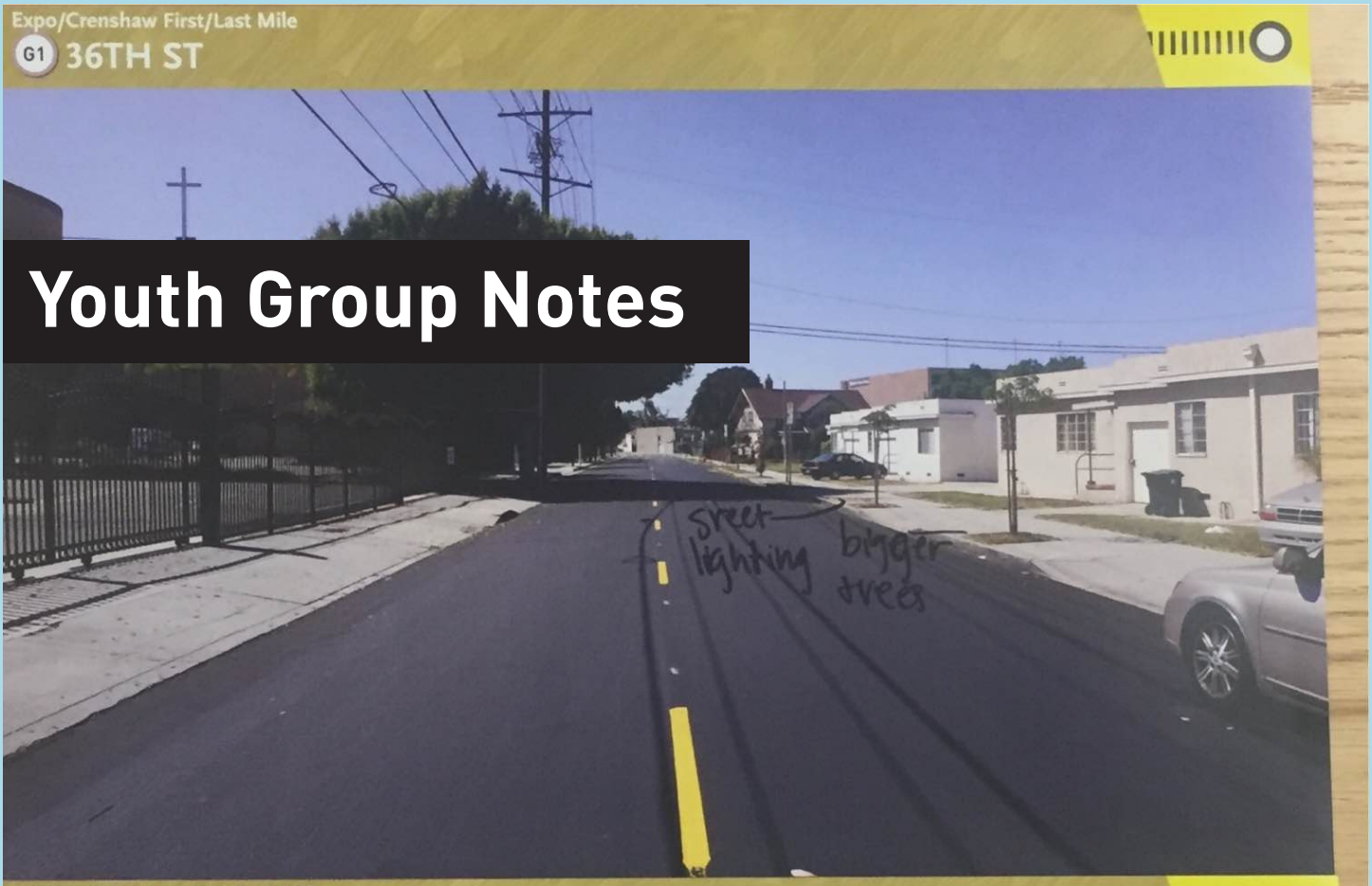
- crenshaw = active but not good for pedestrians.

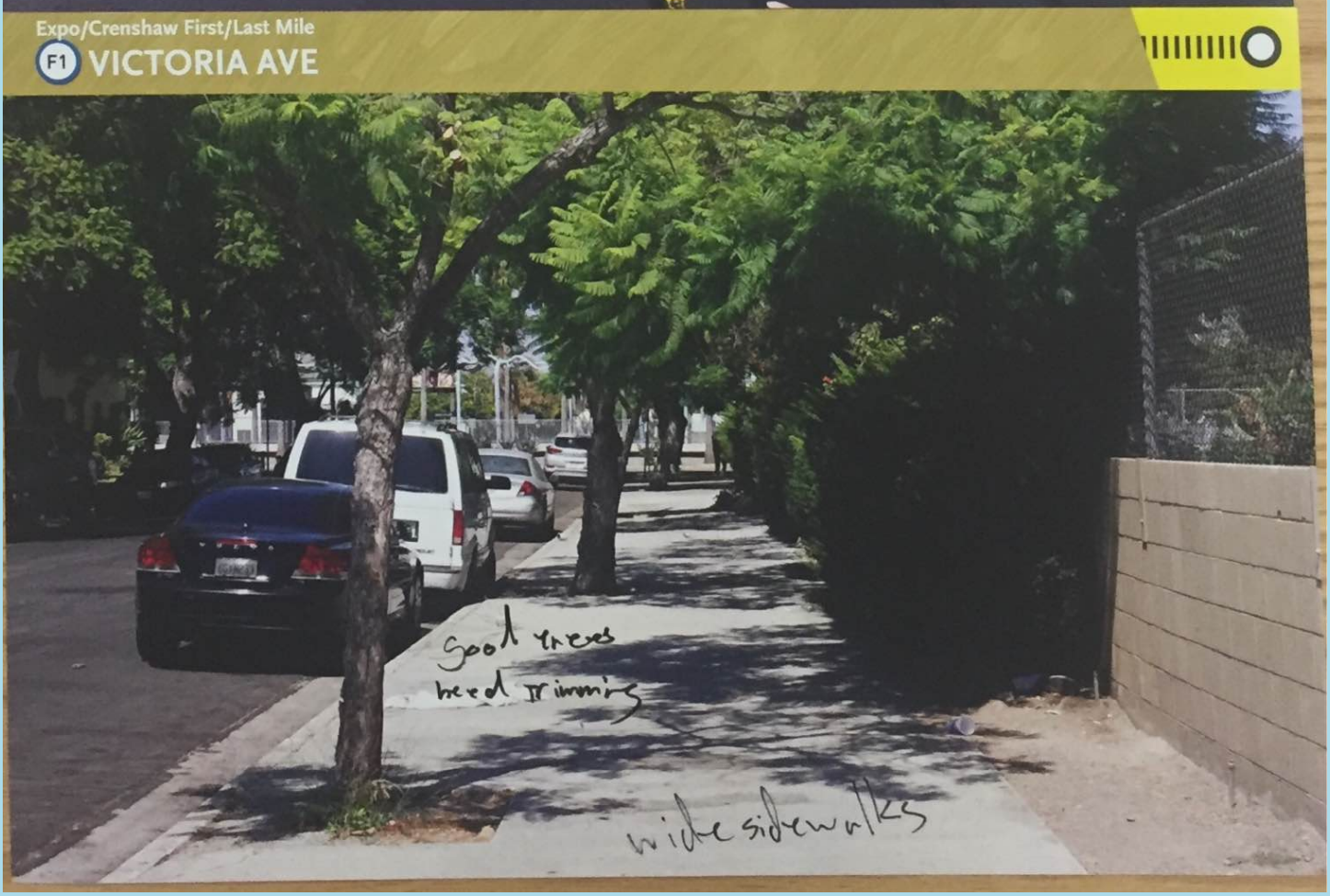
general: need wider bike lanes.

Crenshaw

- very busy
- very wide.
- enhanced crosswalks
- need bike lanes
- cool pavement
- ⊛need trees + landscaping.
- mid block crossings
- cycle track
- technology... speed radar, touch screen wayfinding maps, next bus, next train signage.

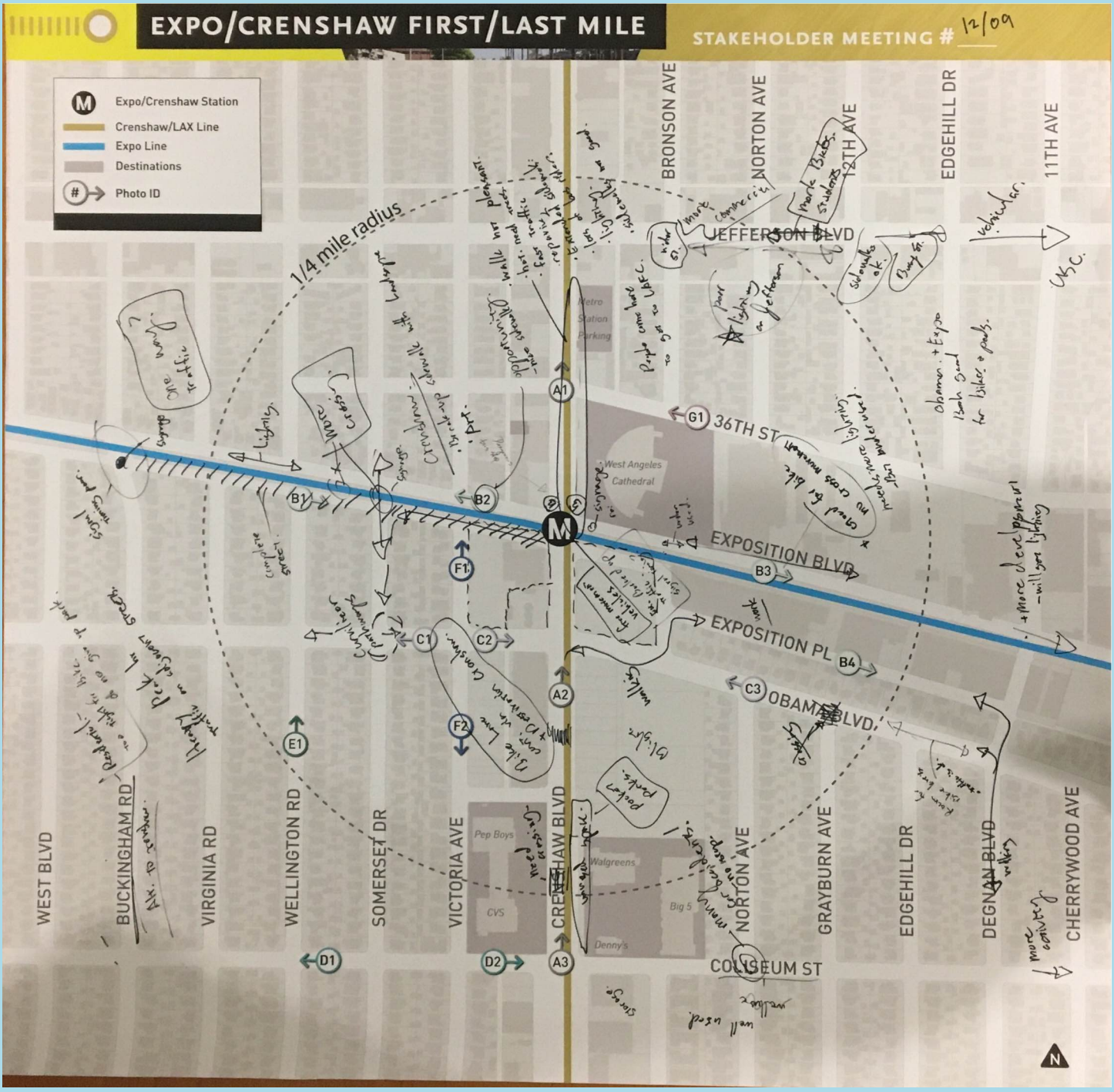
Youth Group Notes



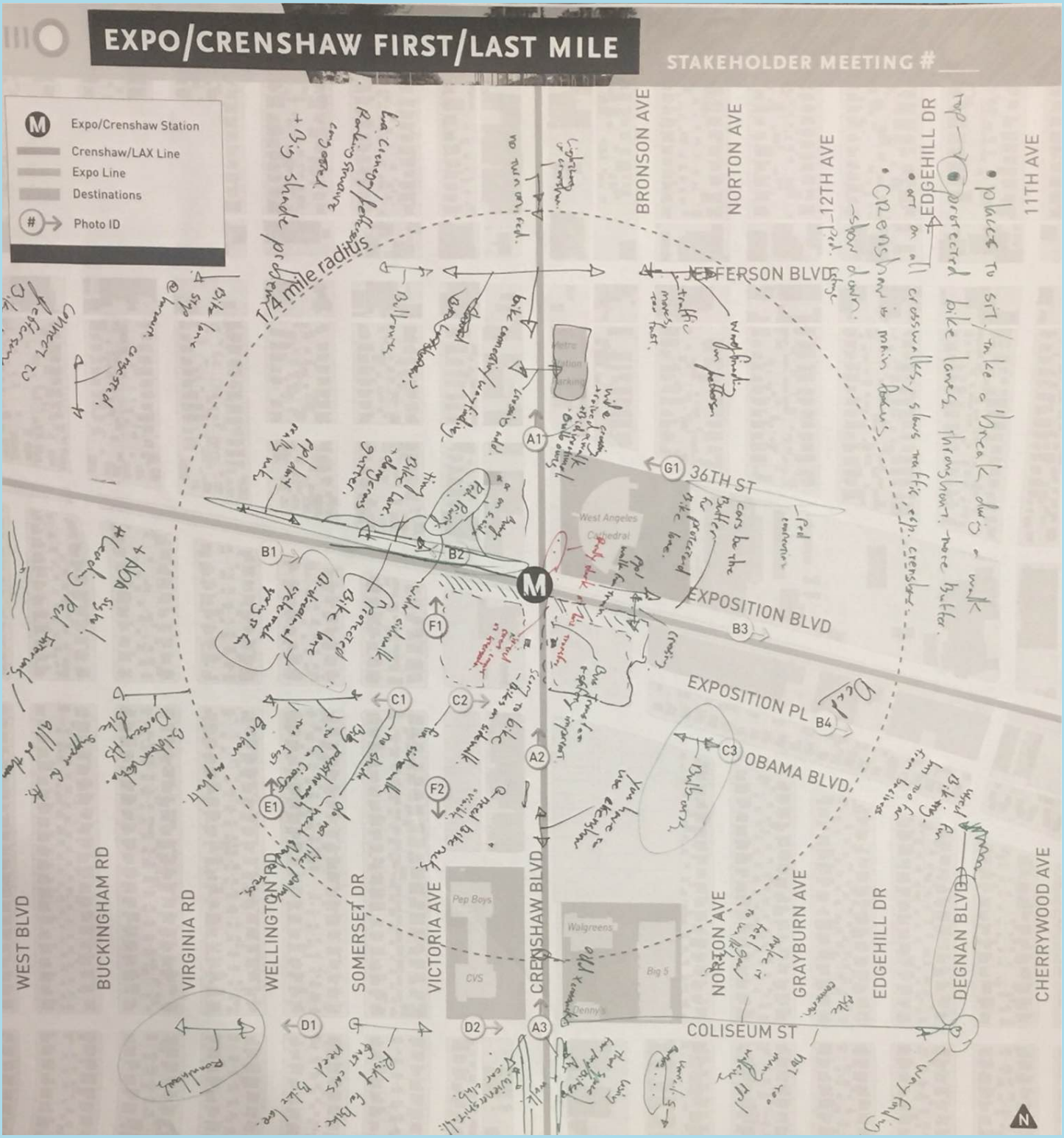


Neighborhood Affiliate Notes

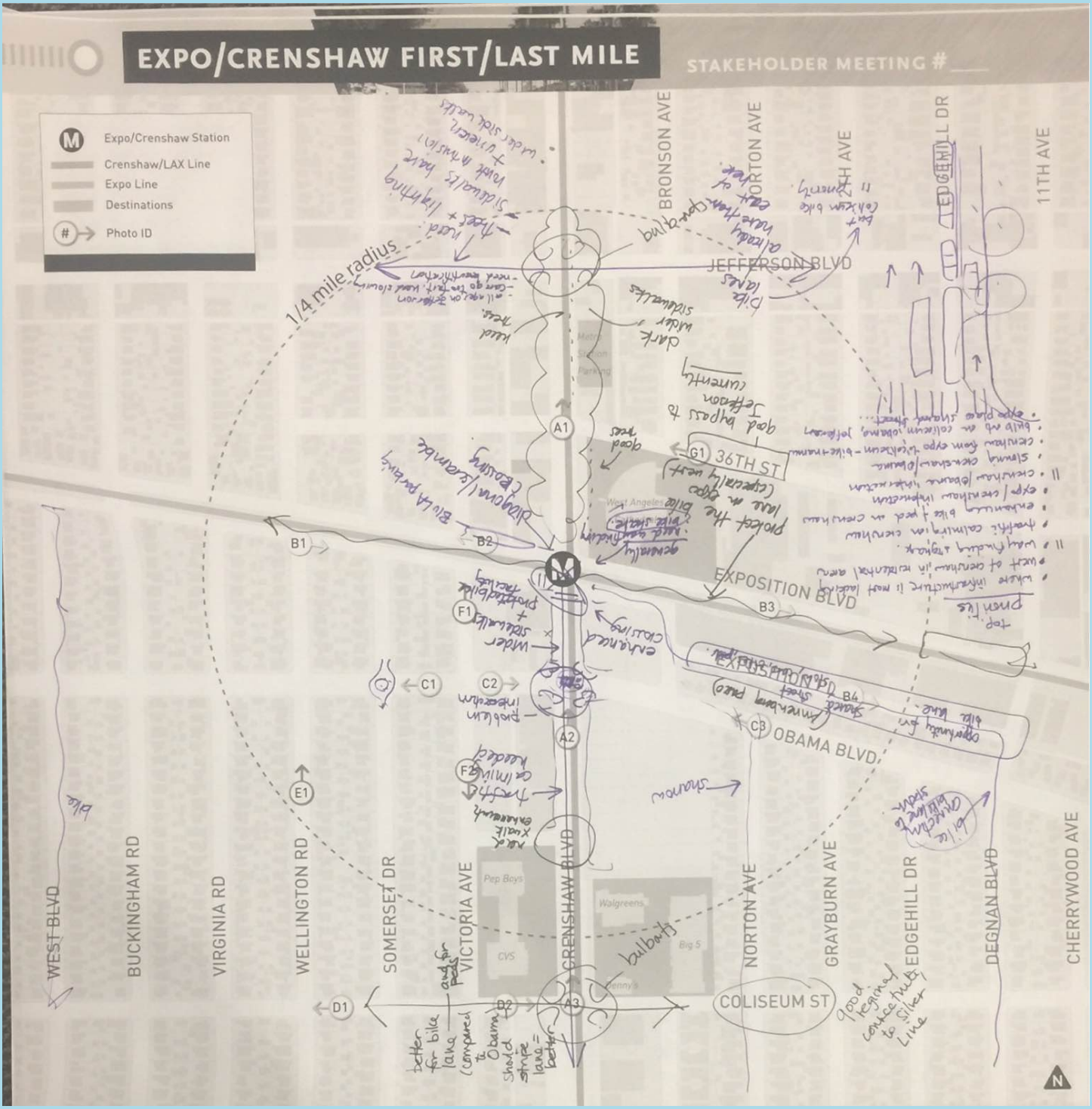
Neighborhood Affiliate Notes



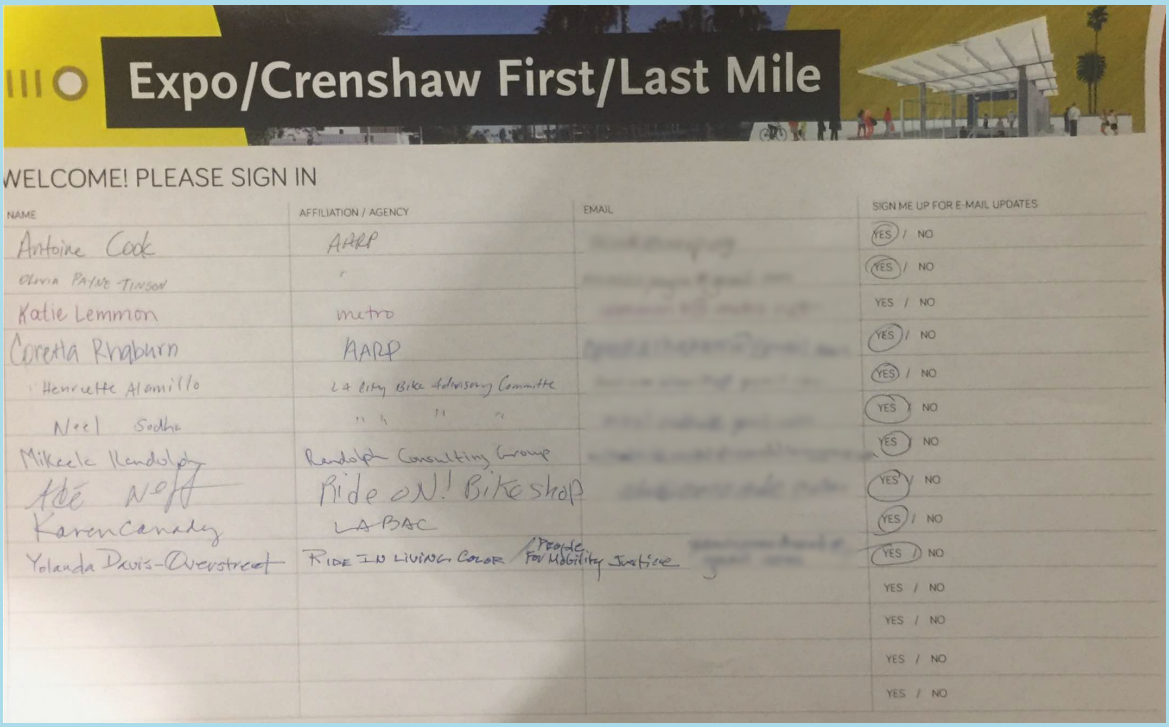
Bike & Ped Advocate Notes



Bike & Ped Advocate Notes



Sign in Sheets

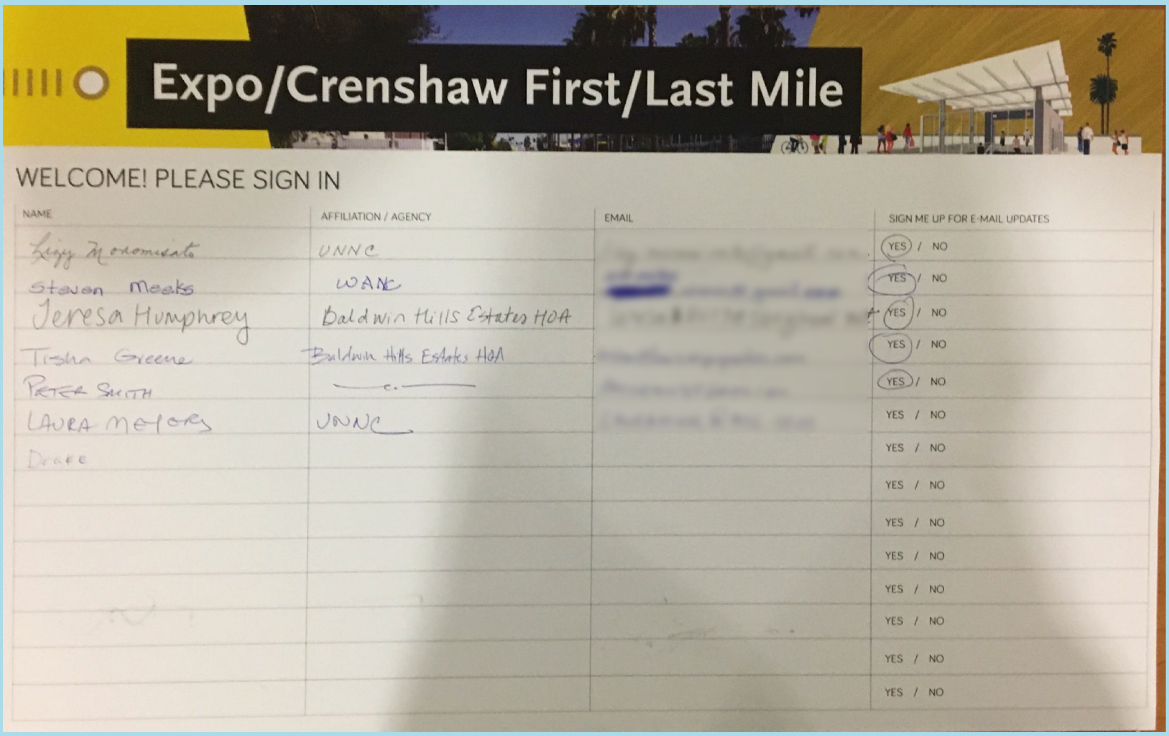


Expo/Crenshaw First/Last Mile

WELCOME! PLEASE SIGN IN

NAME	AFFILIATION / AGENCY	EMAIL	SIGN ME UP FOR E-MAIL UPDATES
Antoine Cook	AARP		YES / NO
Olivia Paine-Tinson			YES / NO
Katie Lemmon	metro		YES / NO
Coretta Rayburn	AARP		YES / NO
Henriette Alamillo	LA City Bike Advisory Committee		YES / NO
Neel Sodha	" " "		YES / NO
Mikeele Randolph	Randolph Consulting Group		YES / NO
Adé Neff	Ride ON! Bike shop		YES / NO
Karen Canady	LA BAC		YES / NO
Yolanda Davis-Overstreet	Ride In Living Color / People For Mobility Justice		YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO

Pedestrian and Bicycle Advocates Sign In

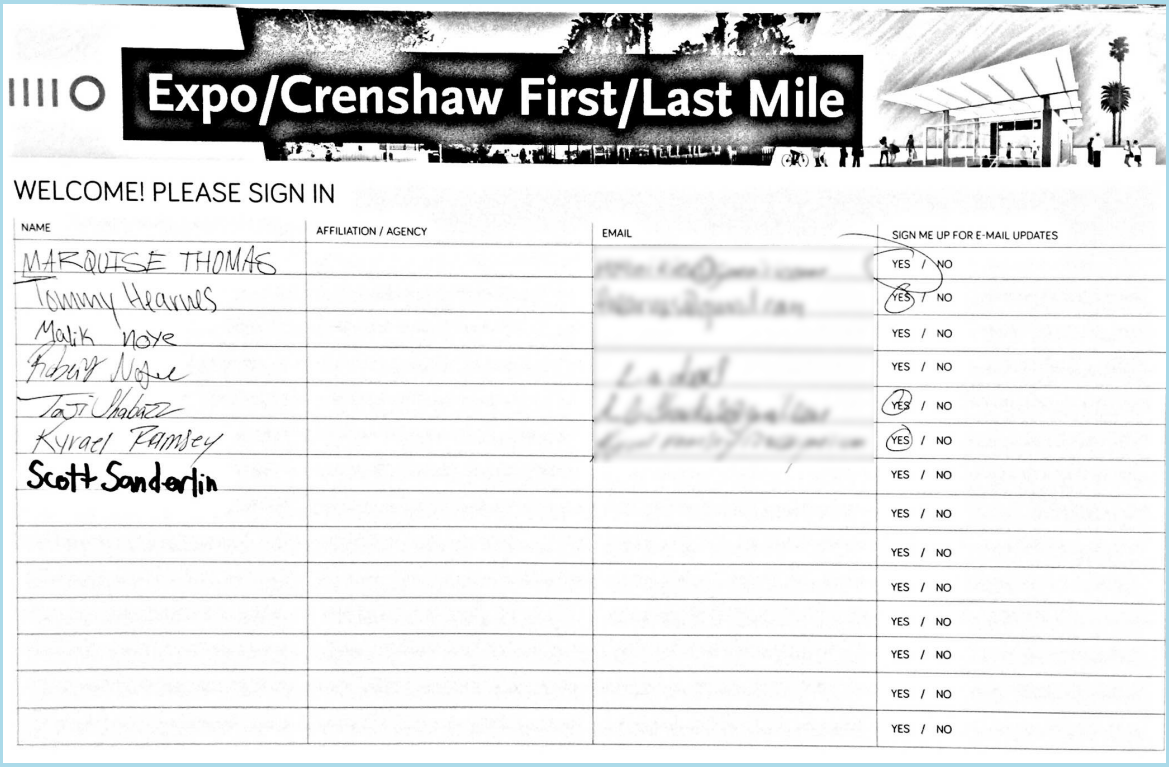


Expo/Crenshaw First/Last Mile

WELCOME! PLEASE SIGN IN

NAME	AFFILIATION / AGENCY	EMAIL	SIGN ME UP FOR E-MAIL UPDATES
Leigh Monomisate	UNNC		YES / NO
Steven Meeks	WANC		YES / NO
Teresa Humphrey	Baldwin Hills Estates HOA		YES / NO
Tisha Greene	Baldwin Hills Estates HOA		YES / NO
Peter Smith	— " —		YES / NO
Laura Meyers	UNNC		YES / NO
Drake			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO

Neighborhood Affiliates Sign In



Expo/Crenshaw First/Last Mile

WELCOME! PLEASE SIGN IN

NAME	AFFILIATION / AGENCY	EMAIL	SIGN ME UP FOR E-MAIL UPDATES
MARQUISE THOMAS			YES / NO
Tommy Hearnes			YES / NO
Malik Noye			YES / NO
Fidel Noye			YES / NO
Taji Chalmers			YES / NO
Kyrael Ramsey			YES / NO
Scott Sanderlin			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO
			YES / NO

Youth Group Sign In

Community Voices

EXPO/CRENSHAW POP-UP SUMMARY

Overview

CONTEXT

As part of the Expo/Crenshaw First/Last Mile (FLM) Plan, Metro held a pop-up community event to gather feedback on desired FLM improvements. The event was held at the Crenshaw Farmers Market on Saturday, February 29, 2020.

The goals of the pop-up were to introduce the FLM project to community stakeholders and gather feedback to prioritize FLM improvements within the 1/4 mile around the new Expo/Crenshaw station.

HOW THE ACTIVITY WORKS

To incite passerby curiosity and reduce barriers to engagement, the activity created a playful atmosphere, using oversized "Connect 4" game boards as the feedback mechanism. To begin, participants were given a brief primer on the scope and goals of the project, and the principles and objectives of FLM planning. They were then shown a menu of potential FLM improvements and instructed to choose the three streets they felt needed the most improvements. Finally, participants placed a feedback chip with their desired improvement on their selected street. Participants could also suggest improvements by writing their idea on a blank feedback chip. When feedback on a street filled the Connect-4 boards, the chips were recorded and then emptied. Participants were offered a free day pass TAP card and other Metro giveaways for their participation. Over 20 people participated in the pop-up.

Images from the pop-up workshop

Metro

April 3, 2020

POP-UP RESULTS

141 improvements
were suggested during the pop-up

Number of comments by street
Crenshaw Blvd - 49
Obama Blvd - 25
Jefferson Blvd - 18
Exposition Blvd - 14
Coliseum St - 10
Exposition Pl - 5
Buckingham Rd - 2
General Area - 18

Number of comments by improvement
Landscaping/Shade - 18
New or Improved Crosswalks - 14
Pedestrian & Bicycle Lighting - 14
Bike Facilities - 13
Bus Stop Improvements - 12
New or Improved Sidewalks - 11
Street Furniture - 9
Wayfinding Signs - 8
Bulbouts at Corners - 7
ADA Access Ramps - 7
Traffic Calming - 6

KEY FEEDBACK

Crenshaw Blvd was the clear focus of participants' feedback, the majority of which focused on the need for pedestrian improvements. Improvements to crosswalks, sidewalks, and landscaping/ shade were noticeably sought after. Participants also indicated support for other safety and comfort improvements such as bulbouts, street furniture, wayfinding, lighting, and bus stop improvements. Finally, there was support for a bike facility on Crenshaw Blvd that would create a much-needed north-south bike connection to the rail station.

Obama Blvd was the second-most commented-upon street. Its feedback pointed to both its current needs and future potential. Participants indicated this street as a possibility for an east-west bike connection. They also envisioned a more pedestrian-friendly street by supporting new crosswalks for increased crossing opportunities and traffic calming measures for reduced vehicle speeds. Other pedestrian amenities were prioritized, namely landscaping/shade, street furniture, improved sidewalks, improved ADA access ramps and pedestrian & bicycle lighting.

Jefferson Blvd was the third-most commented-upon street. Participants identified that the street needs pedestrian amenities to serve a high volume of transit users. Improvements to landscaping/ shade, pedestrian & bike lighting, bus stop amenities, and wayfinding signage were requested to aid this population. Additionally, participants saw an opportunity for a safe east-west bike connection.

Exposition Blvd was seen as needing improved pedestrian amenities. Pedestrian & bike lighting, wayfinding signs, landscaping/shade, and improved sidewalks were the focal improvement categories.

Coliseum St was indicated as needing ADA access ramps, as ramps are not present at certain intersections. Participants also identified bulbouts as another intersection treatment to improve this street.

Exposition Pl received single comments in the traffic calming, landscaping/shade, street furniture, wayfinding, and lighting categories but offered no clear consensus on a recommendation for the street.

Buckingham Rd was indicated as needing traffic calming measure to reduce vehicle speeds.

Write-in comments from participants

Participants added comments that could be applied to the entire study area or that were outside of FLM planning's purview. Participants indicated a desire for:

- Auditory walk signals
- Flashing crosswalk beacons
- Speed bumps are too low and not effective
- Bike share throughout the area
- Sidewalk improvement on residential streets, not just arterial streets
- FLM planning that incorporated the needs of seniors
- To bring back places to sit at existing bus stops
- Driver education that puts a priority on pedestrian and bicyclist safety
- More security officers

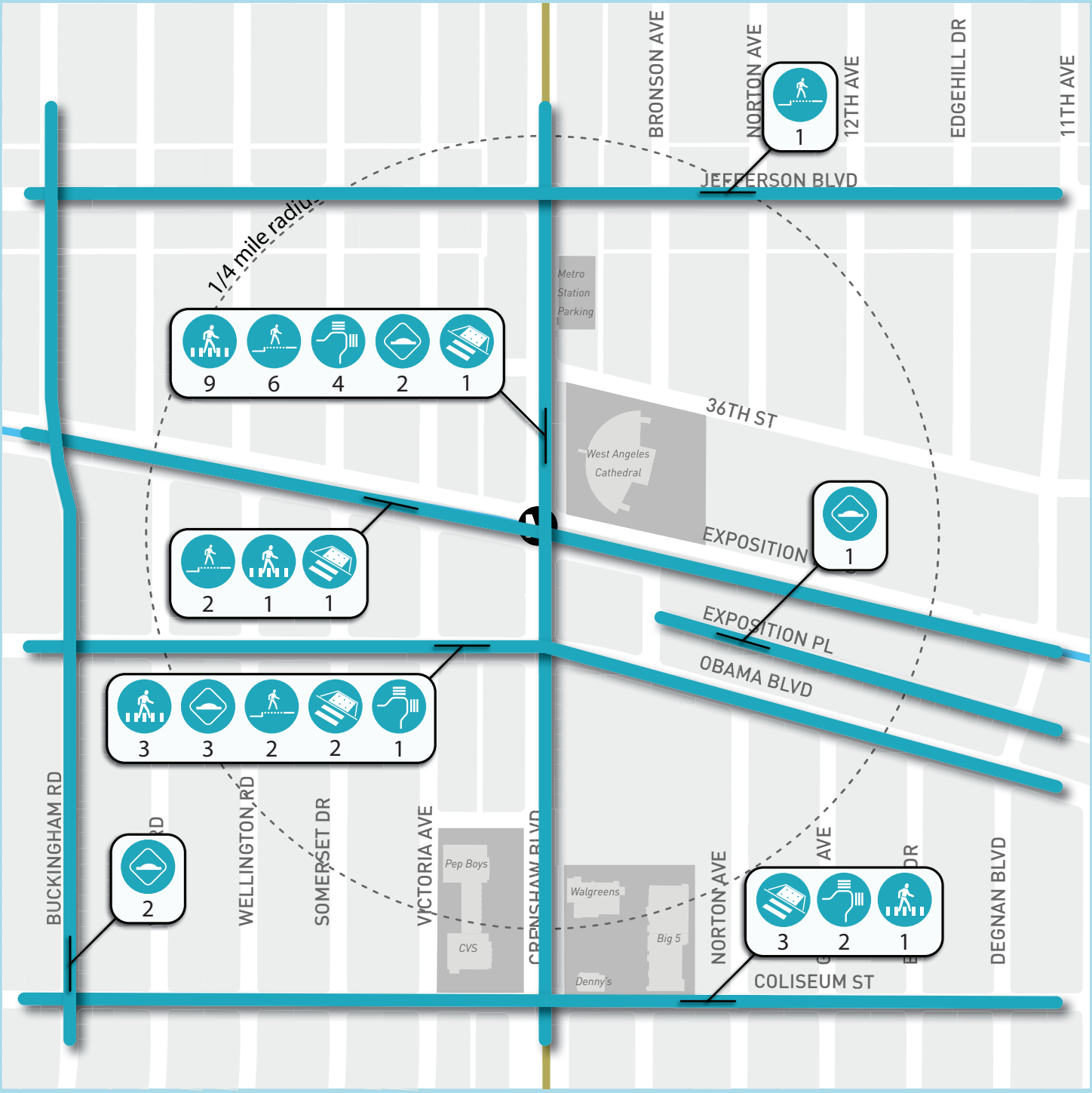
Participants shared comments pertaining to areas outside of the study area as well. Participants let us know that:

- Scramble crosswalks should be utilized at major intersections near the MLK Jr., Hyde Park, Downtown Inglewood, LAX and Leimert Park stations
- Adams Blvd needs improved sidewalks and crosswalks
- Marlton Ave needs trees and benches
- La Cienega Blvd needs lighting near the station and on the street
- Stocker St needs benches and trees

FEEDBACK MAPS

The next pages display maps showing the improvements divided into two categories, one addressing Safety, the other addressing Comfort. There are callouts on the maps showing the number of feedback chips a street received for a particular improvement.

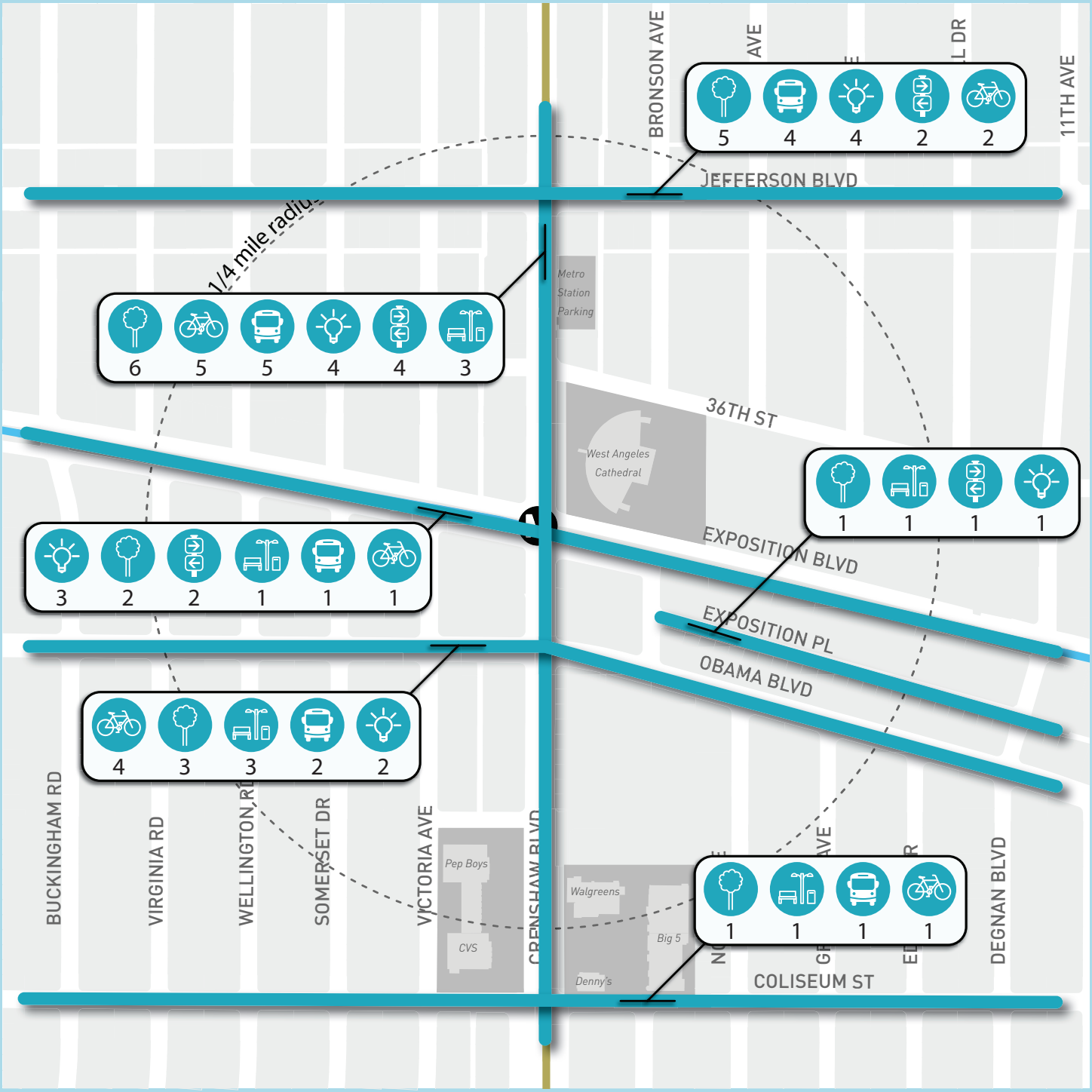
Safety Improvements



LEGEND

- New or Improved Crosswalks
- Bulbouts (curb extensions)
- ADA Access Ramps
- New or Improved Sidewalks
- Traffic Calming
- Number-**#offeedbackchips**

Comfort Improvements



LEGEND

- Street Furniture
- Bus Stop Improvements
- Bike Lane, Route, or Facility
- Number-#offeedbackchips
- Landscaping & Shade
- Wayfinding Signs
- Pedestrian & Bike Lighting

Images

Coliseum St & Crenshaw Blvd (1/3)

Coliseum St & Crenshaw Blvd (2/3)

Coliseum St & Crenshaw Blvd (3/3)

Exposition Blvd & Jefferson Blvd (1/1)

Obama Blvd & Exposition Pl (1/2)

Obama Blvd & Exposition Pl (2/2)

Survey Summary

130 Survey Entries

Top 3 streets that need improvements:

- **Crenshaw Blvd**
- **Obama Blvd**
- **Exposition Blvd**

The purpose of the online survey was to allow additional community members to have a chance to share their thoughts regarding improvements needed around the Expo/Crenshaw station. The survey aligns with the questions asked during the pop up; gathering feedback to help prioritize FLM improvements within the 1/4 mile around the Expo/Crenshaw station. The survey, which was online for 3 weeks, was distributed via Metro social media, listserves, and through community members and organizations who had previously participated in stakeholder roundtable meetings. Respondents submitted 130 survey entries. 72% of respondents reported that they live within the study area. Key takeaways from the survey are summarized below.

WHAT ARE THE TOP IMPROVEMENTS NEEDED IN THE STUDY AREA?*

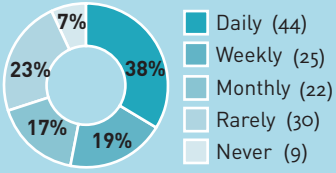
- (209) Landscaping & Shade
- (153) New or improved crosswalks
- (137) Pedestrian & Bike Lighting
- (133) Bike lane, route, or facility
- (129) New or widened sidewalks
- (72) Bus stop improvements
- (55) ADA access ramps
- (45) Street furniture
- (44) Corner curb extensions
- (37) Wayfinding signs

*Participants chose the top three streets that need improvement, and chose the top three improvements for their top three streets. Numbers show total entries for each street and improvement.

WHICH STREET NEEDS IMPROVEMENTS THE MOST?*

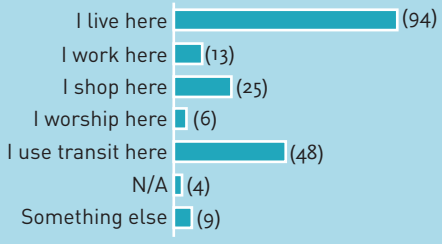
	Crenshaw Blvd	Obama Blvd	Exposition Blvd	Jefferson Blvd	Coliseum St	Exposition Pl
	122	74	69	65	32	18
What are the top 3 improvements needed for each street?	(76)	(37)	(33)	(40)	(16)	(8)
	(46)	(32)	(28)	(25)	(15)	(8)
	(45)	(30)	(28)	(22)	(15)	(7)

HOW OFTEN DO PEOPLE USE THE BUS OR RAIL SYSTEM?

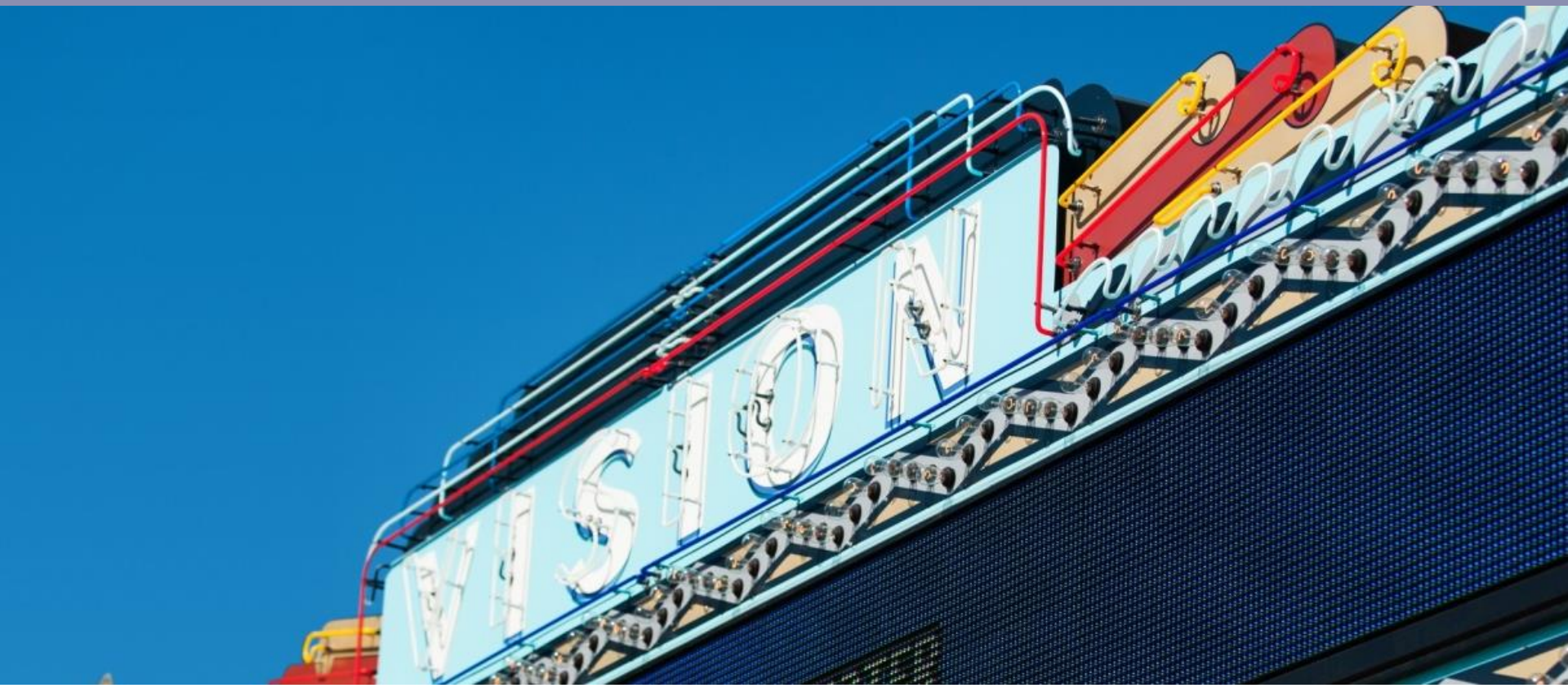


WHAT DRAWS PEOPLE TO THE STUDY AREA?

(Participants could select more than one answer)



Expo/Crenshaw Joint Development Project and First/Last Mile Plan



Planning and Programming Committee

March 17, 2021

Agenda Item 17

Metro

Recommendations

1. AUTHORIZE the Chief Executive Officer to execute an amendment to the Exclusive Negotiation Agreement and Planning Document (ENA) with WIP-A, LLC, a wholly-owned subsidiary of Watt Companies, Inc., and the County of Los Angeles for 12 months with the option to extend for an additional 12 months for the joint development of 1.77 acres of Metro-owned property and 1.66 acres of County-owned property at the Expo/Crenshaw Station in partnership with West Angeles CDC; and

2. ADOPT the Expo/Crenshaw First/Last Mile Plan.

Project Progress

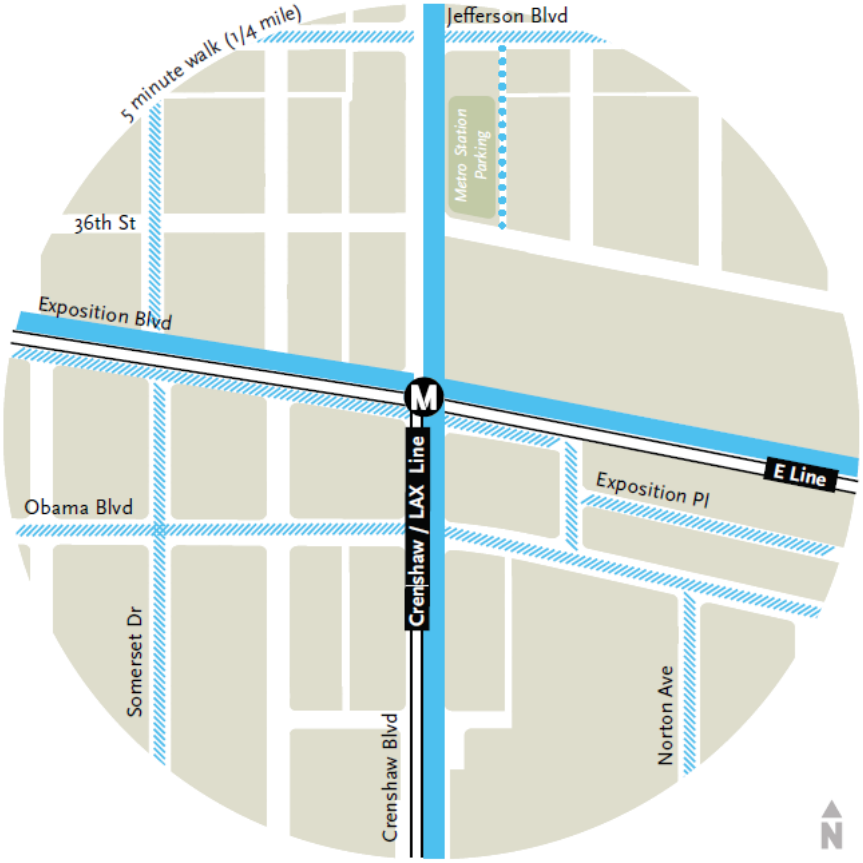
- **June 2016:** Board adopted Development Guidelines
- **Early 2018:** Metro, County and Watt Companies enter into initial ENA
- **Spring 2018:** Watt Co. entered into an agreement with West Angeles CDC to partner in the delivery and operation of the project
- **September 2018:** Board approved a 14-month ENA
- **September 2019:** Submitted for entitlements from City of L.A.
- **November 2019:** Metro Board approved a 12-month ENA extension with option to extend an additional 4 months *(expires April 2021)*
- **April 2020:** Conceptual plans approved by Metro and County
- **On-Going:** Joint Development Agreement and Ground Lease negotiations; community engagement to neighborhood councils, block clubs and other stakeholders

Joint Development Project

- On-going 401 total rental units (20% affordable set aside)
  - 15% restricted to households earning 50% or less of Area Median Income (AMI)
  - 5% restricted to households earning 30-80% of AMI
- Exploring feasibility of restricting an additional 30% of the units to very low to moderate income households.
- 40,000 sq. ft. of commercial and community space, including a grocery store.

First/Last (FLM) Mile Plan

- Completed August 2020
- Builds upon prior planning work, TOC Demonstration Program
- Recommendations improve pedestrian and bicyclist comfort, safety, and connectivity in reaching the station
- Bicycle facilities and protected bike lanes
- Community-informed: 3 roundtables, Crenshaw Farmers Market, online survey



Next Steps

- Summer 2021: Secure project entitlements
- Developer pursues project financing
- Continue negotiations and return to Metro and County Boards for approval of final Joint Development and Ground Lease terms and Project scope
- Work with City of Los Angeles to identify funding for First/Last Mile Plan
- Community engagement on-going

February 2020 Crenshaw Farmers Market First/Last Mile "Pop-Up" Booth

File #: 2020-0897, **File Type:** Contract **Agenda Number:** 19.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021**

SUBJECT: RAIL VEHICLE LUBRICATING STICKS

ACTIONS: AWARD CONTRACT

RECOMMENDATIONS

AUTHORIZE the CEO to award a 36-month March 2021 through March 2024, firm fixed price contract with two one (1) year extensions, on Contract Number SD66581000, to LB Foster Rail Technologies, Inc., the lowest responsive and responsible bidder for HPF & LCF Lubricating Block for an amount not to exceed $1,176,592.09. Board approval of the contract award is subject to resolution of any properly submitted protest.

ISSUE

This procurement will provide Metro continuity in the supply of rail wheel lubricating sticks at the lowest cost. The contract to be awarded is a “requirement type” agreement, in which we commit to ordering only from the awardee, up to the specified quantity for a specific duration of time, but with no obligation or commitment for us to order any and all of the lubricating sticks that may be anticipated. The bid quantities are estimates only, with deliveries to be ordered and released as required.

DISCUSSION

The procurement is for the acquisition of lubricating sticks needed to maintain and service the Red, Blue, Green, Gold, and Expo Line Rail Fleet. Each of the vehicles has four or six lubricating sticks depending on the wheel configuration. The thin film from the Friction modifier stick provides a consistent friction level on the wheel/rail interface throughout the transit system. The Lubricating Sticks are critical to the operation of the Metro rail fleet because they reduce tread wear and wheel replacement, wheel truing costs, rail wear, gauge widening and noise levels and provide for safer vehicle operation. Rail vehicle lubricating sticks are inspected during the monthly vehicle inspection and replenished as needed as part of the Rail Fleet Service Maintenance Program.

DETERMINATION OF SAFETY IMPACT

Safety is of the utmost importance to Metro; therefore, it is imperative to maintain the lubricating sticks in inventory so that they are immediately available when replacement is warranted. Award of contract will ensure rail Divisions have adequate inventory to maintain and service the rail cars according to Metro Maintenance standards.

FINANCIAL IMPACT

The total contract amount is $1,176,592.09. FY21 funds of $54,000 are included in cost center 3940, projects 300044 and 300055, account 50441 Revenue Parts. The funding of $500,000 for Red, Blue, Green, Gold, and Expo Line lubricating sticks will be requested to be included in FY22 budget in Cost Center Numbers 3941, 3942, 3943, 3944, 3947, and 3948 Rail Fleet Services, Project Numbers 300022, 300033, 300044, 300055, and 300066 under line item 50441 - Parts, Revenue Vehicle.

Since this is a multi-year contract, the cost center manager, project manager and Sr. Executive Officer, Rail Fleet Services will ensure that the balance of funds is budgeted in future fiscal years.

Impact to Budget

Sources of funds for this action include Federal Grants, Prop A 35%, Prop C 40%, Measure R 2%, Measure M 2% SGR, State SB1. Allocating these funds to this effort maximizes their intended use given approved funding guidelines and provisions.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Approval of this recommendation supports the following Metro Strategic Plan Goal 2) Deliver outstanding trip experience for all users of the transportation system.

ALTERNATIVES CONSIDERED

The alternative is not to award the contract and to procure Lubricating Sticks on an as-needed basis at a higher cost. This approach is not recommended since it does not provide a commitment from the suppliers to ensure availability and price stability.

NEXT STEPS

The acquisition of lubricating sticks will proceed under the provisions of the contract.

ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - DEOD Summary

Prepared by: Bob Spadafora, Sr. Executive Officer, Rail Fleet Services
(213) 922-3144
Michael Ornelas, Sr. Director, Rail Vehicle Maintenance,
(213) 922-3223

Reviewed by: James T. Gallagher, Chief Operations Officer, (213) 418-3108
Debra Avila, Chief Vendor/Contract Management Officer,
(213) 418-3051

Phillip A. Washington
Chief Executive Officer

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ATTACHMENT A

PROCUREMENT SUMMARY

PURCHASE OF LUBRICATING BLOCKS HPF & LCF SD66581

1.	**Contract Number**: SD66581000	
2.	**Recommended Vendor**: LB Foster Technologies, Inc. 415 Holiday Dr. Suite 100 Pittsburg, PA 15220	
3.	**Type of Procurement (check one):** ☒ **IFB** ☐ **RFP** ☐ **RFP–A&E** ☐ **Non-Competitive** ☐ **Modification** ☐ **Task Order**	
4.	**Procurement Dates**:	
	A. Issued: 1-15-2020	
	B. Advertised/Publicized: 1-14-2020	
	C. Pre-proposal/Pre-Bid Conference: 1-22-2020	
	D. Proposals/Bids Due: 4-29-2020	
	E. Pre-Qualification Completed 6-30-2020	
	F. Conflict of Interest Form Submitted to Ethics: November 9, 2020	
	G. Protest Period End Date: November 25, 2020	
5.	**Solicitations Picked up/Downloaded**: 16	**Bids/Proposals Received**: 3
6.	**Contract Administrator**: **Sherri Jackson**	**Telephone Number**: **213/922-1025**
7.	**Project Manager**: **Mary Leigh**	**Telephone Number**: **213/922-5860**

A. Procurement Background

This Board Action is to approve Contract No.SD66581000 for the procurement of HPF & LCF Lubricating Blocks for 36 months, with two-1-year options. Board approval of the contract award is subject to resolution of any properly submitted protest(s).

IFB No SD66581 was issued in accordance with Metro's Acquisition Policy and the contract type is a Firm Fixed Price (FFP).

Five amendments were issued during the solicitation phase of this IFB: The amendments were issued because of the State of Emergency surrounding COVID-19, and Metro's response to addressing receipt of bids during this period.

Amendment No. 1 issued on February 21, 2020 was to revise Pre-Qualification and Bid Opening/Closing date.

Amendment No. 2 issued on March 2, 2020 was to revise Pre-Qualification and Bid Opening/Closing date.

Amendment No. 3 issued on March 10, 2020 was to revise Pre-Qualification and Bid Opening/Closing date

Amendment No. 4 issued on March 23, 2020 was to revise Pre-Qualification and Bid Opening/Closing date

Amendment No.5 issued on April 23, 2020 with revised Instructions on Bid Submittals.

IFB No.SD66581 was released on January 15, 2020 as a competitive procurement.

A total of three bids were received on April 29, 2020.

B. Evaluation of Bids

This procurement was conducted in accordance and complies with LACMTA's Acquisition Policy for a competitive sealed bid. Three bids were received:

1. LB Foster Rail Technologies, Inc. (Pittsburg)
2. Whitmore Mfg. Company
3. LB Foster Rail Technologies Corporate (Canada)

LB Foster Rail Technologies, Inc. (Pittsburg) was determined to be responsive and responsible to the IFB requirements. Whitmore Mfg. Company and LB Foster Rail Technologies Corporate (Canada) and capable of meeting the compliance of the technical requirements but would require 1st article approval.

C. Price Analysis

The recommended bid amount of $ 1,176,592.09 is determined to be fair and reasonable based on an adequate open competitive bid process in a competitive environment. The recommended award amount is approximately 35.5% lower than Metro's Independent Cost Estimate.

Low Bidder Name	Bid Amount	Metro ICE
LB Foster Rail Technologies, Inc (Pittsburg)	$1,176,592.09	$1,824,830.00.
Whitmore Mfg. Company, LLC	$1,260,042.75	$1,824,830.00.
LB Foster Rail Technologies Corporate (Canada)	$1.733,569.99	$1,824,830.00.

D. Background on Recommended Contractor

The recommended firm, LB Foster Rail Technologies, Inc. has been in business since 1902, they are a global supplier. LB Foster manufactures and distributes a wide range of railway products and services including new rail, used rail, insulated rail joints, rail lubrication systems, transit products, and trackwork. LB Foster has

national and international clients, including public transit agencies such as Massachusetts Bay Transportation Authority (MBTA), and New York City Department of Transportation. LB Foster has performed satisfactorily on providing parts and services for the P2000, and P2550 Light Rail Vehicles and the A650 Heavy Rail Vehicles.

DEOD SUMMARY

PURCHASE OF LUBRICATING BLOCKS HPF & LCF SD66581

A. Small Business Participation

The Diversity and Economic Opportunity Department (DEOD) established a 2% Disadvantaged Business Enterprise (DBE) goal for this solicitation. LB Foster Technologies, Inc. exceeded the goal by making a 4.79% DBE commitment.

Small Business Goal	2% DBE	Small Business Commitment	4.79% DBE

	DBE Subcontractor	Ethnicity	% Committed
1.	Langley Traffic Services	Caucasian Female	4.79%
		Total Commitment	**4.79%**

B. Living Wage / Service Contract Worker Retention Policy Applicability

The Living Wage and Service Contract Worker Retention Policy is not applicable to this contract.

C. Prevailing Wage Applicability

Prevailing wage is not applicable to this contract.

D. Project Labor Agreement/Construction Careers Policy

Project Labor Agreement/Construction Careers Policy is not applicable to this Contract. Project Labor Agreement/Construction Careers Policy is applicable only to construction contracts that have a construction contract value in excess of $2.5 million.

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Los Angeles, CA

File #: 2020-0912, **File Type:** Contract **Agenda Number:** 20.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021**

SUBJECT: PARTS WASHER LEASING AND MAINTENANCE SERVICES

ACTION: APPROVE CONTRACT AWARD

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to award a five-year, firm fixed unit rate Contract No. PS7235000, to FRS Environmental Inc., for parts washer leasing, and maintenance services in an amount not to exceed $1,443,375.00 effective May1, 2021.

ISSUE

The existing contract will expire on April 30, 2021. To continue to provide the required parts washer leasing and maintenance services to Metro facilities, a new contract is required effective May 1, 2021. This will ensure service continuity and avoid any interruption to Metro's operations.

BACKGROUND

Under the existing contract, parts washing services are performed throughout Metro Bus and Rail Maintenance facilities. The parts washers are used to remove dirt, grime, and grease from parts, tools, and equipment using aqueous (water or solvent-based) solutions. These units support the diverse production requirements of maintenance shops for both bus and rail operating divisions.

DISCUSSION

The Central Maintenance Shops (CMS) provides maintenance support to Metro's extensive bus fleet and utilizes thirty-three (33) of the sixty-nine (69) parts washers that shall be leased and maintained as part of this contract. Parts washer equipment are used at the Central Maintenance Facilities to support the operating divisions in completing engine repairs and replacements, transmission disassembly, rebuilding and replacement, major accident repair, complete bus painting, and the rebuilding of components for power plant assemblies. Bus and rail operating divisions also utilize parts washer equipment to support their daily maintenance requirements.

The contract includes lease of contractor-owned parts washing equipment, refilling of these machines to their optimal level, removal and proper disposal of hazardous waste materials and preventative maintenance of the units. Services are performed at various scheduled intervals depending on the

requirements of each location.

DETERMINATION OF SAFETY IMPACT

Award of this contract will ensure that the Central Maintenance Facilities (CMF) will continue to have regularly maintained parts washer machines to clean parts, tools and components required to perform repairs and maintenance of buses and trains in accordance with Metro Maintenance standards.

FINANCIAL IMPACT

Funding of $50,000 for this contract is included in the FY21 Budget in multiple cost centers under Service Contract Maintenance account 50308 and project 306002 including 3366-Central Maintenance Shops (CMS), 5430-Revenue Collection Equipment Maintenance, 3790-Maintenance Administration, 3601-Maintenance Division 1, 3503-Maintenance Division 3, 3805-Maintenance Division 5, 3707-Maintenance Division 7, 3508-Maintenance Division 8, 3609-Maintenance Division 9, 3513-Maintenance Division 13, 3515-Maintenance Division 15, 3818-Maintenance Division 18; 3942-Red Line, project 300044; and 3943-Green Line, project 300033.

The cost center manager, project manager and Executive Director, Maintenance will ensure that the balance of funds is budgeted in future years.

Impact to Budget

The current source of funding for this action include Federal, Prop A, Prop C, Measure R, Measure M, TDA, and CARES. Allocating these funding sources to this effort maximizes their intended use given approved funding guidelines and provisions.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The parts washer services support Strategic Goal 1: Provide high-quality mobility options that enable people to spend less time traveling. The proper cleaning of parts and components will help to maintain the reliability of the bus and rail fleet and ensure that our customers are able to arrive at their destinations without interruption and in accordance with the scheduled service intervals for Metro bus and rail operations.

ALTERNATIVES CONSIDERED

Staff considered providing this service through Metro in-house staff. This alternative is not recommended for the following reasons: Metro would have to purchase the equipment, costing approximately $400,000, and handle the maintenance and periodic repair of the equipment; degreasing agents used for parts washer units are considered hazardous materials which requires specialized certification for handling and disposal; removal and transportation of hazardous waste must be performed by a licensed transporter; and treatment and disposal of hazardous waste can

only be performed by a permitted Treatment, Storage and Disposal Facility.

NEXT STEPS

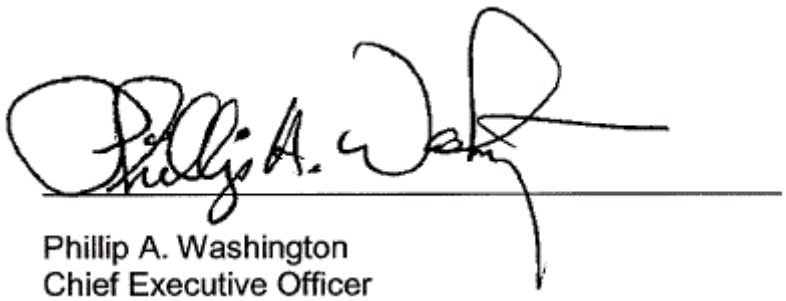
Upon approval by the Board, staff will execute Contract No. PS7235000 with FRS Environmental Inc. to provide parts washer leasing and maintenance services.

ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - DEOD Summary

Prepared by: James Pachan, Superintendent of Maintenance, (213) 922-5804
Alan Tang, Sr. Manager, Equipment Maintenance, (213) 922-5707

Reviewed by: Debra Avila, Chief Vendor/Contract Management (213) 418-3051
James T. Gallagher, Chief Operations Officer (213) 418-3108



Phillip A. Washington
Chief Executive Officer

PROCUREMENT SUMMARY

PARTS WASHER LEASING AND MAINTENANCE SERVICES/PS7235000

1.	**Contract Number**: PS7235000	
2.	**Recommended Vendor**: FRS Environmental Inc.	
3.	**Type of Procurement (check one):** ☒ **IFB** ☐ **RFP** ☐ **RFP–A&E** ☐ **Non-Competitive** ☐ **Modification** ☐ **Task Order**	
4.	**Procurement Dates**:	
	A. Issued: November 13, 2020	
	B. Advertised/Publicized: November 13, 2020	
	C. Pre-Bid Conference: November 23, 2020	
	D. Bids Due: December 21, 2020	
	E. Pre-Qualification Completed: January 21, 2021	
	F. Conflict of Interest Form Submitted to Ethics: December 28, 2020	
	G. Protest Period End Date: March 22, 2021	
5.	**Solicitations Picked up/Downloaded**: 8	**Bids Received**: 1
6.	**Contract Administrator**: **Antwaun Boykin**	**Telephone Number**: **(213) 922-1056**
7.	**Project Manager**: **Alan Tang**	**Telephone Number**: **(213) 922-5707**

A. Procurement Background

This Board Action is to approve the award of Contract No. PS7235000 to FRS Environmental, Inc. to provide parts washer leasing and maintenance services for Metro's Central Maintenance Shops as well as certain bus/rail maintenance divisions.

Invitation for Bid (IFB) No. PS72350 was issued as a competitive procurement in accordance with Metro's Acquisition Policy. The proposed contract type is a firm fixed unit rate. The IFB was open only to Metro Certified Small Business Enterprise (SBE) firms.

Three amendments were issued during the solicitation phase of this IFB:

- Amendment No. 1, issued on November 24, 2020 revised Section III of the IFB, Submittal Requirements to include additional requirements.
- Amendment No. 2, issued on December 11, 2020 revised Exhibit A, Scope of Services and Exhibit 2, Schedule of Quantities and Prices to include additional equipment requirement.
- Amendment No. 3, issued on December 17, 2020 extended the bid due date and revised the bid opening date.

IFB No. PS72350 was released on November 13, 2020, as a competitive procurement open only to Metro certified small businesses. The solicitation was available for download from Metro's website. Advertisements were placed with the Los Angeles Daily News to notify potential proposers of this solicitation. Metro notified

proposers from Metro's vendor database based on applicable North American Industry Classification System (NAICS) codes.

A pre-bid conference was held on November 23, 2020 and was attended by one participant.

Eight (8) firms downloaded the IFB and were included on Metro's planholders' list. Eight (8) questions were received regarding the solicitation and were responded to prior to the bid due date. Only one (1) bid was received on December 21, 2020.

Metro staff canvassed firms on the planholders list to determine why no other bids were received. Only a single response was received from TEQ Lease stating they only finance equipment. The planholders list consisted of the incumbent contractor, four (4) companies that provide access to bid plan rooms and upcoming bid opportunities, two (2) firms that provide specialty services that are different from the IFB requirements and one (1) firm is a parts washer manufacturer.

B. Evaluation of Bids

This procurement was conducted in accordance with and complies with Metro's Acquisition Policy for a competitive sealed bid. One (1) bid was received from the bidder listed below:

FRS Environmental Inc.

The firm was determined to be responsive, responsible and qualified to perform the services based on the IFB's requirements.

C. Cost/Price Analysis

The recommended fully burdened unit rates from FRS Environmental Inc. were determined fair and reasonable based on price analysis, technical evaluation, fact finding and negotiations.

Bidder Name	Original Bid Amount	Metro ICE	Negotiated Bid Amount
FRS Environmental Inc.	$1,476,365.00	$1,411,250.00	$1,443,375.00

D. Background on Recommended Contractor

The recommended firm, FRS Environmental Inc. (FRS Environmental) located in Corona, CA has been in business for over 20 years. It provides waste management solutions such as pressure washing, hazardous waste management, lab packing, vacuum pumping, parts washers and soaps and solutions. FRS Environmental' s clients include the City of Los Angeles, 29 Palms US Marine Corps Base, Omnitrans, and Metro.

FRS Environmental is a Metro certified SBE firm. It has been providing parts washing leasing and maintenance services to Metro since 2006 and performance has been satisfactory.

DEOD SUMMARY

PARTS WASHER SERVICES FOR MAINTENANCE FACILITIES / PS7235000

A. Small Business Participation

Effective June 2, 2014, per Metro's Board-approved policy, competitive acquisitions with three or more Small Business Enterprise (SBE) certified firms within the specified North American Industry Classification System (NAICS) as identified for the project scope shall constitute a Small Business Set-Aside procurement.

Accordingly, the Contract Administrator advanced the solicitation, including posting the solicitation on Metro's website, advertising, and notifying certified small businesses as identified by NAICS code(s) that this solicitation was open to SBE Certified Small Businesses Only.

FRS Environmental Inc., an SBE Prime, is performing 100% of the work with its own workforce.

B. Living Wage and Service Contract Worker Retention Policy Applicability

The Living Wage and Service Contract Worker Retention Policy is not applicable to this contract.

C. Prevailing Wage Applicability

Prevailing wage is not applicable to this contract.

D. Project Labor Agreement/Construction Careers Policy

Project Labor Agreement/Construction Careers Policy is not applicable to this Contract. Project Labor Agreement/Construction Careers Policy is applicable only to construction contracts that have a construction contract value in excess of $2.5 million.

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Los Angeles, CA

File #: 2020-0860, **File Type:** Contract **Agenda Number:** 21.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021**

SUBJECT: ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES

ACTION: APPROVE CONTRACT MODIFICATION

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to execute Contract Modification No. 5 to Contract No. PS46172000, with Gannett Fleming Transit & Rail Systems, for engineering support of rail maintenance to exercise the second-year option extending the period of performance through April 26, 2022 and increasing the total contract not-to- exceed amount by $5,000,000 from $21,000,000 to $26,000,000.

ISSUE

The first-year option performance period for Contract No. PS46172000 ends on April 26, 2021. A contract modification is required to exercise the second-year option to continue providing engineering support from April 27, 2021 through April 26, 2022.

Metro Maintenance and Engineering has limited scope and depth of engineering and technical resources to develop and execute capital projects and meet the day-to-day engineering needs necessary to maintain and improve transit infrastructure assets and systems. Contract No. PS46172000 has been providing engineering support that enables Metro to augment internal resources on an on-call basis in situations where either Metro does not have sufficient capacity or expertise necessary to perform the required task.

BACKGROUND

In April 2018, the Board of Directors approved the award of Contract No. PS46172000 for Maintenance and Engineering support in a total not-to exceed amount of $31,000,000 ($16,000,000 for the initial two-year base period, and $15,000,000 for the three, one-year options at $5,000,000 per year). This task order based contract provides for a range of engineering services for train control, traction power, communications, track, mechanical, electrical, plumbing, civil design, and fare collection. Also included are support services for project management, construction management, and computer aided design and drafting (CADD).

For a list of previous modifications to Contract No. PS46172000, please see Attachment C.

DISCUSSION

The State of Good Repair (SGR) for the Maintenance of Way and Facilities Maintenance work program is approximately $39.2 million for combined fiscal years 2021 and the projected 2022 budget. Maintenance and Engineering has determined that a support cost of 10 - 15% is reasonable in order to deliver capital projects on time and on budget. To date, Contract No.PS46172000 has awarded task orders totaling $18,016,796. Work has entailed performing assessments for rail corrosion, radio communication coverage, bus and rail facilities, CCTV security enhancements; pantograph condition monitoring, Expo geotechnical surveys, vertical transportation survey, OCS inspection system development, signal standardization, emergency trip system; and augmentation for the engineering disciplines.

A Disadvantaged Business Enterprise (DBE) commitment of 25% was established as part of this contract. The DBE participation is based on the aggregate of all task orders awarded. To date, Gannett Fleming Transit & Rail Systems has 49.39% DBE participation by subcontracting to DBE certified firms.

This contract continues to support the planning, implementation, and execution of SGR projects. Refer to Attachment A for a list of SGR projects this contract is supporting.

DETERMINATION OF SAFETY IMPACT

The engineering support services for rail maintenance are not directly related to a specific safety issue. However, the services provided via this contract will contribute to maintaining the transit system in a state of good repair as recommended by Metro's Transit Asset Management (TAM) Plan, which is essential to providing a safe and reliable service for riders who use the Metro rail system daily.

FINANCIAL IMPACT

The total for the second-year option is $5,000,000 of spending authority. For FY21, $5,352,834 in funding was included under the various capital project budget(s) in cost center 3960 - Rail Transit Engineering, Account 50316 -Professional and Technical Services. As additional task orders become necessary to execute, they will be funded through the appropriate capital projects.

Since this is a multi-year contract, the Project Manager will ensure that the balance of funds is budgeted in future fiscal years.

Impact to Budget

The source of funds for this action include TDA, Measure R, & Measure M. Allocation of these funds to this effort maximizes their intended use given approved funding guidelines and provisions. The source of funds will be dependent on the specific capital project funding.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Approval of this recommendation supports the following Metro Strategic Plan Goals:

1. Provide high-quality mobility options that enable people to spend less time traveling.

2. Deliver outstanding trip experiences for all users of the transportation system.

This engineering support services contract will help maintain safety, service and reliability standards in an effort to provide a world-class transportation system that enhances quality of life for all who live, work, and play within Los Angeles County.

ALTERNATIVES CONSIDERED

1) Solicit competitive bids for each individual task order as it becomes required. This is not recommended as it would require extensive additional staff time to process each request and result in project delays due to the lead time required to complete each procurement cycle.

2) Utilize existing Engineering staff to provide the required technical support. This is not feasible as the current budgeted MOW Engineering capacity is fully utilized to maintain Metro's existing systems and oversee the acceptance of the new rail lines. Also, there would not be sufficient existing staff to re-assign to provide technical support to the various capital projects concurrently.

NEXT STEPS

Upon Board approval, staff will execute Modification No. 5 to Contract No. PS46172000 with Gannett Fleming Transit & Rail Systems to provide engineering support for Rail Maintenance and Engineering on an as needed, task-orders basis.

ATTACHMENTS

Attachment A - List of Supported Project Uses
Attachment B - Procurement Summary
Attachment C - Contract Modification/Change Order Log
Attachment D - DEOD Summary

Prepared by: Rudy Loera, Senior Director, Project Engineering, (213) 617-6225
Errol Taylor, Senior Executive Officer, Maintenance and Engineering, (213) 922-3227
Kelvin Zan, Deputy Executive Officer, Systems Engineering (Interim), (213) 922-6264

Reviewed by: James T. Gallagher, Chief Operations Officer, (213) 418-3108
Debra Avila, Chief Vendor/Contract Management Officer, (213) 418-3051

Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

LIST OF FY 21 SUPPORTED PROJECT USES

ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES PS46172000

Description
Support for the Rail Fiber Optic Installations
Project to implement an Overhead Catenary System (OCS) Monitoring System
Support for various TPSS/COM/TP/UPS Battery Replacement Projects
Computer Aided Design (CAD) Support to Capture System Configuration
Support for Corrosion Control and Protection
Support for System Security and Law Enforcement Projects
Support for MGL Train Control and TWC Replacement Project
Support for Bus and Rail Facility Maintenance Projects
Support for MRL Train to Wayside Communication (TWC) Rehabilitation Project
Support for Radio Replacement Project
Support for various Rail Maintenance and Engineering Initiatives
Support for Rail Maintenance and Engineering Acceptance of Various Mega Projects
Support for Rail Maintenance and Engineering Project Construction Management
Support for various Safe-7 projects
Assessments and Inspections of Critical Fire/Life/Safety Elements and Infrastructure
Assessments and Inspections of Critical Wayside Control and Power Systems

PROCUREMENT SUMMARY

ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES / PS46172000

1.	**Contract Number**: PS46172000			
2.	**Contractor**: Gannett Fleming Transit & Rail Systems			
3.	**Work Description:** Exercise Option Year 2 for On-Call Engineering Support Services in support of Maintenance of Way projects.			
4.	**Contract Work Description**: On-Call Engineering Support Services in support of Maintenance of Way projects.			
5.	**The following data is current as of**: February 16, 2021			
6.	**Contract Completion Status**		**Financial Status**	
	Contract Awarded:	April 26, 2018	**Contract Award Amount:**	$16,000,000
	Notice to Proceed (NTP):	N/A	**Total of Modifications Approved:**	$5,000,000
	Original Complete Date:	April 26, 2020	**Pending Modifications (including this action):**	$5,000,000
	Current Est. Complete Date:	April 26, 2021	**Current Contract Value (with this action):**	$26,000,000
7.	**Contract Administrator**: Victor Zepeda		**Telephone Number**: (213) 922-1458	
8.	**Project Manager**: Rudy Loera		**Telephone Number**: (213) 617-6225	

A. Procurement Background

This Board Action is to authorize the CEO to execute Contract Modification No. 5 to Contract No. PS46172000, with Gannett Fleming Transit & Rail Systems, to exercise option year two to continue providing engineering support for bus and rail maintenance services, extending the period of performance through April 26, 2022.

This Contract Modification will be processed in accordance with Metro's Acquisition Policy and the contract type is task order-based/firm fixed price.

On April 26, 2018, the Board approved a two-year base, and three, one-year options, Contract No. PS46172000 (File #2018-0061, Agenda Number 30) to provide on-call engineering support services on a task order basis with Gannett Fleming Transit & Rail Systems, in the total base not-to-exceed amount of $16,000,000.

Further, in December 2019, the Board approved exercising the first option year that extended the period of performance from April 2020 to April 2021 and increased the

not to exceed Contract Value from $16,000,000 to $21,000,000 (File #2019-0728, Agenda Number 23).

Refer to Attachment C, Contract Modification/Change Order Log.

B. Cost/Price Analysis

All future task orders and contract modifications will be determined to be fair and reasonable in accordance with Metro's Acquisition Policy at the time of issuance and award.

ATTACHMENT C

CONTRACT MODIFICATION/CHANGE ORDER LOG

ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES / PS46172000

Mod. No.	Description	Status (approved or pending)	Date	Amount
1	Revise the Approved Subcontractors (SP-04), revise the insurance requirements to minimize Metro's risk, and revise the approved unit rates for the newly added Subcontractors.	Approved	10/22/18	$0
2	Revise the Approved Subcontractors and revise the approved unit rates for the newly added Subcontractors.	Approved	2/11/19	$0
3	Revise the approved unit rates for Year 2 and adjust the retention rate	Approved	6/11/19	$0
4	Exercise Option Year 1 extending Period of Performance from April 2020 to April 2021.	Approved	12/5/19	$5,000,000
5	**Exercise Option Year 2 extending Period of Performance from April 2021 to April 2022**	**PENDING**	**3/25/21**	**$5,000,000**
	Modification Total:			**$10,000,000**
	Original Contract:		4/26/18	**$16,000,000**
	Total:			**$26,000,000**

ATTACHMENT D

DEOD SUMMARY

ENGINEERING SUPPORT FOR BUS AND RAIL MAINTENANCE SERVICES / PS46172000

A. Small Business Participation

Gannett Fleming made a 25% DBE overall commitment for this contract. The overall DBE participation is based on the cumulative value of all task orders issued. To date, forty-five (45) task orders have been awarded. Based on payments reported, Gannet Fleming is exceeding its commitment with a DBE participation of 49.39%.

Small Business Commitment	25% DBE	Small Business Participation	49.39% DBE

	DBE/SBE Subcontractors	Ethnicity	Current Participation[1]
1.	Acumen Building Enterprise	African American	1.74%
2.	Armand Consulting	Caucasian Female	7.56%
3.	Birdi Systems, Inc.	Subcontinent Asian American	0.51%
4.	C2PM, Inc.	Asian Pacific American	12.12%
5.	Colmena Engineering	Hispanic American	6.31%
6.	GC Tech, Inc.	African American	5.76%
7.	JM Diaz	Hispanic American	1.36%
8.	Mammoth Associates, LLC	Caucasian Female	3.92%
9.	Pacific Railway Enterprises	Caucasian Female	3.72%
10.	PacRim Engineering Inc.	Asian Pacific American	4.77%
11.	PBS Engineers, Inc. (Added)	Subcontinent Asian American	0.00%
11.	Rani Engineering, Inc.	Hispanic American	0.58%
12.	Wagner Engineering & Survey	Caucasian Female	1.04%
		Total	**49.39%**

[1]*Current Participation = Total Actual amount Paid-to-Date to DBE firms ÷Total Actual Amount Paid-to-date to Prime.*

B. Living Wage and Service Contract Worker Retention Policy Applicability

A review of the current service contract indicates that the Living Wage and Service Contract Worker Retention Policy (LW/SCWRP) was not applicable at the time of award. Therefore, the LW/SCWRP is not applicable to this modification.

C. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will continue to monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

Board Report

File #: 2020-0055, **File Type:** Contract **Agenda Number:** 24.

**OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021**

SUBJECT: P2550 LIGHT RAIL VEHICLE (LRV) MIDLIFE MODERNIZATION/OVERHAUL PROGRAM, RAIL VEHICLE CONTRACTOR

ACTION: INCREASE THE LIFE-OF-PROJECT BUDGET AND APPROVE CONTRACT AWARD

RECOMMENDATION

A. Increase the Life-of-Project (LOP) Budget for the P2550 Light Rail Vehicle (LRV) Midlife Modernization/Overhaul Program (CP 214003) by $46,340,841 from $160,000,000 to $206,340,841.

B. Authorize the Chief Executive Officer to award a firm-fixed unit rate Contract No. P2550-2019 Light Rail Vehicle (LRV) Midlife Modernization to Kinkisharyo International, L.L.C. in the not-to-exceed amount of $170,349,474 inclusive of Options, for a period of 55 months from Notice-to-Proceed (NTP) for the midlife modernization of the 50 AnsaldoBreda P2550 LRVs.

ISSUE

Many of the critical systems and components on the AnsaldoBreda P2550 LRV fleet are experiencing parts obsolescence issues, lack of vendor support, and outdated technology. These deficiencies diminish the performance and maintainability of the fleet. By modernizing/overhauling and replacing these critical systems and components, this midlife Modernization Program will maintain the fleet's State of Good Repair (SGR) and ensure the continued safety, reliability, availability, and maintainability of the fleet for revenue service.

In May 2019, the Board authorized staff to issue a federally funded solicitation for a Best Value Request for Proposals (RFPs) as competitive negotiations pursuant to PCC § 20217 and Metro's procurement policies and procedures for the Midlife Modernization/Overhaul Program.

Staff's recommendation presents the firm that is most advantageous to Metro. Kinkisharyo's offer represents the Best Value to Metro when all technical and price factors are considered in accordance with the approved evaluation criteria. The Procurement Summary of this report (Attachment A) further describes the evaluation results and detailed rankings for all Proposers, including the weighted scores associated with each evaluation criteria.

DISCUSSION

The primary objective of the project is to deliver safe, reliable, high quality overhauled LRVs that will be modernized to current technologies. By awarding this contract to Kinkisharyo, Metro will also create and retain local jobs tied directly to Kinkisharyo's participation in the U.S. Employment Plan (USEP) associated with the P2550 LRV Midlife Modernization/Overhaul Program.

The Scope of Work for the P2550 LRV Midlife Modernization/Overhaul Program includes the following critical systems and safety components: Vehicle Door Systems, Propulsion System Controllers, Friction Brake System Controllers, Trucks, Automatic Train Control (ATC)/Automatic Train Operation (ATO) System Controllers, Heating and Air Conditioning (HVAC) System, and Communication System Controllers.

Performing the Midlife Modernization/Overhaul Program is in accordance with the Rail Fleet Management Plan FY2015-FY2040 (Draft, May 24, 2016, v.8). The plan outlines the need to expand rail fleets to accommodate anticipated growth in ridership; line extensions; and to overhaul or replace vehicles reaching mid-life or end of life, as appropriate.

A Source Selection Committee (SSC), consisting of key Metro Operations staff, was assembled to conduct a comprehensive evaluation of the proposals received. The committee reviewed the proposals and evaluated five (5) key factors, weighted in descending levels of relative importance: 1) Experience and Past Performance, 2) Price, 3) Technical Compliance, 4) Project Management, and 5) USEP. The three proposals received were in compliance with the RFP requirements and determined to be within the Competitive Range.

Upon Board approval, Notice-to-Proceed (NTP) will be issued to the recommended vehicle contractor. The midlife modernization of the P2550 LRVs is scheduled to be completed within 55 months following NTP plus warranty phase. The required delivery dates have liquidated damage assessments that may be imposed for late deliveries.

USEP

In January 2018, the Board moved to apply the U.S. Employment Plan to all of Metro's federally funded rolling stock procurements and related contracts with a minimum contract value of $100 million. Metro's USEP is designed to create new and retain existing jobs created by the Proposers, providing that at least 10 percent of the jobs are targeted for defined disadvantaged populations.

Staff's goal of creating and retaining meaningful new manufacturing jobs that are tied to Metro's Rolling Stock overhaul program was achieved, as evidenced by the fact that the recommended Awardee, Kinkisharyo has committed to creating and retaining jobs totaling $32,063,402 in wages and benefits. This equates to 143 FTE's for a period of 55 months plus warranty phase.

DETERMINATION OF SAFETY IMPACT

The approval of this Contract award will have a direct and positive impact to system safety, service

quality, system reliability, maintainability, and overall customer satisfaction. The P2550 Light Rail Vehicle Midlife Modernization Program will permit Metro to maintain the LRV fleet in a State of Good Repair.

FINANCIAL IMPACT

Upon approval of recommendation A, the LOP budget for the P2550 Light Rail Program will increase to $206,340,841 which reflects $46,340,841 growth from the current $160,000,000 LOP. With approval of Recommendation A, the project may execute Recommendation B to award the contract and fund support functions such as Professional Services, Metro Administration and other project activities as needed. Since this is a multi-year contract, the Chief Operations Officer, Project Manager, and cost center manager will be responsible for future fiscal year budgeting.

Impact to Budget

The FY21 budget includes $900,000 for professional services to continue procurement support for this contract. The budget is found under Project 214003 - P2550 Light Rail Vehicle Midlife Modernization Program, Cost Center 3043 for professional services. Approval of the recommendations and contract award will allow for award and early mobilization payments.

The current source of funds for this action is Prop A 35% Rail funds which are operating eligible. Using this funding source maximizes project funding use given approved guidelines and provisions. Staff continues to pursue additional Federal, State and Local funding sources as they become available.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports strategic plan goal # 1) to provide high-quality mobility options that enable people to spend less time traveling and #5) to provide responsive, accountable and trustworthy governance within the Metro organization.

ALTERNATIVES CONSIDERED

Staff has considered using in-house Metro resources to perform this work. However, this approach is not recommended as Metro does not have sufficient resources and Subject Matter Experts available to perform this work.

The Board of Directors may choose not to authorize the Contract award for this project; however, this alternative is not recommended by Metro staff because the Overhaul Program is critical to maintaining a SGR on the 50 AnsaldoBreda P2550 LRVs and to enable the Maintenance department to effectively plan and schedule its work.

NEXT STEPS

Upon Contract award, Metro will meet with Kinkisharyo for the Contract required Project Kick-off and Specification Review Meeting. During the same meetings, Metro will establish communication and

reporting protocols. Key milestones and deliverables, through the shipment of the first two pilot vehicles and delivery of the production vehicles will be discussed to ensure understanding and agreement of requirements to ensure expedient reviews and approvals.

ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - DEOD Summary
Attachment C - Funding / Expenditure Plan
Attachment D - USEP Board Motion dated January 18, 2018
Attachment E - Metro Board Report dated May 16, 2019

Prepared by: Annie Yang, Sr. Director, Rail Vehicle Acquisition, (213) 922-3254
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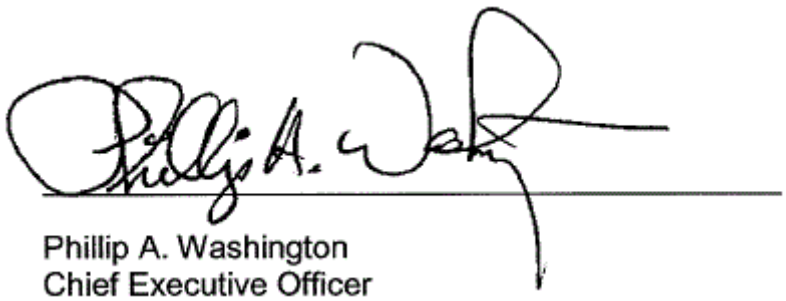
Reviewed by: James T. Gallagher, Chief Operations Officer, (213) 922-4424
Debra Avila, Chief, Vendor/Contract Management Officer, (213) 418-3051



Phillip A. Washington
Chief Executive Officer

PROCUREMENT SUMMARY

NAME OF PROJECT/CONTRACT NUMBER

1.	**Contract Number**: **P2550-2019**	
2.	**Recommended Vendor**: Kinkisharyo International, L.L.C.	
3.	**Type of Procurement (check one):** ☐ **IFB** ☒ **RFP** ☐ **RFP–A&E** ☐ **Non-Competitive** ☐ **Modification** ☐ **Task Order**	
4.	**Procurement Dates**:	
	A. Issued: 06.05.2019	
	B. Advertised/Publicized: 06.06.19	
	C. Pre-proposal/Pre-Bid Conference: 06.26.19	
	D. Proposals/Bids Due: 11.01.19	
	E. Pre-Qualification Completed: TBD	
	F. Conflict of Interest Form Submitted to Ethics: 02.18.21	
	G. Protest Period End Date: 03.25.21	
5.	**Solicitations Picked up/Downloaded**: 121	**Bids/Proposals Received**: 3
6.	**Contract Administrator**: Robert Pennington	**Telephone Number**: (213) 922-5527
7.	**Project Manager**: Annie Yang	**Telephone Number**: (213) 922-3254

A. Procurement Background

The Los Angeles County Metropolitan Transportation Authority (LACMTA) desires to maintain the Metro P2550 Light Rail Vehicles (LRVs) in a state of good repair through its useful life by replacing and/or modernizing critical vehicle systems and subsystems. This is to enhance the LRVs safety, availability, and reliability through the anticipated useful life of 30 years. The P2550 LRV fleet consists of 50 LRVs manufactured by Ansaldo Breda between 2008 through 2012. LACMTA issued a Request for Proposal (RFP) "RFP P2550-2019 for the P2550 Light Rail Vehicle Modernization Program" to accomplish this mission.

This Board Action is to approve Contract No. P2550-2019 issued in support of the P2550 Light Rail Vehicle (LRV) Modernization/Overhaul Program.

The RFP was issued in accordance with Metro's Acquisition Policy and the contract type is a firm fixed unit price.

Nineteen (19) Amendments were issued during the solicitation phase of this RFP:

Amend.	Date	Document Title	Section	Revision/Change
No. 1	19-Jun-19	Letter of Invitation; Instructions to Bidders; Regulation Req.	Section One; IP-01; RR-21.E	Letter of Invitation - Submittal Date; Prequal Requirements; A&D Program
No. 2	25-Jun-19	Special Provisions; SOW; Comp; Bid For; Price Forms	SP-29; XIV; CP-02; PS-1; PF-8	Conditional Acceptance and Acceptance of LRVs; Duties & Responsibilities; Milestone Payment; Submittal Checklist; Price Forms
No. 3	2-Jul-19	Letter of Invitation	Section One	Letter of Invitation - Submittal and Question Dates
No. 4	29-Jul-19	General Conditions Clause & Instructions to Proposers	GC-01B; GC-16A; GC-21; GC-27B; IP-14H	Definitions; Final Acceptance; Changes; Termination for Default; Evaluation Process;
No. 5	9-Aug-19	Letter of Invitation; Submittal Requirements	Section One; PR-2.0, Tab 5	Letter of Invitation - Submittal Date; Tech Proposal (Vol 1)
No. 6	12-Aug-19	Letter of Invitation	Section One	Letter of Invitation - Submittal Date
No. 7	20-Aug-19	Special Provisions; Price Forms	SP-27; PF-02 & 06	Bonding Requirement; Battery & Spare Pricing
No. 8	9-Sep-19	Tech Specifications	TS 7.4.7.4	Heater Assembly
No. 9	18-Sep-19	Proposal Submittal Requirements	PR-2.0, Tab 5	Technical Proposal (Volume 1)
No. 10	20-Sep-19	Pricing Forms	PF-02	Batteries Pricing
No. 11	3-Oct-19	Letter of Invitation	Section One	Letter of Invitation - Submittal Date
No. 12	15-Jul-19	Letter of Invitation	Section One	Proposal Date
No. 13	10-Nov-20	Compensation and Provisions; Price Forms, SOW	CP-02; CP-03; CP-13, Attachment 2, Section III	Milestone Payment; Retentions, Escrow; Exemption from CA Sales Tax; Price Forms, TS-4 & 6 Options; TS-14
No. 14	19-Nov-20	Pricing Forms – BAFO II; Certifications, SOW	Attachment 2 & 4; SOW, Section III	BAFO II Pricing Forms; For 132; Certifications, Options
No. 15	24-Nov-20	Letter of Invitation; BAFO II Price Forms	Section I	Proposal Submittal Date and validity of proposal and the number of Proposal paper copies required; ATP&TWC PF
No. 16	01-Dec-20	Technical Specifications	TS 1 Attachment 3	Revise TS 1.4.2 Contractor Responsibility
No. 17	07-Dec-20	Letter of Invitation; BAFO Price Forms & Certifications	Section One; Attachment 2 & 4	Revise second paragraph shall be modified; Price Sheets and SCAQMD certification
No. 18	14-Jan-21	Letter of Invitation	Section One	Letter of Invitation - Submittal Date

No. 19	25-Jan-21	Letter of Invitation; Submittal Forms; Special Provision, SOW, Submittal Docs; Forms; Tech Specs	Section One, Attachment 4; SP-43, Section III, PR-1.0, Attachment 1	Letter of Invitation - Submittal Date; TF-1 Form; SP-43; TS-13; TS.4.4.1 & TS 14.4.10

A total of three (3) proposals were received on November 1, 2019. A Pre-Proposal Conference was held on June 26, 2019 at Division 20 so vehicle inspections could be conducted over the following two (2) days.

Proposer Site visits and Interviews were conducted at each proposers manufacturing facility between March 4, 2020 and March 10, 2020. The purpose of the visit was to inspect and qualify the proposed manufacturing/assembly facilities and interview the Proposers prospective Project Team.

Responses to proposer's questions were received throughout the solicitation period. Those questions not resulting in an Amendment were grouped and posted to the project data repository accessible to all planholders as Clarification responses. Seventeen (17) sets of Clarification responses were uploaded to the site from June 26, 2019 to January 31, 2021. All available drawings, manuals, and other reference material was also posted to the site.

B. Evaluation of Proposals/Bids

A Source Selection Committee (SSC) consisting of staff from Metro Operations was convened and conducted a comprehensive technical evaluation of the proposals received.

The proposals were evaluated based on the following evaluation criteria and weights:

Proposal Evaluation Criteria	Points
1. Past Experience and Past Performance	300
2. Price	300
3. Technical Compliance	250
4. Project Management Experience	100
5. U.S. Employment Plan (USEP)	50
Total Available Points	1,000

The evaluation criteria are appropriate and consistent with criteria developed for other similar vehicle acquisition and overhaul procurements. The USEP is included as a mandatory criterion in accordance with the January 2018 Board Motion (File 2017-0904 Agenda Number 45). The evaluation criteria and their Subfactors were numerically scored and ranked for all responsive Proposers. Numerical scores will indicate the degree to which the Proposer's technical and price offer has met the standard for each criterion evaluated. The standard for each numerical value defined was used by the SSC as a guide during the evaluation process. Each SSC member also provided a narrative evaluation that supports the numerical scoring they present. Several factors were considered when developing these weights, giving the greatest importance to past experience and past performance on rail vehicle overhaul and integration or new rail vehicle acquisition.

All three of the proposals received were determined to be within the competitive range. The firms are listed below in alphabetical order:

1. Alstom Transportation, Inc.
2. Kinkisharyo International, L.L.C.
3. Talgo, Inc.

The proposal evaluation kick-off meeting was conducted on November 4, 2019 with the SSC and Technical Advisors (TAs) present. The TAs were used to support the SSC with their expertise in the relevant subject matter on various subsystems. Comments from the TAs were compiled and presented to the SSC on December 4, 2019. Request for Clarifications were sent to the Proposers on December 13, 2019 with a due date of January 15, 2020. New comments from the TAs were compiled and presented to the SSC on February 6, 2020

Oral presentations and Site Visits with each firm were scheduled with an equal amount of time for each. These presentations provided the SSC and TAs with their first meeting with the proposed teams and key personnel. Immediately following the oral presentations, the SSC conducted site visits to each of the firms proposed overhaul locations. These site visits were held the week of March 4, 2020 through March 10, 2020, covering trips to Kinkisharyo's Palmdale, CA facility, Alstom's Mare Island, CA facility and Talgo's Milwaukee, WI facility. The SSC were able to evaluate and assess each of the proposer's facilities along with the corresponding capability and capacity of the location.

The SSC considered the proposals, oral presentations, and the site visits in their initial proposal evaluation score. The price proposals were then opened and pre-

negotiation positions were established using the independently developed Engineers Estimate. Although pricing from the firms exceeded the Engineers Estimate and the project budget, the basis of the Estimate was reexamined and determined to be sound.

Notices were sent to all three of the Proposers targeting Mid-April, 2020 for the discussions/negotiations to be held virtually. Unfortunately, due to the pandemic threat of COVID-19, the discussions / negotiations were suspended due to governmental safety regulations. As the pandemic worsened, the entire project was suspended indefinitely on July 15, 2020.

In late September 2020, it was determined that the procurement process for this project be resumed. The Proposers were notified and met with the SSC virtually on November 4-6 to discuss the path forward and negotiate prices and technical requirements. The Proposers were notified of their respective strengths and weaknesses that could be enhanced in a Best and Final Offer (BAFO). The BAFO request was released on November 10, 2020 with a due date of December 11, 2020.

Each Proposer's BAFO submittal was reviewed by the SSC and all were determined to contain deficient or ambiguous elements that required reopening of discussions and provided the opportunity to resubmit responsive offers. These developments resulted in conducting discussions with each Proposer and clarifying Metro's commercial terms and technical specification requirements. On January 14, 2021, a second request for BAFO (BAFO II) was issued with a due date of February 3, 2021. Final evaluations of BAFO II were completed the week of February 10, 2021, and were used as the basis of the recommendation for award

US Employment Program

All Proposers were required to propose a level of participation in the United States Employment Program (USEP). This participation resulted in a normalized distribution of the 50 points allocated in accordance with their respective commitment value of the new and sustained jobs retained by each firm and added to the final evaluation score. Kinkisharyo proposed the highest USEP commitment value and therefore received the maximum incentive score.

Buy American Pre-Award Audit

As required by the RFP Buy America Requirements and in accordance with FTA requirements as stated in 49 CFR 663, a Buy America Pre-Award Audit was conducted the week of February 4, 2021. As a precaution, all three proposer firms were audited, and all were determined to satisfy the stated Buy America requirements.

Qualifications Summary of Firms Within the Competitive Range:

Alstom Transportation, Inc.

Alstom has proposed to perform this overhaul project out of its Mare Island, California facility. This dedicated manufacturing facility is located approximately 400 miles from Los Angeles and has been performing component replacements, overhauls, and extensive railcar repairs there for the past six years. The firm proposed to perform the railcar stripping, final assembly, and testing at this facility, while the engineering work would be generated out of its Naperville, Illinois site. Alstom Transport has extensive experience in U.S. railcar overhaul work, having overhauled or modernized nearly 5,100 railcars for many of the major transit agencies.

Kinkisharyo, Inc.

Kinkisharyo has its US headquarters based in El Segundo, California and has proposed to perform this modernization out of its Palmdale, California production facility where is has been manufacturing the P3010 LRV since 2012. Kinkisharyo has manufactured over 15,000 LRVs worldwide since 1920 and in the US since the 1980s. Kinkisharyo has extensive LRV modernization experience with other US Transit Agencies in Dallas, Seattle, Atlanta and in Jersey City. Kinkisharyo is also known for being the only LRV manufacturer to maintain its own LRV fleet

Talgo, Inc.

Talgo is headquartered in Seattle, Washington and has proposed to perform this modernization project out of its Milwaukee, Wisconsin production facility. Talgo intends to draw from its global engineering resources and relocate them to Milwaukee for this project. Talgo is one of the world's leading suppliers of rolling stock with a particular focus on extended lifecycle and service/reliability. While Talgo is primarily known globally as a railcar manufacturer, its experience also encompasses the U.S. market with new railcars, and overhaul and maintenance work for Amtrak, Oregon DOT, and Washington State DOT.

1	Firm	Average Score	Factor Weight	Weighted Average Score	Rank
2	**Alstom**				
3	**Proposal Evaluation Criteria**				
4	Past Experience and Past Performance	74.9	300	229.5	
5	Price	[redacted]	300	300.0	
6	Technical Compliance	76.5	250	192.2	
7	Project Management	76.3	100	76.8	
8	U.S. Employment Plan Evaluation	[redacted]	50	45.8	
9	**Total**			844.3	2
10	**Kinkisharyo**				
11	**Proposal Evaluation Criteria**				
12	Past Experience and Past Performance	83.6	300	251.5	
13	Price	[redacted]	300	268.8	
14	Technical Compliance	83.6	250	209.8	
15	Project Management	85.1	100	85.1	
16	U.S. Employment Plan Evaluation	[redacted]	50	50.0	
17	**Total**			865.2	1
18	**Talgo**				
19	**Proposal Evaluation Criteria**				
20	Past Experience and Past Performance	67.5	300	197.0	
21	Price	[redacted]	300	269.0	
22	Technical Compliance	68.2	250	171.8	
23	Project Management	61.2	100	62.3	
24	U.S. Employment Plan Evaluation	[redacted]	50	9.9	
25	**Total**			709.9	3

C. Cost/Price Analysis

The recommended price has been determined to be fair and reasonable based upon adequate competition, technical evaluation, fact finding, and negotiations. While the award is being recommended to a proposer other than the lowest price offeror, Kinkisharyo's price is within 17.7% of the Independent Cost Estimate (ICE) and within 11.6% of the lowest price offer. Based on the technical evaluation and economic analysis, the recommended price addresses all cost elements and presents the best overall value when all evaluation factors are considered, including schedule risk, past performance, technical expertise, project management and U.S. jobs creation.

	Proposer Name	Initial Proposal	BAFO II Proposal Amount	Metro ICE
1.	Alstom	$184,741,787	$152,614,867	$ 144,666,865
2.	Kinkisharyo	$162,484,679	$170,349,473	$ 144,666,865
3.	Talgo	$168,512,375	$170,210,924	$ 144,666,865

The Technical Specifications for this midlife modernization project contained work elements that could be exercised as options. The Option elements were included in the technical and price evaluation and can be unilaterally exercised at Metro's discretion The following table provides the Base and Options pricing.distribution.

	Proposer Name	Base	Option	Total
1.	Alstom	$139,036,961.52	$13,577,905.00	$152,614,866.52
2.	Kinkisharyo	$157,231,331.04	$13,118,142.00	$170,349,473.04
3.	Talgo	$166,070,135.09	$4,140,789.00	$170,210,924.09

D. Background on Recommended Contractor

The recommended firm, Kinkisharyo, has been designing and manufacturing rail transit vehicles in Japan since 1920 and in North America since the 1980's. Kinkisharyo has been operating a manufacturing facility in Palmdale, California since 2012 where is it completing its work on LACMTA's order for two hundred thirty five (235) P3010 LRVs.

DEOD SUMMARY

LIGHT RAIL VEHICLE (LRV) MIDLIFE MODERNIZATION/OVERHAUL PROGRAM / P2550-2019

A. Small Business Participation

Kinkisharyo International, LLC is a Transit Vehicle Manufacturer (TVM) and is on the Federal Transit Administration's (FTA) list of eligible TVMs with a Disadvantaged Business Enterprise (DBE) overall goal methodology, in compliance with 49 Code of Federal Regulations (CFR) Part 26.49(a)(1). TVMs submit overall DBE goals and report participation directly to FTA. As such, Kinkisharyo International, LLC submitted its overall DBE goal of 9.00% to FTA for FY21.

B. Living Wage and Service Contract Worker Retention Policy Applicability

The Living Wage and Service Contract Worker Retention Policy is not applicable to this contract.

C. Prevailing Wage Applicability

Prevailing wage is not applicable to this contract.

D. Project Labor Agreement/Construction Careers Policy

Project Labor Agreement/Construction Careers Policy is not applicable to this Contract. Project Labor Agreement/Construction Careers Policy is applicable only to construction contracts that have a construction contract value in excess of $2.5 million.

E. United States Employment Plan Program

United States Employment Plan (USEP) Program is applicable on this Contract. DEOD staff within V/CM has been monitoring progress on USEP commitments, including the contractual commitment in creating employment opportunities. To date, Kinkisharyo has exceeded its USEP commitment in new wages and benefits.

ATTACHMENT C

FUNDING USES and SOURCES PLAN

CP 214003 ANSALDO BREDA P2550 LIGHT RAIL VEHICLES MIDLIFE MODERNIZATION

Descriotion	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Total	% of Total
Uses of Funds										
Project Administration	$200,000	$234,767	$612,909	$649,598	$1,048,734	$1,336,726	$1,232,248	$760,859	$6,075,841	2.94%
Professional Services	$350,000	$500,000	$1,554,000	$1,935,400	$1,852,200	$1,178,200	$82,400	$187,800	$7,640,000	3.70%
Modernization		$3,500,000	$5,079,900	$30,516,333	$45,620,333	$38,746,834	$26,765,600	$21,771,000	$172,000,000	83.36%
Contingency				$5,800,000	$3,725,000	$3,700,000	$3,700,000	$3,700,000	$20,625,000	10.00%
Total Project Cost	**$550,000**	**$4,234,767**	**$7,246,809**	**$38,901,331**	**$52,246,267**	**$44,961,760**	**$31,780,248**	**$26,419,659**	**$206,340,841**	**100%**
Sources of Funds										
Local (PA Rail 35%) / State / Federal / Other	$550,000	$4,234,767	$7,246,809	$38,901,331	$52,246,267	$44,961,760	$31,780,248	$26,419,659	$206,340,841	100%
Total Project Funding	**$550,000**	**$4,234,767**	**$7,246,809**	**$38,901,331**	**$52,246,267**	**$44,961,760**	**$31,780,248**	**$26,419,659**	**$206,340,841**	**100%**

** Staff will pursue additional federal funds that may become available through MAP-21 or other federal sources for this project to maximize availability of local fund sources. Staff will also substitute non federal funds as they become available to meet project requirements

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2017-0904, **File Type:** Motion / Motion Response **Agenda Number:** 45.

SYSTEM SAFETY, SECURITY AND OPERATIONS COMMITTEE
JANUARY 18, 2018

Motion by:

Solis, Krekorian, Kuehl, Fasana, Garcetti, and Dupont-Walker

Item 45: Advancing Job Creation and Equity Outcomes with Manufactured Transit Equipment Procurements

As the first transit agency in the nation to adopt a Construction Careers Policy, Metro has become a leader in harnessing the full potential of local investments by achieving and promoting family-supporting jobs in disadvantaged communities, improved equity outcomes, and cleaner transportation options for Los Angeles County.

For the purchase of new railcars and buses, Metro was also the first transit agency in the country to utilize the U.S. Employment Plan (USEP), which incentivizes manufacturers to create good local jobs and training programs, invest in new or existing manufacturing facilities and generate unprecedented opportunities for historically underserved communities. Metro's USEP was approved by the Federal Transit Administration for use on the P3010 Light Rail Car project, which awarded an $890 million contract to railcar manufacturer Kinkisharyo International. The contract resulted in a new manufacturing facility in Los Angeles County and the creation of 404 high quality jobs. Metro has also employed localized versions of the USEP, known as the Local Employment Plan (LEP).

The USEP and LEP programs have elevated Metro's transparency related to the procurement of manufactured equipment by disclosing information about jobs, training, and equity commitments and reporting requirements from contractors. The USEP complies with the full and open competition requirements mandated in all federal contracting. Given the anticipated growth in Metro's transit operations, capital infrastructure program and associated procurements for manufactured transit equipment, it's prudent to maximize:

- Job creation and career development for low-income residents and those facing barriers to employment;
- Equity outcomes and economic resiliency in disadvantaged communities; and
- Investments in new or existing manufacturing/assembly facilities in Los Angeles County.

SUBJECT: Motion by Solis, Krekorian, Kuehl, Fasana, Garcetti, and Dupont-Walker

Advancing Job Creation and Equity Outcomes with Manufactured Transit Equipment Procurements

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WE THEREFORE MOVE that the Board direct the CEO to apply the USEP to all federally funded rolling stock procurements, and related contracts with a minimum contract value of $100 million that prescribes inclusion of, but is not limited to, the following:

A. Factors such as the total wages and benefits for quality jobs that would be newly created or retained in connection to a major capital project contract; a requirement that Disadvantaged Workers comprise at least 10% of the total new wages, and benefits; identification of the location (s) of manufacture and assembly of the major capital projects; investment in new or existing facilities; investment in training, workforce development and apprenticeship programs;

B. Include an evaluation mechanism in the USEP proposal scoring criteria that represents a meaningful level of the overall possible points for a Best Value proposal evaluation; and

C. Enforcement mechanisms requiring awardees to submit quarterly reports regarding compliance with USEP commitments by Contractor and any Subcontractors after contract awards. The quarterly report shall summarize the major actions taken during the prior quarter during implementation of the USEP, and progress toward the attainment.

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Los Angeles, CA

File #: 2019-0057, **File Type:** Contract **Agenda Number:** 22.

OPERATIONS SAFETY AND CUSTOMER EXPERIENCE COMMITTEE
MAY 16, 2019

SUBJECT: P2550 LIGHT RAIL VEHICLES MIDLIFE MODERNIZATION - REQUEST FOR PROPOSAL SOLICITATION AND ESTABLISH LOP

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. AUTHORIZING the Chief Executive Officer (CEO) to solicit a Best Value Request for Proposals (RFPs), as competitive negotiations, pursuant to Public Contract Code (PCC) §20217 and Metro's procurement policies and procedures for the midlife modernization of Metro's P2550 Light Rail Vehicles (LRV's); and

(REQUIRES 2/3 VOTE OF THE FULL BOARD)

B. ESTABLISHING a Life of Project budget (LOP) of $160 million for the midlife modernization of Metro's fifty (50) P2550 LRVs; for CP 214003 (P2550 Light Rail Vehicle Mid-Life Modernization). This is an initial estimate for the midlife project; adjustments will be made once proposals are received and evaluated.

ISSUE

The P2550 fleet, consisting of 50 Light Rail Vehicles (LRVs), is reaching its recommended period for mid-life modernization. Due to age, service loads, and increased difficulties with maintaining the fleet, this mid-life work is required to maintain fleet reliability, maintainability, and State of Good Repair. Additionally, it is an opportunity to upgrade systems to provide our customers with the latest transit amenities. Deferment of this work, at a minimum, will result in degradation of performance to critical systems, potentially impacting safe, reliable, and maintainable operations.

BACKGROUND

Currently, 50 P2550 LRV's are assigned to the Gold Line; operating from Azusa to East Los Angeles, via Union Station (29.7 miles, each direction). The LRV's are on average 10 years old from date of acceptance and have an average mileage of approximately 720,000 revenue service miles.

The manufacturer's recommended frequency for overhaul/midlife modernization work to the major systems and sub-systems is at 5, 10, and 15 year intervals. Metro's Rail Fleet Services (RFS) and Rail Vehicle Acquisitions (RVA) coordinate to schedule and perform the required work. RFS has developed and implemented component level refurbishment programs to repair and/or overhaul key systems and components that are currently impacting service reliability for this fleet. The removal and replacement of overhauled components and systems is performed in-house. In parallel, RVA develops a modernization plan, performed at the fleet's mid-life, to upgrade critical systems that have, or are about to become obsolete. In addition, this opportunity is used to upgrade features to provide our customers the latest transit amenities. These include but are not limited to improved lighting, ADA signage, passenger announcements systems, security & surveillance systems, and an Automatic Passenger Counting system. Due to the complexity of the work, the midlife modernization work is outsourced.

DISCUSSION

The P2550 LRV's have reached the point at which the recommended midlife modernization must be initiated for it to be completed at or near mid-life. The need for the midlife modernization work is evident due to the fleet's age, the observed wear and tear, the increased maintenance demands, and the increased challenges with repairing and replacing obsolescent parts and obtaining supplier support.

It is in the public's interest to utilize competitive negotiation rather than a sealed bid process to consider factors other than price in the award of contracts for vehicles and refurbishment of vehicles, as allowed under PCC §20217. Staff recommends the use of Best Value solicitations to allow for the consideration of technical and commercial factors, as well as price, in the contract award process. By establishing explicit factors that identify Metro's definition of best value, the solicitation can use important evaluation criteria to augment price considerations such as past performance related to schedule adherence, quality, reliability, vehicle performance, and a U.S. Employment program, as mandated by new Board policy.

In addition to the ability to evaluate key technical and schedule factors, the Best Value Request for Proposal process permits direct discussions and negotiations with proposers to clarify requirements and cost prior to an award recommendation. This process minimizes the risks associated with a complex specification and scope of work by allowing the parties to clarify ambiguities and correct deficiencies.

DETERMINATION OF SAFETY IMPACT

The approval of this capital project will have a direct and positive impact to safety, service quality, system reliability, performance, and overall customer satisfaction.

FINANCIAL IMPACT

Adoption of Recommendation A will not have any financial impact to the agency at this time. Adoption of Recommendation B will require establishing a LOP budget of $160 million for this project in Cost

Center 3043 - Rail Vehicle Acquisition, capital project 214003 - Metro P2550 Light Rail Vehicle (LRV) Midlife Modernization Project.

This is an initial estimate for the project, including professional services, Metro administration and contractor costs. Final LOP will be adjusted once bids are evaluated and the final selection has been made.

Since this is a multi-year contract/project, the cost center manager, will be responsible for budgeting the costs in future years, including any options exercised.

Impact to Budget

The initial source of funds for this capital project will be Prop A 35%, which is eligible for rail operating and capital activities. This project is part of the Rail Development Program. Metro staff will continue pursuing federal and local funding to maximize the use of funds for this project.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports strategic plan goal #1) to provide high-quality mobility options that enable people to spend less time traveling and # 5) to provide responsive, accountable and trustworthy governance within the Metro organization.

ALTERNATIVES CONSIDERED

The Board of Directors may choose not to authorize the life-of-project (LOP) budget for this project; however, this alternative is not recommended by Metro staff because without proceeding with this midlife modernization work, the safety, reliability, performance and maintainability of the P2550 LRV's may be compromised. Alternatively, deferring the midlife modernization will present a growing challenge to ensure maintaining a State of Good Repair, adequate reliability, performance, passenger comfort, and passenger safety.

In addition, procurement by a low bid process was considered but is not recommended. The sealed bid process does not adequately account for any technical superiority of performance, reliability, or system life cycle costs that on firm's equipment or solution may have over another since the process must award to the lowest responsive and responsible bidder. For these reasons, staff does not recommend this alternative. The competitively negotiated procurement process will provide for evaluation of critical non-price related factors in the selection process.

NEXT STEPS

If this action is approved, staff will proceed with competitively negotiated best value solicitations for the midlife modernization of the P2550 vehicles.

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Reviewed by: James T. Gallagher, Chief Operations Officer, (213) 418-3108
Debra Avila, Chief Vendor/Contract Management Officer, (213) 418-3051

Phillip A. Washington
Chief Executive Officer

Los Angeles County
Metropolitan Transportation
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Los Angeles, CA

File #: 2021-0051, **File Type:** Project **Agenda Number:** 31.

CONSTRUCTION COMMITTEE
MARCH 18, 2021

SUBJECT: I-5 NORTH COUNTY ENHANCEMENTS PROJECT

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

A. ESTABLISH a life-of-project budget for the I-5 North County Enhancements Project in the amount of $679,400,000.

B. AUTHORIZE the Chief Executive Officer to negotiate and execute project related agreements, including contract modifications, up to the authorized Life-of-Project Budget.

ISSUE

An LOP budget for the Project is required to execute contracts and pursue completion of the Project. Establishing the LOP budget at the time of contract award is consistent with the recommendations in the Office of the Inspector General (OIG) Construction Management Best Practices Study Report and lessons learned regarding establishing final budgets, when adequate information (such as the receipt and validation of responsiveness of hard bids) is available.

BACKGROUND

The 13.9-mile Project will improve the operations and safety of the corridor, facilitate the movement of freight and people, and accommodate expected growth in the area on I-5 from SR-14 to Parker Road. The proposed improvements include the addition of one High Occupancy Vehicle (HOV) lane in each direction, extension of trucking/freight lanes from Calgrove Blvd. to South of Weldon Canyon in the southbound direction (2.23 miles) and from the Gavin Canyon undercrossing to Calgrove Blvd. in the northbound direction (0.98 miles); auxiliary lanes at various locations along the corridor (2.5 miles); widening of 7 bridges including the Gavin Canyon Undercrossing, Calgrove Boulevard Undercrossing, Butte Canyon Bridge, Magic Mountain Parkway Undercrossing, Santa Clara Overhead, Rye Canyon Undercrossing, and Castaic Creek Bridge; and the replacement of the Weldon Canyon bridge to accommodate the proposed freeway improvements.

The Project is being delivered through a contractual partnership between Caltrans and Metro in the form of cooperative agreements for design and construction. Metro, defined as a Local Agency within

these agreements, is responsible for advertising, awarding, and administering the contract. The Project is funded through a combination of federal and state grant funding and Metro local funding, as shown in Attachment A Funding and Expenditure Plan. Metro will be responsible for managing the Project budget and identifying any future funding, if required.

Partnering sessions with Caltrans have been ongoing to ensure a high level of collaboration and issue resolution during the Project planning, design, and procurement phase. Metro staff from Vendor/Contract Management and Program Management, supported by County Counsel, performed an extensive contract review and revision process to ensure that the highway contract reflected the technical and commercial requirements of both parties. In parallel to this contract review/revision process, a detailed low-bid style cost estimate and constructability analysis was performed. Lastly, Metro conducted an industry review of the highway contract. Caltrans-assigned oversight personnel have provided support to Metro throughout these processes.

DISCUSSION

To date, the Project has been funded on a fiscal year basis. The proposed LOP budget for this project is based on total project costs incurred including Metro labor and non-labor costs for PA&ED, PS&E, Utilities, ROW support, the forecasted construction cost and support, and required contingencies. The proposed LOP budget has been approved by FHWA and Caltrans respectively and utilizes lessons learned on past local agency delivered highway projects and the Project specific risk profile developed and approved through the FHWA risk assessment process. In October 2020, the Metro Board of Directors authorized a construction support services contract for construction management and Project oversight support. Key personnel from this contract have been onboarded to assist Metro staff in the procurement and pre-construction activities required for the Project. The Project Invitation for Bid was released on November 6th, 2020 and 3 bids were received on February 24, 2021. The bids are currently being validated for responsiveness.

OHL (Apparent Low Bid)	$389,957,231
Flatiron Security Paving JV	$406,182,281
Skanska / Rasmussen JV	$513,600,000
Metro Independent Cost Estimate	$480,841,729

Design-bid-build projects typically carry a 10 to 12 percent contingency because the design is carried out to 100%. For this Project, staff has allocated an 18 percent contingency due to the following risk factors identified in the risk assessment process:

- Due to the Project location within the mountainous Transverse Range and proximity to major fault lines, geotechnical issues are expected related to soil nail wall installation, Cast-in-Drilled -Hole pile installation, sound wall and retaining wall foundation construction, and unsuitable subgrade under pavement.

- Latent sub-surface features, including buried human-made objects and differing site conditions

- Unanticipated presence of protected special-status species in active construction areas, specifically within creeks, rivers, and Waters of the US resulting in construction delays

The risk assessment process identified approximately $50M in additional risk contingency that is accounted for within the LOP budget.

In addition to the increased contingency, staff are recommending additional budget for oversight and support. Typical construction oversight costs for projects historically vary between 8 to 13 percent of project budget. However, given lessons learned on past collaborative highway efforts between Metro and Caltrans, staff have allocated roughly 16 percent construction oversight for the Project. This cost is inclusive of a more robust Owner controlled quality oversight program than is typical of Metro projects that is designed to reduce rework, reduce rejected work, minimize schedule delays, and ensure timely and complete Caltrans final acceptance of the Project.

Project Schedule & Community Outreach

Notice of Award is anticipated in mid-April with a start of construction in Summer of 2021. The contract duration is 58 months, which is inclusive of 100 adverse weather days anticipated during the Project. Construction completion is slated for Summer 2026. The schedule for construction contract award is developed to coincide with current budgetary considerations and to ensure contractor mobilization and construction expenditures meet the Trade Corridor Enhancements Program (TCEP) funding requirement to issue Notice to Proceed by May 13, 2021.

Staff has begun the Project communication, notification, and outreach program to the local jurisdictions, stakeholders, residents, businesses, and the general public. Metro has developed and continues to build valuable partnerships with local and regional jurisdictions and stakeholders including the County of Los Angeles, City of Santa Clarita, North County Transportation Coalition, Golden State Gateway Coalition, Santa Clarita Economic Development Corporation, and the Santa Clarita Valley Chamber of Commerce.

DETERMINATION OF SAFETY IMPACT

Approval of these recommendations will have no detrimental safety impact.

FINANCIAL IMPACT

This is a multi-year Project. Upon approval of the Life of Project budget, staff will manage the Project within the Board approved fiscal year budgets. It is the responsibility of the Project Manager and Chief Program Management Officer to budget for this project in future fiscal years.

Impact to Budget

The Project is funded through Federal Surface Transportation STBGP and Fastlane/Infra ($56,800,000), State SB1 ($247,000,000) and a Metro local funds match from tax measures Measure R - Highway and Measure M - Highway ($375,600,000). These funds are not eligible for bus or rail operations.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This recommendation supports strategic goal #1 by providing high-quality mobility options that enable people to spend less time traveling. Metro acknowledges the need for partnerships with local, regional, and state authorities to leverage funding to maintain streets, highways, and shared freight rail corridors in a state of good repair for all users. Metro continues to work with its partners in the region to advance more efficient use of roadway capacity through needed state of good repair projects.

ALTERNATIVES CONSIDERED

The Board may choose not to move forward with the establishment of an LOP budget. This is not recommended as this may jeopardize current and future grant opportunities.

NEXT STEPS

Upon Board approval of the recommendations, staff will move the Project forward into construction.

ATTACHMENTS

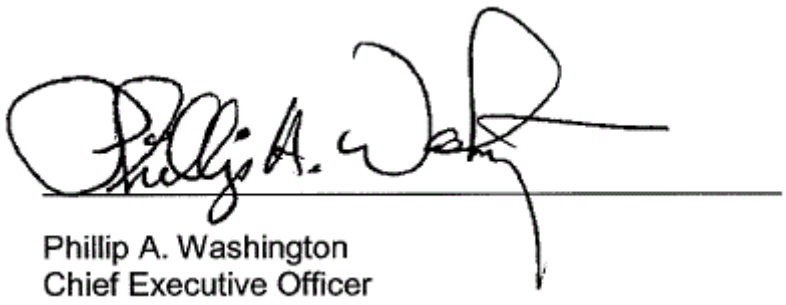
Attachment A - Funding and Expenditure Plan

Prepared by: Brad Owen, Executive Officer, Program Management, (213) 418-3143

Reviewed by:

Richard Clarke, Chief Program Management Officer, (213) 922-7557

Debra Avila, Chief Vendor/Contract Management Officer, (213) 418-3051



Phillip A. Washington
Chief Executive Officer

ATTACHMENT "A"

EXPENDITURE and FUNDING PLAN

I5N COUNTY ENHANCEMENTS PROJECT Cash Flow and Sources of Funds

Uses of Funds

Work Package	**Thru FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**FY27**	**Total**
PA&ED	$ 8.88	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.88
PS&E	$ 42.25	$ 0.26	$ 0.20	$ 0.70	$ 0.50	$ 0.46	$ -	$ -	$ 44.37
ROW	$ 0.39	$ 0.01	$ 0.05	$ 0.05	$ 0.04	$ 0.04	$ -	$ -	$ 0.58
Utilities	$ -	$ 0.39	$ 4.00	$ 3.00	$ 1.36	$ 0.48	$ -	$ -	$ 9.23
ROW Support	$ 0.11	$ 0.01	$ 0.08	$ 0.08	$ 0.08	$ 0.04	$ -	$ -	$ 0.40
Construction Support	$ 2.38	$ 6.53	$ 20.28	$ 24.40	$ 24.10	$ 21.70	$ 10.99	$ -	$ 110.38
Construction Capital	$ -	$ 5.99	$ 52.01	$ 147.91	$ 140.26	$ 43.78	$ -	$ -	$ 389.95
Unallocated Contingency	$ -	$ -	$ 3.60	$ 20.30	$ 18.87	$ 3.08	$ 32.61	$ 23.32	$ 101.78
Program Reserve	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 13.80	$ 13.80
Total Project Estimate	**$ 54.01**	**$ 13.19**	**$ 80.22**	**$ 196.44**	**$ 185.21**	**$ 69.58**	**$ 43.60**	**$ 37.12**	**$ 679.37**

Sources of Funds

Federal Revenue

Surface Transportation (STBGP)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.50	$ 7.50
TCSPPP	$ 2.31	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2.31
Fastlane/Infra	$ -	$ 3.08	$ 25.78	$ 18.14	$ -	$ -	$ -	$ -	$ 47.00
Federal Revenue Subtotal	**$ 2.31**	**$ 3.08**	**$ 25.78**	**$ 18.14**	**$ -**	**$ -**	**$ -**	**$ 7.50**	**$ 56.81**

Local Revenue

Measure M - Highway	$ -	$ -	$ -	$ 70.20	$ 90.67	$ 33.05	$ 24.37	$ 21.72	$ 240.01
Measure R - Highway	$ 43.30	$ 6.09	$ 18.61	$ 21.32	$ 14.95	$ 7.00	$ 7.98	$ 7.90	$ 127.15
Private Funding	$ 8.41	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8.41
Local Revenue Subtotal	**$ 51.71**	**$ 6.09**	**$ 18.61**	**$ 91.52**	**$ 105.62**	**$ 40.05**	**$ 32.35**	**$ 29.62**	**$ 375.56**

State Revenue

SB1 Trade Corridors (Federal)	$ -	$ -	$ -	$ 5.64	$ 53.59	$ 29.53	$ 11.24	$ -	$ 100.00
SB1 Trade Corridors (State)	$ -	$ 4.02	$ 35.83	$ 81.14	$ 26.01	$ -	$ -	$ -	$ 147.00
State Revenue Subtotal	**$ -**	**$ 4.02**	**$ 35.83**	**$ 86.78**	**$ 79.60**	**$ 29.53**	**$ 11.24**	**$ -**	**$ 247.00**

TOTAL SOURCES	**$ 54.01**	**$ 13.19**	**$ 80.22**	**$ 196.44**	**$ 185.22**	**$ 69.58**	**$ 43.59**	**$ 37.12**	**$ 679.38**

Los Angeles County
Metropolitan Transportation
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Los Angeles, CA

Metro

Board Report

File #: 2021-0014, **File Type:** Agreement **Agenda Number:** 33.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: AMEND TAYLOR YARD BRIDGE CONSTRUCTION FUNDING AGREEMENT

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

AUTHORIZE the Chief Executive Officer (CEO) to negotiate and execute an amendment to a Memorandum of Understanding (MOU) dated March 7, 2018 with the City of Los Angeles for the Taylor Yard Bridge with a not-to-exceed amount of $25,450,000, an increase of $3,750,000 over the previously authorized amount of $21,700,000.

ISSUE

In a 1992 settlement agreement pertaining to the development of the Taylor Yard Commuter Rail Facility (1992 Settlement), the former Los Angeles County Transportation Commission (LACTC), a predecessor agency to Metro, agreed to design, finance, and construct a pedestrian access system linking the communities to the east and west of Taylor Yard over the Los Angeles River.

In January 2012, the Metro Board approved the award of funds to the City of Los Angeles (City) for the design of the Taylor Yard Bicycle/Pedestrian Bridge over Los Angeles River (Bridge). The 2012 Board Report is included as Attachment A. Accordingly, Metro provided the funds for the design of the Bridge.

In July 2017, the Metro Board authorized the Chief Executive Officer (CEO) to negotiate and execute a Construction Funding Agreement with the City of Los Angeles for Taylor Yard Bridge with a not-to-exceed amount of $21,700,000. The Board Report stated that execution of the Construction Funding Agreement and completion of the Bridge by the City would fulfill Metro's commitment as part of the 1992 Settlement. Metro proceeded to execute a Memorandum of Understanding dated March 7, 2018 with the City of Los Angeles for the construction of the Taylor Yard Bikeway/Pedestrian Bridge Over Los Angeles River.

The City is forecasting it will exceed its $21,700,000 budget and has asked for an amendment to the funding authorization in the MOU so that the not-to-exceed amount is increased by $3,750,000 to $25,450,000. The terms of the MOU will not change, only the budget.

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BACKGROUND

In July 2017, the Metro Board authorized the Chief Executive Officer to negotiate and execute a Construction Funding Agreement with the City for the Taylor Yard Bridge. In the Board Action, the responsibility of administering the MOU was transferred from Countywide Planning and Programming to Program Management. Nine months after the Board Action, Metro executed a Memorandum of Understanding (MOU) dated March 7, 2018 with the City for the construction of the bridge in which Metro would program up to $21,700,000 starting in FY19. As per the MOU, funds are advanced every six months based on expected expenditures and recalculated every six months based on actual expenditures reflected in quarterly progress reports.

In early June 2018, the City notified Metro that award of the construction contract would be higher than anticipated and therefore immediately sought to increase the value of the MOU by $3,750,000. In August 2018, Metro staff sent the City a letter acknowledging receipt of the request for additional budget. In the letter, citing the fact construction had not yet started, Metro suggested that the request be revisited at a later time. Through December 2020, the City has made four disbursement requests. Based on the four disbursement requests, Metro has paid the City $21,498,740 of the $21,700,000 allowance and has approximately $200,000 remaining to draw down. In November 2020, the City revisited its request to increase the value of the MOU, hence this proposed action.

DISCUSSION

Findings

The original $21,700,000 budget allocated $16,000,000 for the construction contract and contained $3,200,000 in construction contingency for a total construction budget of $19,320,000. However, the value of the construction contract the City awarded to Ortiz Enterprises, Inc. for construction of the Bridge was $18,725,375, which immediately accounted for $2,725,000 of the $3,200,000 in contingency. Since construction began in 2018, the City has executed $1,331,000 in change orders/contract modifications to the construction contract and has pending or potential change orders totaling $870,000 for a current construction forecast of $20,925,000. The City has also indicated that soft costs including staff costs and consultant contracts to support the construction are almost $1 million higher than previously forecast. Through the end of December 2020, the City spent $1,775,000 on City Staff Costs, $787,000 on consultants, and $663,000 on fees. All figures are summarized in Table 1.

Table 1: Original Budget vs Actuals and Current Forecast

Item	Original Budget (in MOU)	Actual Expenditures (in thousands) Through Dec 2020	Forecast (in thousands)	Increase from Original Budget
Construction Contract Award	16,000,000	14,334,000	18,725,000	2,725,000
Contingency	3,200,000	-	-	-
Changes to Construction Contract*	-	-	2,200,000	2,200,000
Total for Construction Contract	19,200,000	14,334,000	20,925,000	4,925,000

City Staff Costs for Project Management / Construction Management and Inspection	2,100,000	1,775,000	1,865,000	(235,000)
Consultants/Monitoring	370,000	787,000	800,000	530,000
Direct Costs/Fee	30,000	663,000	700,000	670,000
Total for Soft Costs	2,500,000	3,225,000	3,365,000	965,000
Total Construction and Soft Costs	21,700,000	17,559,000	24,290,000	5,890,000

*Forecast includes 1,331,000 in executed change orders and 869,000 in pending/potential changes

Considerations

In a letter dated November 20, 2020, the City forecast it will need an additional $2,690,000 to complete the Bridge. However, staff feels it is appropriate to authorize amending the funding of the MOU by up to $3,750,000 because the MOU has a provision for Audit Requirements/Payment Adjustments. Metro retains five percent (5%) of every City disbursement request. That retention will not be paid to the City until a final audit by Metro. The provision also dictates that the City shall reimburse Metro for any expenditure not in compliance with the MOU.

DETERMINATION OF SAFETY IMPACT

This board action will not impact Metro safety standards. Construction of the Bridge is overseen by the City, not Metro.

FINANCIAL IMPACT

The proposed action will have an impact of up to $3,750,000 spread over FY21 and FY22. If Board authorization is given to amend the MOU, the City will request a disbursement of up $2,690,000 in FY21. Since this is a multi-year project, the Project Manager, Cost Center Manager, and Chief Program Management Officer will be responsible for budgeting the cost in future fiscal years.

Impact to Budget

The proposed action will not have an impact to the FY21 Annual Budget. The FY21 Annual Budget has $2,860,000 in Cost Center 8510, Construction Contracts/Procurement, for Project 410088, Taylor Yard Bridge. Funding for this project is Proposition C 25% sales tax revenues which are not eligible for transit operations.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This action directly supports the Project which is consistent with Metro's Strategic Plan Goals to enhance communities and lives through mobility and access to opportunity. By constructing the Metro

Training and Innovation Center, the Project seeks to better connect residents to workforce development opportunities, a wider range of regional employment, travel, and cultural opportunities.

ALTERNATIVES CONSIDERED

The Board could choose not to authorize negotiation and execution of the Construction Funding Agreement. This is not recommended because it does not support Metro's legal commitment made in the 1992 Settlement.

NEXT STEPS

Upon Board approval, negotiations to amend the MOU will be finalized and the Construction Funding Agreement executed. The MOU will only be amended to increase the funding authorization and no other terms.

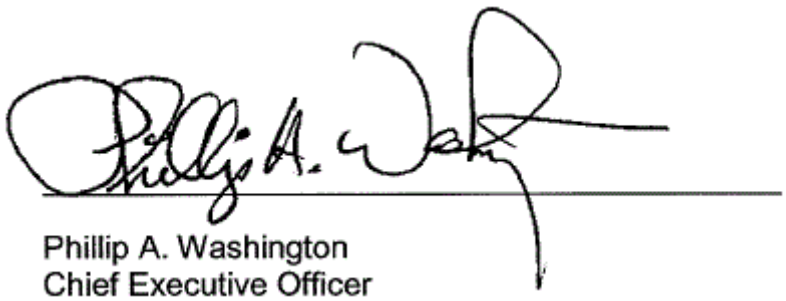
ATTACHMENTS

Attachment A - Memorandum of Understanding for the Construction of Taylor Yard Bikeway/Pedestrian Bridge Over Los Angeles River dated March 7, 2018.

Attachment B - Letter from City of Los Angeles Request for Additional Funding Beyond Authority of MOU dated November 20, 2020.

Prepared by: Gerardo Alvarez, Senior Director, (213) 922-2567
Tim Lindholm, Senior Executive Officer, (213) 922-5585

Reviewed by: Richard Clarke, Chief Program Management Officer, (213) 922-7557



Phillip A. Washington
Chief Executive Officer

MEMORANDUM OF UNDERSTANDING

For the Construction of:
TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE OVER LOS ANGELES RIVER

This Memorandum of Understanding ("MOU") is dated 3/7/2018 and is by and between the Los Angeles County Metropolitan Transportation Authority ("LACMTA") and the City of Los Angeles ("City") for the construction of the Taylor Yard Bikeway/Pedestrian Bridge Over Los Angeles River ("Bridge").

WHEREAS, in July 1992, the City, the Los Angeles County Transportation Commission (LACTC) and the Southern California Regional Rail Authority entered into a memorandum of understanding to resolve disputes pertaining to the development of the Taylor Yard Commuter Rail Facility (the "1992 Settlement")

WHEREAS, LACTC, the predecessor agency to LACMTA, agreed in the 1992 Settlement to design, finance and construct a pedestrian access system, linking the communities to the east and west of Taylor Yard and providing access to rail service, including a pedestrian bridge across the Los Angeles River;

WHEREAS, LACMTA and the City entered into MOU P002077NC, dated April 2012 (the "2012 MOU"), which provided to the City's Department of Transportation funding of $1,073,000 to complete the design of the Bridge, which was estimated to include preliminary conceptual design; environmental documentation; right-of-way agreements and environmental clearance; and final design and bid package preparation;

WHEREAS, the Bridge is a priority of the Mayor and the City Council, and is noted as project #171 in the 2007 Mayor and Council approved Los Angeles River Revitalization Master Plan;

WHEREAS, the City's Bureau of Engineering assumed Project Management for the Bridge on May 11, 2012.

WHEREAS, the Bureau of Engineering Project Management responsibilities are only partially covered by LACMTA and the rest is covered by City General Fund staff allocations.

WHEREAS, the City has contracted with a consultant for the design of the Bridge, using funds provided in the 2012 MOU, and the services were procured using the procedures of the Board of Public Works.

WHEREAS, the City has completed 50% design of the Bridge which has been approved by LACMTA.

WHEREAS, the City is in the process of securing all required permits and rights of way required for the construction of the Bridge.

WHEREAS, Los Angeles Department of Water and Power (LADWP) has provided funding for design of a recycled water line that could travel under the bridge.

WHEREAS, the LACMTA Board of Directors, at its meeting on July 27, 2017 authorized funds to be used by City for the construction of the Bridge, subject to the terms and conditions contained in this MOU.

WHEREAS, The City Council, at its meeting on 2/20/18 authorized the City, acting through its City Engineer to enter into this MOU and construct the Bridge.

NOW, THEREFORE, the parties hereby agree as follows:

The terms and conditions of this MOU consist of the following, and each is incorporated by reference herein as if fully set forth herein:

Part I - Specific Terms of the MOU
Part II - General Terms of the MOU
Attachment A - Scope of Work
Attachment A-1 - Approved 50% Bridge Design
Attachment B - Project Budget
Attachment C - Project Schedule
Attachment D - Reporting and Expenditure Guidelines
Attachment D1 - Quarterly Progress/Expenditure Report

In the event of a conflict, this MOU shall prevail over the previous MOUs and the Specific Terms of the MOU shall prevail over the General Terms of the MOU.

IN WITNESS WHEREOF, the parties have caused this MOU to be executed by their duly authorized representatives as of the dates indicated below:

LACMTA:
LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

By: _____ Date: 12/8/2017
Phillip A. Washington
Chief Executive Officer

APPROVED AS TO FORM:

MARY C. WICKHAM
County Counsel

By: _____ Date: 11/27/17
Deputy

CITY:
CITY OF LOS ANGELES

By: Gary Lee Moore Date: 3/7/2018
Gary Lee Moore, PE, ENV SP
City Engineer

APPROVED AS TO FORM:

By: _____ Date: 3/1/2018
Edward Jordan
Assistant City Attorney
General Counsel to Public Works

PART I
SPECIFIC TERMS OF THE MOU

1. The title of the project is Taylor Yard Bikeway/Pedestrian Bridge Over Los Angeles River ("Bridge"), as described in the Scope of Work, Attachment A and approved 50% Bridge Design, Attachment A-1. The City will be procuring a construction contract for the Bridge ("Bridge Contract") via a competitive solicitation. Prior to award of Bridge Contract, the Bridge Contract will be subject to review by LACMTA for compliance with this MOU. Prior to award of Bridge Contract, an updated Scope of Work and the 100% Design shall replace Attachment A and A-1, respectively, via written amendment to this MOU.

2. To the extent the Funds are available, LACMTA shall make available to the City funds in an amount not to exceed $21,700,000 (the "Funds") for the construction budget of the Bridge, in accordance with the Project Budget (Attachment B). LACMTA Board of Directors' action of July 27, 2017 authorized use of the Funds not to exceed $21,700,000 to the City for the Bridge. The Funds are programmed over 3 years: FY2019, FY2020, and FY2021. Prior to award of Bridge Contract, the updated Budget shall replace Attachment B, and the not to exceed amount will be updated by written amendment to this agreement, provided that it does not exceed the LACMTA Board approved $21,700,000. If the solicitation process for the Bridge Contract results in a Project Budget that exceeds $21,700,000, additional authorization by LACMTA Board of Directors will be required.

3. Funds shall be advanced every six months based upon biannual estimates of expenditures as detailed in Part II, Section 4 DISBURSEMENT OF FUNDS. The City must provide the appropriate supporting documentation with the Quarterly Progress/Expenditure Report. LACMTA will withhold five percent (5%) of eligible expenditures per invoice as retainage pending an audit of expenditures and completion of Scope of Work. The audit of expenditures will commence within six months of the final submitted invoice, pursuant to Part II Section 5 AUDIT REQUIREMENTS/PAYMENT ADJUSTMENTS. The City shall withhold the same 'five percent (5%)' retainage from their contractors so that expenditures match the disbursement amount.

4. The Bridge will be funded by LACMTA, subject to the terms of this MOU. Responsibilities for additional costs are as follows:

a) The City is responsible for (i) additional costs that are the result of changes to the Scope of Work for the Bridge requested by the City, and/or (ii) additional costs that are the result of delays caused by the failure of the City to act in a timely manner. The City may not utilize any contingency funds identified in the Project Budget to pay for additional costs described in this paragraph.

b) LACMTA will be responsible for (i) additional costs that are the result of changes to the Scope of Work that are a technical necessity, or legal requirement of an outside agency, in order to complete construction of the Bridge, subject to reasonable approval by LACMTA, (ii) additional costs that are a result of delays caused by unforeseen conditions, including, but not limited to, unanticipated environmental mitigation and/or permit compliance costs, costs for differing site conditions, and/or (iii) additional costs that result from errors and omissions in the design and engineering of the Bridge. LACMTA may utilize contingency funds identified in the Project Budget to pay for the additional costs described in this paragraph.

5. The City is responsible for the timely construction and completion of the Bridge as described in the Project Schedule, (Attachment C). The Project Schedule includes, project milestones and a set schedule, which the City must follow. Prior to award of the Bridge Contract, an updated Project Schedule shall replace Attachment C. Work shall be delivered in accordance with that schedule unless otherwise agreed to by the parties in writing. If the City is consistently behind schedule in meeting project milestones or in delivering the Bridge, then LACMTA will have the option to terminate this MOU for default as described in Part II, Section 9 DEFAULT, unless a schedule delay mutually agreed upon by MTA and the City, is in place.

6. Changes and Change Orders.

a) "Change Orders" shall refer to changes to the Bridge Contract.

b) Any Change Order in excess of $100,000 shall be submitted to LACMTA for review and approval. The parties shall develop a specific approval schedule and process for timely approval, prior to award of the Bridge Contract.

c) If a Change Order in excess of $100,000 is considered an emergency, LACMTA will be contacted via email for the emergency basis of approval. The City will then provide all documentation per the final approval to LACMTA, within 30 days of the Change Order approval.

d) "Material Changes" shall refer to any change or Change Order that (i) results in a Project Schedule that requires funding beyond the last year in which funds are programed (FY 2021), (ii) results in a Project Budget amount that is greater than $21,700,000, (iii) changes the Scope of Work, or (iv) otherwise changes the terms of this MOU. Material Changes will require a written amendment to this MOU.

e) A Project Budget amount that is greater than the $21,700,000 will require approval by the LACMTA Board of Directors.

f) Change Orders that are less than $100,000, and do not materially affect the terms of this MOU ("Non Material Changes"), can be made without LACMTA approval, but with formal notification to LACMTA for informational purposes, within ten (10) days of the Change Order.

7. The Bridge will be owned, operated and maintained by the City. LACMTA shall have no obligation to operate, or maintain the Bridge. The City shall be solely responsible for any costs associated with operating and maintaining the bridge.

8. The Department of Water and Power (DWP) will be responsible for funding the portion of the Bridge costs associated with the DWP facilities incorporated into the bridge. LACMTA will not be responsible for any costs associated with the DWP facilities, or the design or construction thereof.

9. The following costs are not a part of the Bridge Scope of Work and will be ineligible expenses for LACMTA funding under this agreement:

a) Costs associated with a bicycle path connection along Kerr Road to San Fernando Boulevard are ineligible expenses.

b) Costs associated with the DWP facilities are ineligible expenses, including the pro-rata share of hard and soft costs attributable to the DWP facilities.

c) Costs expended in association with required permits, obtained under a prior MOU, are ineligible expenses. Costs expended in association with permit renewal or compliance during construction, or mitigation costs as part of construction or permit compliance, will be eligible expenses under this MOU.

d) Costs expended in association with real estate or right of way acquisitions, are ineligible expenses, unless unforeseen real estate expenses are necessary to complete bridge construction, subject to approval by LACMTA.

10. LACMTA's fulfillment of its obligations under this MOU shall fulfill LACMTA's obligations under the 1992 Settlement.

11. LACMTA's Address:

Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012
Attention: Marie Sullivan
Mail Stop 99-23-4
sullivanma@metro.net

12. City's Address:

City of Los Angeles
1149 S. Broadway Street, Suite 830
Los Angeles, CA 90015
Attention: Nur Malhis
Mail Stop 507
nur.malhis@lacity.org

PART II
GENERAL TERMS OF THE MOU

1. TERM:

1.1 The term of this MOU shall commence on the Effective Date of this MOU and shall expire upon the occurrence of all of the following, unless terminated earlier as provided herein: (i) the agreed upon Scope of Work has been completed; (ii) all LACMTA audit and reporting requirements have been satisfied; and (iii) the final disbursement of the Funds has been made to City. All eligible Bridge expenses as defined in the Reporting and Expenditure Guidelines (Attachment D) incurred after the Effective Date shall be eligible expenses in accordance with the terms and conditions of this MOU. The parties understand and agree there are certain covenants and clauses of this MOU which specifically remain in effect after expiration or termination of this MOU.

1.2 Should LACMTA determine there are insufficient Funds available for the Bridge; LACMTA may terminate this MOU by giving written notice to City at least thirty (30) days in advance of the effective date of such termination, at which point, City must notify Contractor immediately to stop work. If this MOU is terminated pursuant to this section, LACMTA shall not be responsible for any costs incurred by City after the effective date of such termination, except for the following:

i) costs to comply with all permit and environmental agency requirements already incurred at the time of termination, or resulting from the termination,
ii) costs necessary to return any facilities constructed or modified by the Bridge's construction to a safe state,
iii) costs already incurred by the Contractor at the time of termination, or
iv) costs for Contractor's known claims already on record and approved by LACMTA at the time of termination, or resulting from the termination and approved by LACMTA.

Additionally, in such event of insufficient Funds, LACMTA will be responsible for eligible expenses incurred by the City prior to the date of termination. In the event of a termination due to lack of funds, LACMTA's obligation under the 1992 Settlement shall not have been satisfied.

2. INVOICE BY CITY:

2.1 Unless otherwise stated in this MOU, the Quarterly Progress/Expenditure Report, with supporting documentation of expenses and Bridge progress as described in Part II, Section 4 DISBURSMENT OF FUNDS of this MOU, shall satisfy LACMTA invoicing requirements.

2.2 Submit invoice with supporting documentation to:

ACCOUNTSPAYABLE@METRO.NET (preferable) or mail to:

Los Angeles County Metropolitan Transportation Authority
Accounts Payable
P. O. Box 512296
Los Angeles, CA 90051-0296

2.3 All invoice material must contain the following information:

Re: LACMTA Project ID# 2077NC and FA# 920000000F
Marie Sullivan; Mail Stop 99-23-4

3. USE OF FUNDS:

3.1 City shall utilize the Funds to complete the Bridge as described in the Scope of Work and Project Schedule.

3.2 City shall not use the Funds to substitute for any other funds or projects not specified in this MOU. Further, City shall not use the Funds for any expenses or activities beyond the approved Scope of Work.

*3.3 City must use the Funds in the most cost-effective manner. If City intends to use a consultant or contractor to implement all or part of the Bridge, LACMTA requires that such activities be procured in accordance with City's contracting procedures and consistent with State law. City will also use the Funds in the most cost-effective manner when the Funds are used to pay "in-house" staff time. This effective use of funds provision will be verified by LACMTA through on-going project monitoring and through any LACMTA interim and final audits.

*3.4 City's employees, officers, councilmembers, board member, agents, or consultants (a "City Party") are prohibited from participating in the selection, award, or administration of a third-party contract or sub-agreement supported by the Funds if a real or apparent conflict of interest would be involved. A conflict of interest would include, without limitation, an organizational conflict of interest or when any of the following parties has a financial or other interest in any entity selected for award: (a) a City Party (b) any member of a City Party's immediate family, (c) a partner of a City Party; (d) any organization that employs or intends to employ any of the above. This conflict of interest provision will be verified by LACMTA through on-going project monitoring and through any LACMTA interim and final audits.

3.5 City is obligated to continue using the Bridge consistent with the public transportation purposes for which the Bridge was intended. The Bridge

right-of-way and real property purchased to implement the Bridge shall remain dedicated to public transportation use. The obligations set forth in this section shall survive termination of this MOU.

3.6 If City desires to use the Funds to purchase or lease equipment including, without limitation, vehicles, office equipment, computer hardware or software, or other personal property ("Equipment") necessary to perform or provide the services set forth in the Scope of Work, City must obtain LACMTA's written consent prior to purchasing any Equipment. Equipment purchased without such prior written consent shall be deemed an ineligible expenditure of the Funds. Equipment acquired as part of the Bridge shall be dedicated to that Bridge use for their full economic life cycle, including any extensions of that life cycle achieved by reconstruction, rehabilitation, or enhancements.

3.7 If equipment ceases to be used for the proper use as originally stated in the Scope of Work, City will be required to return to LACMTA the Funds used to purchase or lease such Equipment in proportion to the useful life remaining. The obligations set forth in this section shall survive termination of this MOU.

3.8 City understands that this MOU does not provide any rights for City to use LACMTA real property needed for the Bridge. If the Bridge requires use of LACMTA Property, City will need to enter into a separate MOU with LACMTA in accordance with LACMTA real property policies and procedures. Nothing in this MOU obligates LACMTA to provide City with any real estate right.

4. DISBURSEMENT OF FUNDS:

4.1 Upon award of Bridge Contract, City shall provide the schedule of values and construction schedule from the Bridge Contract to be reviewed and approved by LACMTA. City shall create cost projections every six months, based on the schedule of values and construction schedule. Disbursements shall be made every six months, upon receipt of a valid and LACMTA approved cost projection for the following six months, in accordance with the provisions of this MOU. Cost projections will be submitted to LACMTA every six months, beginning as soon as City has a cost projection and needs advance of funds, and on June 1 and December 1 thereafter. LACMTA shall disburse funds for the following six months within 30 days of receipt of a valid cost projection. Each cost projection should reflect any discrepancies between projected and actual expenditures from the previous disbursement period. Disbursements will be adjusted accordingly if there are unspent funds from the previous cost projection.

4.2 City shall submit the Quarterly Progress/Expenditure Report (Attachment D-1) within 30 days after the close of each quarter. Should City fail to submit such reports within 10 days of the due date and/or City submits incomplete reports, LACMTA will not process the subsequent disbursement until the completed, required reports are received, reviewed, and approved. The Quarterly Progress/Expenditure Report shall include all supporting documentation (such as contractor invoices, timesheets, receipts, etc.) with a clear justification and explanation of their relevance to the Bridge. If the City cannot submit official reports at the specified due date, they will submit draft reports and replace them with official reports, when they become available, but in no event later than at the end of the following quarter. If no activity has occurred during a particular quarter, City will still be required to submit the Quarterly Progress/Expenditure Report indicating no dollars were expended that quarter. Each six months, LACMTA will review the Quarterly Progress/Expenditure Report from the previous two quarters for compliance with the associated cost projection.

4.3 LACMTA will make all disbursements electronically unless an exception is requested in writing. Disbursements via Automated Clearing House (ACH) will be made at no cost to City. City must complete the ACH form and submit such form to LACMTA before disbursements can be made. ACH Request Forms can be found at http://www.metro.net/projects/call_projects/call_projects-reference-documents/.

4.4 City must provide detailed supporting documentation with its Quarterly Progress/Expenditure Report.

4.6 Expenses that are not reported in the Quarterly Progress/Expenditure Report within 90 days after City has paid the expense are not eligible expenses, unless prior notification of late invoices from the Contractor or Vendors are reported to LACMTA by City, and concurred in writing by LACMTA. However, in the event, a late invoice is submitted by the Contractor, and prior notification is not reported to LACMTA, reimbursement will be eligible if invoices are verified by City and accepted by LACMTA as a valid expense.

4.7 Any Funds expended by City prior to the Effective Date of this MOU shall not be eligible expenses, without the prior written consent of LACMTA.

5. AUDIT REQUIREMENTS/PAYMENT ADJUSTMENTS:

*5.1 LACMTA, and/or its designee, shall have the right to conduct audits of the Bridge, as deemed appropriate, such as financial and compliance audits; interim audits; pre-award audits, performance audits and final audits. LACMTA will commence a final audit within six months of receipt of an acceptable final invoice, provided the Bridge is ready for final audit (meaning all costs and charges have been paid by City and invoiced to LACMTA, and such costs, charges and invoices

are properly documented and summarized in the accounting records to enable an audit without further explanation or summarization including actual indirect rates for the period under review). Payment of retention amounts shall not occur until after LACMTA's final audit is completed. City agrees to establish and maintain proper accounting procedures and cash management records and documents in accordance with Generally Accepted Accounting Principles (GAAP). City shall reimburse LACMTA for any expenditure not in compliance with this MOU. City's eligible expenditures submitted to LACMTA for this Bridge shall be in compliance with the Reporting and Expenditure Guidelines (Attachment D) and 2 CFR Subtitle A, Chapter II, Part 200. The eligibility of costs for City's contractors, consultants and suppliers submitted to LACMTA through Recipient's Quarterly Progress Reports/Expenditures shall be in compliance with 2 CFR Subtitle A, Chapter II, Part 200 or, 48 CFR Part 31 (FAR), whichever is applicable. Any use of the Funds which is expressly prohibited under this MOU shall be an ineligible use of the Funds and may be disallowed by LACMTA audit. Findings of the LACMTA audit are subject to review and comment by City, prior to being finalized. When LACMTA audit findings require City to return monies to LACMTA, City shall return such monies within thirty (30) days after the final audit is sent to City. The parties do not release nor waive their rights to proceed in a court of competent jurisdiction to appeal or otherwise adjudicate finalized audit findings.

*5.2 City's records shall include, without limitation, accounting records, written policies and procedures, contract files, original estimates, correspondence, change order files (including documentation covering negotiated settlements), invoices, and any other supporting evidence deemed necessary by LACMTA to substantiate charges related to the Bridge (all collectively referred to as "records") shall be open to inspection and subject to audit and reproduction by LACMTA auditors or authorized representatives to the extent deemed necessary by LACMTA to adequately permit evaluation of expended costs. Such records subject to audit shall also include, without limitation, those records deemed necessary by LACMTA to evaluate and verify, direct and indirect costs, (including overhead allocations) as they may apply to costs associated with the Bridge. These records must be retained by City for three years following final payment under this MOU

*5.3 City shall cause all contractors to comply with the requirements of Part II, Sections 5.1 and 5.2 above. City shall cause all contractors to cooperate fully in furnishing or in making available to LACMTA all records deemed necessary by LACMTA auditors or authorized representatives related to the Bridge.

*5.4 LACMTA or any of its duly authorized representatives, upon reasonable written notice shall be afforded access to all of the records of City and its contractors related to the Bridge, and shall be allowed to interview any employee of City and its contractors through final payment to the extent reasonably practicable.

*5.5 LACMTA or any of its duly authorized representatives, upon reasonable written notice, shall have access to the offices of City and its contractors, shall have access to all necessary records, including reproduction at no charge to LACMTA, and shall be provided adequate and appropriate work space in order to conduct audits in compliance with the terms and conditions of this MOU.

*5.7 When business travel associated with the Bridge requires use of a vehicle, the mileage incurred shall be eligible at the mileage rates set by the Internal Revenue Service, as indicated in the United States General Services Administration Federal Travel Regulation, Privately Owned Vehicle Reimbursement Rates.

*5.8 City shall certify monthly invoices by reviewing all contractor and subcontractor costs and maintaining internal control to ensure that all expenditures are allocable, eligible and reasonable and in accordance with 2 CFR Subtitle A, Chapter II, Part 200 or 48 CFR Part 31 (whichever is applicable) and the terms and conditions of this MOU.

5.9 City shall also certify final costs of the Bridge to ensure all costs are in compliance with 2 CFR Subtitle A, Chapter II, Part 200 or 48 FAR Part 31 (whichever is applicable) and the terms and conditions of this MOU.

5.10 Whenever possible, in exercising its audit rights under this MOU, LACMTA shall rely on City's own records and audit work to minimize direct audit of contractors, consultants, and suppliers.

5.11 LACMTA shall be given a copy of the final construction contract between the City of Los Angeles, Public Works and the Contractor, for review and approval.

5.12 LACMTA, or any of its duly authorized representatives, shall be invited to attend the regular scheduled construction meetings or specially called meetings related to change orders or schedule changes.

6. ONE TIME FUNDING:

6.1 This MOU does not imply nor obligate any future funding commitment on the part of LACMTA, beyond that agreed upon by the MOU.

7. SOURCES AND DISPOSITION OF FUNDS:

7.1 The obligation for LACMTA to disburse the Funds for the Bridge is subject to sufficient Funds being made available for the Bridge by the LACMTA Board of Directors.

7.2 If, at the time of final Quarterly Progress/Expenditure Report, it is determined that City has received Funds in excess of what City should have received for the Project, City shall return such overage to LACMTA within 30 days from final Quarterly Progress/Expenditure Report.

8. TIMELY USE OF FUNDS:

8.1 City must demonstrate timely use of the Funds by:

a) executing this MOU within ninety (90) days of receiving formal transmittal of the MOU from LACMTA; and

b) meeting the project milestones as agreed upon by the LACMTA and City in the MOU, the Scope of Work and Project Schedule;

c) awarding the Bridge construction contract within two (2) years from the date of execution of this MOU; and

d) submitting the Quarterly Progress/Expenditure Reports; and

e) expending the Funds disbursed under this MOU for eligible costs within four (4) years of the first disbursement.

8.2 Quarterly Progress/Expenditure Reports will be used to evaluate compliance with the Project milestone due dates as identified in the MOU. If the Project does not meet the milestone due dates as agreed upon in the Project Schedule, attached as Attachment C, and otherwise in this MOU, LACMTA will issue a notice of non-compliance to City, and City will be required to develop a written recovery plan illustrating in detail City's actions to resolve the delay and to meet the Project completion date agreed upon in the MOU (the "Recovery Plan"). If the Recovery Plan is deemed viable by LACMTA staff, and meets the Project completion date agreed upon in the MOU, LACMTA may grant an administrative schedule update as long as the Funds are expended in compliance with (iv) above. If City fails to submit a Recovery Plan within 30 days of the notice of non-compliance from LACMTA, or the Recovery Plan is not sufficient to show the Bridge will be completed in a reasonable amount of time, as determined by LACMTA, City shall be in Default.

8.3 If City fails to meet any of the conditions in paragraph 8.1 or 8.2 above, City shall be in Default.

9. DEFAULT:

9.1 A Default under this MOU is defined as any one or more of the following: (i) City fails to comply with the terms and conditions contained herein; (ii) City is consistently behind schedule in meeting project milestones or in delivering the Project; or (iii) City fails to perform satisfactorily or makes a Material Change, as determined by LACMTA at its sole discretion, to the Scope of Work, the Project Budget, or the Bridge Schedule without LACMTA's prior written consent or approval as provided herein. If the Contractor is causing the City to be in Default, the City shall provide a recovery plan to Metro, per the guidelines in Section 8.2.

9.2 If City Defaults and does not cure the Default, LACMTA will have fulfilled its obligation under the 1992 Settlement.

10. REMEDIES:

10.1 In the event of a Default by City, LACMTA shall provide written notice of such Default to City with a 30-day period to cure the Default. In the event City fails to cure the Default, or commit to cure the Default and commence the same within such 30-day period to the satisfaction of LACMTA, LACMTA shall have the following remedies: (i) LACMTA may terminate this MOU; (ii) LACMTA may make no further disbursements of Funds to City; and/or (iii) LACMTA may recover from City any Funds disbursed to City as allowed by law or in equity.

10.2 Effective upon receipt of written notice of termination from LACMTA pursuant to Section 10.1, City shall not undertake any new work or obligation with respect to this MOU unless so directed by LACMTA in writing. Any Funds expended after termination shall be the sole responsibility of City.

10.3 The remedies described herein are non-exclusive. LACMTA shall have the right to enforce any and all rights and remedies herein or which may be now or hereafter available at law or in equity.

11. COMMUNICATIONS:

*11.1 City shall ensure that all Communication Materials contain recognition of LACMTA's contribution to the Bridge as more particularly set forth in "Funding Agreement Communications Materials Guidelines" available on line or from the LACMTA Project Manager. Please check with the LACMTA Project Manager for the web address. The Funding Agreement Communications Materials Guidelines may be changed from time to time during the course of this MOU. City shall be responsible for complying with the latest Funding MOU Communications Materials Guidelines during the term of this MOU, unless

otherwise specifically authorized in writing by the LACMTA Chief Communications Officer.

*11.2 For purposes of this MOU, “Communications Materials” include, but are not limited to, press events, public and external newsletters, printed materials, advertising, websites radio and public service announcements, electronic media, and construction site signage. A more detailed definition of “Communications Materials” is found in the Funding Agreement Communications Materials Guidelines.

*11.3 The LACMTA logo is a trademarked item that shall be reproduced and displayed in accordance with specific graphic guidelines. These guidelines and logo files including scalable vector files will be available through the LACMTA Project Manager.

*11.4 City shall ensure that any subcontractor, including, but not limited to, public relations, public affairs, and/or marketing firms hired to produce Project Communications Materials for public and external purposes will comply with the requirements contained in this Section.

11.5 The LACMTA Project Manager shall be responsible for monitoring City compliance with the terms and conditions of this Section. City failure to comply with the terms of this Section shall be deemed a default hereunder and LACMTA shall have all rights and remedies set forth herein.

12. OTHER TERMS AND CONDITIONS:

12.1 This MOU, along with its Attachments, constitutes the entire understanding between the parties, with respect to the subject matter herein. The MOU shall not be amended, nor any provisions or breach hereof waived, except in writing signed by the parties who agreed to the original MOU or the same level of authority.

*12.2 Neither LACMTA nor any subsidiary or their respective directors, officers, agents, or employee thereof shall be responsible for any damage or liability occurring by reason of anything done or committed to be done by City under or in connection with any work performed by or service provided by City, its officers, agents, employees, contractors and subcontractors under this MOU or the design of the Bridge under the 2012 MOU. Except for the active negligence or willful misconduct of LACMTA, City shall fully indemnify, defend (with counsel approved by LACMTA) and hold LACMTA, and its subsidiaries and their respective directors, officers, agents and employees harmless from and against any suits and causes of actions, claims, losses, liability, damages, costs and expenses, including without limitation, any costs or liability on account of bodily injury, death or personal injury of any person or for damage to or loss of property, any environmental obligation, and any legal fees in any way arising out of acts or

omissions to act related to the Bridge or this MOU, without requirement that LACMTA first pay such claim. The obligations set forth in this section shall survive termination of this MOU.

12.3 Neither party hereto shall be considered in default in the performance of its obligation hereunder to the extent that the performance of any such obligation is prevented or delayed by unforeseen causes including acts of God, acts of a public enemy, and government acts beyond the control and without fault or negligence of the affected party. Each party hereto shall give notice promptly to the other of the nature and extent of any such circumstances claimed to delay, hinder, or prevent performance of any obligations under this MOU.

*12.4 City shall comply with and insure that work performed under this MOU is done in compliance with Generally Accepted Accounting Principles (GAAP), all applicable provisions of federal, state, and local laws, statutes, ordinances, rules, regulations, and procedural requirements including Federal Acquisition Regulations (FAR), and the applicable requirements and regulations of LACMTA. City acknowledges responsibility for obtaining copies of and complying with the terms of the most recent federal, state, or local laws and regulations, and LACMTA requirements including any amendments thereto.

12.5 City agrees that those sections of this MOU marked with an asterisk shall be included in every contract entered into by City or its contractors relating to work performed under this MOU and LACMTA shall have the right to review and audit such contracts.

12.6 City shall not assign this MOU, or any part thereof, without prior approval of the LACMTA Chief Executive Officer or his designee, and any assignment without said consent shall be void and unenforceable at the option of LACMTA.

12.7 This MOU shall be governed by California law. If any provision of this MOU is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions shall nevertheless continue in full force without being impaired or invalidated in any way.

12.8 The covenants and MOUs of this MOU shall inure to the benefit of, and shall be binding upon, each of the parties and their respective successors and assigns.

12.9 City will advise LACMTA prior to any key Project staffing changes including changes in Project Manager, Project Engineer, and Construction Manager.

12.10 City in the performance of the work described in this MOU is not a contractor nor an agent or employee of LACMTA. City attests to no organizational or personal conflicts of interest and agrees to notify LACMTA immediately in the event that a conflict, or the appearance thereof, arises. City shall not represent itself as an agent or employee of LACMTA and shall have no powers to bind LACMTA in contract or otherwise.

12.11 The parties may amend this MOU, as needed, subject to mutual written consent.

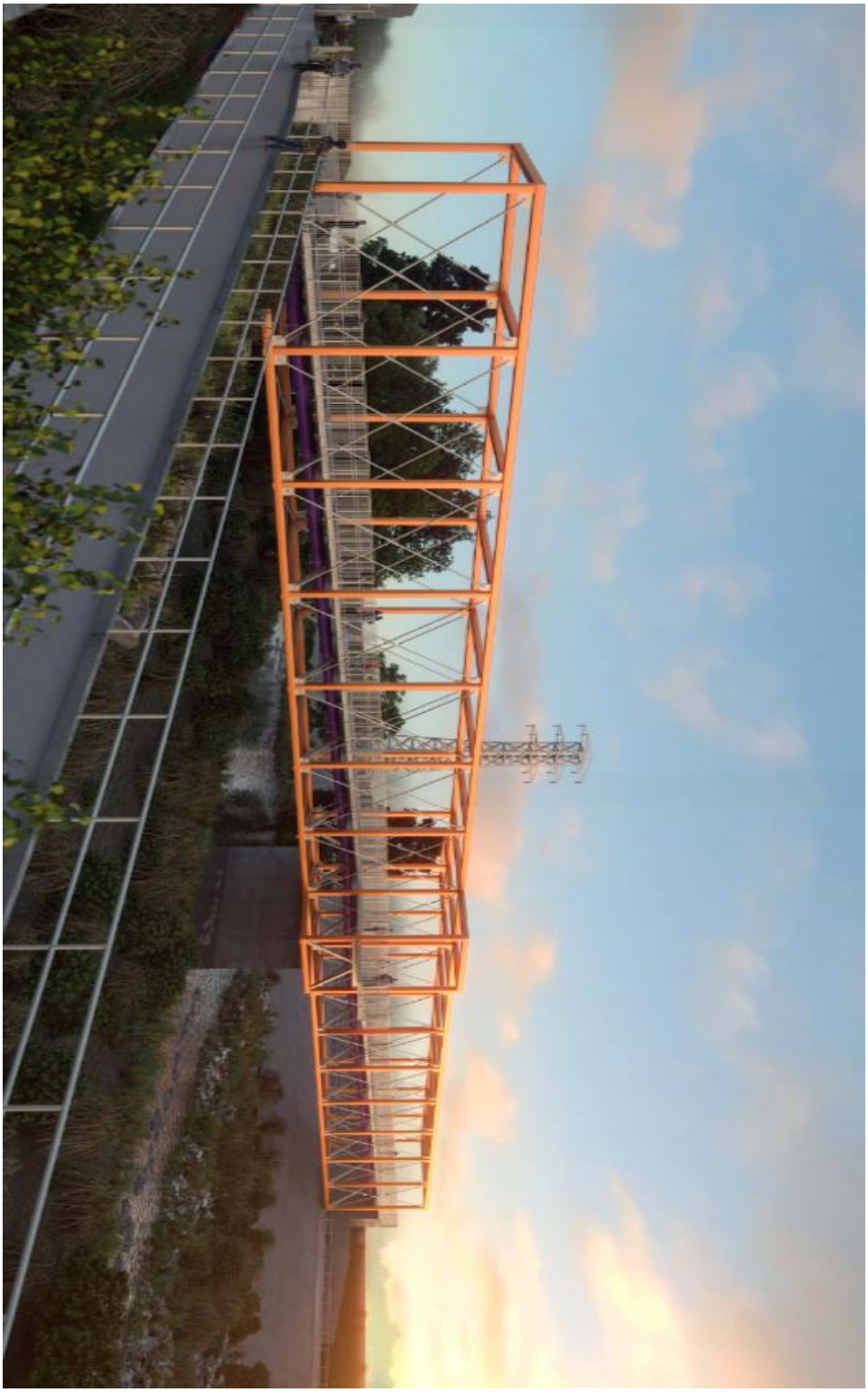
ATTACHMENT A – SCOPE OF WORK

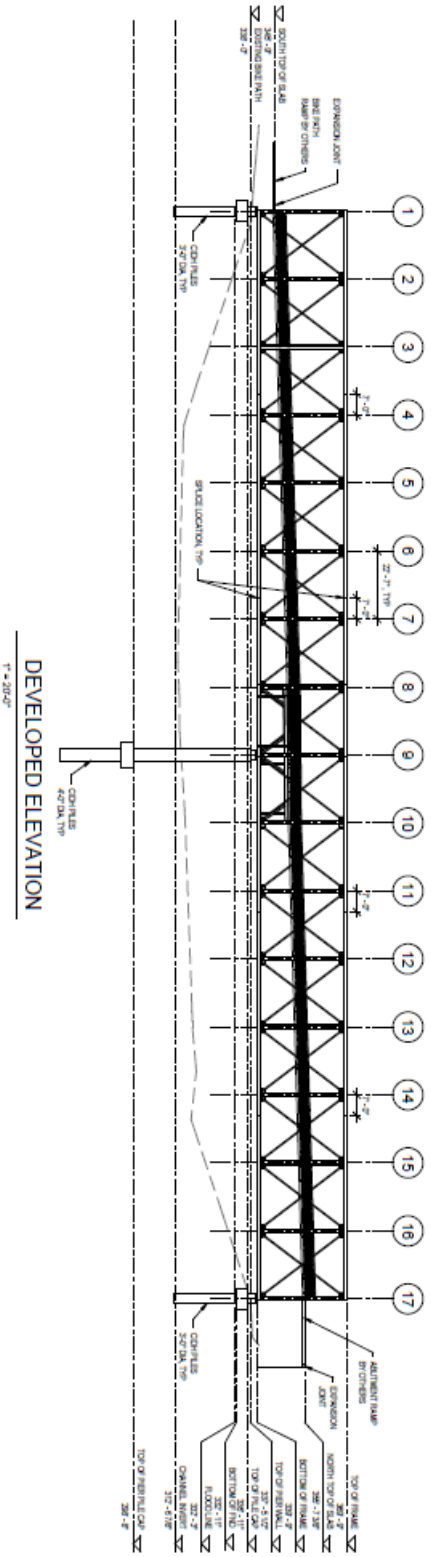
The Taylor Yard Bikeway/Pedestrian Bridge over the Los Angeles River Project ("Bridge") is located within the City of Los Angeles ("City"), which will connect the communities of Elysian Valley on the west and Cypress Park on the east of the LA River. The Bridge will be for bicycle and pedestrian use, and will also support emergency vehicles. On the west side of the LA River, the Bridge will connect with the existing bikeway along the river.

The Bridge features a steel-framed structure, approximately 400 feet long, which will be supported on abutments and a concrete pier in the central portion of the LA River channel. The abutment to the east will be along the Los Angeles River maintenance road, and the abutment on the west side will be along the existing bikeway. Both abutments will be adjacent to the top of the channel slopes. The Bridge structure itself will be approximately 30 feet high by 27 feet wide and the width of the actual pedestrian and bikeway path will be approximately 18 feet.

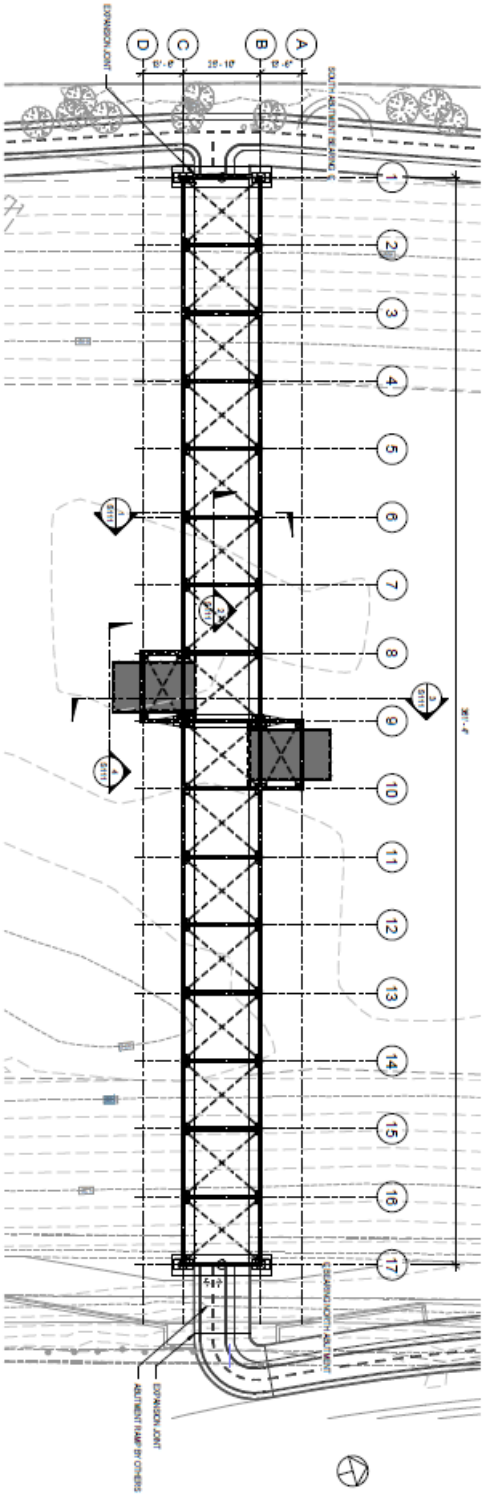
The Bridge landing on the west side will land on the G2 parcel, recently purchased by the City from the previous owner, Union Pacific Regional Railroad. On this parcel runs a tail track owned by Metrolink which will require an at-grade crossing. At this time, Metrolink is working to fund a design for a relocation of the tail track, as a result of the sale of the G2 parcel. The Bridge will occupy land within jurisdictions governed by the City, the Army Corps of Engineers, and the Los Angeles County Flood Control District.

ATTACHMENT A-1 – Approved 50% Bridge Design

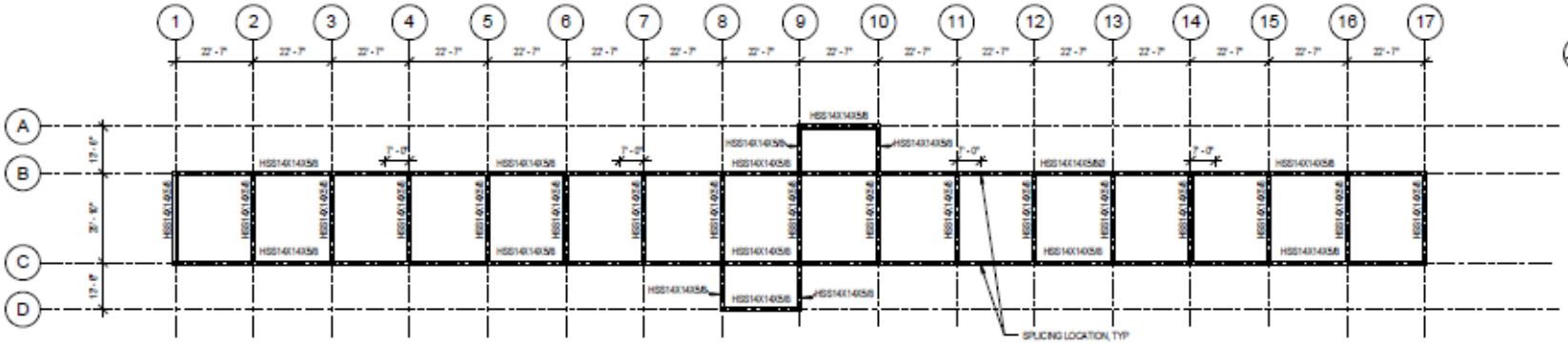




DEVELOPED ELEVATION

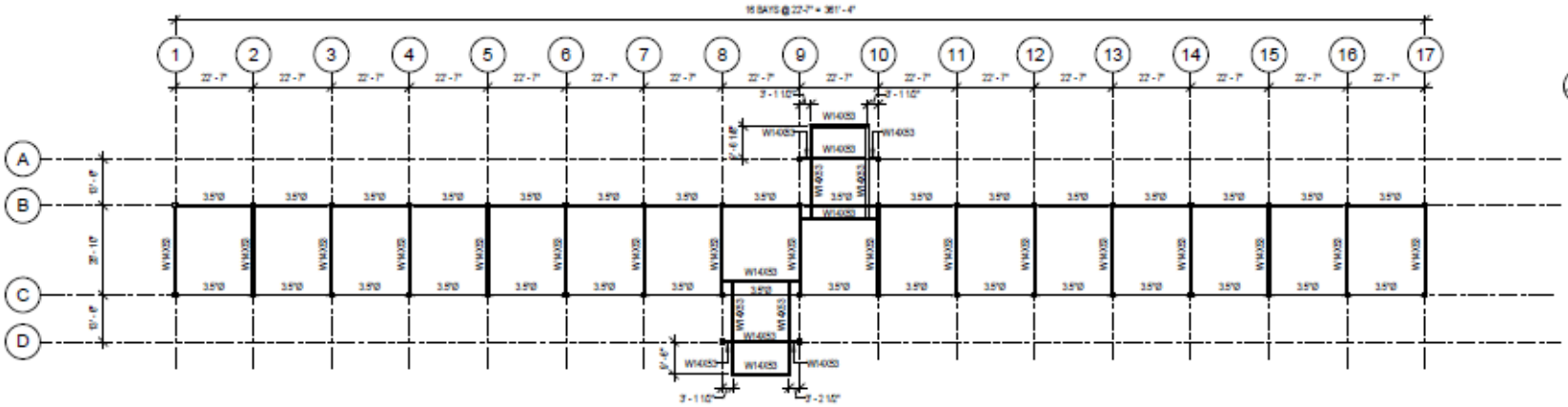


GENERAL PLAN



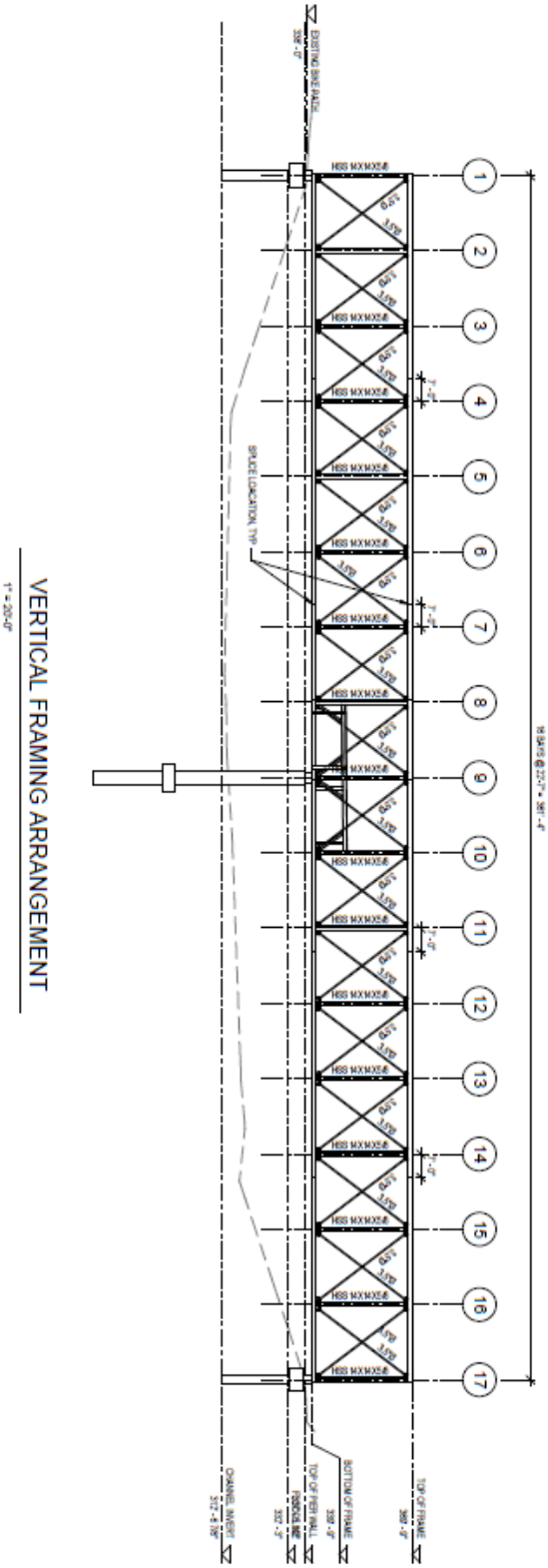
TOP FRAME PLAN

1" = 20'-0"

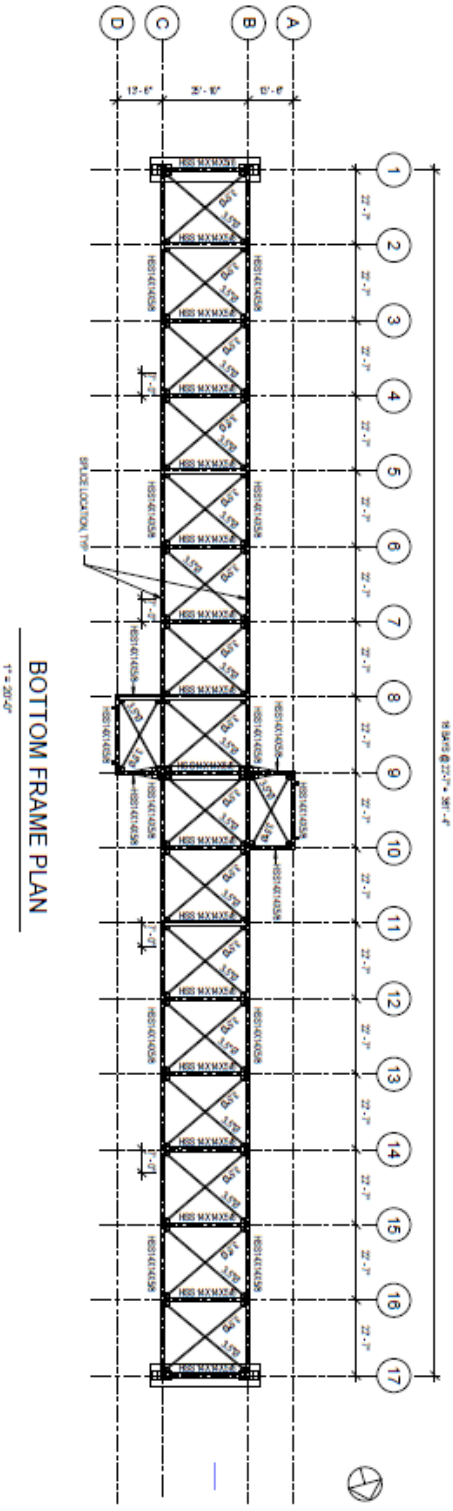


FRAME AT BOTTOM OF SLAB

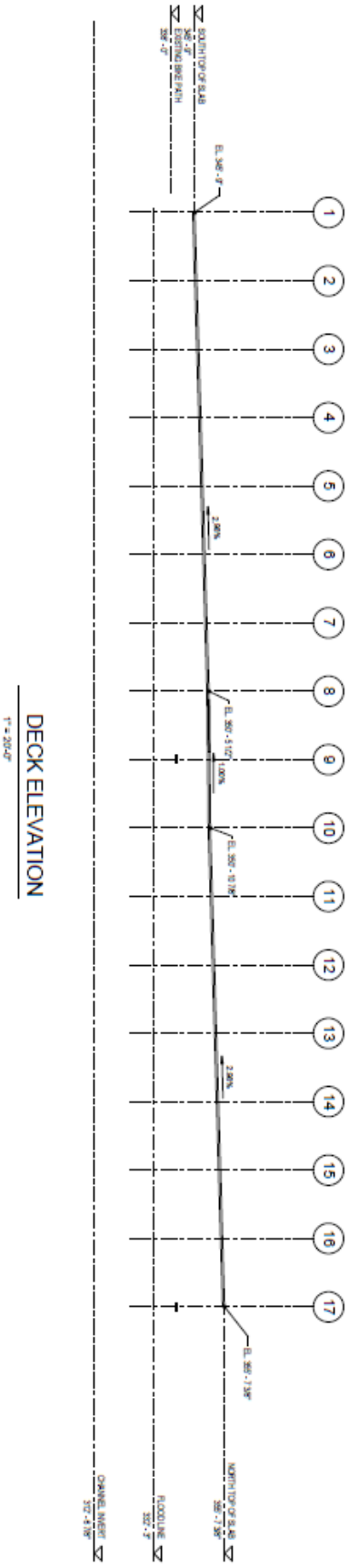
1" = 20'-0"



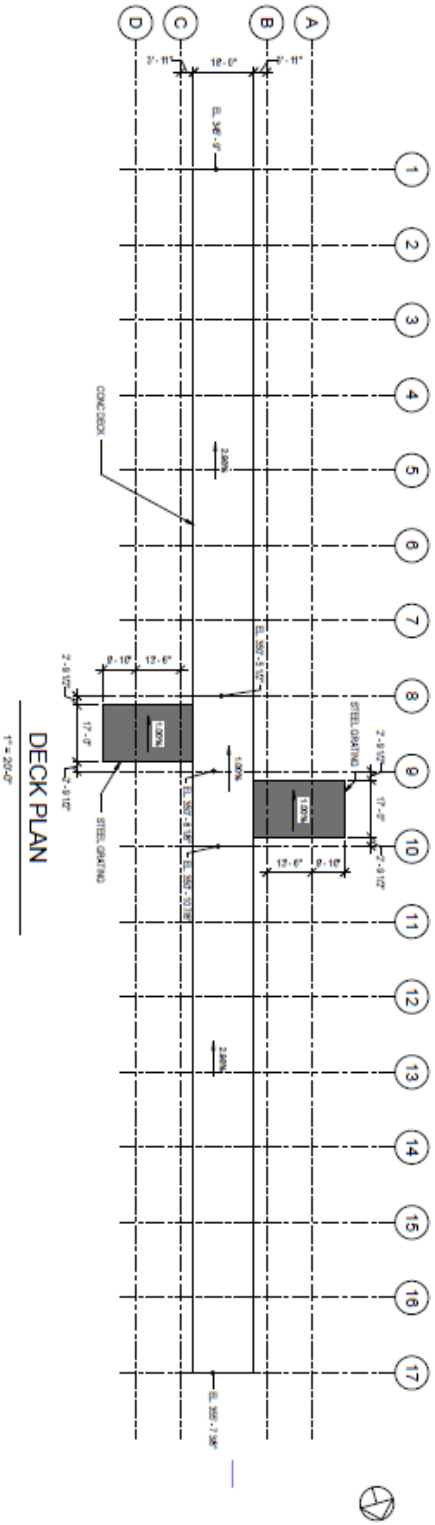
VERTICAL FRAMING ARRANGEMENT



BOTTOM FRAME PLAN



DECK ELEVATION



DECK PLAN

ATTACHMENT B – Project Budget

Item	Cost	Comments
Construction		
Construction Cost	$16,000,000	General Conditions, General Requirements, Allowances, Mobilization, Bridge Super and Substructure, Pedestrian Approach and Bike Path, Lighting, Drainage, Erosion Control, Landscaping, Irrigation, Signing and Striping
Construction Contingency	$3,200,000	20% of Construction Cost
Total Construction Cost	**$19,200,000**	
Construction Engineering/Administration		
Project Management / Construction Management Costs	$1,100,000	Approximately 15% of Total Construction Costs
Bureau of Contract Administration/ Inspection and Testing Costs	$1,000,000	
Consultant Costs	$270,000	
Mitigation and Monitoring Costs	$100,000	
Other Direct Costs	$30,000	
Total Construction Engineering/Administration Costs	**$2,500,000**	
TOTAL CONSTRUCTION BUDGET	**$21,700,000**	

ATTACHMENT C – Project Schedule

Milestone /Season	**Start**	**Finish**	**Duration**	**Activities**
Award Contract	08/31/2018		Milestone	
Construction Start	10/01/2018		Milestone	Issue Notice to Proceed
Wet Season (2018)*	10/01/2018	04/14/2019	7 months	Mobilization, Clearing and Grubbing, Contractor Submittals
Dry Season (2019)	04/15/2019	10/15/2019	6 months	Construct Substructure for Bridge
Wet Season (2019)*	10/16/2019	04/14/2020	6 months	Offsite Erection of Bridge Frame, Submittals
Dry Season (2020)	04/15/2020	10/15/2020	6 months	Construct Superstructure of Bridge
Wet Season (2020)	10/16/2020	03/15/2021	5 months	Construct Bikeway Approach Ramps, Landscaping, Lighting, Final Items
Punch List	03/16/2021	05/15/2021	2 months	
Total			**32 months**	
Notes:				
*Contractor cannot work in the LA River Channel during wet season				

ATTACHMENT D – REPORTING & EXPENDITURE GUIDELINES

REPORTING GUIDELINES

1) Quarterly Progress/Expenditure Report (Attachment D1) is required for all projects. The City shall be subject to and comply with all applicable requirements of the funding agency regarding project-reporting requirements. In addition, City will submit a quarterly report to the LACMTA at ACCOUNTSPAYABLE@METRO.NET or by mail to Los Angeles County Metropolitan Transportation Authority, Accounts Payable, P. O. Box 512296, Los Angeles, California 90051-0296. Please note that letters or other forms of documentation may not be substituted for this form.

2) The Quarterly Progress/Expenditure Report covers all activities related to the project and lists all costs incurred. It is essential that City provide complete and adequate response to all the questions. The expenses listed must be supported by appropriate documentation with a clear explanation of the purpose and relevance of each expense to the project.

3) In cases where there are no activities to report, or problems causing delays, clear explanation, including actions to remedy the situation, must be provided.

4) City is required to track and report on the project schedule. LACMTA will monitor the timely use of funds and delivery of projects. Project delay, if any, must be reported each quarter. Projects not delivered in a timely manner may be subject to the Default clause.

5) The Quarterly Progress/Expenditure Report is due to the LACMTA as soon as possible after the close of each quarter, but no later than the following dates for each fiscal year:

Quarter	Report Due Date
July –September	October 30
October- December	January 31
January - March	April 30
April - June	July 31

6) Upon completion of the Project a final report that includes project's final evaluation must be submitted.

EXPENDITURE GUIDELINES

1) Any activity or expense charged above and beyond the approved Scope-of-Work (Attachment C) is considered ineligible and will not be eligible unless prior written authorization has been granted by the LACMTA Chief Executive Officer or his/her designee.

2) Administrative cost is the ongoing expense incurred by the City for the duration of the project and for the direct benefit of the project as specified in the Scope-of-Work (Attachment C). Examples of administrative costs are personnel, office supplies, and equipment. As a condition for eligibility, all costs must be necessary for maintaining, monitoring, coordinating, reporting and budgeting of the project. Additionally, expenses must be reasonable and appropriate to the activities related to the project.

3) LACMTA is not responsible for, any costs incurred by the City prior to the Effective Date of the FA, unless written authorization has been granted by the LACMTA Chief Executive Officer or her/her designee.

DEFINITIONS

1) Eligible Cost: To be eligible, costs must be reasonable, recognized as ordinary and necessary, consistent with established practices of the organization, and consistent with industry standard of pay for work classification.

2) Excessive Cost: Any expense deemed “excessive” by LACMTA staff would be adjusted to reflect a “reasonable and customary” level. For detail definition of “reasonable cost”, please refer to the Federal Register OMB Circulars A-87 Cost Principals for State and Local Governments; and A-122 Cost Principals for Nonprofit Organizations.

3) Ineligible Expenditures: Any activity or expense charged above and beyond the approved Scope-of-Work is considered ineligible.

ATTACHMENT D1 –
FORM OF QUARTERLY PROGRESS EXPENDITURE REPORT

City To Complete	
Invoice #	
Invoice Date	
FA#	920000000F
Quarterly Report #	

LACMTA FA ATTACHMENT D-1

QUARTERLY PROGRESS / EXPENSE REPORT

CITY IS REQUESTED TO EMAIL THIS REPORT TO

ACCOUNTSPAYABLE@METRO.NET
or submit by mail to:
Los Angeles County Metropolitan Transportation Authority
Accounts Payable
P. O. Box 512296
Los Angeles, California 90051-0296
after the close of each quarter, but no later than November 30, February 28, May 31 and August 31. Please note that letters or other forms of documentation may **not** be substituted for this form. Refer to the Reporting and Expenditure Guidelines (Attachment D) for further information.

SECTION 1: QUARTERLY EXPENSE REPORT

Please itemize grant-related charges for this Quarter on Page 5 of this report and include totals in this Section.

		City Staff Time $	Construction Contract $	Total $
Project Quarter Expenditure				
This Quarter Expenditure				
Retention Amount				
Net Invoice Amount (Less Retention)				
Project-to-Date Expenditure				

Funds Expended to Date (Include this Quarter)				
Total Project Budget				
% of Project Budget Expended to Date				
Balance Remaining				

SECTION 2: GENERAL INFORMATION

PROJECT TITLE: _____

FA #: _____

QUARTERLY REPORT SUBMITTED FOR:

Fiscal Year : ☐ 2018-2019 ☐ 2019-2020 ☐ 2020-2021

Quarter : ☐ Q1: Jul - Sep ☐ Q2: Oct - Dec ☐ Q3: Jan - Mar ☐ Q4: Apr - Jun

DATE SUBMITTED: _____

LACMTA Project Manager	Name:	
	Phone Number:	
	E-mail:	

Project Sponsor Contact / Project Manager	Contact Name:	
	Job Title:	

Department:	
City / Agency:	
Mailing Address:	
Phone Number:	
E-mail:	

SECTION 3 : QUARTERLY PROGRESS REPORT

1. DELIVERABLES & MILESTONES

List all deliverables and milestones as stated in the MOU, with start and end dates. Calculate the total project duration. ***DO NOT CHANGE THE ORIGINAL MOU MILESTONE START AND END DATES SHOWN IN THE 2ND AND 3RD COLUMNS BELOW.***

Grantees must make every effort to accurately portray milestone dates in the original FA Scope of Work, since this will provide the basis for calculating any project delay. If milestone start and/or end dates change from those stated in the MOU indicate the new dates under Actual Schedule below and re-calculate the project duration. However, this does not change the original milestones in the MOU.

MOU Milestones	**Original MOU Schedule in Scope of Work**		**Actual Schedule**	
	Start Date	**End Date**	**Start Date**	**End Date**
Construction Bid & Award				
Ground Breaking Event				
Construction				
Ribbon Cutting Event				
Total Project Duration (Months)				

2. PROJECT COMPLETION

A. Based on the comparison of the original and actual project milestone schedules above, project is (select only one) :

☐ On schedule per original MOU schedule

☐ Less than 12 months behind original schedule

☐ Between 12-24 months behind original schedule

☐ More than 24 months behind original schedule

C. Was a construction contract or capital purchase executed within 9 months after completion of MOU

☐ Yes ☐ No ☐ Not Applicable

3. TASKS / MILESTONES ACCOMPLISHED

List tasks or milestones accomplished and progress made this quarter.

4. PROJECT DELAY

If project is delayed, describe reasons for delay (this quarter). Pay particular attention to schedule delays. If delay is for the same reason as mentioned in previous quarters, please indicate by writing "Same as Previous Quarter".

5. ACTION ITEMS TO RESOLVE DELAY

If the project is delayed (as described in #4), include action items that have been, or will be, undertaken to resolve the delay.

SECTION 4: ITEMIZED LISTING OF EXPENSES AND CHARGES THIS QUARTER

All expenses and charges must be itemized and listed below. Each item listed must be verifiable by an invoice and/or other proper documentation. The total amounts shown here must be equal to this quarter's expenditures listed on page 1 of this report. All expenses and charges must be reflective of the approved budget and rates as shown in the MOU. Use additional pages if needed.

	ITEM	INVOICE #		EXPENSES / CHARGES	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

TOTAL			

Notes:

1. All receipts, invoices, and time sheets, attached and included with this Expense Report must be listed and shown under the Invoice Number column of the Itemized Listing (above).

I certify that I am the responsible Project Manager or fiscal officer and representative of _____ and that to the best of my knowledge and belief the information stated in this report is true and correct.

_____ _____

Signature *Date*

_____ _____

Name *Title*

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CITY ENGINEER

1149 S. BROADWAY, SUITE 700
LOS ANGELES, CA 90015-2213

http://eng.lacity.org

November 20, 2020

Mr. Tim Lindholm
Senior Executive Officer, Project Management
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012

SUBJECT: TALYOR YARD BIKEWAY / PEDESTRIAN BRIDGE OVER LOS ANGLES RIVER- REQUEST FOR ADDITIONAL FUNDING BEYOND AUTHORITY OF MOU

Hello Tim:

I hope all is well.

BACKGROUND

The City of Los Angeles, Public Works, Engineering (BOE) is currently in construction for the Taylor Yard Bikeway/Pedestrian over the Los Angeles (LA) River **(Attachment 1)**, and the Contractor has completed the bridge portion of the scope as well as the South bike ramp. The remaining portion of the work includes installing the bridge railing, lighting, painting, and the North bike ramp. The project is scheduled to be completed in June of 2021. To date, there are a total of $1,330,627.07 executed change orders, which is 7% of the contract amount, and approximately $350,000 of additional forecasted/potential change orders.

The change orders negotiated to date consist of the following:

1) Differing Site Conditions: When drilling for the pile foundation, the Contractor encountered a non-standard hard rock layer which was unanticipated and, hence, not accounted to for the boring logs. Additional labor and equipment were needed in order to drill through these. Additionally, there were unforeseen manmade buried objects discovered in the North side when constructing a smaller retaining wall structure, adjacent to the bridge.
2) Additional excavation and re-compaction of foundation of the south bike path due to Geotechnical concern for integrity of the stability of soil in the area.
3) Acceleration for steel fabrication and installation due to construction delays as a result of the pandemic, as well as other construction delays. The need to move the project faster was needed to satisfy the environmental agency requirements of vacating the river by the end of the dry season.
4) Additional cost for concrete of the South bike ramp

5) Additional stainless-steel rods needed for the bridge outlook structures
6) North Bike Ramp: Soil Nail Wall: There was a need to change the shoring method for the North Bike Ramp from a cantilevered shoring system to a soil nail system for safety, constructability as well as compliance with Metrolink requirements
7) Miscellaneous items

The forecasted/pending change order include the following:

1) Installation of the guardrail and safety fencing on South side bike path for added pedestrian safety
2) Rapid Flashing Beacons and crosswalk on Kerr Road at the exit of the bridge ramp, for allowance of safe transit for bicyclists and pedestrians
3) Miscellaneous items for additional rebar for the bridge and other electrical items

At this time, we do not forecast any additional large change orders, however, this project has not been completed, and the main item remaining is the construction of the large 160-foot-long, 12-ft-high north bike ramp. This site is an area of concern, due to having made buried objects, and potential contamination, which would require intricate soil handling. For this reason, we would like to increase the contingency allocation for the change order to 12%, which yields a total quantity of $2,200,000. This funding can pay for any unforeseen conditions or claims for the project.

Due to these items, the new projected hard construction cost is anticipated to be approximately **$20,925,375.**

To date, the only cost which has been spent or will be spent on scope outside of the MOU are the following: 1) compliance with the legal requirement of the City of Los Angeles Administrative Code, 1% Arts Fee by the Department of Cultural Affairs, which was $187,254. 2) Installing a flashing beacon, and crosswalk on Kerr Road for allowance of safe transit for bicyclists and pedestrians, when they are leaving the bridge.

FUNDING SHORTFALL

This project is funded through Metro through an executed MOU for Construction, dated March 7, 2018, for a total amount of **$21,700,000**, to fund hard costs (Contractor), direct costs (permit costs, etc.) and soft costs (Consultant and BOE staff costs)

Additionally, Metro released a "Letter of Commitment" **(Attachment 2)** indicating that Metro can will commit to pay, up to $**3,750,800** more in additional funds as necessary, to bring the total Metro funds to $**25,450,800**, due to the bids coming in higher than anticipated. The total amount of encumbered construction engineering /administration for non-city staff and direct costs, is approximately **$1,875,000,** and the total amount of staff costs (Project Management, Construction Management, and inspection) is approximately **$1,400,000**, which leaves a total anticipated project budget of approximately **$24,200,000 [$20,925,375 + $1,875,000 + $1,400,000] ,** which would yield a total shortfall of approximately **$2,500,000 [$24,200,000- $21,700,000],** when considering the budget of $21,700,000 in the original MOU. Table 1 below summarizes the project budget for the project.

Table 1

CONTRACTOR	**Ortiz Enterprises**
ORIGINAL CONTRACT AMOUNT	**$18,725,375**
CHANGE ORDERS	
Total Change Orders to Date (Executed)	$1,330,627
Additional Request for Pending and Potential Change Orders	$869,373
TOTAL AMOUNT REQUESTED TO BE ALLOCATED TO CHANGE ORDERS	**$2,200,000**
NEW CONTRACTOR CONSTRUCTION BUDGET	**$20,925,375**
TOTAL CONSTRUCTION ENG/ADMIN (STAFF COSTS-PM/CM/INPECTION)	**$1,500,000**
TOTAL CONSTRUCTON ENG/ADMIN (DIRECT COSTS /NON-CITY STAFF)	**$1,865,000**
NEW TOTAL CONSTRUCTION BUDGET	**$24,390,375**
ORIGINAL MOU	**$21,700,000**
SHORTFALL	**($2,690,375)**
REQUEST OF ADDITIONAL FUNDS FOR THIS PROJECT	**$2,690,375**
REQUEST OF ADDITIONAL FUNDING TO BE AVAILABLE FOR THS MOU AMENDMENT	**$3,750,800**

FUNDING REQUEST

BOE requests the following:

1. Requests that Metro and City formally amend the MOU
2. Although the projected funding shortfall is $2,690,375, BOE requests that the committed amount of $3,750,850, be available (earmarked) as part of this MOU amendment, in the event that additional unforeseen costs arise, and for the purpose of not needing a second (2nd) amendment.

At this time, there have been four disbursement requests, as seen in Table 2.

Table 2

New Total Construction Budget	$24,390,375.00
Amount Deducted for Retention (5%)	($1,219,518.75)
New Total Construction Budget (Including Retention)	**$23,170,856.25**
Total Disbursement Checks (includes 5% retention)	**$23,170,856.25**
Check No. 01-Received	$3,507,495.00
Check No. 02-Received	$8,413,389.43
Check No. 03-Received	$3,620,078.55
Check No. 04-Received	$4,882,840.38
Check No. 05- Funding Disbursement Request No.05	**$2,747,052.89**

The attachments below contain a Construction Funding Projection Table as well as Disbursement Request summary **(Attachment 3)**

If you need further information or clarification, please contact me by email at Nur.Malhis@lacity.org or Shirley Lau, at Shirley.Lau@lacity.org.

Sincerely,

Nur Malhis, PE
Senior Engineer/Project Manager
Municipal Facilities Program

Attachments:

1. Bridge Rendering
2. Copy of the "Letter of Commitment" to provide additional funding up to $3,750,850, as needed, for Taylor Yard Bridge, executed on August 2, 2018
3. Disbursement Request/Construction Funding Projection Package, dated November 19, 2020

Cc Steven Fierce, Engineering
Shirley Lau, Engineering

:

TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE OVER LOS ANGELES RIVER
PROPOSED PROJECT

ENGINEERING
CITY OF LOS ANGELES

[SPF:a]

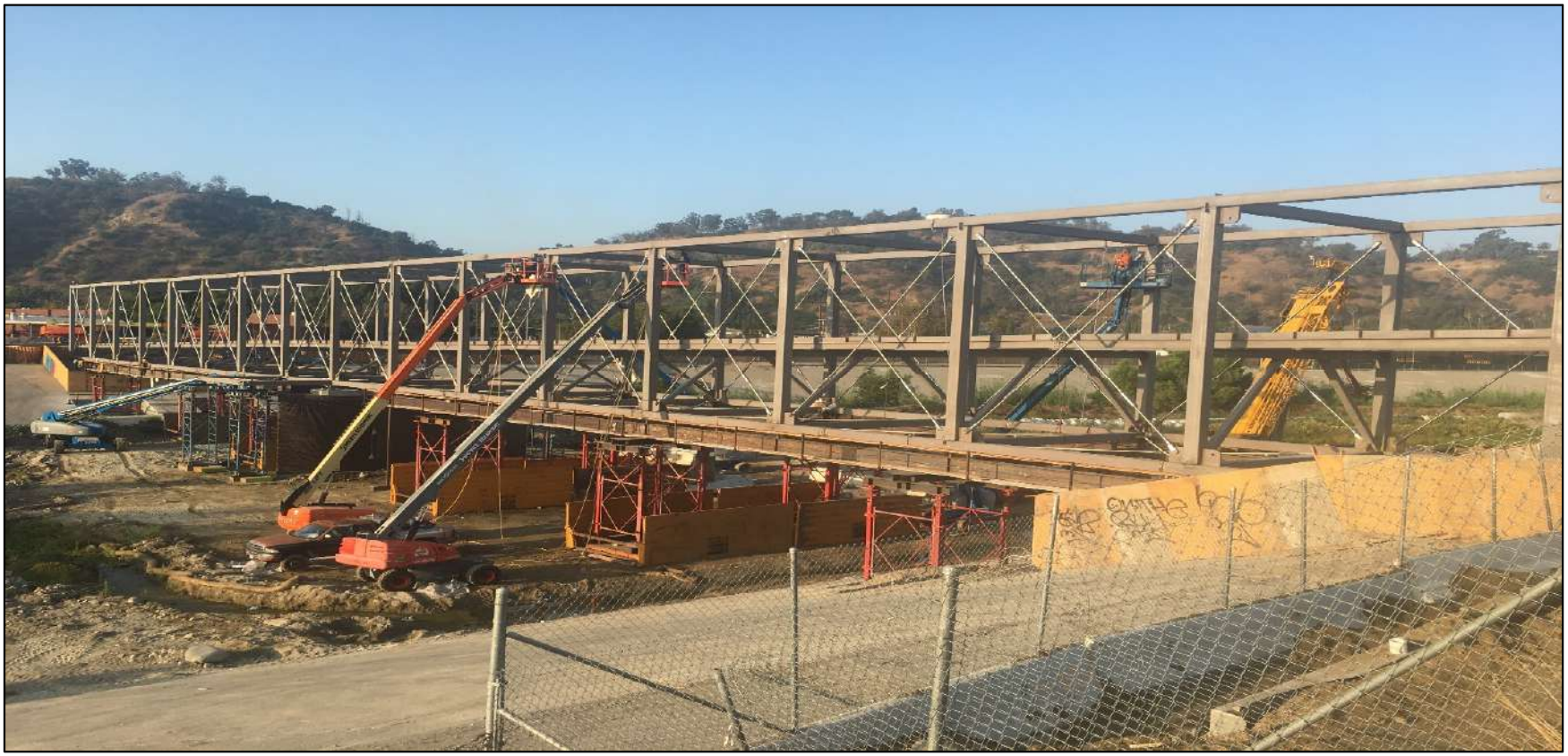
TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE OVER LOS ANGELES RIVER
PROPOSED PROJECT

[SPF:a]

Taylor Yard Bikeway/Pedestrian Bridge over LA River

Progress Photos: Bridge Construction-Profile Looking North

ENGINEERING
CITY OF LOS ANGELES



Taylor Yard Bikeway/Pedestrian Bridge over LA River

Progress Photos: Bridge Construction-Main Line View

ENGINEERING
CITY OF LOS ANGELES

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

August 2, 2018

City of Los Angeles
Bureau of Engineering
1149 S. Broadway, Suite 700
Los Angeles, CA 90015

Attn: Deborah Weintraub, Chief Deputy City Engineer

Subject: Taylor Yard Bridge

Dear Ms. Weintraub:

This letter is to confirm we have received your June 7, 2018 letter and subsequent July 20, 2018 e-mail correspondence in regards to the revised construction budget for the Taylor Yard Bridge (attached).

We have reviewed the correspondence, as well as the terms of the Memorandum of Understanding (MOU) between Metro and the City of Los Angeles (City) that was approved by the Metro Board in July 2017, and agree with your assessment that the overall construction budget requires revision. Based on the results of construction bidding, it is anticipated that the construction budget will need to be revised by $3,750,850.

Per the terms of the agreement, Metro committed to funding a project total of $21,700,000; however, the agreement also indicates that if bids were to come in higher than expected, Metro would fund the difference. As such, Metro fully intends to abide by our agreements and provide the additional funding by the time required.

Given that the Taylor Yard Bridge project has not yet started construction, and that Metro and the City have already agreed to a yearly project cash flow, it is anticipated that the additional funding will not be required until approximately Summer 2020. Given this, Metro recommends that we bring this forward to the Board as part of the yearly budget process, which for FY20 will conclude in approximately May 2019.

If you have any questions, please do not hesitate to contact Tim Lindholm, Executive Officer for Capital Projects, at 213.922.7297.

Regards,
LOS ANGELES COUNTY METROPOLITAN TRANPORTATION AUTHORITY

Richard F. Clarke

Richard Clarke
Chief Program Management Officer

cc: Daniel Rodman – Mayor's Office
Mahmood Karimzadeh – BOE
Tim Lindholm – Metro
Quintin Sumabat - Metro
Gerardo Alvarez - Metro
Marie Sullivan (Metro)

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GARY LEE MOORE, PE, ENV SP
CITY ENGINEER

1149 S. BROADWAY, SUITE 700
LOS ANGELES, CA 90015-2213

http://eng.lacity.org

June 7, 2018

Mr. Gerardo Alvarez
Senior Director, Project Control, Program Management
Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012

TALYOR YARD BIKEWAY / PEDESTRIAN BRIDGE- REVISED MOU ATTACHMENT B- CONSTRUCTION BUDGET

Dear Gerardo:

The City of Los Angeles, Bureau of Engineering (Engineering), has updated the total construction budget, which includes a more detailed construction administration and engineering budget, per your email, dated May 25, 2018.

Enclosed are the following documents:

1. Updated Attachment B for the MOU
2. Detailed Preliminary Projected Cost Loaded Schedule for the entire project broken down by six (6) month increments

At this time, it is important to note that the projected cost loaded schedule is preliminary and assumed. This cost loaded schedule will be superseded when the Contractor submits his cost loaded schedule at the start of construction.

This project is anticipated to be awarded by June 30, 2018, and a Notice to Proceed to the Contractor is anticipated to be released by August 1, 2018.

If you have any questions, or need further information, please contact Nur Malhis by email at Nur.Malhis@lacity.org, or by phone at 213-485-4737.

Sincerely,

for

Mahmood Karimzadeh, AIA
Principal Architect
Architectural Division, Engineering

TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE OVER LA RIVER
PROJECT CONSTRUCTION BUDGET
ATTACHMENT B-VERSION 1

Construction Cost

Category	Title/Firm	Scope of Work		Total	Comments
Construction	Oritz Enterprises, Inc.	Allowances, Mobilization, SWPPP, Removals and Access, Bridge Structure, Pedestrian Approach and Bike Path, Landscaping, Drainage, Electrical and Lighting, Signage and Striping		$ 18,585,375.00	
Construction Contingency			20%of Construction Costs	$ 3,717,075.00	
Total Construction Costs			$	22,302,450.00	

Construction Administration Costs

Category	Title/Firm	Duties	Rate/Month	Months	Total	Comments
Project Management						
	BOE Project Mgr-Civil Engineer (Class 7237)	Manager the project through Contruction phase	$ 8,660.00	32	$ 277,120.00	Billing rate of $100/hr-Half Time
	Design Reviews	Review Design			$ 20,000.00	Charge per work
Construction Management						
	BOE Construction Mgr -Civil Engineer (Class 7237)	Answering RFIs, responding to submittals, processing change orders, monitoring construction activity, negotiation of claims, cost estimating, assisting inspector in field work	$ 17,330.00	32	$ 554,560.00	Billing rate of $100/hr -Full Time
	BOE Construction Mgr Civil Engineering Associate (Class 7246-3)		$ 3,900.00	32	$ 124,800.00	Billing rate of $90/hr-Quarter Time
Inspection and Material Testing						
	BCA Inspector -Sr Inspector (Class 7294)	Inspecting all project activities for contract compliance, material evaluation and testing, and composing of daily field reports	$ 14,700.00	32	$ 470,400.00	Billing rate of $85/hr -Full Time
	BCA Inspector - Inspector (Class 7291)		$ 6,900.00	32	$ 220,800.00	Billing rate of $80/hr-Half Time
	BCA Inspector -Inspector (Class 7291)		$ 3,460.00	32	$ 110,720.00	Billing rate of $80/hr-Quarter Time
Consultant Work						
Prime Consultant	SPF:a Architects	Providing technical expertise on shop drawings, submittals, RFIs. Performing field inspections, structual obsrvations, interpreting construction related documents, attending construction meetings.			$ 570,000.00	Actual Cost from Submitted Proposal + Contingency
Geotechnical Consultant	To Be Determined	Providing monitoring of geotechnical work during excavation and pile installation			$ 150,000.00	Anticipated Costs. Final Cost will be negotiated with Consultant
Environmental Consultant	To Be Determined	Provide monitoring for biological impacts, water quality surveys for plants, bats, nesting birds, cultural materials, sensitive plants, implemetnation of soil management and noise control plan			$ 150,000.00	Anticipated Costs. Final Cost will be negotiated with Consultant
Total Construction Engineering Administration Costs		**~ 14% of Total Cosntruction Costs**	$		3,148,400.00	
Total Construction Budget			$		25,450,850.00	
MOU Agreement			$		21,700,000.00	
SHORTFALL			$		(3,750,850.00)	

Date Revised : 5/29/2018

TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE OVER LA RIVER

CONSTRUCTION FUNDING DISBURSEMENT REQUEST NO. 05 (JANAURY 2021-JUNE 2021)

Construction Costs

	Category	Title/Firm	A Total Construction Budget Per MOU, executed (3/07/2018)	B Total Construction Budget Reallocation and Revision (11/19/20)	C Additional Increases/ Deductions from Original Budget (B-A)	D Total Expenditure (July 2018- June 30, 2020 (Up to Quarterly Report No. 9)	E Quarter 1 7/1/2018-9/30/2018 Amount Invoiced	F Quarter 2 10/01/2018-12/31/2018 Amount Invoiced	G Quarters 3 01/01/2019-03/31/2019 Amount Invoiced	H Quarter 4 04/01/2019-06/30/2019 Amount Invoiced	I Quarter 5 07/01/2019-09/30/2019 Amount Invoiced	J Quarter 6 10/01/2019-12/30/2019 Amount Invoiced	K Quarter 7 01/01/2020-03/30/2020 Amount Invoiced	L Quarter 8 04/01/2020-06/30/2020 Amount Invoiced	M Quarter 9 07/01/2020-09/30/2020 Amount Invoiced	N Quarters 8 and 9 01/01/2021-06/30/2021 Amount Requested	O TOTAL 7/1/2018-6/30/2021 Total Projected Expenditure and Requested (D+ N)
1a	Construction Costs	Oritz Enterprises, Inc.	$ 16,000,000.00	$ 18,725,375.00	$ 2,725,375.00	$ 8,598,467.56	$ -	$ 110,845.60	$ 111,111.50	$ 614,192.45	$ 1,277,654.45	$ 443,076.70	$ 2,787,098.48	$ 875,293.68	$ 3,258,732.59	$ 10,126,907.44	$ 18,725,375.00
1b.	Contingency (Change Orders)		$ 3,200,000.00	$ 2,200,000.00	$ (1,000,000.00)	$ 879,537.89										$ 1,320,462.11	$ 2,200,000.00
	Total Construction Costs		$ 19,200,000.00	$ 20,925,375.00	$ 1,725,375.00	$ 9,478,005.45	$ -	$ 110,845.60	$ 111,111.50	$ 614,192.45	$ 1,277,654.45	$ 443,076.70	$ 2,787,098.48	$ 875,293.68	$ 3,258,732.59	$ 11,447,369.55	$ 20,925,375.00
	Construction Engineering/Administration Costs																
	Bureau of Engineering/Bureau of Contract Adminstration																
2a.	Project Management	BOE Project Mgr-Civil Engineer (Class 7237)	$ 1,397,340.00	$ 1,600,000.00	$ 202,660.00	$ 1,511,379.75	$ 69,581.94	$ 56,827.16	$ 83,839.76	$ 142,329.82	$ 269,930.52	$ 178,530.40	$ 169,378.38	$ 235,048.49	$ 305,913.28	$ 298,497.23	$ 1,600,000.00
2b	Construction Management	BOE Construction Mgr -Civil Engineer (Class 7237) BOE Construction Mgr Civil Engineering Associate (Class 7246-3)															
2c	Construction Management Support Technical Review	BSL-Lighting Design Staff BOE -Environmental Staff Review BOE -Environmental Staff BOE- Geotechnical Staff BOE-Structural Staff Review															
2d	Inspection and Material Testing	BCA Inspector -Sr Inspector (Class 7294) BCA Inspector - Inspector (Class 7291)															
	Consultants																
3a	Architect	SPF:a Architects	$ 320,550.00	$ 650,000.00	$ *329,450.00*	$ 351,502.77	$ -	$ -		$ 120,491.46		$ 60,019.00	$ 170,992.31	$ -	$ -	$ 298,497.23	$ *650,000.00*
3b	Geotechnical	Fugro	$ 140,777.00	$ 265,000.00	$ *124,223.00*	$ 147,824.41	$ -	$ -		$ 1,013.00	$ 31,737.00	$ 75,720.46	$ 5,360.25	$ 21,837.65	$ 12,156.05	$ 117,175.59	$ *265,000.00*
3c	Environmental	Parsons	$ 141,333.00	$ 200,000.00	$ *58,667.00*	$ 157,508.04	$ -	$ -	$ -	$ 59,754.73	$ 29,477.91	$ 25,430.32	$ -	$ 7,997.73	$ 34,847.35	$ 42,491.96	$ *200,000.00*
	Direct Costs																
4a	C&M Agreement	SCRRA	$ 500,000.00	$ 750,000.00	$ *250,000.00*	$ 663,054.00	$ -	$ -	$ 175,800.00	$ -	$ -	$ -	$ -	$ -	$ -	$ 86,946.00	$ 750,000.00
4b	Mitigation Fees	Department of Fish and Wildlife-Land Veritas					$ 250,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
4c	Department of Cultural Affairs Approval	Department of Cultural Affaris					$ -	$ -	$ -	$ -	$ 187,254.00	$ -	$ -	$ -	$ -		
4d	Mountain Recreation Conservation Agency Fees	Mountain Recreation Conservation Agency					$ -	$ -	$ -	$ -	$ -	$ 50,000.00	$ -	$ -	$ -		
	Total Construction Engineering / Administration Costs		$ 2,500,000.00	$ 3,465,000.00	$ *965,000.00*	$ 2,831,268.97	$ 319,581.94	$ 56,827.16	$ 259,639.76	$ 323,589.01	$ 518,399.43	$ 389,700.18	$ 345,730.94	$ 264,883.87	$ 352,916.68	$ 843,608.01	$ *3,465,000.00*
	TOTAL CONSTRUCTION EXPENDITURE AND DISBURSEMENT REQUEST(J		$ 21,700,000.00	$ 24,390,375.00	$ *2,690,375.00*	$ 12,309,274.42	$ 319,581.94	$ 167,672.76	$ 370,751.26	$ 937,781.46	$ 1,796,053.88	$ 832,776.88	$ 3,132,829.42	$ 1,140,177.55	$ 3,611,649.27	$ 12,290,977.56	$ *24,390,375.00*

	DISBURSEMENT PAYMENT RECEIVED (5% Deduction for Retention)	DISBURSEMENT PAYMENT REQUESTED (No Retention)
FUNDING DISBURSEMENT REQUESTS SUBMITTED TO METRO		
1. DISBURSEMENT NO.01	$ (3,507,495.00)	$ (3,692,100.00)
2. DISBURSEMENT NO.02	$ (8,413,389.43)	$ (8,856,199.40)
3. DISBURSEMENT NO.03	$ (3,620,078.55)	$ (3,810,609.00)
4. DISBURSEMENT NO.04	$ (4,882,840.38)	$ (5,139,832.41)
TOTAL DISBURSEMENTS TO DATE	$ (20,423,803.36)	$ (21,498,740.81)

FUNDING DISBURSEMENT REQUEST NO. 05 (JANUARY 2021-JUNE 2021)	$ 24,390,375.00	+	$ (21,498,740.81)	$ 2,891,634.19
FUNDING DISBURSEMENT REQUEST NO. 05 (JANUARY 2021-JUNE 2021) -5% RETENTION AMOUNT	*5%*	*of*	*$ 2,891,634.19*	*$ (144,581.71)*
FUNDING DISBURSEMENT REQUEST NO. 05 (JANUARY 2021-JUNE 2021)				**$ 2,747,052.48**
FUNDING BALANCE REMAINING FROM MOU BUDGET OF $21.7 M	$ 21,700,000.00	+	$ (24,390,375.00)	$ (2,690,375.00)

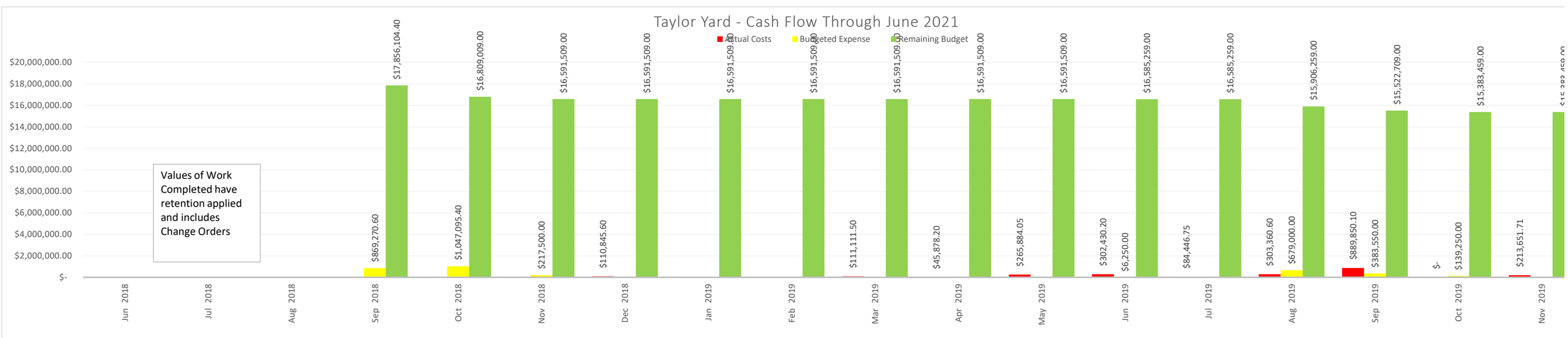
Notes:

1. Staff Charges for Quarters 7 ($169K) and 8 ($235 K), in the amount of $404K was not requested in Disbursement Request No. 03 Projection, and it is not requested in full in this Disbursement Request
2. Costs in this table are cumulative and costs herein have been incorporated in Disbursement Request No. 1 ,2, and 3 and 4 . Actual disbursement receipts, Nos 1, 2, 3 and 4 are shown herein.

TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE O/LA RIVER
ORTIZ ENTERPRISES- CASH FLOW DIAGRAM

WO E1907487

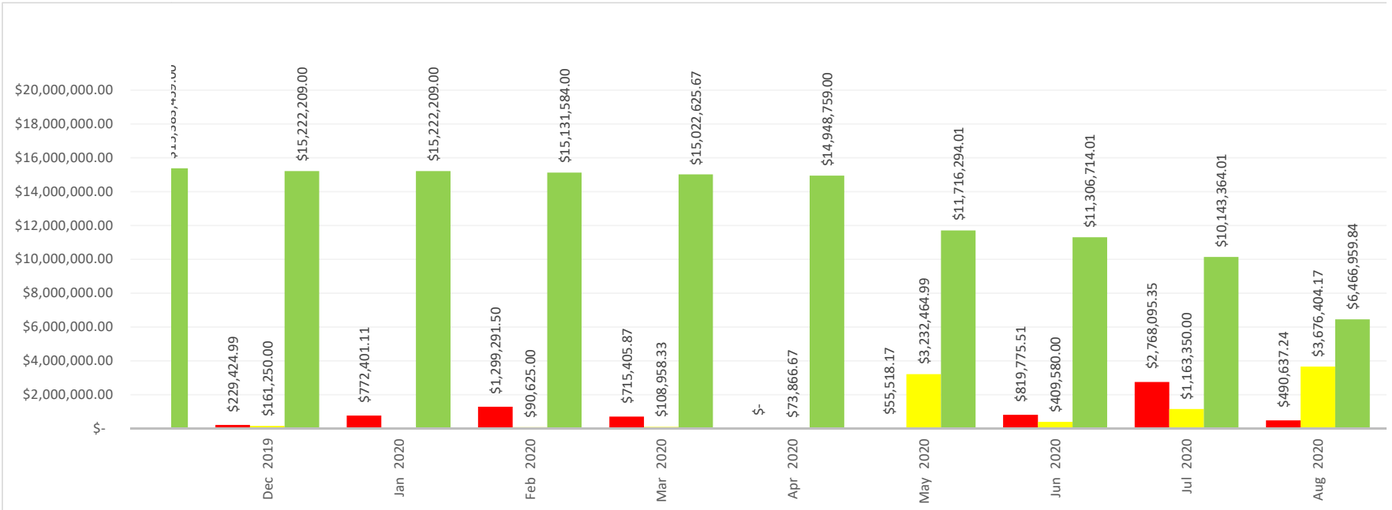
Date	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019
Value of Work Completed this Period (Not including Retention)							$ 110,845.60			$ 111,111.50	$ 45,878.20	$ 265,884.05	$ 302,430.20	$ 84,446.75	$ 303,360.60	$ 889,850.10	$ -	$ 213,651.71
Budgeted Monthly Expense				$869,270.60	$1,047,095.40	$217,500.00							$6,250.00		$679,000.00	$383,550.00	$139,250.00	
Total Remaining Balance				$17,856,104.40	$16,809,009.00	$16,591,509.00	$16,591,509.00	$16,591,509.00	$16,591,509.00	$16,591,509.00	$16,591,509.00	$16,591,509.00	$16,585,259.00	$16,585,259.00	$15,906,259.00	$15,522,709.00	$15,383,459.00	$15,383,459.00



TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE O/LA RIVER
ORTIZ ENTERPRISES- CASH FLOW DIAGRAM

WO E1907487

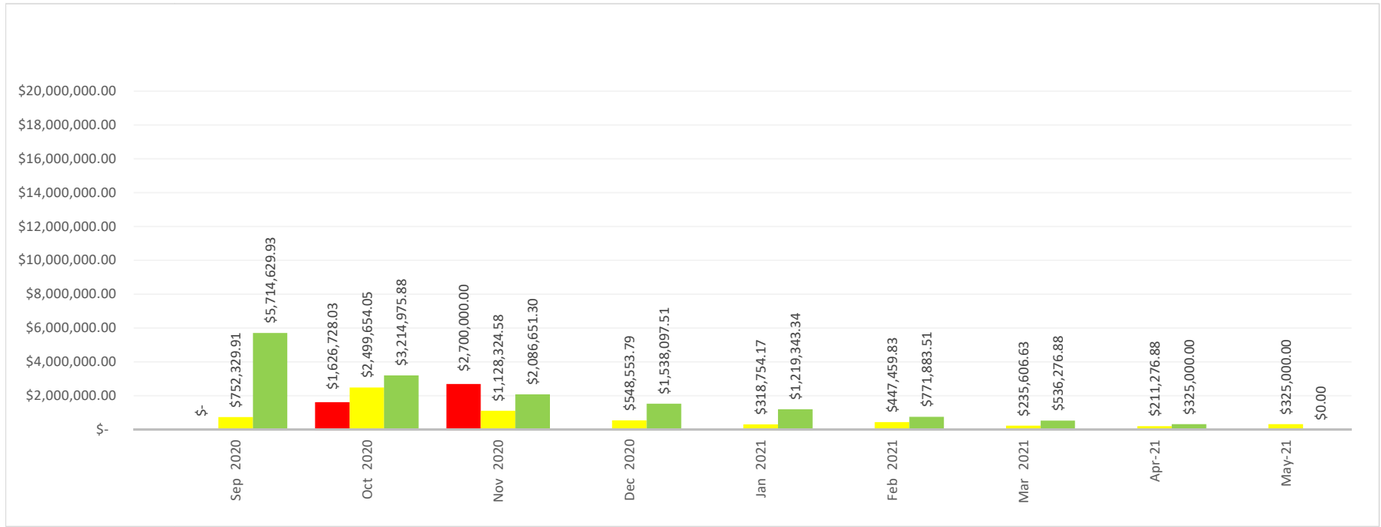
Date	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020
Value of Work Completed this Period (Not including Retention)	$ 229,424.99	$ 772,401.11	$ 1,299,291.50	$ 715,405.87	$ -	$ 55,518.17	$ 819,775.51	$ 2,768,095.35	$ 490,637.24
Budgeted Monthly Expense	$161,250.00		$90,625.00	$108,958.33	$73,866.67	$3,232,464.99	$409,580.00	$1,163,350.00	$3,676,404.17
Total Remaining Balance	$15,222,209.00	$15,222,209.00	$15,131,584.00	$15,022,625.67	$14,948,759.00	$11,716,294.01	$11,306,714.01	$10,143,364.01	$6,466,959.84



TAYLOR YARD BIKEWAY/PEDESTRIAN BRIDGE O/LA RIVER
ORTIZ ENTERPRISES- CASH FLOW DIAGRAM

WO E1907487

Date	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr-21	May-21	Period Total	Revised Contract (including Change Orders)
Value of Work Completed this Period (Not including Retention)	$ -	$ 1,626,728.03	$ 2,700,000.00							$ 13,804,736.48	$ 13,804,736.48
Budgeted Monthly Expense	$752,329.91	$2,499,654.05	$1,128,324.58	$548,553.79	$318,754.17	$447,459.83	$235,606.63	$211,276.88	$325,000.00	$18,725,375.00	$20,056,002.07
Total Remaining Balance	$5,714,629.93	$3,214,975.88	$2,086,651.30	$1,538,097.51	$1,219,343.34	$771,883.51	$536,276.88	$325,000.00	$0.00	$4,920,638.52	$6,251,265.59



CONTRACTOR- COST LOADED SCHEDULE PROJECTION VS ACTUAL EXPENDITURE

		A	B	C	D	E	F
		Contractor- P6 Budgeted Expenditure (Per Month)	Contractor- P6 Budgeted Expenditure (Cumulative)	Contractor- P6 Budgeted Expenditure per Quarter (Cumulative)	Contractor- Actual Expenditure per Quarter (Payment Requests)	Contractor- Actual Expenditure per Quarter (Payment Requests (Cumulative)	Cost Difference (C-E)
Quarter 1	Jul-18	$ -	$ -				
	Aug-18	$ -	$ -				
	Sep-18	$ 869,270.60	$ 869,270.60	$ 869,270.60	$ -	$ -	$ 869,270.60
Quarter 2	Oct-18	$ 1,047,095.40	$ 1,916,366.00				
	Nov-18	$ 217,500.00	$ 2,133,866.00				
	Dec-18	$ -	$ 2,133,866.00	$ 2,133,866.00	$ 110,845.60	$ 110,845.60	$ 2,023,020.40
Quarter 3	Jan-19	$ -	$ 2,133,866.00				
	Feb-19	$ -	$ 2,133,866.00				
	Mar-19	$ -	$ 2,133,866.00	$ 2,133,866.00	$ 111,111.50	$ 221,957.10	$ 1,911,908.90
Quarter 4	Apr-19	$ -	$ 2,133,866.00				
	May-19	$ -	$ 2,133,866.00				
	Jun-19	$ 6,250.00	$ 2,140,116.00	$ 2,140,116.00	$ 614,192.45	$ 836,149.55	$ 1,303,966.45
Quarter 5	Jul-19	$ -	$ 2,140,116.00				
	Aug-19	$ 679,000.00	$ 2,819,116.00				
	Sep-19	$ 383,550.00	$ 3,202,666.00	$ 3,202,666.00	$ 1,277,654.45	$ 2,113,804.00	$ 1,088,862.00
Quarter 6	Oct-19	$ 139,250.00	$ 3,341,916.00				
	Nov-19	$ -	$ 3,341,916.00				
	Dec-19	$ 161,250.00	$ 3,503,166.00	$ 3,503,166.00	$ 443,076.70	$ 2,556,880.70	$ 946,285.30
Quarter 7	Jan-20	$ -	$ 3,503,166.00				
	Feb-20	$ 90,625.00	$ 3,593,791.00				
	Mar-20	$ 108,958.33	$ 3,702,749.33	$ 3,702,749.33	$ 2,787,098.48	$ 5,343,979.18	$ (1,641,229.85)
Quarter 8	Apr-20	$ 73,866.67	$ 3,776,616.00				
	May-20	$ 3,232,464.99	$ 7,009,080.99				
	Jun-20	$ 409,580.00	$ 7,418,660.99	$ 7,418,660.99	$ 875,293.68	$ 6,219,272.86	$ 1,199,388.13
Quarter 9	Jul-20	$ 1,163,350.00	$ 8,582,010.99				
	Aug-20	$ 3,676,404.17	$ 12,258,415.16				
	Sep-20	$ 752,329.91	$ 13,010,745.07	$ 13,010,745.07	$ 3,258,732.59	$ 9,478,005.45	$ 3,532,739.62
Quarter 10 (Current Quarter)*	**Oct-20**	**$ 2,499,654.05**	**$ 15,510,399.12**				
	Nov-20	**$ 1,128,324.58**	**$ 16,638,723.70**				
	Dec-20	**$ 548,553.79**	**$ 17,187,277.49**	**$ 17,187,277.49**	**$ 4,326,728.03**	**$ 13,804,733.48**	**$ 3,382,544.01**
Quarter 11	Jan-21	$ 318,754.17	$ 17,506,031.66				
	Feb-21	$ 447,459.83	$ 17,953,491.49				
	Mar-21	$ 235,606.83	$ 18,189,098.32	$ 18,189,098.32	FUTURE	FUTURE	FUTURE
Quarter 12	Apr-21	$ 211,276.88	$ 18,400,375.00				
	May-21	$ 325,000.00	$ 18,725,375.00				
	Jun-21	$ -	$ 18,725,375.00	$ 18,725,375.00	FUTURE	FUTURE	FUTURE
		Total	**$ 18,725,375.00**				
		Current Executed Change Otders as of 11/19/20	$ 1,330,627.07				
		Current Contract Amount	**$ 20,056,002.07**				

Notes:

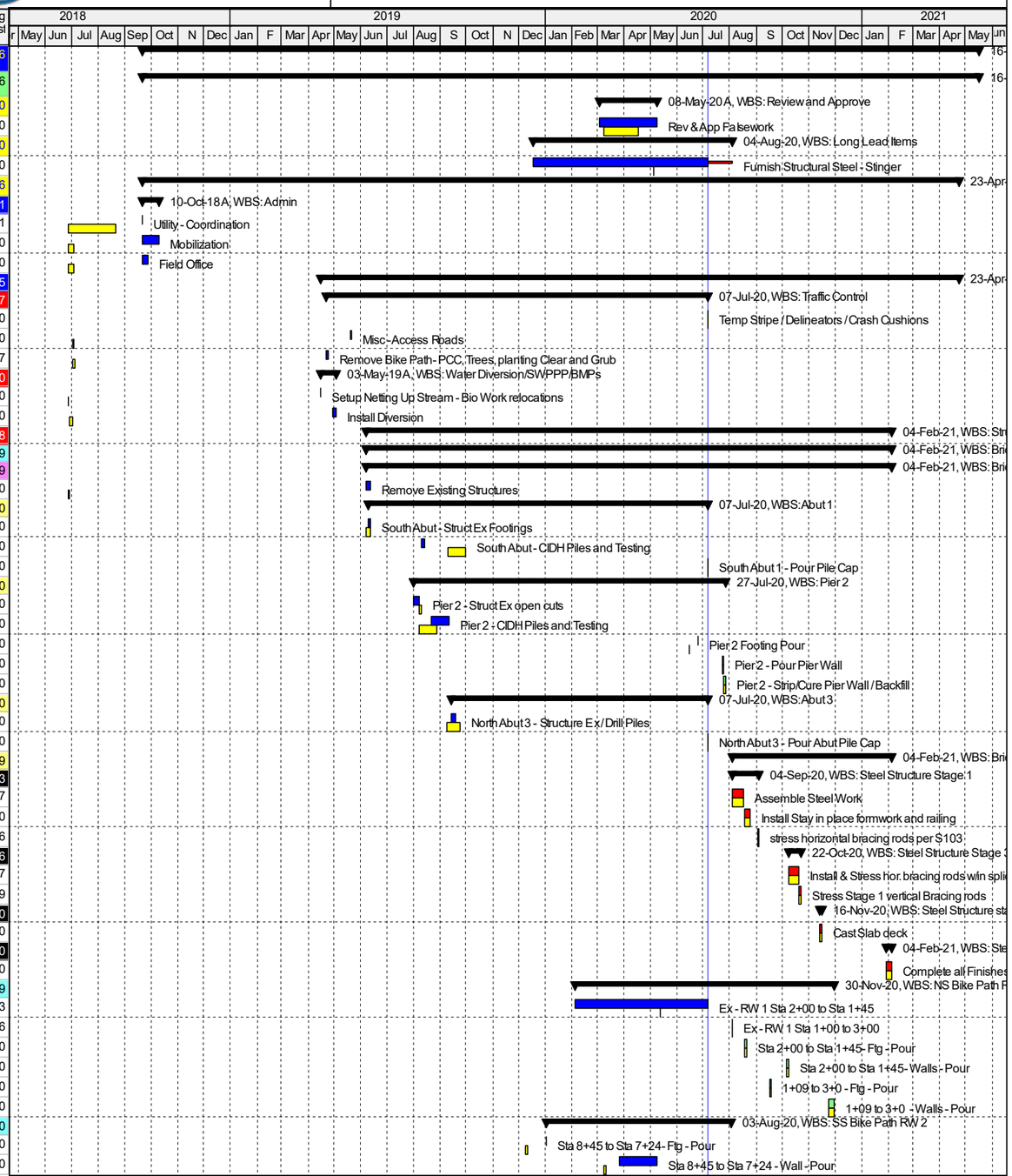
1) The cost differences between the cost loaded anticiapetd expenditures and the actual expenditures (Column F) are due to payment requests being delayed

2) This expendtiure for quarter 10 has not completed the month of December 2020, which is expected to be another $2 M payment request

3) Contractor Payment Request include change order costs

City of LA - Taylor Yard Bikeway Ped Bridge Update 14 DD 06072020

Activity ID	Activity Name	Original Duration	Start	Finish	Expense Cost % Complete	Budgeted Expense Cost	Actual Expense Cost	Remaining Expense Cost
Project: City of LA - Taylor Yard Bikeway Ped Bridge U		753	21-Sep-18 A	16-May-21	33.08%	$18,725,374.99	$6,334,215.91	$12,812,466.56
WBS: Taylor Yard Bikeway/Ped Bridge		753	21-Sep-18 A	16-May-21	33.08%	$18,725,374.99	$6,334,215.91	$12,812,466.56
WBS: Review and Approve		30	03-Mar-20 A	08-May-20 A	7%	$50,000.00	$3,500.00	$46,500.00
Rev-0015	Rev & App Falsework	30	03-Mar-20 A	08-May-20 A	7%	$50,000.00	$3,500.00	$46,500.00
WBS: Long Lead Items		0	18-Dec-19 A	04-Aug-20	50.73%	$3,026,664.99	$1,535,355.99	$1,491,309.00
A1008	Furnish Structural Steel - Stinger	0	18-Dec-19 A	04-Aug-20	50.73%	$3,026,664.99	$1,535,355.99	$1,491,309.00
WBS: Stage 1		738	21-Sep-18 A	23-Apr-21	30.25%	$14,429,311.00	$4,447,535.13	$10,255,831.36
WBS: Admin		40	21-Sep-18 A	10-Oct-18 A	64.33%	$1,225,451.00	$788,330.39	$437,120.61
S1-0019	Utility - Coordination	40	21-Sep-18 A	21-Sep-18 A	30.76%	$580,000.00	$178,433.79	$401,566.21
S1-0020	Mobilization	5	21-Sep-18 A	10-Oct-18 A	94.07%	$600,000.00	$564,445.60	$35,554.40
S1-0021	Field Office	5	21-Sep-18 A	27-Sep-18 A	100%	$45,451.00	$45,451.00	$0.00
WBS: Construction		738	15-Apr-19 A	23-Apr-21	27.15%	$13,203,860.00	$3,659,204.74	$9,818,710.75
WBS: Traffic Control		264	22-Apr-19 A	07-Jul-20	69.03%	$419,915.00	$289,874.03	$130,040.97
49-1001	Temp Stripe / Delineators / Crash Cushions	1	07-Jul-20	07-Jul-20	52%	$75,000.00	$38,997.60	$36,002.40
50-1005	Misc - Access Roads	2	20-May-19 A	21-May-19 A	66.87%	$187,000.00	$125,050.00	$61,950.00
64-1004	Remove Bike Path - PCC, Trees, planting Clear and Gru	3	22-Apr-19 A	24-Apr-19 A	79.68%	$157,915.00	$125,826.43	$32,088.57
WBS: Water Diversion/SWPPP/BMPs		4	15-Apr-19 A	03-May-19 A	80.18%	$425,000.00	$340,755.00	$84,245.00
5-1001	Setup Netting Up Stream - Bio Work relocations	1	15-Apr-19 A	15-Apr-19 A	68.82%	$50,000.00	$34,410.00	$15,590.00
5-1002	Install Diversion	3	30-Apr-19 A	03-May-19 A	81.69%	$375,000.00	$306,345.00	$68,655.00
WBS: Structures		682	07-Jun-19 A	04-Feb-21	26.83%	$10,504,760.00	$2,896,018.51	$7,897,541.48
WBS: Bridge		682	07-Jun-19 A	04-Feb-21	26.24%	$7,711,460.00	$2,044,768.51	$5,747,491.49
WBS: Bridge		682	07-Jun-19 A	04-Feb-21	26.24%	$7,711,460.00	$2,044,768.51	$5,747,491.49
B1000	Remove Existing Structures	2	07-Jun-19 A	11-Jun-19 A	63.54%	$138,500.00	$88,000.00	$50,500.00
WBS: Abut 1		150	10-Jun-19 A	07-Jul-20	72.3%	$268,900.00	$194,427.50	$74,472.50
Abut 1 -1000	South Abut - Struct Ex Footings	3	10-Jun-19 A	11-Jun-19 A	92.44%	$6,250.00	$5,777.50	$472.50
Abut 1 -1001	South Abut - CIDH Piles and Testing	15	10-Aug-19 A	14-Aug-19 A	100%	$188,650.00	$188,650.00	$0.00
Abut 1 -1008	South Abut 1 - Pour Pile Cap	1	07-Jul-20	07-Jul-20	0%	$74,000.00	$0.00	$74,000.00
WBS: Pier 2		254	01-Aug-19 A	27-Jul-20	44.67%	$1,833,150.00	$855,037.00	$1,058,913.00
Pier 2 -1000	Pier 2 - Struct Ex open cuts	3	01-Aug-19 A	07-Aug-19 A	92.83%	$120,000.00	$186,400.00	$14,400.00
Pier 2 -1001	Pier 2 - CIDH Piles and Testing	15	21-Aug-19 A	10-Sep-19 A	100%	$559,000.00	$558,987.00	$13.00
Pier 2 -1004	Pier 2 Footing Pour	1	25-Jun-20 A	25-Jun-20 A	12.71%	$362,000.00	$46,000.00	$316,000.00
Pier 2 -1008	Pier 2 - Pour Pier Wall	1	24-Jul-20	24-Jul-20	0%	$590,000.00	$0.00	$590,000.00
Pier 2 -1009	Pier 2 - Strip/Cure Pier Wall / Backfill	3	25-Jul-20	27-Jul-20	31.49%	$202,150.00	$63,650.00	$138,500.00
WBS: Abut 3		84	13-Sep-19 A	07-Jul-20	72.3%	$268,900.00	$194,427.50	$74,472.50
Abut 3 -1001	North Abut 3 - Structure Ex / Drill Piles	12	13-Sep-19 A	18-Sep-19 A	99.76%	$194,900.00	$194,427.50	$472.50
Abut 3 -1008	North Abut 3 - Pour Abut Pile Cap	1	07-Jul-20	07-Jul-20	0%	$74,000.00	$0.00	$74,000.00
WBS: Bridge Deck		126	04-Aug-20	04-Feb-21	13.7%	$5,202,010.00	$712,876.51	$4,489,133.49
WBS: Steel Structure Stage 1		24	04-Aug-20	04-Sep-20	0%	$1,773,198.33	$0.00	$1,773,198.33
Stage 1-20000	Assemble Steel Work	10	04-Aug-20*	17-Aug-20	0%	$640,011.67	$0.00	$640,011.67
Stage 1-20001	Install Stay in place formwork and railing	5	18-Aug-20*	24-Aug-20	0%	$535,575.00	$0.00	$535,575.00
Stage 1-20003	stress horizontal bracing rods per S103	2	03-Sep-20	04-Sep-20	0%	$597,611.66	$0.00	$597,611.66
WBS: Steel Structure Stage 3		10	09-Oct-20	22-Oct-20	30.61%	$2,329,111.67	$712,876.51	$1,616,235.16
Stage 3 - 1	Install & Stress hor. bracing rods w/in splice bays	7	09-Oct-20	19-Oct-20	52.59%	$526,500.00	$276,874.63	$249,625.37
Stage 3 - 2	Stress Stage 1 vertical Bracing rods	3	20-Oct-20	22-Oct-20	24.19%	$1,802,611.67	$436,001.88	$1,366,609.79
WBS: Steel Structure stage 4		2	13-Nov-20	16-Nov-20	0%	$802,700.00	$0.00	$802,700.00
Stage 4 - 2	Cast Slab deck	2	13-Nov-20	16-Nov-20	0%	$802,700.00	$0.00	$802,700.00
WBS: Steel Structure Stage 5		5	29-Jan-21	04-Feb-21	0%	$297,000.00	$0.00	$297,000.00
Stage 5-2	Complete all Finishes	5	29-Jan-21	04-Feb-21	0%	$297,000.00	$0.00	$297,000.00
WBS: NS Bike Path RW 1		138	05-Feb-20 A	30-Nov-20	17.44%	$2,402,800.00	$437,250.00	$2,069,549.99
64-RW1-S1-1000	Ex - RW 1 Sta 2+00 to Sta 1+45	1	05-Feb-20 A	07-Jul-20	11.62%	$200,000.00	$23,250.00	$176,750.03
64-RW1-S2-1000	Ex - RW 1 Sta 1+00 to 3+00	1	04-Aug-20	04-Aug-20	0%	$1,870,300.00	$0.00	$1,870,299.96
RW1-S1-1004	Sta 2+00 to Sta 1+45- Ftg - Pour	2	18-Aug-20	20-Aug-20	97.07%	$80,625.00	$103,500.00	$3,125.00
RW1-S1-1008	Sta 2+00 to Sta 1+45- Walls - Pour	2	06-Oct-20	08-Oct-20	97.07%	$80,625.00	$103,500.00	$3,125.00
RW1-S2-1004	1+09 to 3+0 - Ftg - Pour	1	17-Sep-20	18-Sep-20	97.07%	$80,625.00	$103,500.00	$3,125.00
RW1-S2-1008	1+09 to 3+0 - Walls - Pour	2	24-Nov-20	30-Nov-20	88.75%	$90,625.00	$103,500.00	$13,125.00
WBS: SS Bike Path RW 2		102	02-Jan-20 A	03-Aug-20	83.72%	$390,500.00	$414,000.00	$80,500.00
RW2-SS-S1-1004	Sta 8+45 to Sta 7+24- Ftg - Pour	2	02-Jan-20 A	02-Jan-20 A	97.07%	$80,625.00	$103,500.00	$3,125.00
RW2-SS-S1-1008	Sta 8+45 to Sta 7+24 - Wall - Pour	2	26-Mar-20 A	08-May-20 A	97.07%	$80,625.00	$103,500.00	$3,125.00



Actual Level of Effort | Actual Work | Critical Remaining Work
Primary Baseline | Remaining Work | Milestone

TASK filter: Cost Analysis.

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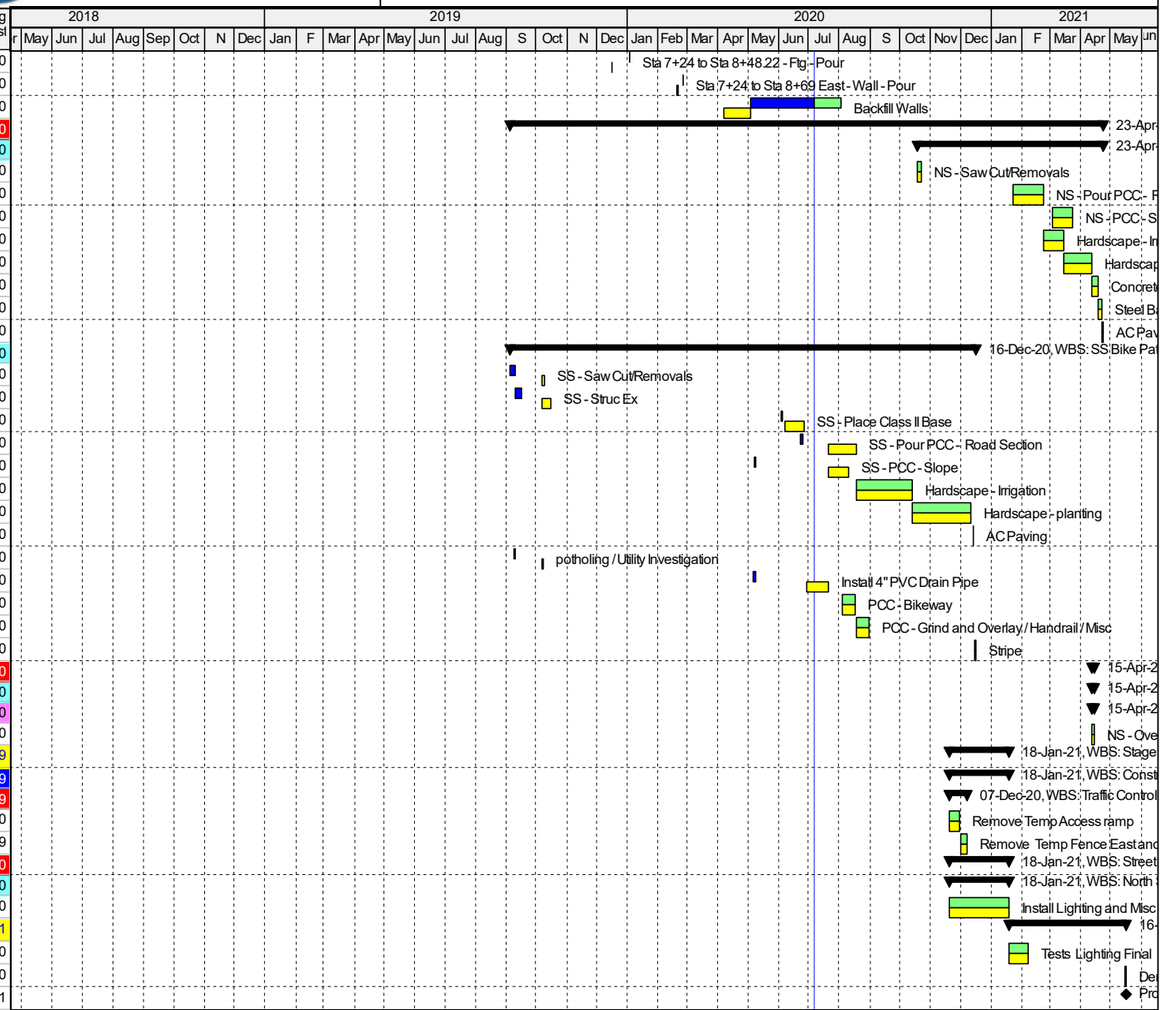
City of LA - Taylor Yard Bikeway Ped Bridge Update 14 DD 076072020

Activity ID	Activity Name	Original Duration	Start	Finish	Expense Cost % Complete	Budgeted Expense Cost	Actual Expense Cost	Remaining Expense Cost
RW2-SS-S2-1004	Sta 7+24 to Sta 8+48.22 - Ftg - Pour	1	03-Jan-20 A	03-Jan-20 A	97.07%	$80,625.00	$103,500.00	$3,125.00
RW2-SS-S2-1008	Sta 7+24 to Sta 8+69 East - Wall - Pour	2	26-Feb-20 A	26-Feb-20 A	88.75%	$90,625.00	$103,500.00	$13,125.00
RW2-SS-S2-1010	Backfill Walls	20	04-May-20 A	03-Aug-20	0%	$58,000.00	$0.00	$58,000.00
WBS: Street Improvements		389	05-Sep-19 A	23-Apr-21	7.45%	$1,794,185.00	$132,557.20	$1,646,883.30
WBS: NS Bike Path		128	19-Oct-20	23-Apr-21	1.61%	$642,497.50	$10,350.00	$632,147.50
63-NS1-0001	NS - Saw Cut/Removals	3	19-Oct-20	22-Oct-20	0%	$7,650.00	$0.00	$7,650.00
NS1–0008	NS - Pour PCC - Road Section	21	22-Jan-21	22-Feb-21	0%	$205,625.00	$0.00	$205,625.00
NS1–0010	NS - PCC - Slope	15	03-Mar-21	24-Mar-21	0%	$39,675.00	$0.00	$39,675.00
NS1–0011	Hardscape - Irrigation	15	22-Feb-21	15-Mar-21	7.33%	$141,130.00	$10,350.00	$130,780.00
NS1–0012	Hardscape - planting	20	15-Mar-21	12-Apr-21	0%	$155,425.00	$0.00	$155,425.00
NS1–0013	Concrete Crossing Panels	5	12-Apr-21	19-Apr-21	0%	$80,000.00	$0.00	$80,000.00
NS1–0014	Steel Barrier Gate	3	19-Apr-21	22-Apr-21	0%	$11,500.00	$0.00	$11,500.00
NS1–0015	AC Paving	1	22-Apr-21	23-Apr-21	0%	$1,492.50	$0.00	$1,492.50
WBS: SS Bike Path		300	05-Sep-19 A	16-Dec-20	10.75%	$1,151,687.50	$122,207.20	$1,014,735.80
SS - 0001a	SS - Saw Cut/Removals	3	05-Sep-19 A	09-Sep-19 A	22.31%	$7,650.00	$1,707.00	$5,943.00
SS - 0002	SS - Struc Ex	7	10-Sep-19 A	16-Sep-19 A	84.84%	$40,100.00	$21,512.20	$3,843.30
SS - 003	SS - Place Class II Base	15	04-Jun-20 A	04-Jun-20 A	45.24%	$42,000.00	$19,000.00	$23,000.00
SS - 008	SS - Pour PCC - Road Section	21	23-Jun-20 A	25-Jun-20 A	0%	$205,625.00	$0.00	$205,625.00
SS - 010	SS - PCC - Slope	15	08-May-20 A	08-May-20 A	0%	$39,675.00	$0.00	$39,675.00
SS - 011	Hardscape - Irrigation	40	18-Aug-20	13-Oct-20	18.77%	$141,130.00	$26,488.00	$114,642.00
SS - 012	Hardscape - planting	40	14-Oct-20	11-Dec-20	0%	$155,425.00	$0.00	$155,425.00
SS - 015	AC Paving	1	14-Dec-20	14-Dec-20	0%	$1,492.50	$0.00	$1,492.50
SS - 1001	potholing / Utility Investigation	1	09-Sep-19 A	09-Sep-19 A	42.08%	$91,500.00	$38,500.00	$53,000.00
SS - 1003	Install 4" PVC Drain Pipe	15	06-May-20 A	08-May-20 A	0%	$41,850.00	$0.00	$41,850.00
SS - 1005	PCC - Bikeway	10	04-Aug-20	17-Aug-20	10%	$150,000.00	$15,000.00	$135,000.00
SS - 1006	PCC - Grind and Overlay / Handrail / Misc	10	18-Aug-20	31-Aug-20	0%	$231,240.00	$0.00	$231,240.00
SS - 1007	Stripe	2	15-Dec-20	16-Dec-20	0%	$4,000.00	$0.00	$4,000.00
WBS: Wet Utilities		3	12-Apr-21	15-Apr-21	0%	$60,000.00	$0.00	$60,000.00
WBS: Drainage		3	12-Apr-21	15-Apr-21	0%	$60,000.00	$0.00	$60,000.00
WBS: Line B		3	12-Apr-21	15-Apr-21	0%	$60,000.00	$0.00	$60,000.00
NS-DB-001	NS - Overflow Drainage Basin	3	12-Apr-21	15-Apr-21	0%	$60,000.00	$0.00	$60,000.00
WBS: Stage 2		42	20-Nov-20	18-Jan-21	4.83%	$849,399.00	$41,055.21	$808,343.79
WBS: Construction		42	20-Nov-20	18-Jan-21	4.83%	$849,399.00	$41,055.21	$808,343.79
WBS: Traffic Control		10	20-Nov-20	07-Dec-20	11.25%	$261,899.00	$29,455.21	$232,443.79
50-2004	Remove Temp Access ramp	5	20-Nov-20	30-Nov-20	0%	$57,350.00	$0.00	$57,350.00
50-2005	Remove Temp Fence East and West Sides	5	01-Dec-20	07-Dec-20	14.4%	$204,549.00	$29,455.21	$175,093.79
WBS: Street Improvements		60	20-Nov-20	18-Jan-21	1.97%	$587,500.00	$11,600.00	$575,900.00
WBS: North Side		60	20-Nov-20	18-Jan-21	1.97%	$587,500.00	$11,600.00	$575,900.00
NS2-0013	Install Lighting and Misc Electrical	60	20-Nov-20	18-Jan-21	1.97%	$587,500.00	$11,600.00	$575,900.00
WBS: Project Closeout		118	19-Jan-21	16-May-21	59.31%	$370,000.00	$306,769.58	$210,482.41
PC-0008	Tests Lighting Final	20	19-Jan-21	07-Feb-21	0%	$45,000.00	$0.00	$45,000.00
PC-0011	Demobilize	1	16-May-21	16-May-21	0%	$100,000.00	$0.00	$100,000.00
PC-0012	Project Completion	0		16-May-21	82.41%	$225,000.00	$306,769.58	$65,482.41



Actual Level of Effort | Actual Work | Critical Remaining Work
Primary Baseline | Remaining Work | Milestone

TASK filter: Cost Analysis.

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Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2020-0704, **File Type:** Motion / Motion Response **Agenda Number:** 34.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: REPORT ON FARE CAPPING IN RESPONSE TO MOTION 31.1

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

AUTHORIZE the Chief Executive Officer to:

A. APPROVE moving forward with the fare capping pilot; and

B. NEGOTIATE and execute project-related contract awards, including contract modifications, up to the amount needed for software development and integration to implement fare capping.

ISSUE

In September 2020, the Board of Directors adopted Motion 31.1 by Director Butts and Director Barger that directed staff to return to the Board with a status report on the development of a budget and timeline for fare capping options to be phased in over time. Staff previously provided a report (File ID 2020-0565) on the evaluation of fare capping for Metro in response to Motion 36 “Emergency Relief: Full Price Passes”.

BACKGROUND

Fare capping provides an equitable fare payment option by offering customers the means to pay as they go while earning a day pass, a weekly pass or a monthly pass. No longer will customers have to pay $100 upfront for a monthly pass. This feature allows everyone to benefit from traveling on Metro with the foreknowledge that they will pay the lowest price possible for travel.

DISCUSSION

Staff was instructed to examine if ridership growth could be anticipated from capping fares. In response, ridership growth is possible since implementation of fare capping will result in:

1. Accessible and equitable fare payment options
   - With no more passes to buy, customers will load their TAP card quickly and easily with Stored Value at TAP Vending Machines, bus fareboxes, retail outlets, on the mobile app

or online.
- Customers will know the best fare is calculated automatically for them, ensuring they pay the lowest possible price.
- With the newly launched TAP mobile app, customers can effortlessly purchase a TAP card on their phones and load Stored Value. The TAP card in the mobile app can be used immediately to pay and earn the same fare capping benefits as any TAP card.

2. Streamlined fare structure
   - Refund requests will decrease since riders will not be able to purchase an incorrect pass.
   - Software testing will decrease due to a simplified fare structure.

Motion 36 - "Emergency Relief: Full-Price Passes"

As directed by the Board, TAP will initiate the sale of promotional passes at 50% of the cost of full-price passes when front-door boarding commences.

Motion 31.1 - Fare Capping Coordination with Fareless System Initiative (FSI)

The TAP system is very flexible, and TAP can offer free fares to select groups such as Students K-12 and low-income riders, while all remaining customers benefit from fare capping.

For example:
1. If fare capping is approved, TAP will begin software development followed by a pilot test of fare capping of the Metro day pass.
2. TAP will then expand fare capping to all rider classes and passes.
3. FSI recommendations for a particular rider class or classes can be accommodated at any time (two months' notice).
4. All these programs can run concurrently or separately.

Implementation Process (Schedule)

Staff recommends a multi-step approach for fare capping by first initiating an early pilot of daily capping for select Metro customers before expanding to all riders. Implementation of fare capping is considered a fare change therefore a Title VI analysis and public hearings must be conducted. Software development and testing efforts to implement the pilot will take between 6 to 9 months from Notice-To-Proceed (NTP) following contract executions.

System Software Upgrade (6 to 9 months)
a. Software design
b. Software development
c. Lab and seed testing

Step 1: Early Pilot
a. Limited launch with select group for day pass
b. Monitor and evaluate

Step 2: Expanded Pilot (6 months); full Metro launch
a. Expand fare capping to all rider classes; add capping of 7-day and monthly passes

Step 3: Regional Fare Capping (Simultaneous with Step 1 to 2)
a. Work with TAP partner agencies to simplify regional fare structure. Participating agencies, including Metro, would replace local passes with regional passes valid for travel on all participating transit systems
b. Update the Regional TAP Program and Service Center Operating Rules

Software Development

The current TAP system and TAP mobile app will require additional software design/development and testing to support fare capping. TAP cards will require a “fare capping” configuration written onto them, while fare collection equipment - TAP Vending Machines, faregates, station validators, bus fareboxes and mobile validators - will require a software upgrade. The upgrade will include a display of fare capping status showing the progress towards paying for rides and earning passes. A software modification will also be necessary on the Mobile Phone Validators, used by fare enforcement staff, to correctly check and process the fare capping status of TAP cards.

TAP’s customer relationship management system, *TAPforce*, as well as the *taptogo.net* website and TAP vendor sales devices will require upgrades to provide a seamless customer experience. Customers will be able to call into the TAP Call Center or log into their *taptogo.net* accounts to see a progress bar on how much value has been deducted and how much more is needed to earn a pass.

Marketing and Accessibility

A thorough marketing and public information campaign will be necessary to ensure customers understand the benefits of fare capping and the pay-as-you-go model. Messaging would be consistent throughout a traditional print and digital marketing campaign to include important customer education tools, as well as highlight the TAP mobile app. The campaign would include strategies to distribute up to one million TAP cards in advance of implementation - this was proven successful during the transfer on second boarding and token elimination efforts to ensure cash customers transition seamlessly to TAP. Staff will also prepare internal campaigns to support in-person trainings, on-site division marketing and materials for operators to distribute to customers.

Staff will focus on promoting existing touchpoints where TAP cards are readily available. Customers can purchase and load Stored Value onto TAP cards with cash or debit/credit card at over 1,000 TAP vendor locations, 495 TAP Vending Machines, about 2,500 bus fareboxes, *taptogo.net*, on the TAP mobile app or by calling the TAP Service Center.

DETERMINATION OF SAFETY IMPACT

No adverse safety impacts are anticipated.

FINANCIAL IMPACT

The budget for Steps 1 and 2 as described above is estimated between $6 to $8 million. Contract awards to various vendors are necessary for full system software development and integration for fare capping on Metro. This is a preliminary estimate which does not include an amount for Metro's labor and related overhead costs.

Fare revenue loss from capping fares is anticipated. Staff will monitor closely and keep the Board updated.

Upon Board approval, funding for the fare capping project will be identified and included into the FY22 budget. Since this is a multi-year effort, the Executive Officer of TAP and Project Manager will be responsible for budgeting costs in future years.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Pilot and implementation of fare capping would support:

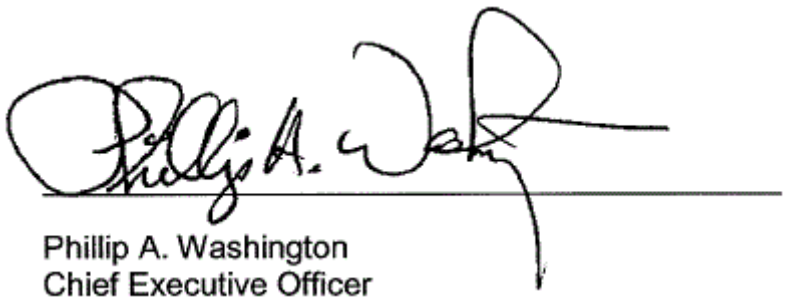
- Strategic Plan Goal #1: Provide high quality mobility options that enable people to spend less time traveling as part of an effort to manage transportation demand through fair and equitable pricing structures.
- Strategic Plan Goal #2: Deliver outstanding trip experiences for all users of the transportation system by improving legibility, ease of use, and trip information on the transit system.

NEXT STEPS

Staff will negotiate and execute necessary contracts and contract modifications for full system software development and integration for fare capping on Metro. Staff can report back to the Board, if requested, on project-related contracts and contract modifications executed under this delegated authority.

Prepared by: David Sutton, Executive Officer, TAP, 213.922.5633

Reviewed by: Nalini Ahuja, Chief Financial Officer, (213) 922-3088



Phillip A. Washington
Chief Executive Officer

Fare Capping
Response to Motion 31.1

Executive Management Committee

March 18, 2021

Fare Capping/Best Fares

- Instead of paying upfront for a pass, customers use their TAP cards to pay-as-they-go to earn 1-day, 7-day or 30-day passes
- Once a customer reaches the fare equivalent for each specific pass period, the remaining rides are at no cost
- Implementation of fare capping will result in more streamlined fare structure, and provide accessible and equitable fare payment options
- Preliminary cost estimate for full system software development and integration for fare capping on Metro is between $6 and $8 million

Fare Capping Implementation Strategy

Step 1 - Early Pilot

Limited launch with select group for day pass. Pilot can be implemented after 6 to 9 months from Notice-To-Proceed

Step 2 - Expanded Pilot (6 months)

Expand to all groups and passes; full Metro launch

Step 3 (Simultaneous with Step 1 to 2)

Work with TAP partner agencies to simplify regional fare structure

Fare Capping Coordination with FSI

- TAP is flexible and can easily coordinate with Fareless System Initiative (FSI) recommendations
- Various programs can run concurrently or separately

For example:

1. Once approved, TAP will begin software development followed by pilot of fare capping of Metro's day pass
2. FSI recommendations for a particular rider class or classes can be accommodated at any time with two months' notice

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2020-0736, **File Type:** Project **Agenda Number:** 35.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: UNIVERSAL CITY/STUDIO CITY STATION ACTIVATION AND MOBILITY HUB CONCEPT

ACTION: APPROVE RECOMMENDATION

RECOMMENDATION

CONSIDER:

a. INTRODUCING a station activation and mobility hub concept at Universal City/ Studio City B Line (Red) Station; and

b. AUTHORIZING staff to develop a strategic plan, including identifying necessary real estate, infrastructure and financing to support the station activation and increased mobility.

ISSUE

Staff is presenting a station activation and mobility hub concept at the Universal City/Studio City Station (Station) to form a long-term vision for the property which will improve the customer experience and enhance the quality of life in the surrounding communities.

BACKGROUND

The Station was opened in 2000 as part of the B Line (Red) Segment 3 Project. Located just a mile south of the confluence of the 134, 101 and 170 freeways, the Station is in a prime real estate location providing the jobs and housing-rich San Fernando Valley with dramatically reduced travel times to Hollywood and downtown.

Metro owns two large parcels at the Station. The first parcel is the Station's main parking facility located on the north side of the 101-freeway with access from both Lankershim Boulevard and Campo de Cahuenga. The second parcel is directly across the street and currently serves as a bus plaza and layover facility with an entrance on Campo de Cahuenga. These two pieces of property provide ample real estate and opportunity to transform the Station.

Three parking facilities service the Station. Metro's main lot has a capacity of 550 parking spaces and serves as the main facility. Two additional park and ride facilities south of the 101-freeway owned by Caltrans (80 spaces) and LA County (202 spaces) also serve the Station totaling just over 800 spaces for the station.

DISCUSSION

Metro B Line (Red) is the backbone of the Metro system, with direct connections to most existing and future rail lines as well as more than a dozen major bus lines. As such, transit demand is anticipated to continue to grow significantly under Measure M with extensions leading to better mobility across Los Angeles County. The Station is well connected to destinations throughout the San Fernando Valley. Three of the County's largest employers-Disney, Warner Bros., and NBCUniversal Studios-as well as a vast number of supportive services are located within two miles of the Station. The Station is situated in an intensive mixed-use area with a variety of multi- and single-family homes, thousands of jobs, hundreds of retailers, as well as major parks and amenities within walking distance.

Current Challenges

Despite the mixed-use, amenity-rich environment, the site presents a number of challenges. Major infrastructure in the area creates barriers that are difficult to navigate without a car (the Station area has the highest reported car use of all 13 B Line (Red) Stations); bike and pedestrian facilities connecting the Station to area destinations are limited (the 2016 Metro Active Transportation Strategic Plan ranked the Station last among the B Line (Red) Stations on almost all walkability categories); and there are no designated bicycle facilities connecting to the Station. Within the site, portions of the surface park and ride lot are more remote, and due to the fragmented layout of the facilities, navigating to find parking can be a challenge. The site presents long stretches of unactivated street frontage, particularly along Bluffside Drive where a wall, landscaping and parked cars limit visibility.. Security in and around the site is further challenged by the relatively limited number of people that use it throughout the day and night who could provide passive surveillance or "eyes on the street." Covid-19 has exacerbated these issues.

Long-Term Goals and Master Planning

With the Station located on a prime location and given B-Line is the backbone of the Metro system, it is necessary to develop a long-term strategic plan activating the station and surrounding property which will enhance overall transit customer experience. Moreover, the location is also a good candidate to be considered for a transit-oriented development project. A development master plan for the Station is recommended. It could include, but not be limited to, affordable housing, first and last mile components, improved transit parking, enhanced bus operation infrastructure, economic motivators (such as retail and offices), active transportation and alternative mobility connectivity infrastructure development. By activating the Station with such a master plan, it will not only enhance Metro customer experience but also improve the quality of life in the community. Increasing foot traffic from both transit ridership and destination visits will assist to address security issues in the long term.

Future Joint Development

The 10.75-acre site represents one of Metro's most significant and marketable joint development opportunities. Current zoning would allow a mix of uses to be constructed on the site, including residential, retail/commercial, and open space. Joint development would enable Metro to pursue its current policy goals for affordable housing, revenue generation, community integration and placemaking. In January 2021, staff presented several potential updates to the Joint Development Policy in order to strengthen Metro's response to the housing crisis. Among the goals of this update is to increase the number and velocity of housing units that are delivered on Metro-owned land. The Universal City sites would present an opportunity to get a head start on these goals on a site that would bring affordable housing to a resource-rich area.

Property for Metro's station and park and ride lot at Universal City was acquired from MCA, Inc. (now NBCUniversal) in 1994. As a part of that deal, NBC also retained a right of first offer (ROFO) providing that if Metro decides to pursue joint development of the property, the development rights must first be offered to NBC. This provision made pursuit of joint development at the site impractical, since it would be unlikely that a developer would invest resources to respond to an RFP knowing that the proposal could be appropriated by NBC under the ROFO. In 2007 Metro entered into an Exclusive Negotiating Agreement (ENA) with Thomas Properties after receiving an unsolicited proposal from NBC for a 200,000 square feet television production facility and two office towers totaling 950,000 square feet at the Station. The developer had nearly secured entitlements for the proposal, however the project was cancelled when the merger of NBC and Comcast eliminated the need for new television production studios. More recently, NBC has expressed a willingness to work with Metro in the interest of advancing joint development of the property.

Any future joint development would require the developer to construct a parking structure to replace existing surface parking serving transit riders. Advanced construction of replacement parking would remove this condition, accelerating development and increasing the marketability and value of the site. Based on comparable transactions in the surrounding area, it is anticipated that the revenues to Metro generated by eventual joint development would fully reimburse upfront costs needed to build the parking structure.

In accordance with Metro's Joint Development Policy and Process, staff would conduct extensive public outreach and complete development guidelines for the site prior to releasing a Joint Development RFP.

Consolidation of Transit Parking

Exploring how to consolidate parking to better serve transit riders at the station as well as the surrounding community is a critical first step in addressing the site challenges. Relocating the current surface parking to a structure over the bus layover property would open up activation opportunities on both parcels, reduce the amount of land dedicated to automobile storage and infrastructure, and provide the flexibility needed to implement longer-term joint development strategies.

The Metro-owned park and ride surface lot at Universal Station has a capacity of 550 parking spaces and averages 90% utilization during peak transit hours. The parking is currently divided into several

areas to the north and west of the Campo de Cahuenga historical site and interpretive museum. Staff proposes to complete a feasibility study to explore the capacity that could be provided in a new parking structure facility based on land availability and physical constraints, as well as revenue-neutral means of financing. Innovative parking management strategies and facility upgrades, such as EV-chargers, gateless transit parking management and a parking guidance system, would maximize utilization and flexibility to implement demand-responsive pricing structures into the future, while enhancing the customer experience and modernizing the current facility amenities.

A parking structure facility could also be constructed to be convertible. This would allow for flexibility for future use to serve other needs such as affordable housing, commercial spaces or other innovative purpose in the future should parking demand decrease.

Mobility Hub and Amenities

In tandem with additional first/last mile improvements, a dedicated mobility hub would not only provide residents within the Station's bike-shed with additional options for accessing the B Line (Red), bus lines and other transit services, but this same resource may also support commuters coming from the B Line (Red) and bus lines more options for reaching employers in the area. The mobility hub would enhance the commuter experience, benefit the surrounding community and support local transportation demand management goals. This new facility type could provide a seamless connection for transit patrons among multiple modes and transit lines, increasing mobility opportunities for residents of the Los Angeles County.

A mobility hub could also provide infrastructure for numerous transportation services such as transportation network companies, ridesharing, and shuttle services. It would further promote and encourage active transportation, micro-mobility vehicles and bike share services. Other amenities, such as small business retail, tourist services and bicycle facilities should be considered as well as community input to activate the Station. Internal amenities such as operator break rooms and security offices can also be considered. Additionally, these amenities will improve security in and around the station addressing some of the security concerns through activation.

Community Outreach

Staff proposes to initiate a comprehensive outreach program to engage Station stakeholders in a meaningful dialogue about the current Station site and the long-term vision of station activation. Metro will employ a wide range of efforts to share information with local residents, businesses, community organizations, transit riders, and parking patrons to gather feedback through digital surveys, stakeholder briefings and virtual public workshops. Through robust community outreach, Metro staff hope to respond to and address concerns from different perspectives, as well as develop a feasible "wish list" prior to the final design of any project.

Preliminary Project Financial Plan

This potential project is anticipated to be self-funded, with no impact to any planned or adopted capital or operating budget. The future joint development project financial resource will be developed

in accordance with Metro's Joint Development Policy and Process. As for the transit parking consolidation and potential parking structure project, it is likely it can be offset entirely by parking revenue. In addition to transit parking revenue, providing monthly and daily parking for local business and residences will also be considered.

Staff will further develop the comprehensive financial plan as part of next steps and formation of a project.

Equity Platform

Activation of Stations will provide a range of services and amenities for patrons at various income levels. The results of the Rapid Equity Assessment Tool indicate this will positively benefit equity focused communities. Activation will further provide multiple affordable mobility options and convenience amenities that would not otherwise be available to transit patrons, who represent households with lower incomes and rates of car ownership. These amenities can also be integrated with Metro's LIFE program to support disadvantage and transit-dependent constituents. A more thorough Equity Assessment Tool analysis will be utilized as a potential project is developed to further identify opportunities and engage disadvantaged communities in the region.

DETERMINATION OF SAFETY IMPACT

Approving this item will not negatively impact the safety of Metro patrons or employees as the approval of this item would only authorize staff to continue with initiation of a robust community outreach program and develop a comprehensive and feasible financial plan for the project.

FINANCIAL IMPACT

Authorizing development of a station activation plan and identifying real estate and infrastructure needs will not create any financial impact.

Impact to Budget

Staff will utilize available funds in current fiscal year from Parking Management Cost Center 3046, Parking Management Program Project 308001, Task 01.01, to conduct the consolidation of transit parking feasibility study, infrastructure conceptual design of the mobility HUB and other costs to develop the station activation strategic plan. No budget amendment is required or any impact to the adopted budget for this project at this time.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports strategic plan goals # 1 and 2.

- Goal 1: Provide high-quality mobility options that enable people to spend less time traveling. The Project adds mobility options for residents in LA County.

- Goal 2: Deliver outstanding trip experiences for all users of the transportation system. Enhancing transportation options and enhancing patrons experience of transit trips.

ALTERNATIVES CONSIDERED

The Metro Board has the option to not approve the recommendation. However, this alternative is not recommended as it is not consistent with Metro's Strategic Plan goals to provide mobility options and spend less time traveling throughout Los Angeles County. If this plan is not authorized to move forward this would negatively impact Metro's future transportation needs and transit riders experience. It will also eliminate the benefits of station activation and mobility hub amenities.

NEXT STEPS

If approved, staff will kick off a robust community outreach program to incorporate input from transit riders and the surrounding community to form a long-term vision for the Station. Staff will complete a feasibility for parking relocation and report back in summer 2021 to provide an update and recommendation on the following steps.

Prepared by: Shannon Hamelin, Senior Director, Parking Management, Countywide Planning & Development, (213) 418-3076
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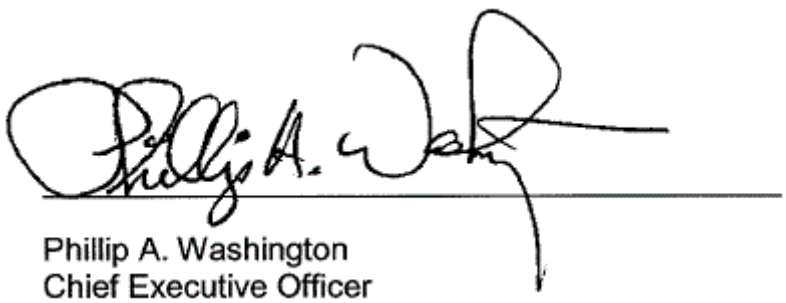
Frank Ching, DEO, Transportation Demand Management, Countywide Planning & Development, (213) 922-3033
Holly Rockwell, SEO - Real Estate, Transit Oriented Communities and Transportation Demand Management, Countywide Planning & Development, (213) 922-5585

Reviewed by: James de la Loza, Chief Planning Officer, (213) 922-2920



Phillip A. Washington
Chief Executive Officer

Los Angeles County
Metropolitan Transportation Authority

UNIVERSAL CITY/STUDIO CITY STATION ACTIVATION AND MOBILITY HUB

Executive Management Committee – Item 35

March 18, 2021

RECOMMENDATION

- INTRODUCING a station activation and mobility hub concept at Universal City/ Studio City B Line (Red) Station;

- AUTHORIZING staff to develop a strategic plan, including identifying necessary real estate, infrastructure and financing to support the station activation and increased mobility.

SITE OVERVIEW

- 10.75-acres, zoned commercial
- Connections to 5 Metro bus lines, Burbank Bus and employee shuttles
- State-designated High-Resource Area
- Major area employers and recreation facilities located within bike shed
- Access to 134, 101 and 170 freeways

Challenges:

- Access barriers
- Limited bike and pedestrian facilities
- Fragmented parking layout
- Un-activated street frontage

Parking:

Metro Lot - 550 Paid spaces – 90%
Caltrans Lot – 80 free spaces -100%
County Lot – 198 free spaces – 80%

ACTIVATION CONCEPTS & MOBILITY HUB

Station area programming

Joint Development

Retail

First Last Mile Improvements

Kiosks

Active Transportation Facilities

IMPLEMENTATION

- Identify Land Use
- New Bus Layover / Terminal Plaza
- Relocated/expanded transit parking
- Mobility Hub amenities
  - w/ TNC other mobility movements
  - Enhance commuter experience
- Active Transportation Facilities
- First/Last Mile Improvements
- Joint Development

NEXT STEPS

- Introduce to Board – March 2021
- Robust community outreach process
- Stakeholders / transit riders engagement
- Continued coordination within Metro and local jurisdictions
- Traffic Impact Study / Financial Planning
- Entitlement & Design Process:
  - A transportation use on Metro property
  - Metro as lead agency of the project

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Metropolitan Transportation
Authority
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3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2020-0846, **File Type:** Federal Legislation / State Legislation (Position) **Agenda Number:** 38.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: STATE LEGISLATION

ACTION: ADOPT STAFF RECOMMENDED POSITION

RECOMMENDATION

ADOPT staff recommended position:

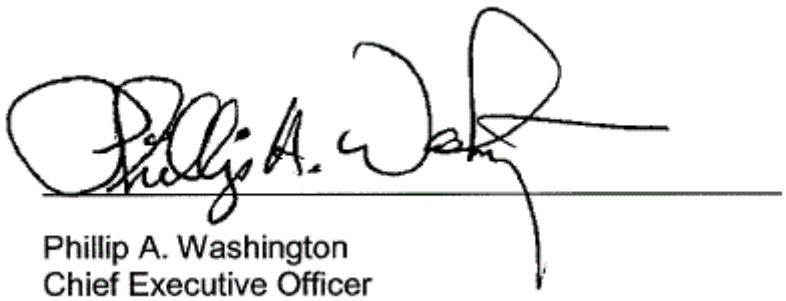
1. Senate Bill 671 (Gonzalez) - Transportation: Clean Freight Corridor Efficiency Program - SUPPORT

ATTACHMENT

Attachment A - SB 671 (Gonzalez) Legislative Analysis

Prepared by: Michael Turner, DEO, Government Relations, (213) 922-2122
Desarae Jones, Senior Manager, Transportation Planning/State Legislative Affairs, Government Relations, (213) 922-2230
Alex Amadeo, Government Relations Officer, Government Relations, (213) 922-2763

Reviewed by: Yvette Rapose, Chief Communications Officer, (213) 418-3154



Phillip A. Washington
Chief Executive Officer

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ATTACHMENT A

BILL: **SENATE BILL 671 – AS INTRODUCED FEBRUARY 19, 2021**

AUTHOR: **SENATOR LENA GONZALEZ (D – LONG BEACH)**

SUBJECT: **TRANSPORTATION: CLEAN FREIGHT CORRIDOR EFFICIENCY PROGRAM**

STATUS: **REFERRED TO SENATE ENVIRONMENTAL QUALITY AND TRANSPORTATION COMMITTEES**

ACTION: **SUPPORT**

RECOMMENDATION

Staff recommends that the Board of Directors adopt a SUPPORT position on Senate Bill 671 (Gonzalez), as introduced.

ISSUE

This bill was introduced on February 19, 2021. Specifically, the bill would:

- Establish the Clean Freight Corridor Efficiency Program, to be jointly administered by the California Transportation Commission and State Air Resources Board, in coordination with other state entities;
- Require the program to establish criteria for identifying qualifying freight corridors and define minimum requirements for clean truck corridors, surrounding local streets and roads, and associated facilities;
- Require the program to identify California's 5 most-used freight corridors and objectives for improving the corridors, as specified, and identify projects and funding opportunities in these corridors;
- Require the commission and the board to jointly submit a report containing the program's criteria, requirements, and recommendations to the Legislature and the Governor by December 31, 2023, and every 5 years thereafter; and
- Require the program's criteria, requirements, and recommendations to be incorporated into the development of the state freight plan and the California Transportation Plan.

DISCUSSION

Senate Bill 671 was introduced to establish the statewide Clean Freight Corridor Efficiency Program. The program would be jointly administered by the California Transportation Commission (CTC) and the California Air Resources Board (CARB). It would establish criteria for identifying qualifying freight corridors that would be candidates

for the Program, with the goal of achieving infrastructure ready zero-emission freight corridors. The bill would also identify California's five most used freight corridors and the primary objectives for improving each of those corridors, such as congestion and air pollution reduction. The bill would require the CTC and CARB to jointly issue a report with program recommendations and funding ideas by the end of 2023, and every five years afterwards. The bill would further require the reports findings and recommendations to be incorporated into the funding programs of both the CTC and CARB.

Existing law requires the CTC and CARB to coordinate on freight issues. While there is a requirement that these two agencies coordinate there is no specific emphasis or guidelines on how to implement clean freight technology and corridor designations. This bill aims to align the state's freight plans with the state's clean air and equity goals. Metro initiated work on the LA County Goods Movement Strategic Plan in November 2018 to create an action plan to develop, in partnership with goods movement stakeholders, a vision for investments and long-term planning. If the bill is enacted, Metro could serve as a partner to the state to provide perspectives regarding the clean freight and equity needs of the LA County region, specifically.

Emissions from the freight sector are a significant source of air pollution in the State. Those emissions are highly concentrated in Southern California. In Los Angeles County in particular existing freight corridors and the resulting emissions are also disproportionately located in disadvantaged communities. SB 671 would provide a key pathway for addressing the impacts of freight related emissions on disadvantaged communities.

A key portion of the bill would be to incorporate the new corridors and strategies into the funding programs of the CTC and CARB. Many transportation stakeholders have argued that the CTC funds in particular should be reserved for state of good repair and capacity expansion projects. While that is certainly one key aspect of the funding provided by SB 1, staff would suggest that expansion of these facilities should not come at the cost of exacerbating a significant existing health hazard.

Staff recommends that the Board adopt a SUPPORT position on Senate Bill 671 (Gonzalez).

DETERMINATION OF SAFETY IMPACT

The impact of this bill on safety is still being evaluated.

FINANCIAL IMPACT

The estimated financial impact of this action is still being evaluated. Enaction of a Clean Freight Corridor Efficiency Program could lead to greater state investment in clean vehicle infrastructure and technology to support Metro's Goods Movement Action Plan goals.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Staff recommendation supports Metro's Vision 2028 Strategic Plan goal #1.3: Manage transportation demand in a fair and equitable manner by managing congestion and reducing conflicts between the movement of goods and people on streets and highways. Increasing technology and efficiency along freight corridors will lead to decreased greenhouse gas emissions, decreased strain on local streets, and better public health and safety outcomes.

ALTERNATIVES CONSIDERED

Staff has considered adopting either an OPPOSE or WORK WITH AUTHOR on the bill. However, an oppose position would be counter to the agency's Board-approved 2021 State Legislative Program Goal #14: Secure approval of key freight projects at the California Transportation Commission which includes supporting efforts to fund goods movement and freight projects through the CTC; and support for regional and statewide efforts to fund innovations in clean-freight technology.

NEXT STEPS

Should the Board approve the adoption of a SUPPORT position on the legislation; staff will communicate the Board's position to the author and work to ensure its passage. Staff will continue to keep the Board informed as this issue is addressed throughout the legislative session.

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File #: 2020-0636, **File Type:** Plan **Agenda Number:** 41.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: ZERO EMISSION BUS ROLLOUT PLAN

ACTION: APPROVE RECOMMENDATION

RECOMMENDATION

APPROVE Zero Emission Bus Rollout Plan for submittal to California Air Resources Board (CARB).

ISSUE

CARB's Innovative Clean Transit (ICT) Regulation requires all public agencies in the State of California to submit a Zero Emission Rollout Plan, approved by the agency's governing body, describing the agency's strategy to transition to 100% zero emission bus operation by 2040.

BACKGROUND

In December 2018, the California Air Resources Board (CARB) approved the Innovative Clean Transit (ICT) Regulation which requires all public transit agencies in the state to transition from conventional buses (compressed natural gas, diesel, etc.) to ZEBs (battery-electric or fuel cell electric) by 2040. The regulation requires a progressive increase of an agency's new bus purchases to be ZEBs based on their fleet size.

To ensure that each agency has a strategy to comply with the 2040 requirement, the ICT regulation requires each agency to submit a ZEB Rollout Plan (Rollout Plan) before purchase requirements take effect. The Rollout Plan is considered a living document and is meant to guide the implementation of ZEB fleets and help transit agencies work through many of the potential challenges and explore solutions.

As a "Large Transit Agency", as defined by the CARB ICT regulation, Metro was originally required to submit a Board-approved Rollout Plan by July 1, 2020. However, due to the severe impact the COVID-19 pandemic to agencies' operations, budgets, and schedules, CARB staff has permitted larger transit bus agencies to request an extension. Metro requested an extension on June 29, 2020 to submit the Rollout Plan by December 31, 2020. CARB granted the extension on June 30th, 2020. Due to resource impacts with COVID, Metro requested another extension on October 22, 2020 to submit the Rollout Plan by March 31, 2021. CARB granted the extension on October 27, 2020.

DISCUSSION

California Air Resources Board (CARB) Zero Emission Bus Rollout Plan

Pursuant to the CARB ICT Regulation, Metro's Rollout Plan (Attachment A) describes the plan to meet CARB's 2040 ZEB goals. Since Metro's goal is to transition by approximately 2030, Metro's Rollout Plan is more aggressive than the ICT Rule's schedule and thus complies with the CARB ICT regulation.

Zero Emission Bus Program Master Plan

The ICT Regulation Rollout Plan is derived the Metro's ZE Master Plan. The key difference is that the ICT Regulation specifies a generic format and level of information to be provided by all California transit bus agencies. Metro's ZE Master Plan is customized for Metro's Operations.

The Rollout Plan (Plan) is based on pre-COVID-19 pandemic operations. While no change to Metro's goal of transitioning to a 100% ZEB bus fleet by 2030 fleet is recommended at this time, staff is investigating potential impacts that changes to revenue, ridership, and service levels may have to the Plan and the Board's 2030 goal.

In parallel:

- Staff continues to refine development of layover charging locations in preparation for additional modeling of battery bus performance with on-route charging options, including for the Pasadena-North Hollywood Bus Rapid Transit Project.
- Staff continues to coordinate with Southern California Edison's (SCE) as they work to electrify the Silver Line. SCE's method of service (MOS) study preliminary analyses is anticipated to be complete by September 2020. This study will inform Metro on strategies to electrify Division 9 and El Monte Station, including considerations for energy storage and siting.

Should staff identify any issues that will result in material changes to the Plan or schedule, Metro will inform the Board and CARB as required by the ICT regulations.

DETERMINATION OF SAFETY IMPACT

This recommendation will have a positive impact on system safety, service quality, and system reliability for our customers.

FINANCIAL IMPACT

Adoption of the Rollout Plan would have no additional financial impact to the agency. Financial impact is consistent with previous Master Plan updates.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This item supports the following Strategic Goals: 1) Provide high-quality mobility options that enable people to spend less time traveling and 2) Provide responsive, accountable, and trustworthy governance within the Metro organization.

ALTERNATIVES CONSIDERED

Staff could request another extension, but such an action would likely not be approved by CARB.

NEXT STEPS

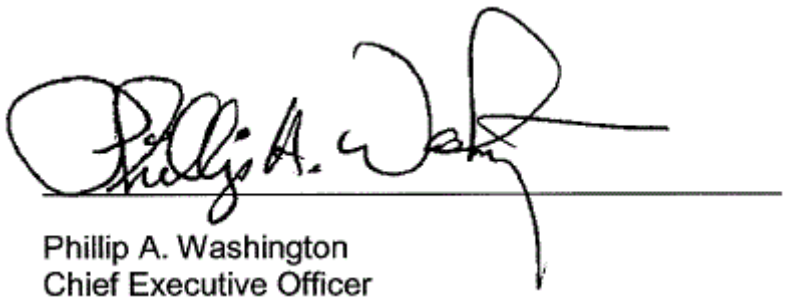
If this action is approved, staff will submit the Rollout Plan to CARB by March 31, 2021 as directed.

ATTACHMENTS

Attachment A - Metro's Rollout Plan

Prepared by: Marc Manning, Sr. Director, Vehicle Engineering & Acquisition, (213) 922-5871
Jesus Montes, Sr. Executive Officer, Vehicle Engineering & Acquisition, (213) 418-3277

Reviewed by: James T. Gallagher, Chief Operations Officer, (213) 418-3108



Phillip A. Washington
Chief Executive Officer

Los Angeles County Metropolitan Transportation Authority

Final
Rollout Plan

Prepared for:

California Air Resources Board

Prepared by:

ZEBGO Partners

444 South Flower Street
Suite 800
Los Angeles, California 90071

March 2021

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Acronyms and Abbreviations

BEB	Battery-Electric Bus
Board	Metro Board of Directors
BRT	Bus Rapid Transit
CARB	California Air Resource Board
CMF	Central Maintenance Facility
CNG	Compressed Natural Gas
DAC	Disadvantaged Communities
FCEB	Fuel Cell Electric Bus
ICT	Innovative Clean Transit
kW	Kilowatt
LADWP	Los Angeles Department of Water and Power
MW	Megawatts
OEM	Original Equipment Manufacturer
RFP	Request for Proposal
SBE	Standard Bus Equivalent
SCE	Southern California Edison
SP	Strategic Plan
ZE	Zero-Emission
ZEB	Zero-Emissions Bus(es)

E.1 ROLLOUT PLAN SUMMARY

Agency Background	
Transit Agency's Name	Los Angeles County Metropolitan Transportation Authority (Metro)
Mailing Address	One Gateway Plaza Los Angeles, California 90012-2952
Transit Agency's Air District	South Coast Air Quality Management District
Transit Agency's Air Basin	South Coast Air Basin
Total number of buses in Annual Maximum Service[1]	1,890[2]
Urbanized Area	Los Angeles – Long Beach – Anaheim, CA
Population of Urbanized Area[3]	12,150,996
Contact information of general manager, chief operating officer, or equivalent	James T. Gallagher Chief Operations Officer 213.418.3108 gallagherj@metro.net
Rollout Plan Content	
Is your transit agency part of a Joint Group[4]	No
Is your transit agency submitting a separate Rollout Plan specific to your agency, or will one Rollout Plan be submitted for all participating members of the Joint Group?	N/A
Please provide a complete list of the transit agencies that are members of the Joint Group (optional)	N/A
Contact information of general manager, chief operating officer, or equivalent staff member for each participating transit agency member	N/A
Does Rollout Plan have a goal of full transition to ZE technology by 2040 that avoids early retirement of conventional transit buses?	Yes
Please explain how your transit agency plans to avoid potential early retirement of conventional buses in order to meet the 2040 goal	Staff is evaluating the pandemic's impact to service, ridership, and available funding. However, sufficient time appears to be available to preclude the need for early retirement of buses.

[1] The ICT regulation defines "Annual Maximum Service" (13 CCR § 2023(b)(3)) as the number of buses in revenue service that are operated during the peak season of the year, on the week and day that maximum service is provided but excludes demand response buses.
[2] This is based on December 2018 (directly operated and contracted) service levels.
[3] As last published by the Census Bureau before December 31, 2017
[4] The ICT regulation defines a Joint Zero-Emission Bus Group or Joint Group (13 CCR § 2023.2) as two or more transit agencies that choose to form a group to comply collectively with the zero-emission bus requirements of section 2023.1 of the ICT regulation.

Rollout Plan Development and Approval	
Rollout Plan's approval date	03/25/21
Resolution No.	2020-0636
Is copy of Board-approved resolution attached to the Rollout Plan?	Yes (Appendix A)
Contact for Rollout Plan follow-up questions	Marc Manning Senior Director, Vehicle Engineering & Acquisition 213.392.6896 Manningm@metro.net
Who created the Rollout Plan?	Consultant
Consultant	ZEBGO Partners

E.2 EXECUTIVE SUMMARY

In accordance with the California Air Resource Board's (CARB) Innovative Clean Transit (ICT) regulation, the following report serves as Los Angeles County Metropolitan Transportation Authority's (Metro) Rollout Plan to transition its bus fleet to 100 percent zero-emission (ZE) by 2040.

E.2.1 CARB's Innovative Clean Transit Regulation

CARB's ICT regulation requires all public transit agencies in the State of California to transition from conventional buses (compressed natural gas, diesel, etc.) to ZE buses (battery-electric or fuel cell electric) by 2040. The regulation requires a progressive increase of an agency's new bus purchases to be zero-emission buses (ZEBs) based on fleet size. By 2040, CARB requires all transit agencies in the state to be operating only ZEBs.

To ensure that each agency has a strategy to comply with the 2040 requirement, the ICT regulation requires each agency, or a coalition of agencies, to submit a ZEB Rollout Plan before purchase requirements take effect. The Rollout Plan is considered a living document and is meant to guide the implementation of ZEB fleets and help transit agencies work through many of the potential challenges and explore solutions. Each Rollout Plan must include a number of required components (as outlined in the Rollout Plan Guidelines) and must be approved by the transit agency's governing body through the adoption of a resolution, prior to submission to CARB.

Metro must comply with the following requirements under the ICT regulation:

- July 1, 2020 – Board-approved Rollout Plan must be submitted to CARB[5]
- January 1, 2023 – 25 percent of all new bus purchases must be ZE
- January 1, 2026 – 50 percent of all new bus purchases must be ZE
- January 1, 2029 – 100 percent of all new bus purchases must be ZE
- January 1, 2040 – 100 percent of fleet must be ZE
- March 2021 – March 2050 – Annual compliance report due to CARB

E.2.2 Zero-Emission Bus Technologies

According to the ICT regulation, a ZEB is a bus with zero tailpipe emissions and is either a battery-electric bus (BEB) or a fuel cell electric bus (FCEB).

BEBs depend on a system to store and retrieve energy much as cars and trucks need fuel. BEBs have multiple battery packs that power an electric motor, resulting in ZE. Similar to many other battery-powered products, BEBs must be charged for a period of time to be operational. Currently, BEBs can be charged at the facility or in-service (on-route charging) via a number of connectors and dispensers.

A FCEB uses hydrogen and oxygen to produce electricity through an electrochemical reaction to power the propulsion system and auxiliary equipment. This ZE process has only water vapor as a byproduct. FCEBs can replace diesel or compressed natural gas (CNG) fuel buses without significant changes to operations and service and functions as a resilient backup alternative in case of natural disaster. The

[5] Due to the impacts of COVID-19, CARB provided an extension to all large transit agencies in California, upon request. Metro requested and was granted an extension to submit the Rollout Plan by December 31, 2020. In October 2020, Metro requested and was granted another extension to accurately capture the results of the recently released NextGen Plan and other service- and market-related updates. Metro now will submit its Board-approved Rollout Plan to CARB by March 2021.

fuel cell is generally used in conjunction with a battery, which supplements the fuel cell's power during peak loads and stores electricity that is recaptured through regenerative braking, allowing for better fuel economy.

Metro's past and ongoing ZEB analysis has found that BEB adoption is the ZEB technology that best aligns with Metro's 2030 ZEB goals. This is in a large part due to the market of BEBs in terms of technological advancement, costs, and availability. While FCEBs are promising and have many potential benefits (as compared to both CNG and BEB), unpredictability in operation costs and a limited supply chain makes it an unviable option at this time, especially considering Metro's aggressive ZEB goals. However, Metro will continue to monitor FCEB advancements and consider the technology in future applications.

E.2.3 Metro's Zero-Emission Bus Efforts

Metro is already embracing the prospects of a ZE future and is taking multiple steps to not only meet the requirements of CARB's ICT regulation, but to also provide a cleaner and more sustainable future for the communities that it serves. These efforts include:

- **Metro's Strategic Plan to ZEB Transition.** In 2017, the Metro Board endorsed staff's Strategic Plan for the transition to ZEBs. The first phase is to convert the Orange Line to ZEBs by 2020 and the Silver Line as soon as feasible, thereafter. The second phase involves the creation of a ZE Master Plan that would evaluate the entire Metro bus system and map out the best strategy and anticipated cost to convert to ZE operation.
- **BEB and Infrastructure Investments.** Shortly after the Board's endorsement of the 2017 Strategic Plan, Metro awarded three ZEB contracts for the electrification of the Orange and Silver Lines; two with BYD for five 60-foot ZEBs intended for the Orange Line and 60 40-foot ZEBs for the Silver Line, and one with New Flyer for 40 60-foot ZEBs for the Orange Line. To support these BEBs, Metro is in the process of installing 10 plug-in chargers at Division 8 and eight on-route chargers to support the Orange Line's transition. In September 2019, Metro's Board approved exercising the options of 40 additional BYD 40-foot ZEBs. With this exercise, Metro has plans to deploy 145 BEBs.
- **ZEB Program Master Plan.** In July 2018, Metro awarded "ZEBGO", a joint venture of multiple industry experts to produce a Master Plan and action-ready RFPs to transition to all ZEBs by 2030 – an ambitious plan that will guide Metro in adopting all ZEBs - 10 years before the ICT regulation requires.
- **NextGen Study.** While not directly tied to ZEB efforts, Metro is currently restructuring existing service to better meet the needs of current and future riders. The NextGen Bus Study will evaluate a number of alternatives and strategies to improve service, which may include more frequent service and shorter headways. This study is ongoing and is being coordinated with Metro's ZEB Master Plan efforts.

E.2.4 Metro's Path to an All-Zero-Emission Fleet

The Rollout Plan identifies a strategy for Metro to procure and operate an all-ZEB fleet by 2030 – ten years before the ICT regulation requires. In accordance with the Rollout Plan Guidance, this document provides an overview of a number of key components to Metro's ZEB transition, including fleet acquisitions, schedule, training, and funding considerations. As previously mentioned, Metro is currently studying and has a goal of transitioning to all ZEBs by 2030. Therefore, there are no anticipated issues with meeting the ICT regulation's 2040 requirement.

Due to the rapidly evolving nature of ZEB technologies, it is possible that the findings and recommended approaches in this report will be outdated when it is time for implementation. The information in this Rollout Plan is informed and based on December 2018 service levels. This information is used because it represents the fleet under typical operating conditions. Since then, there have been a number of special projects, including bus bridges, that may skew the fleet size and division requirements.

It should also be noted that COVID-19 has caused unprecedented losses in Metro's revenue through both the loss of fares from diminished ridership and loss of sales tax revenue from a reduction in Los Angeles consumer spending. For these reasons, Metro has reduced service and operations and is still evaluating the long-term ramifications on the system and the agency's capital projects and goals. Metro will proceed with planning and will adjust as the results from COVID-19 impacts stabilize and trends are more predictable.

The following subsections provide a brief summary of the Rollout Plan.

E.2.4.1 Baseline Conditions

As of December 2018, Metro currently operates a fleet approximately 2,230 buses out of 11 divisions. Another 165 buses are leased to contractors to operate Metro routes. Table E.2-1 summarizes each division and its respective fleet.

Table E.2-1. Summary of Existing Divisions and Baseline Fleet

Div.	Address	Operator	Fuel Type	Main Functions	32' Buses	40' Buses	45' Buses	60' Buses	Total Buses	Total Buses (SBE #)
1	1130 E. 6th St, Los Angeles	Metro	CNG	O&M	-	132	35	22	189	207
2	720 E. 15th St, Los Angeles	Metro	CNG	O&M	-	172	-	-	172	172
3	630 W. Ave 28, Los Angeles	Metro	CNG	O&M	-	86	91	-	177	196
5	5425 Van Ness Ave, Los Angeles	Metro	CNG	O&M	-	134	7	52	193	221
7	8800 Santa Monica Bl. W.Hollywood	Metro	CNG	O&M	-	148	80	5	233	252
8	9201 Canoga Ave, Los Angeles	Metro	CNG	O&M	-	61	107	34	202	241
9	3449 Santa Anita Ave, El Monte	Metro	CNG	O&M	-	161	62	-	223	236
10	742 N. Mission Rd, Los Angeles	Metro	CNG	O&M	-	69	13	69	151	189
13	920 N. Vignes St, Los Angeles	Metro	CNG	O&M	-	56	14	93	163	213
15	11900 Branford St, Los Angeles	Metro	CNG	O&M	-	82	109	50	241	288
18	459 W. Griffith St, Gardena	Metro	CNG	O&M	-	74	116	62	252	307
278	Stored at D10 or CMF	Metro	CNG	Training	-	31	1	-	32	33
								Directly Operated Subtotal	2,228	2,555
95	14913 E. Ramona Bl Baldwin Park	Transdev	CNG	O&M	16	18	-	-	34	31
97	21222 S. Wilmington Ave, Carson	MV Transit	Diesel/CNG	O&M	5	70	-	-	75	74
98	1611 Naud St, Los Angeles	Southland	CNG	O&M	29	27	-	-	56	50
								Contracted Subtotal	165	155
								Fleet Total	**2,393**	**2,710**

Source: ZEBGO, 2018

Note: Division 10 has been repurposed. It will not being used for revenue service except for the temporary relocation of buses during ZEB retrofits. Also, the diesel buses at Division 97 have subsequently been replaced with CNG buses.

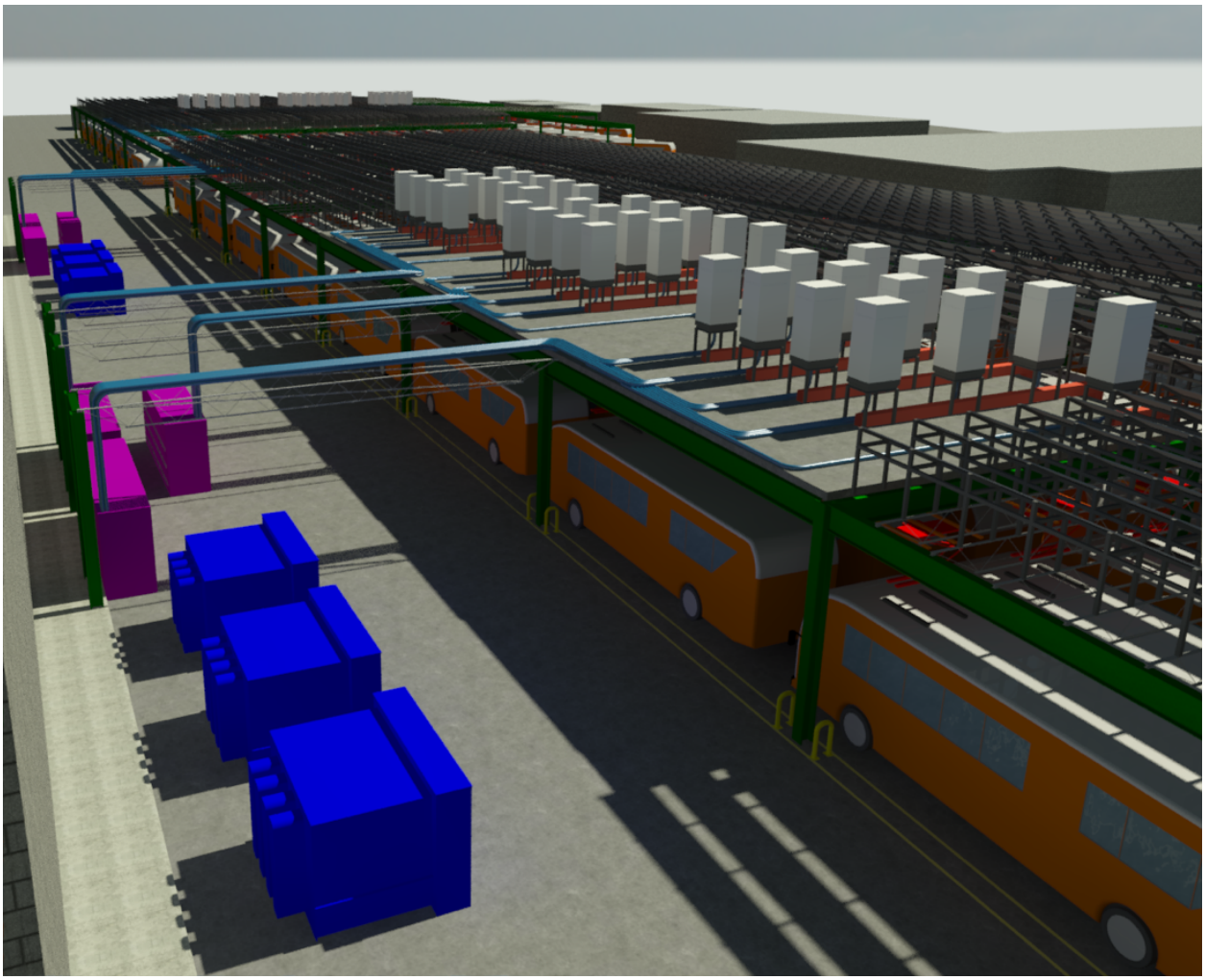
E.2.4.2 Proposed Zero-Emission Implementation Strategy

To achieve ZEB goals, Metro will adopt an inverted pantograph solution at both divisions and strategic layover locations (on-route charging). This technology (Figure E.2-1 and Figure E.2-2) will maximize space and safety of personnel due to the reduced interaction between staff and electrified equipment. These pantographs will be connected to chargers that vary in power. At this time, division-based chargers are expected to be provide 150 kilowatts (kW) of power in a "one to many" orientation (i.e., one charger energizes more than one dispenser), and on-route chargers will provide power in excess of 300 kW.

Figure E.2-1. North Hollywood Station On-Route Charger

Source: Los Angeles County Metropolitan Transportation Authority, July 2020

Figure E.2-2. General Layout of Division Charging Infrastructure



Source: ZEBGO, December 2019

E.2.4.3 Phasing and Construction

To maintain Metro's transition schedule, the availability of buses, construction schedule adherence, and utility enhancements will all have to be aligned.

Metro's transition will be accomplished in multiple on-site construction stages across three phases (periods). These "stages" are segments of the division that will be temporarily shut down to install the necessary BEB-supporting infrastructure. The buses that would normally occupy the staging space will be temporarily relocated on-site or to a neighboring division or facility. This approach will ensure that construction and normal operations can proceed concurrently. This construction method avoids the complete shutdown of the division undergoing improvements, which reduces the risks of service impacts. The number of stages and number of buses that need to be temporarily relocated during each stage vary based on a division's layout, existing fleet, and additional capacity.

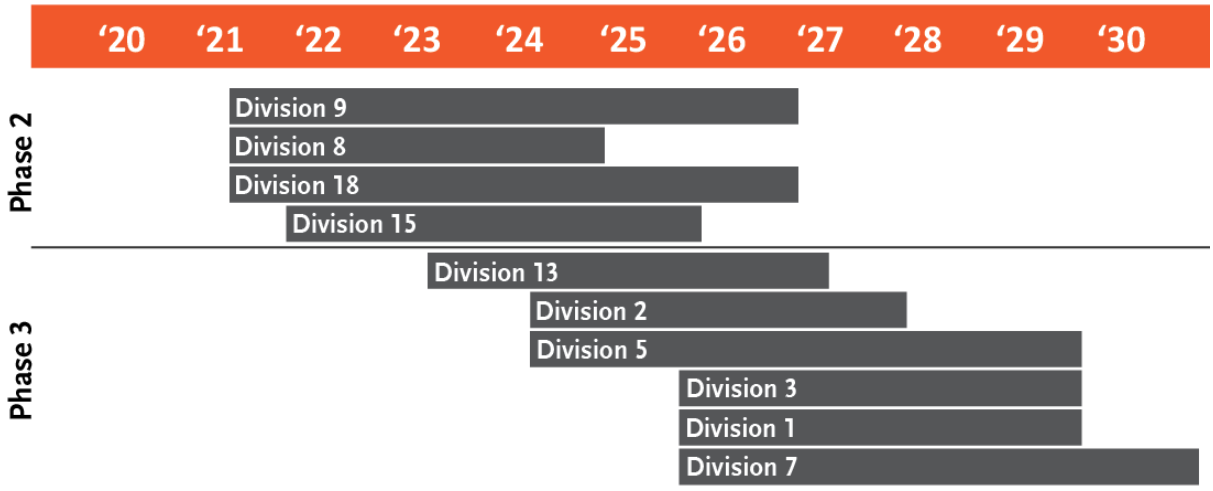
"Phases" are essentially classifications of when and how these divisions are grouped. Phase 1 of the transition is currently underway with the electrification of the Orange and Silver Lines. The remaining two phases are grouped based on a division's space availability and dependency on other divisions for temporary bus relocation. Phase 2 generally consists of "independent" divisions, divisions that have

available space to relocate its buses on-site during staged construction or are in close proximity to a division that does, and Phase 3, consists of "dependent" divisions, divisions that are dependent on other divisions for temporary bus storage or service.

As technology advances, Metro will make adjustments to maximize utility and cost feasibility. This will have direct impacts on the implementation schedule.

Figure E.2-3 presents the preliminary transition schedule. These activities include supplying additional power to the division, which includes utility applications, design, and construction, and the procurement, design, and construction of on-site charging equipment.

Figure E.2-3. LA Metro's Preliminary Transition Schedule



Source: ZEBGO, January 2021
Note: Division 10 will not be retrofitted to accommodate ZEBs. Division 10 will primarily be used for temporary storage and bus relocations during the transition.

E.2.4.4 Start-Up and Scale-Up Issues

To meet ICT deadlines, there are several challenges and opportunities that Metro has identified. The following briefly described some of the challenges that Metro faces for its transition:

- **Technological adaptation**. Currently, Metro is modeling and planning for a transition based on the baseline service and existing ZEB technology. With 2030 and 2040 deadlines looming, it is difficult to anticipate future technological enhancements and changes, such as improved batteries and chargers. Slight changes in these technologies could improve bus ranges, in turn, reducing costs. Metro will monitor these changes as it would be counterproductive to invest in technologies that will soon be outdated.
- **Costs.** Adoption of ZEBs has many benefits, including potential lifecycle cost savings. However, the investment required for capital and change management will be very expensive. Metro will have to be creative with funding mechanisms and sources to ensure that the transition to ZEB will not be detrimental to its operations and service.
- **Market Production Factors.** The ICT regulation will put a lot of pressure on OEMs to produce ZEBs at unprecedented rates. However, it is not only California that is interested in converting to ZEBs.

Legislative changes, such as the ICT regulation, will make it challenging to meet ZEB goals for agencies if the supply of buses cannot meet the demand.

- **Phasing and Transition.** Maintaining service and adhering to ICT regulation purchase requirements, all while managing on-site construction, facility rebuilds, temporary bus relocations, bus procurements, and utility enhancements introduces a lot of risk to the Metro's program. If one element of this transition doesn't go as planned, there will be implications for other components of the program.
- **Utility Upgrades.** Metro's divisions are currently under the jurisdiction of two utilities and its potential on-route charging locations are under nine. These utilities have different rate structures and protocols to apply for and receive additional power. How each utility is regulated, whether municipal or private, also dictates procedural requirements. These nuances will make it challenging to plan for due to the variances in schedule and procedure.
- **Managing Power Demand.** The transition to BEBs will require strategies to ensure that Metro can utilize power in the most cost-efficient way. Metro is currently doing this via utility negotiations and demand modeling to determine methods to reduce peak demand.
- **Uncertainty due to COVID-19.** COVID-19 has impacted all facets of the global economy, transit is not an exclusion. During the pandemic, ridership and revenues have plummeted and caused major shortfalls in Metro's budget which has impacted capital programs and operations. At this time, it is unclear what short- and long-term impacts will be for service. There is a possibility that service ridership levels may not return to previous levels resulting in changes to procurement and funding. Metro will continue to analyze trends to determine changes and plans.

E.2.4.5 Next Steps

The process to transition to ZEBs should and will be iterative to minimize risk, but also to accommodate new developments in a rapidly evolving market. Metro will use the information outlined in the Master Plan to identify and further refine the following:

- **Solutions to complete service if technology does not advance as forecasted.** Approximately 31 percent of Metro's baseline bus blocks travel further than 150 miles per day – a range that exceeds current batteries' capabilities. In order to meet 100% service completion, Metro will have to consider other solutions, including investing in additional on-route charging, filing for exemptions under the ICT regulation, purchasing additional buses, or restructuring service to suit technological limitation.
- **Costs refinement.** Construction, capital, operating, and maintenance costs vary based on a number of factors. It will be important to get an understanding of the up-front and lifecycle costs and savings of investing in ZEBs. Staff continues to develop cost estimates and Metro will need to revisit these estimates to determine if pricing has changed and make adjustments to procurements, as needed.
- **Explore collaboration opportunities.** Metro can continue to maximize outcomes by engaging with other regional and local agencies. Best practices, lessons learned, and cost-sharing among agencies will provide net benefits for Metro and partner agencies.
- **Continue to engage utilities**. Whether adopting BEBs or FCEBs, there is a good chance that the amount of power at the division is either insufficient or needs to be adapted to these new technologies. While procuring buses and installing chargers may be relatively straightforward, the process and protocols associated with electrical enhancements on the utility side can be complex. Therefore, it is essential that Metro continues to coordinate with electric utility providers to ensure critical deadlines are met.

1 INTRODUCTION

In accordance with the California Air Resource Board's Innovative Clean Transit regulation, the following report serves as Los Angeles County Metropolitan Transportation Authority's (Metro) Rollout Plan to transition its bus fleet to 100 percent zero-emission (ZE) by 2040.

1.1 Innovative Clean Transit Regulation

The California Air Resource Board's (CARB) Innovative Clean Transit (ICT) regulation became effective October 1, 2019 and requires all public transit agencies in the state to transition from conventional buses (compressed natural gas (CNG), diesel, etc.) to ZE buses (battery-electric or fuel cell electric) by 2040. The regulation requires a progressive increase of an agency's new bus purchases to be zero-emission buses (ZEBs) based on its fleet size. By 2040, CARB expects all transit agencies in the state to be operating only ZEBs.

To ensure that each agency has a strategy to comply with the 2040 requirement, the ICT regulation requires each agency, or a coalition of agencies ("Joint Group"), to submit a ZEB Rollout Plan ("Rollout Plan") before purchase requirements take effect. The Rollout Plan is considered a living document and is meant to guide the implementation of ZEB fleets and help transit agencies work through many of the potential challenges and explore solutions. Each Rollout Plan must include a number of required components (as outlined in the Rollout Plan Guidelines) and must be approved by the transit agency's governing body through the adoption of a resolution, prior to submission to CARB.

According to the ICT regulation, each agency's requirements are based on its classification as either a "Large Transit Agency" or a "Small Transit Agency". The ICT defines a Large Transit Agency as an agency that operates in the South Coast or the San Joaquin Valley Air Basin and operates more than 65 buses in annual maximum service or it operates outside of these areas, but in an urbanized area with a population of at least 200,000 and has at least 100 buses in annual maximum service. A Small Transit Agency is an agency that doesn't meet the above criteria.

As a "Large Transit Agency" Metro must comply with the following requirements under the ICT regulation:

- July 1, 2020 – Board-approved Rollout Plan must be submitted to CARB[6]
- January 1, 2023 – 25 percent of all new bus purchases must be ZE
- January 1, 2026 – 50 percent of all new bus purchases must be ZE
- January 1, 2029 – 100 percent of all new bus purchases must be ZE
- January 1, 2040 – 100 percent of fleet must be ZE
- March 2021 – March 2050 – Annual compliance report due to CARB

[6] Due to the impacts of COVID-19, CARB provided an extension to all large transit agencies in California, upon request. Metro requested and was granted an extension to submit the Rollout Plan by December 31, 2020. In October 2020, Metro requested and was granted another extension to accurately capture the results of the recently released NextGen Plan and other service- and market-related updates. Metro now will submit its Board-approved Rollout Plan to CARB by March 2021.

1.2 Metro's Background

Metro serves as transportation planner, coordinator, designer, builder, and operator for one of the country's largest, most populous counties. More than 9.6 million people – nearly one-third of California's residents – live, work, and play within Metro's 1,433-square-mile service area.

As of December 2018, Metro directly and indirectly operates approximately 2,400 buses on 165 routes. In that same time period, directly operated Metro lines served approximately 17.3 million riders, per day.

1.3 Metro's Existing ZEB Plans, Procurements, and Projects

As early as 1993, Metro has adopted policies that commit the agency to using alternative energy buses. Pursuant to this vision, Metro successfully transitioned the second largest bus fleet in North America from all-diesel to CNG in 2011 and has continued to commit to innovative technologies and strategies to further reduce its carbon footprint. The conversion to ZEBs is the next step in Metro's future and it has the opportunity to further improve the air quality for Los Angeles residents and visitors in the future.

The transition to a ZEB fleet has been a goal of Metro even before the ICT regulation was adopted. In July 2017, the Metro Board endorsed staff's Strategic Plan for the transition to ZEBs. The first phase in the Strategic Plan is to convert the Metro Orange Line to ZEBs by 2020 and the Metro Silver Line as soon as feasible, thereafter. The second phase involves the creation of a ZE Master Plan that would evaluate the entire Metro bus system and map out the best strategy and anticipated cost to convert to an all-ZE operation.

Shortly after the Board's endorsement of the 2017 Strategic Plan, Metro awarded three ZEB contracts for the electrification of the Orange and Silver bus rapid transit (BRT) lines; two with *BYD* for five 60-foot ZEBs intended for the Orange Line, 60 40-foot ZEBs intended for the Silver Line; and one with *New Flyer* for 40 60-foot ZEBs intended for the Orange Line.

In September 2019, Metro's Board approved exercising the options of 40 additional BYD 40-foot ZEBs. With this exercise, Metro has plans to deploy 145 BEBs.

1.3.1 ZEB Program Master Plan

In July 2018, Metro awarded "ZEBGO" a joint venture of multiple industry experts to produce a Master Plan and action-ready RFPs to transition to all ZEBs by 2030. As part of this plan, ZEBGO is responsible for providing the following services:

- Industry Outreach
- Inventory of Metro Operations
- Assessment of Best Industry Practices
- Evaluation of Compliance with Existing Standards and Codes
- Support Negotiation of Rate Structures with Utilities
- Analyses/System Modeling and Phasing Options
- Development of Technical Specifications for ZEBs and Facilities
- Development of Action-Ready Request for Proposals (RFPs)

ZEBGO's efforts are still ongoing and many of its findings inform the Rollout Plan. The Master Plan's work is iterative and will continue beyond the Rollout Plan submission deadlines. Therefore, some of the information outlined in this report may be superseded based on technological advancements and new information and data.

1.3.2 NextGen Bus Study

In 2018, Metro also began the process of restructuring existing service to better meet the needs of current and future riders. The NextGen Bus Study will evaluate a number of alternatives and strategies to improve service, which may include more frequent service and shorter headways. This project is in now in the implementation phases, and its bus assignments and service blocks will be coordinated with Metro's ZEB Master Plan efforts.

1.4 Rollout Plan Approach

The Rollout Plan identifies a strategy for Metro to procure and operate an all-ZEB fleet by 2030 – 10 years before the ICT regulation requires. In accordance with the Rollout Plan Guidance, this document provides an overview of a number of key components to Metro's ZEB transition, including fleet acquisitions, schedule, training, and funding considerations. As previously mentioned, Metro is currently studying and has a goal of transitioning to all ZEBs by 2030. Therefore, there are no significant concerns with meeting the ICT regulation's 2040 requirement. Due to the rapidly evolving nature of ZEB technologies, it is possible that the findings and recommended approaches in this report will be outdated when it is time for implementation. For that reason, Metro continues to evaluate technologies and strategies beyond 2030, when a fully operational ZEB fleet is anticipated. Those areas of current study will be indicated, where applicable.

The information in this Rollout Plan is informed and based on December 2018 operations. This information is used because it represents the fleet under typical operations. Since then, there have been a number of special projects, including bus bridges, that may skew the fleet size and division requirements. The Master Plan, however, will make use of the most recent information available in anticipation of the release of the NextGen Bus Study, which will provide the foundation for the final version of Metro's Master Plan.

It should also be noted that COVID-19 has caused unprecedented losses in Metro's revenue through both the loss of ridership and a reduction in sales tax revenue. For these reasons, Metro has reduced service and operations and is still evaluating and forecasting the long-term ramifications on the system and the agency's capital projects and goals. That said, how COVID-19 impacts Metro's electrification goals is still unclear, however, Metro will continue to proceed with planning and adjust as needed once COVID-19 is stabilized and trends are more predictable.

1.5 Rollout Plan Structure

In accordance with CARB's Rollout Plan Guidance, Metro's Rollout Plan includes all required elements. The required elements and corresponding sections are detailed below:

- Transit Agency Information (Section 1: Rollout Plan Summary)
- Rollout Plan General Information (Section 1: Rollout Plan Summary)
- Technology Portfolio (Section 4.2: Technology Portfolio)
- Current Bus Fleet Composition and Future Bus Purchases (Section 4: Fleet Acquisitions)
- Facilities and Infrastructure Modifications (Section 5: Facilities and Infrastructure Modifications)

- Providing Service in Disadvantaged Communities (Section 6: Disadvantaged Communities)
- Workforce Training (Section 7: Workforce Training)
- Potential Funding Sources (Section 8: Costs and Funding Opportunities)
- Start-up and Scale-up Challenges (Section 9: Start-up and Scale-up Challenges)

2 FLEET AND ACQUISITIONS

The following section provides an overview of Metro's baseline conditions, planned purchases, and description of how Metro will meet the requirements of the ICT regulation.

2.1 Baseline Bus Fleet

As of December 2018, Metro directly operates 2,228 buses (2,555 standard bus equivalents [SBEs]).[7] An additional 165 SBEs are indirectly operated through contracted services. Metro, as the owner of these buses, will work with contractors to ensure that these buses are replaced and that the owners of the facilities establish plans and support infrastructure pursuant to the ICT regulation. Metro's fleet consists of a mixture of 40-foot, 45-foot, and 60-foot CNG buses.[8] Table 2-1 and Table 2-2 presents a summary of Metro's directly operated bus fleet and contracted bus fleet, respectfully.

Table 2-1. Summary of Directly Operated Bus Fleet (Baseline Conditions)

Manufacturer	Series	Fuel Type	Length	In-Service Year	Bus Type	No. of Buses	No. of Buses (SBE)
New Flyer	3850-4199	CNG	40'	2015	Standard	143	143
				2016		188	188
	5300-5522	CNG	40'	2001	Standard	183	183
	5600-6149	CNG	40'	2014	Standard	306	306
				2015		202	202
NABI	7000-7214	CNG	40'	2000	Standard	5	5
	7300-7514	CNG	40'	2001	Standard	24	24
	7525-7599	CNG	40'	2005	Standard	70	70
	7600-7949	CNG	40'	2002	Standard	85	85
	8000-8099	CNG	45'	2004	Standard	39	47
				2005		48	58
				2006		11	14
	8100-8359	CNG	45'	2009	Standard	130	156
				2010		129	155
	8360-8400	CNG	45'	2009	Standard	41	50
	8401-8491	CNG	45'	2010	Standard	29	35
				2011		53	64
				2012		6	8
	8500-8649	CNG	45'	2012	Standard	33	40

[7] SBEs were determined by applying a 1:1 ratio for 40-foot buses, 1:1.2 ratio for 45-foot buses, and 1:1.5 ratio for 60-foot buses, all values were rounded up to the next whole number.
[8] One 65-foot bus operates from Division 8

Manufacturer	Series	Fuel Type	Length	In-Service Year	Bus Type	No. of Buses	No. of Buses (SBE)
				2013		116	140
	9200-9399	CNG	60’	2005	Articulated	84	126
				2006		112	168
	9400-9494	CNG	60’	2006	Articulated	40	60
				2007		55	83
	9495-9495	CNG	65’	2007	Articulated	1	2
	9500-9594	CNG	60	2007	Articulated	78	117
				2008		17	26
					Total Buses	**2,228**	**2,555**

Source: Los Angeles County Metropolitan Transportation Authority, December 2018

Table 2-2. Summary of Contracted Bus Fleet (Baseline Conditions)

Manufacturer	Series	Fuel Type	Length	In-Service Year	Bus Type	No. of Buses	No. of Buses (SBE)
New Flyer	3850-4199	CNG	40’	2015	Standard	3	3
				2016		16	16
	5300-5522	CNG	40’	2001	Standard	10	10
	5600-6149	CNG	40’	2014	Standard	38	38
Orion	11001-11067	Diesel*	40’	2001	Standard	35	35
NABI	7600-7949	CNG	40’	2002	Standard	13	13
	3100-3149	CNG	32’	2010	Standard	50	40
					Total Buses	**165**	**155**

Source: Los Angeles County Metropolitan Transportation Authority, December 2018
*The diesel buses at have subsequently been replaced with CNG buses.

2.2 Technology Portfolio

Metro’s past and ongoing analysis has found that BEBs are the most suitable technology to meet ZEB goals. This is in a large part due to the market of BEBs in terms of technological advancement, costs, and availability. While FCEBs are promising and have many potential benefits as compared to both CNG and BEB, unpredictability in operation costs and a limited supply chain makes it an unviable option at this time, especially considering Metro’s aggressive ZEB goals. However, Metro will remain open for potential future FCEB integration into its fleet.

2.3 Existing ZEB Procurements and Projects

Metro has taken and is taking several steps to ensure that it is in the best position to meet the Board's 2030 ZEB goal. As mentioned, Metro's Board envisions the fleet transition in two phases. Phase 1 will focus on the conversion of the Orange and Silver BRT Lines to ZEB by 2020 and 2021, respectively, and Phase 2 will convert the rest of the fleet.

To date, Metro has approved the procurement of 145 BEBs. Table 2-3 presents Metro's existing BEB procurements and Table 2-4 details Metro's existing chargers both installed and under construction.

To support these buses, multiple enhancements have been initiated or completed at divisions and stops that serve these lines. For instance, at Division 8, which serves the Orange Line, Metro has coordinated with the utility, the Los Angeles Department of Water and Power (LADWP), to add additional electrical capacity, and ABB, a charger manufacturer, to construct 10 150-kW plug-in chargers to support overnight and midday charging. There is also ongoing construction for on-route chargers at three locations along the Orange Line's route. These on-route chargers range from 450-kW to 600-kW are based on the Society of Automotive Engineers (SAE) pantograph charging standard, J3105-1. The Orange Line is anticipated to be fully electrified by the end of 2020.

The Silver Line and the divisions and stations that serve it - Division 9, Division 18, and El Monte and Harbor Gateway Transit Centers - are all currently being analyzed and designed to determine the most suitable chargers. The Silver Line is anticipated to be electrified by 2021.

Table 2-3. Existing BEB Procurements

OEM	Model	Battery (kWh)	Length (ft.)	Route	No. of Buses	No. of Buses (SBE)
New Flyer	XE60	320	60	Orange	40	60
BYD	K11	610	60	Orange	5	8
BYD	K9	348	40	Silver	60	60
BYD	K9	348	40	TBD	40	60
Total					**145**	**168**

Source: Los Angeles County Metropolitan Transportation Authority, December 2019

Table 2-4. Existing ZEB Chargers

Location	Quantity	OEM	Power (kW)	Type	Status
Division 1	5	BYD	100	Plug-In	Installed
Division 8	10	ABB	150	Plug-In	2 Installed 8 in Procurement
Canoga Station	2	Siemens	450-600	Pantograph	Commissioning
North Hollywood Station	4	Siemens	450	Pantograph	In Operation
Chatsworth Station	2	Siemens	450-600	Pantograph	Under Construction

Source: Los Angeles County Metropolitan Transportation Authority, December 2020

2.4 Procurement Schedule

Based on initial analysis, all new bus purchases will be ZEB starting in 2022 – seven years before the ICT regulation requires. Early retirement should not be an issue pursuant to the ICT regulation based on Metro's future purchases, however, Metro is still evaluating strategies to avoid early retirement pursuant to its 2030 goals.

As previously indicated, Metro also leases approximately 165 buses to contractors to provide service on Metro routes – Metro does not own or operate the facilities where these buses are stored. That said, Metro will continue to provide buses and coordinate with contractors as facility master plans are developed. At this time the schedule and approach for these facilities' upgrades are under development.

Table 2-5 summarizes Metro's anticipated procurements through 2040. In September 2019, the Metro Board granted approval to execute 369 bus options (40 BEB and 329 CNG) to cover Metro's fleet needs (pre-pandemic) until 2022. This table is built off of the assumption that BEBs/battery capacities will be available to meet Metro's service block ranges so that a 1:1 replacement ratio is achievable. Years 2023, 2026, and 2029, are highlighted because these indicate when Metro's new purchases should be 25 percent, 50 percent, and 100 percent ZEB, respectively, in accordance with the ICT regulation.

Table 2-5. Summary of Future Bus Purchases (through 2040)

Year	Total Buses (SBE)	Zero-Emission Buses				Conventional (CNG) Buses			
		No.	Pct.	Bus Type	Fuel Type	No.	Pct.	Bus Type	Fuel Type
2022	-	-	-	-	-	-	-	-	-
2023	4	4	100%	40'/60'	BEB	-	-	-	-
2024	156	156	100%	40'/60'	BEB	-	-	-	-
2025	140	140	100%	40'/60'	BEB	-	-	-	-
2026	259	259	100%	40'/60'	BEB	-	-	-	-
2027	259	259	100%	40'/60'	BEB	-	-	-	-
2028	259	259	100%	40'/60'	BEB	-	-	-	-
2029	259	259	100%	40'/60'	BEB	-	-	-	-
2030	259	259	100%	40'/60'	BEB	-	-	-	-
2031	-	-	-	-	-	-	-	-	-
2032	393	393	100%	40'/60'	BEB	-	-	-	-
2033	364	364	100%	40'/60'	BEB	-	-	-	-
2034	-	-	-	-	-	-	-	-	-
2035	4	4	100%	40'/60'	BEB	-	-	-	-
2036	156	156	100%	40'/60'	BEB	-	-	-	-
2037	140	140	100%	40'/60'	BEB	-	-	-	-
2038	259	259	100%	40'/60'	BEB	-	-	-	-

Year	Total Buses (SBE)	Zero-Emission Buses				Conventional (CNG) Buses			
		No.	Pct.	Bus Type	Fuel Type	No.	Pct.	Bus Type	Fuel Type
2039	259	259	100%	40'/60'	BEB	-	-	-	-
2040	259	259	100%	40'/60'	BEB	-	-	-	-

Source: ZEBGO, 2020

2.4.1 ZEB Range Requirements and Costs

Approximately 31 percent of Metro's bus blocks travel more than 150 miles per day – a range that exceeds current batteries' capabilities. To reduce impacts to service, Metro intends to apply a number of strategies to meet service (range) requirements, including the investment in on-route chargers, additional bus purchases, battery/charging management systems, and solar and battery storage. In future ZEB applications, Metro will also consider FCEBs, especially if battery technology doesn't advance as forecasted.

2.4.2 Conversion of CNG Buses to ZEBs

A full fleet conversion to ZEBs by 2030 will require Metro to increase procurements by 848 buses. To address the increased capital costs associated with advanced procurements, the conversion of approximately 757 buses will be included in the procurement schedule.[9] Currently, conversions are anticipated to take place during the mid-life overhaul during the years 2027 and 2028, though this may be refined further to evenly distribute purchases across the transition period (Table 2-6).

Table 2-6. Summary of Future Bus Retrofits

Year	Number of Buses (SBE)	Bus/Conversion Type
2027	393	CNG to BEB
2028	364	CNG to BEB

Source: ZEBGO, 2020

[9] Addressing the 91-bus shortfall is currently being analyzed by Metro and will likely be addressed by additional procurements or retrofits (conversions).

3 FACILITIES AND INFRASTRUCTURE MODIFICATIONS

The following sections detail the planned charging strategies, infrastructure, detailed division improvements, and program schedule.

3.1 Facility Modifications

Metro's transition to ZE technologies, namely, BEB, will require several modifications and replacements to existing infrastructure and operations. This would include the decommissioning of CNG equipment, enhancements and expansions of electrical equipment, additional electrical capacity, and the installation of BEB gantries, chargers, dispensers, and other components. These changes will not only occur at 10 of Metro's directly-operated bus divisions – Division 10 will only be used for relocations during the transition - but also at select bus layover locations and transit centers that will function as on-route charging stations.

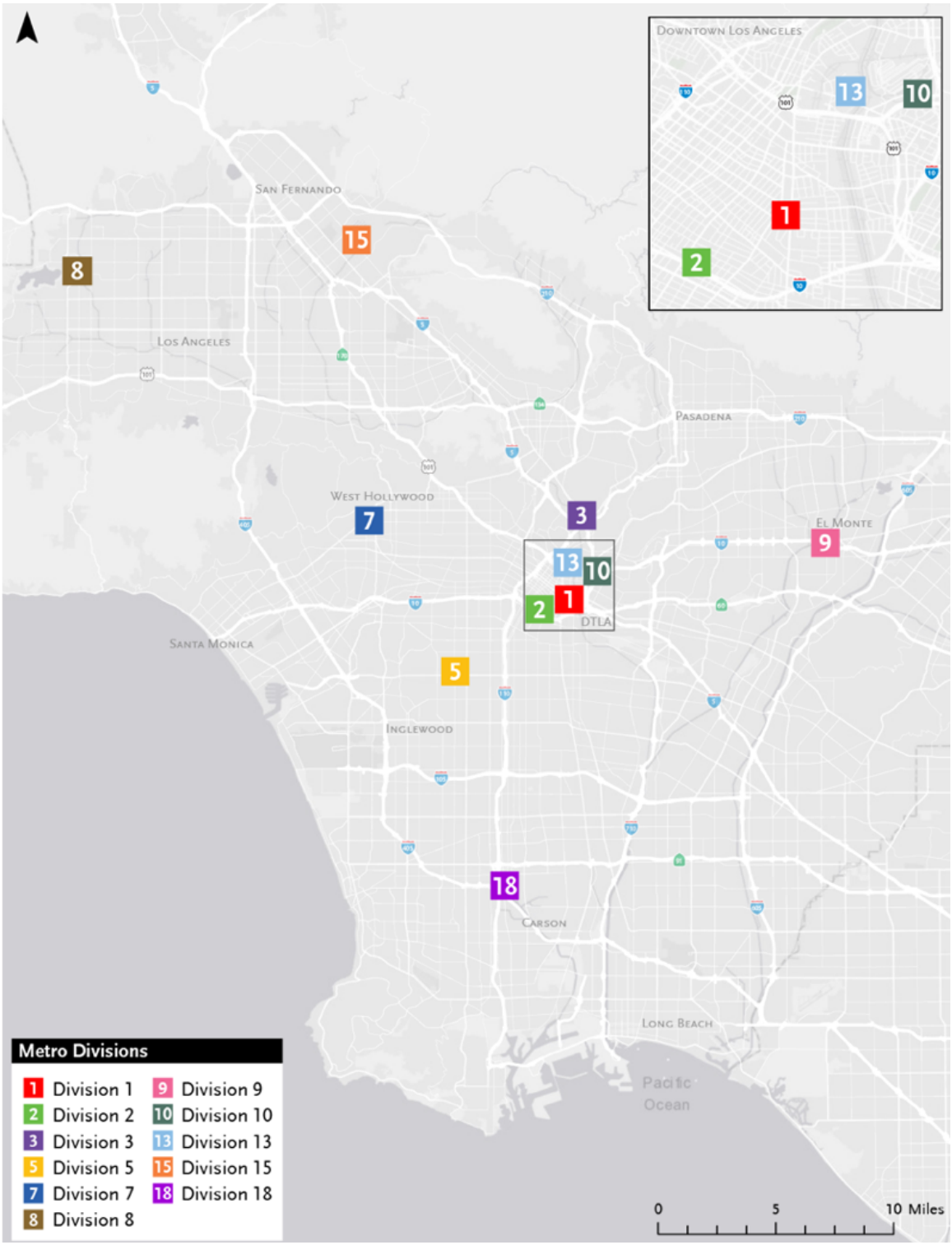
Figure 3-1 illustrates the location of Metro's divisions and Table 3-1 summarizes the modifications and schedules planned at 10 of Metro's bus divisions.

Table 3-1. Summary of Bus Division ZEB Improvements

Div.	Address	Main Functions	Planned ZEB Infrastructure	Service Capacity	Upgrades Req'd?	Estimated Construction Timeline
1	1130 E. 6th St, Los Angeles, CA	O&M	Inverted pantograph charging	189 buses	Yes	2025-2029
2	720 E. 15th St, Los Angeles, CA	O&M	Inverted pantograph charging	172 buses	Yes	2024-2027
3	630 W. Ave 28, Los Angeles, CA	O&M	Inverted pantograph charging	177 buses	Yes	2025-2029
5	5425 Van Ness Ave, Los Angeles, CA	O&M	Inverted pantograph charging	193 buses	Yes	2024-2029
7	8800 Santa Monica Bl. West Hollywood, CA	O&M	Inverted pantograph charging	233 buses	Yes	2025-2030
8	9201 Canoga Ave, Los Angeles, CA	O&M	Inverted pantograph charging	202 buses	Yes	2021-2024
9	3449 Santa Anita Ave, El Monte, CA	O&M	Inverted pantograph charging	223 buses	Yes	2021-2026
13	920 N. Vignes St, Los Angeles, CA	O&M	Inverted pantograph charging	163 buses	Yes	2023-2026
15	11900 Branford St, Los Angeles, CA	O&M	Inverted pantograph charging	241 buses	Yes	2021-2025
18	459 W. Griffith St, Gardena, CA	O&M	Inverted pantograph charging	252 buses	Yes	2021-2026

Source: ZEBGO, February 2020
Note: On-route charging will also be utilized to supplement division charging

Figure 3-1. Metro's Divisions



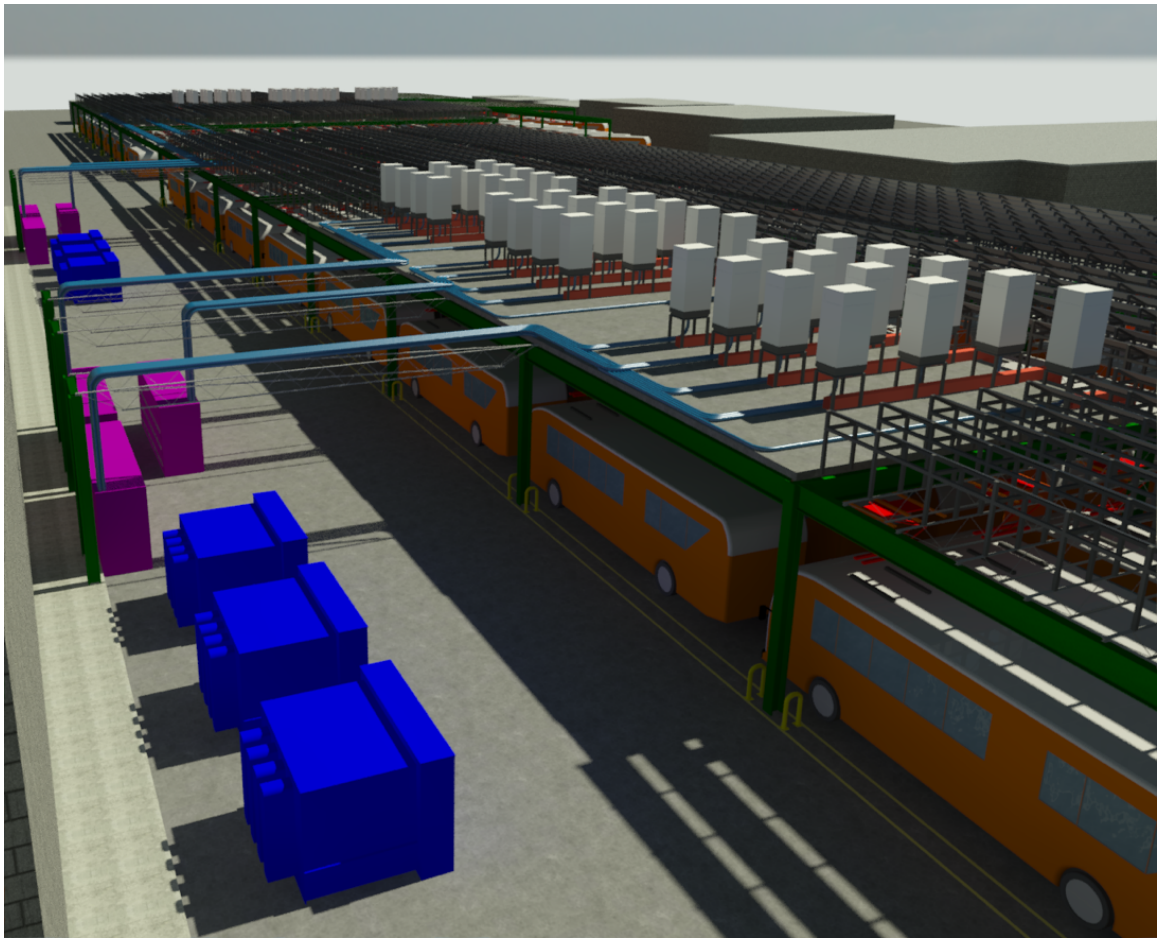
Source: ZEBGO, 2019

3.2 Division Charging Strategies and Infrastructure

All divisions will support DC inverted pantograph charging. In an effort to maximize space and cost savings via reduced demand charges, Metro is currently planning for a "one to many" 150-kW charger to dispenser ratio (one charger to more than one buses) for overnight charging. Metro will also integrate "fast charging lanes" at divisions to provide buses with the opportunity to "top off" during midday pull-ins and/or during servicing before connecting to the overnight "slow" chargers. These "fast charging lanes" will have chargers in excess of the 150-kW chargers. Individual division strategies are still being analyzed and may vary and change based on unique operating and service conditions. As technology develops, Metro will also consider other ratios and charging strategies which may impact the layout of each division.

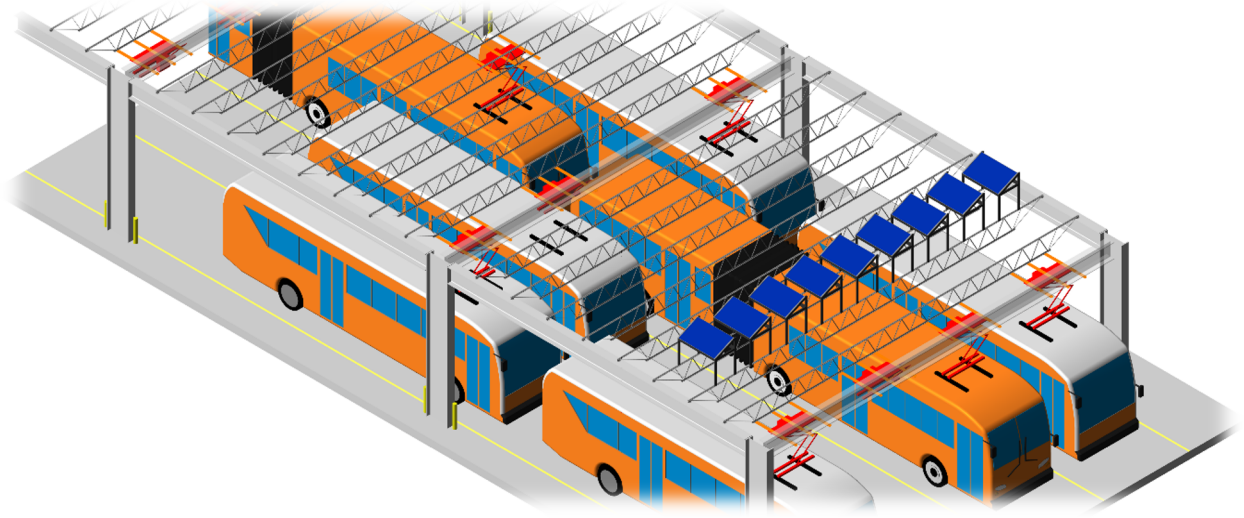
At the divisions, chargers, conduit, and associated pantographs will be supported by an overhead frame that will cover the surface of the bus parking tracks (Figure 3-2). This overhead strategy is due to the general constrained space at most of Metro's divisions. BEB charging infrastructure includes a number of charging cabinets, switches, switchgears, and transformers that require a considerable amount of space. This general design will be at divisions to maximize space and ensure compatibility with all procured BEBs.

Figure 3-2. General Layout of Division Charging Infrastructure



Source: ZEBGO, December 2019

Figure 3-3. Conceptual Division Pantograph-Charging



Source: ZEBGO, December 2019

3.3 On-Route Charging Strategies and Infrastructure

As mentioned, on-route charging is a consideration for Metro's ZEB transition. On-route charging will extend bus ranges, reduce peak demand (kW) at divisions, and serve as future-ready strategy as it is likely that charging during the day will eventually be more cost-competitive than charging at night due to an increasing availability of renewable power.

On-route charging facilities will also utilize DC inverted pantograph chargers. All on-route chargers are anticipated to be "high-powered" (in excess of 150-kW) to ensure that buses can receive more energy in a small period of time, typically during layovers. Metro is planning for up to 1.2 megawatts (MW) of power per SAE J-3105.

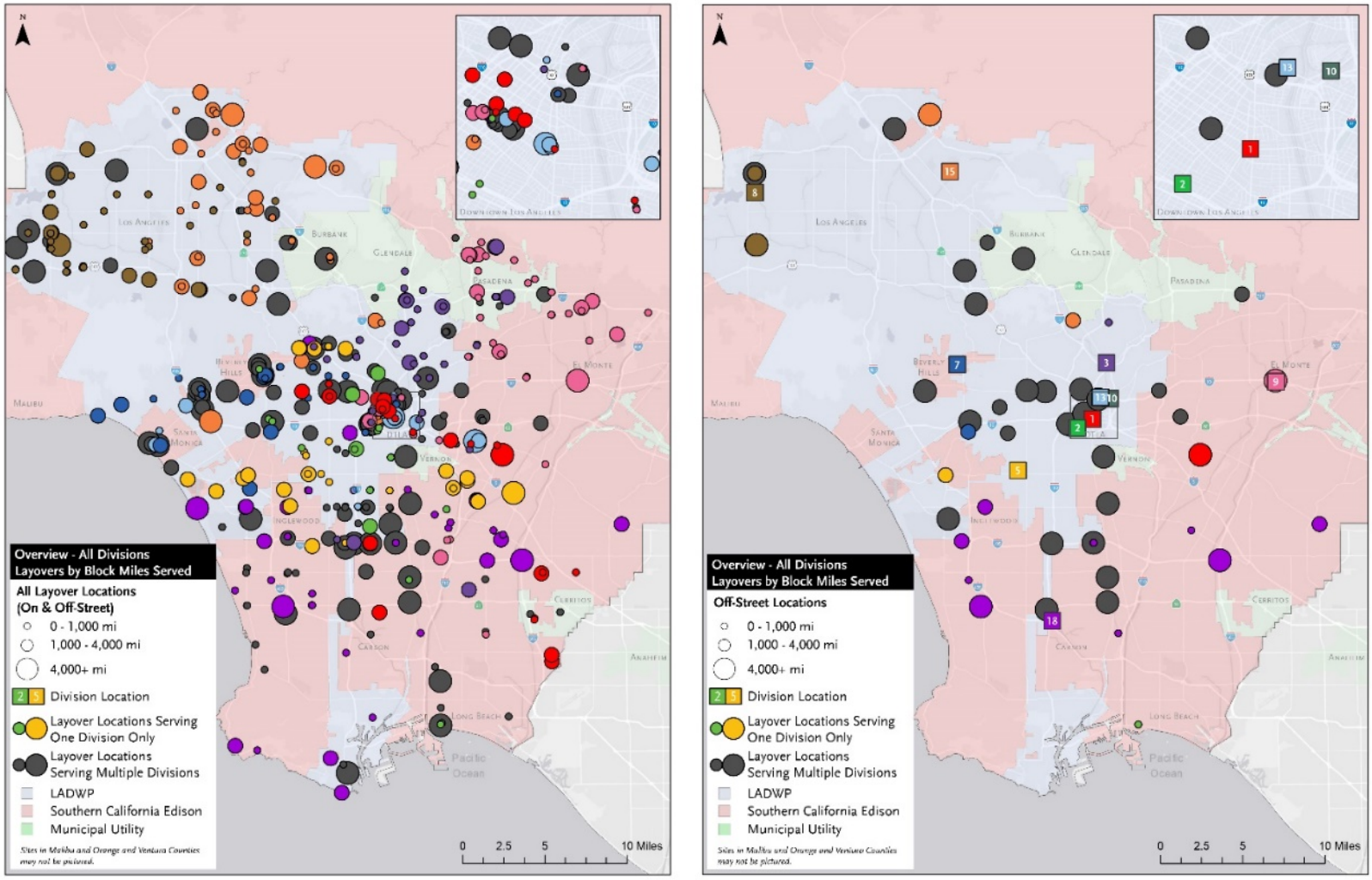
Figure 3-4. North Hollywood Station On-Route Charger

Source: Los Angeles County Metropolitan Transportation Authority, July 2020

On-route charging is most useful at endpoints or layover locations of trips. As of December 2018, Metro has 529 layover locations, of these, approximately 52 are considered ideal and deemed preliminarily feasible as on-route charging areas. These locations were based on the number of vehicles that layover, available space (for charging equipment), and its off-street orientation – for maintenance and safety issues, it was assumed that off-street locations would mitigate safety and vandalism issues with the public. Staff continues to refine modeling and related analysis at these locations to determine which ones will be candidates for implementation. It is assumed that all on-route locations will have 450 kW or greater chargers and will be pantograph-based to support Metro's fleet. It is likely that some of these will be at transit centers that are shared between other transit agencies. For that reason, Metro

is ensuring that an established charging standard is applied to promote future shared use. Figure 3-5 illustrates Metro's 529 layover and 52 potential on-route charging locations, respectively.

Figure 3-5. Metro's Layover Locations and Potential On-Route Charging Locations



Source: ZEBGO, December 2018

3.4 Phasing and Construction Staging

Adhering to the construction schedule and milestones will be critical because divisions' charging infrastructure construction and utility upgrades must be completed before buses are delivered, otherwise, the buses will not be able to operate. The following sections describes the order in which each division will be constructed (phased), and the work to be done on each division's site (staging).

3.4.1 Construction Phases

The prioritization of divisions' conversions will be based on a number of factors, however, space availability (i.e., divisions with more space can accept more buses on a temporary basis) is the most critical as it directly impacts the schedule and Metro's transition goal. It should be noted that the strategy that Metro plans to employ for facility construction will have minimal or no impact on service.

Staff has segmented the transition schedule into three distinct phases to accomplish both Metro and ICT requirements as presented in Table 3-2.

Table 3-2. Metro Transition and Construction Phases

Phase #	Description	Divisions
1	**On-Going Work** includes Metro's ongoing construction and ZEB-related work to transition the Orange and Silver Lines.	8, 9, and 18
2	**Independent Divisions** require few or no bus relocations for ZEB-related construction.	8, 9, 15, and 18
3	**Dependent Divisions** require the temporary relocation of buses to nearby divisions in order to make room for staged construction.	1, 2, 3, 5, 7, and 13

Source: ZEBGO, December 2018

Phase 1 – On-Going Work

Phase 1 is the full electrification of Metro's BRT services, the Orange and Silver Lines as shown in Table 3-2. Electrical enhancements and chargers are currently being installed at Division 8, along with on-route chargers at multiple stations. Concepts for Divisions 9 and 18 are currently under development to serve future BEBs.

Phase 1 is illustrated in Figure 3-6.

Figure 3-6. Phase 1: On-Going Work

Source: ZEBGO, December 2018

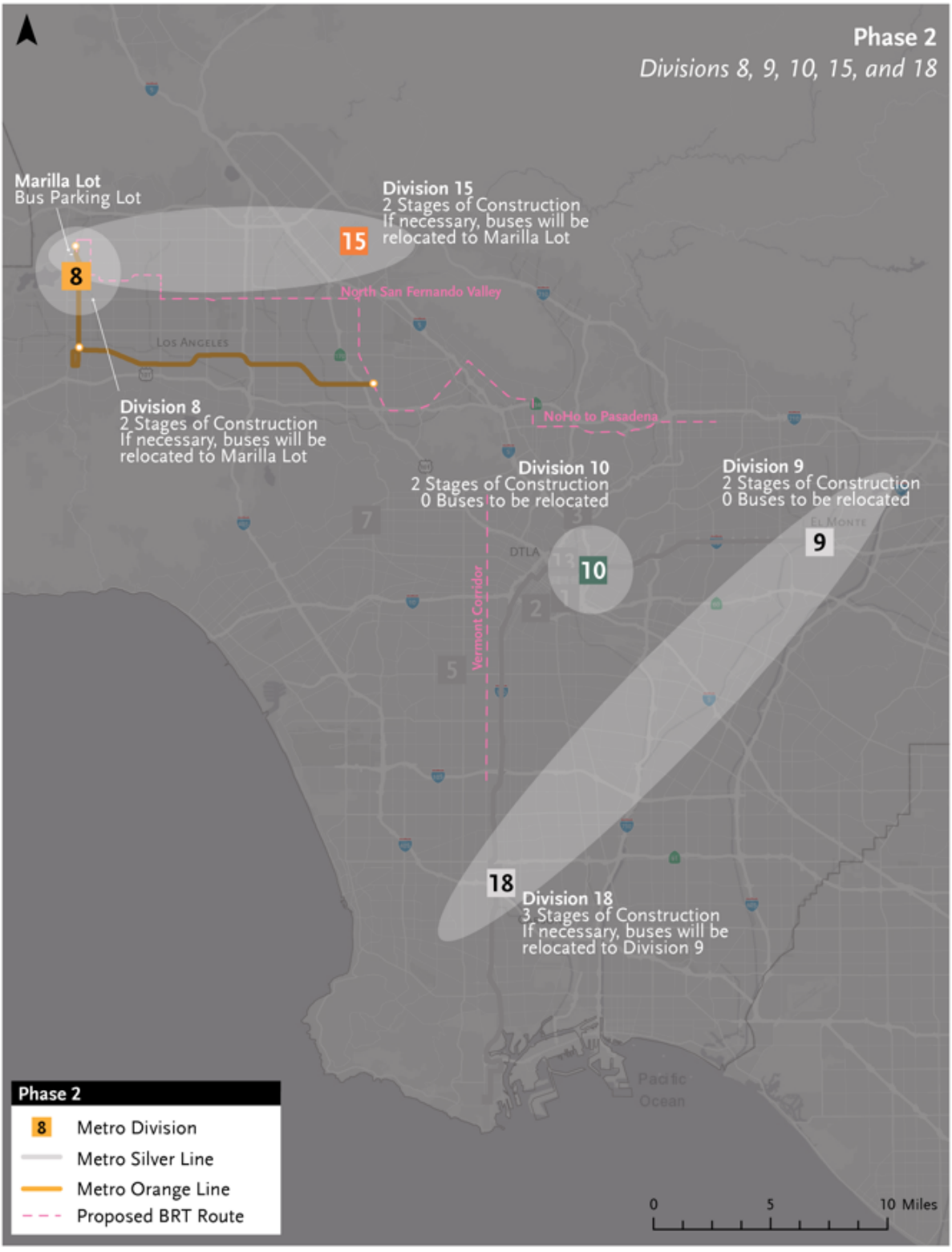
Phase 2 – Independent Divisions

Phase 2 consists of the conversion of Metro's remaining services, including all local, rapid, shuttle, and express routes. Due to adequate on-site space or adjacent Metro property, Divisions 8, 9, 15, and 18 are considered "independent divisions" because BEB infrastructure enhancements can largely be completed with no or minimal buses relocations. Initial work has begun on Division 9 and 18 due to Metro's Board approval of exercising the 40 additional BYD buses in September 2019.

Construction work will be done in stages, on-site, to allow on-going transit service and operations to continue without interruption. Buses can be shifted around on-site to vacate areas for electrification improvements while still operating all buses and serving all routes assigned to these divisions.

Phase 2 is illustrated in Figure 3-7.

Figure 3-7. Phase 2: Independent Divisions



Source: ZEBGO, December 2018
Note: Division 10 will not be retrofitted to accommodate ZEBs. Division 10 will primarily be used for temporary storage and bus relocations during the transition.

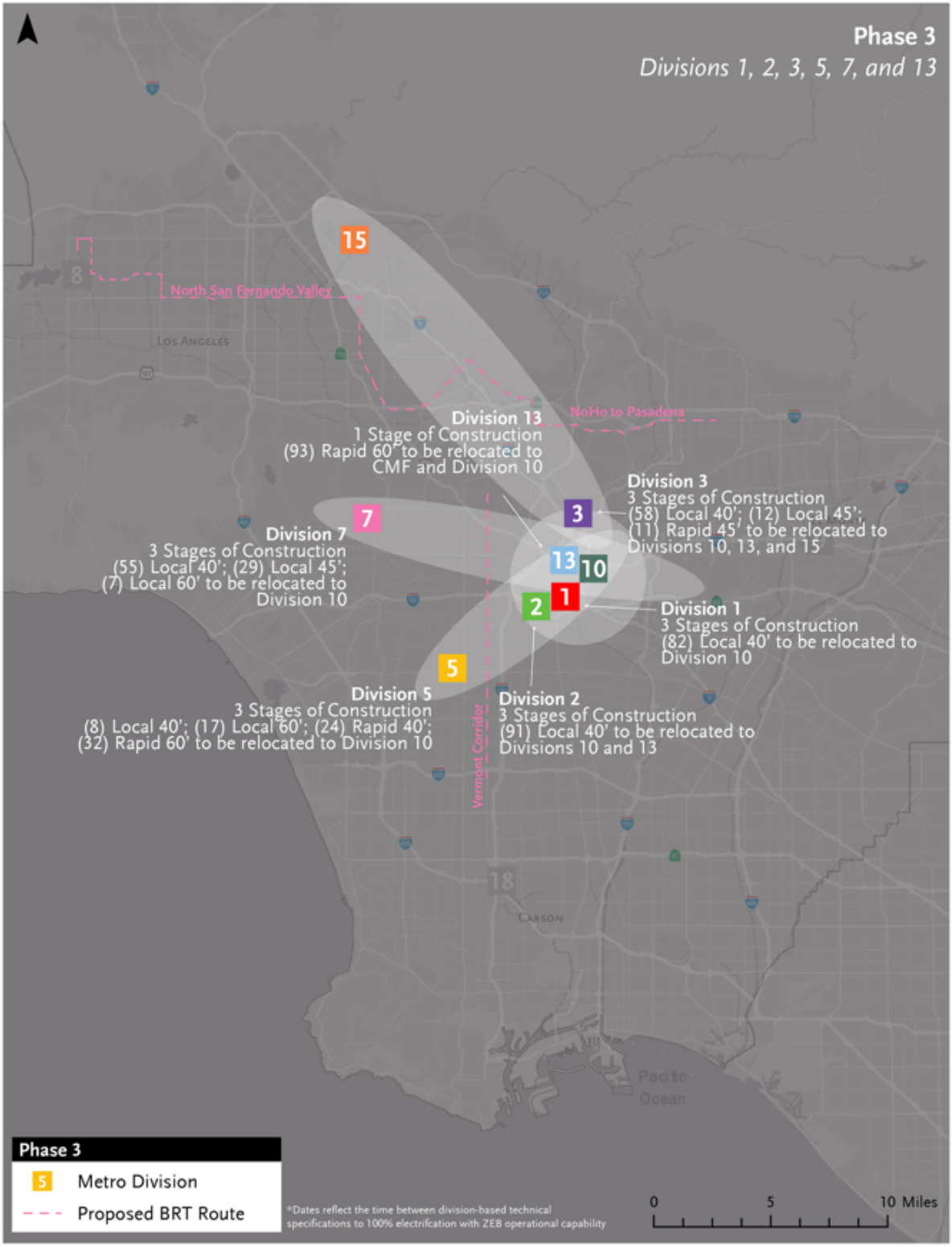
Phase 3 – Dependent Divisions

Phase 3 continues Phase 2 conversions by focusing on the remaining local, rapid, shuttle, and express routes. Due to space constraints, Divisions 1, 2, 3, 5, 7 and 13 are considered "dependent divisions" and will require portions of assigned fleets to be temporarily relocated to and operated from other divisions to allow portions of the site to be turned over for staged construction activities. Phase 3 will likely result in increased operational costs due to the increased deadhead miles incurred.

If one of the Phase 3 divisions is under construction while a portion of its fleet is temporarily relocated to Division 10, no other dependent division can be improved unless additional relocation storage space is identified and made available.

Phase 3 is illustrated in Figure 3-8.

Figure 3-8. Phase 3: Dependent Divisions



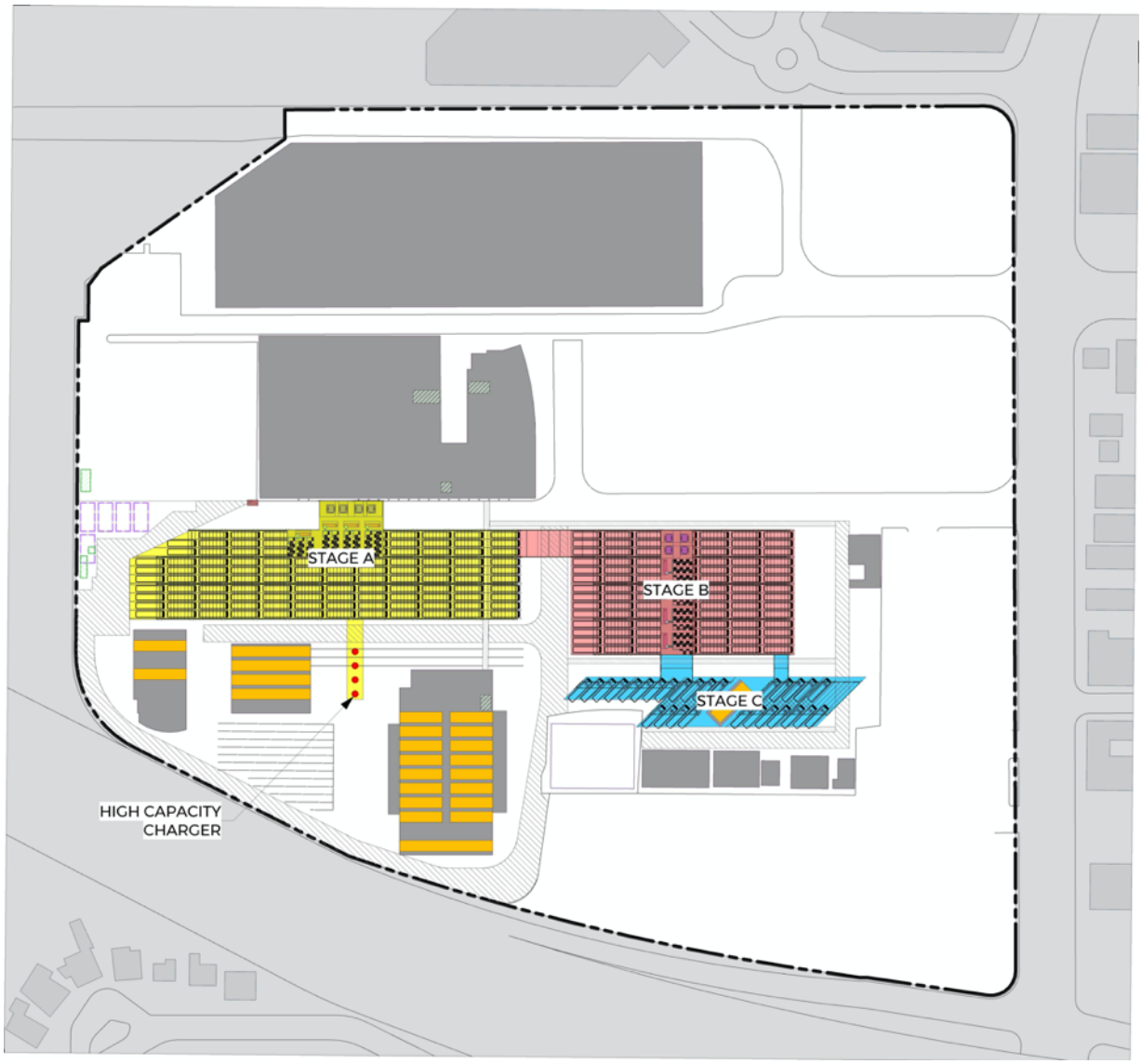
Source: ZEBGO, December 2018

3.4.2 On-Site Staging

Due to space constraints at each division, most divisions' ZEB infrastructure upgrades will be done in multiple on-site "stages" which will require the temporary relocation of buses to other divisions.

Each stage generally represents a natural break of bus parking at each division. For each stage, buses will be relocated for approximately six months so that BEB charging equipment can be installed. At the conclusion of the staged construction, buses can once again be parked there. Figure 3-9 provides an example of the stages of construction at Division 9.

Figure 3-9. Division 9 Staged Construction



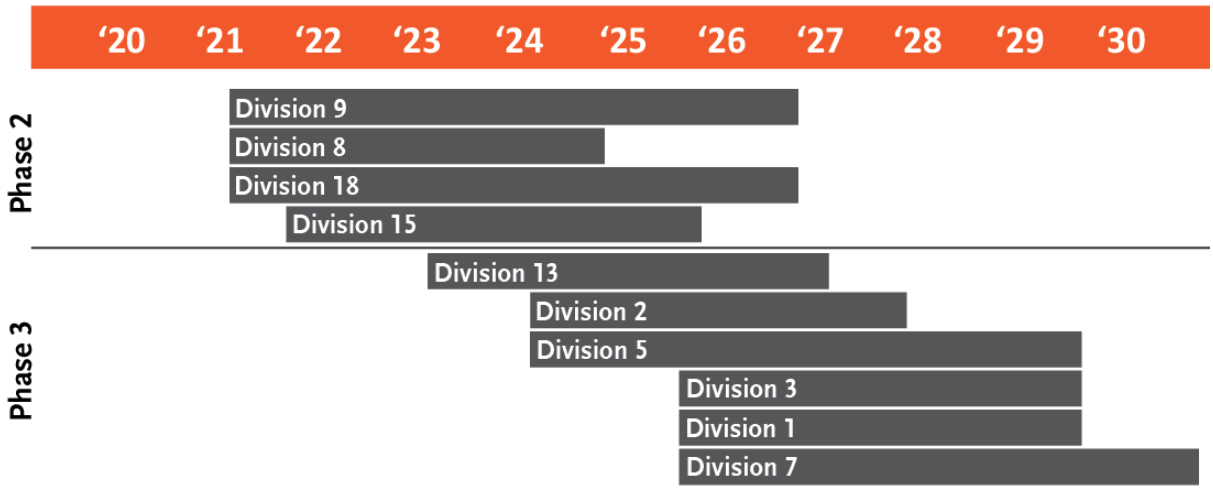
Source: ZEBGO, December 2018

3.5 Schedule and Adaptability

As previously discussed, Metro has a very aggressive ZE transition schedule. While the ICT regulation requires a full fleet conversion by 2040, Metro is planning on converting by 2030. To maintain this schedule, the availability of buses, construction schedule adherence, and utility enhancements will all have to be aligned. It should also be noted that as technology develops and new data is acquired, Metro will continue to make adjustments to maximize utility and cost feasibility. This will have direct impacts on the implementation schedule.

Figure 3-10 presents the preliminary transition schedule. These activities include electrification, design, and construction.

Figure 3-10. LA Metro's Preliminary Transition Schedule



Source: ZEBGO, January 2021
Note: Division 10 will not be retrofitted to accommodate ZEBs. Division 10 will primarily be used for temporary storage and bus relocations during the transition.

The following sections detail the existing conditions and planned modifications for 10 of Metro's 11 divisions. As noted previously, December 2018 service levels were used as a baseline. The number of existing buses on-site are based on the total (regardless of active or spare, or vehicle length). All divisions are able to accommodate at least the number of existing buses if converted to BEBs. Ongoing analysis and bus procurements will refine these numbers based on fleet mix and the advancement of battery technology.

3.5.1 Division 1

Existing Conditions

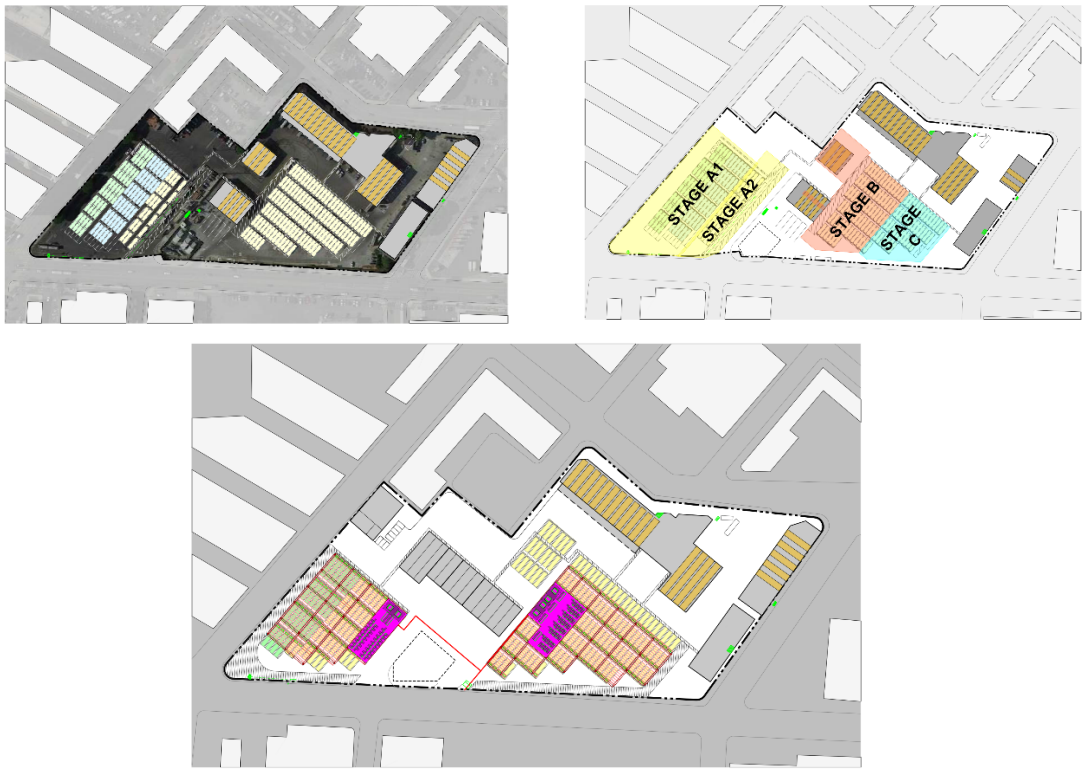
Division 1 is located at 1130 E. 6th Street in the City of Los Angeles. 189 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 1's fleet consists of 132 40-foot, 35 45-foot, and 22 60-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment. Five 100-kW BYD plug-in chargers are onsite (pre-ICT and Master Plan).

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 1. Based on preliminary demand modeling, approximately 12 MW of power will be needed from LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

Construction for Division 1 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Buses are anticipated to be temporarily stored at Division 10 during these stages. Ultimately, Division 1 is expected to have 66 150-kW and six 450-kW chargers and will be BEB-operational in 2029. Figure 3-11 illustrates the process that Division 1 will undergo towards full electrification.

Figure 3-11. Division 1 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.2 Division 2

Existing Conditions

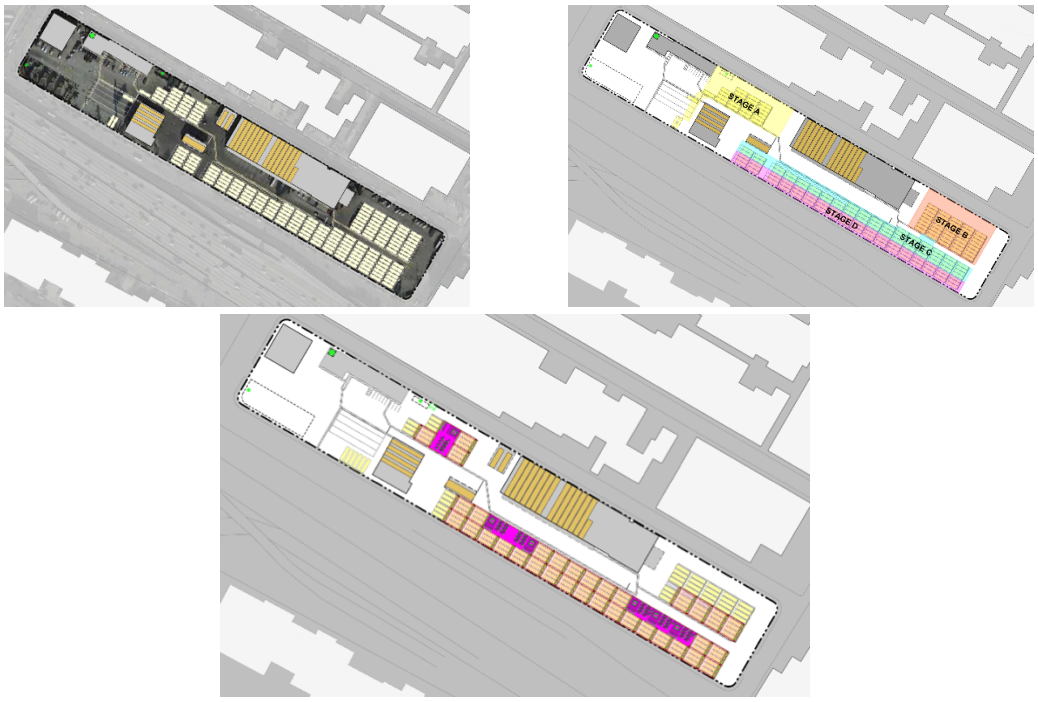
Division 2 is located at 720 E. 15th Street in the City of Los Angeles. 172 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 2's fleet consists of all 40-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses Division 2. Based on preliminary demand modeling, approximately 12 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

Construction for Division 2 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Buses are anticipated to be temporarily stored at Division 10 during these stages. Ultimately, Division 2 is expected to have 86 150-kW and four 450-kW chargers and will be BEB-operational in 2027. Figure 3-12 illustrates the process that Division 2 will undergo towards full electrification.

Figure 3-12. Division 2 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.3 Division 3

Existing Conditions

Division 3 is located at W. Avenue 28 in the City of Los Angeles. 177 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 3's fleet consists of 86 40-foot and 91 45-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 3. Based on preliminary demand modeling, approximately 13 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

Construction for Division 3 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Buses are anticipated to be temporarily stored at Division 10 during these stages. Ultimately, Division 3 is expected to have 89 150-kW and four 450-kW chargers and will be BEB-operational in 2029. Figure 3-13 illustrates the process that Division 3 will undergo towards full electrification.

Figure 3-13. Division 3 – Existing, Construction Staging, and Buildout

Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.4 Division 5

Existing Conditions

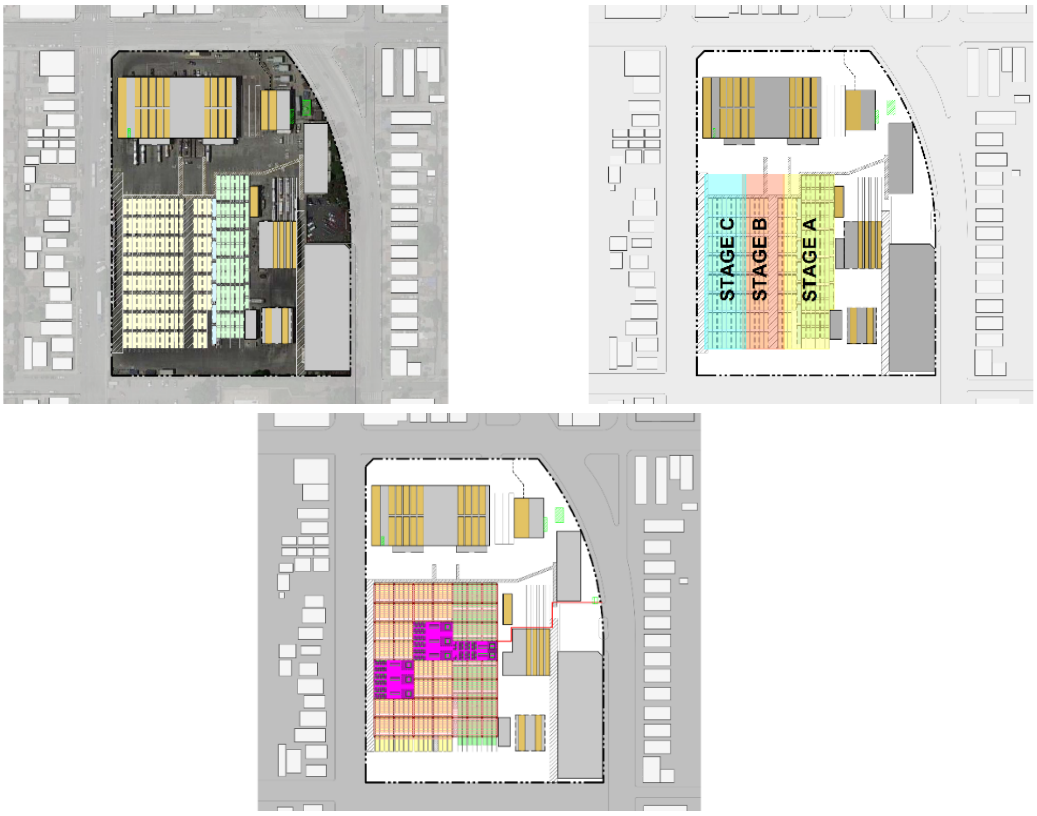
Division 5 is located at 5425 S. Van Ness Avenue in the City of Los Angeles. 193 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 5's fleet consists of 134 40-foot, seven 45-foot, and 52 60-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses Division 5. Based on preliminary demand modeling, approximately 14 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

Construction for Division 5 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Buses are anticipated to be temporarily stored at Division 10 during these stages. Ultimately, Division 5 is expected to have 97 150-kW and four 450-kW chargers and will be BEB-operational in 2029. Figure 3-14 illustrates the process that Division 5 will undergo towards full electrification.

Figure 3-14. Division 5 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.5 Division 7

Existing Conditions

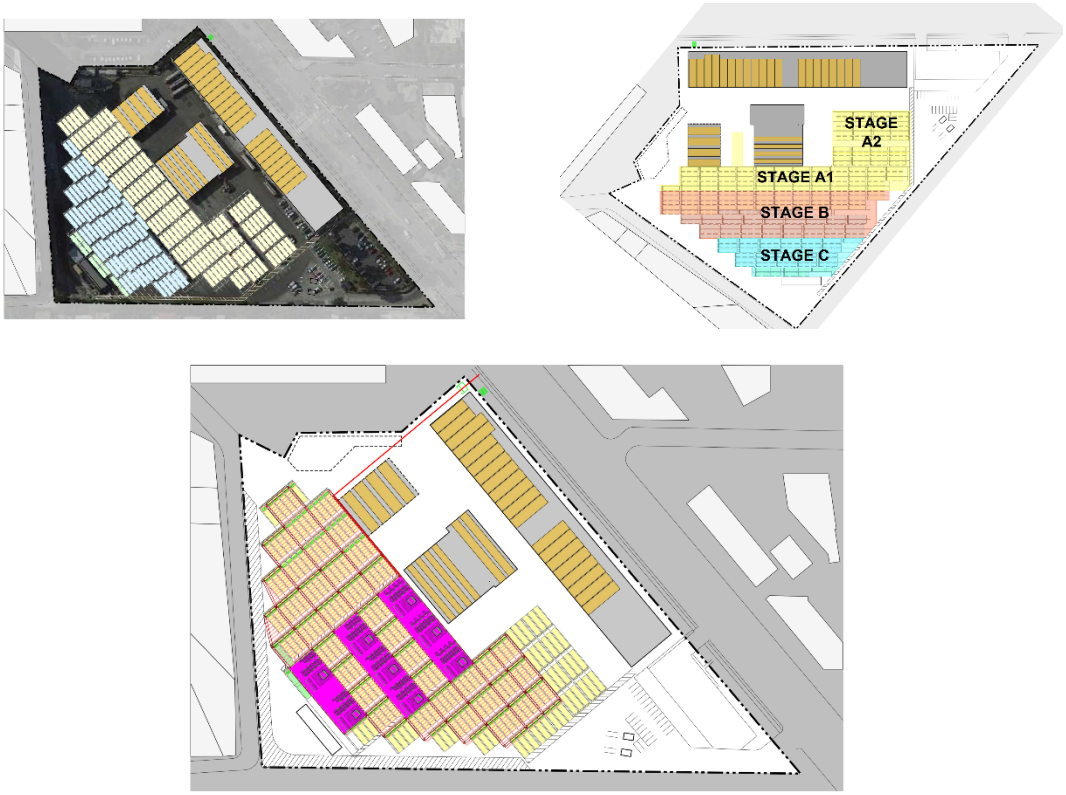
Division 7 is located at 8800 Santa Monica Boulevard in the City of West Hollywood. 233 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 7's fleet consists of 148 40-foot, 80 45-foot, and five 60-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses Division 7. Based on preliminary demand modeling, approximately 14 MW of power will be needed to be provided by Southern California Edison (SCE) to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take three to five years.

Construction for Division 7 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Buses are anticipated to be temporarily stored at Division 10 during these stages. Ultimately, Division 7 is expected to have 117 150-kW and three 450-kW chargers and will be BEB-operational in 2030. Figure 3-15 illustrates the process that Division 7 will undergo towards full electrification.

Figure 3-15. Division 7 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.6 Division 8

Existing Conditions

Division 8 is located at 9201 Canoga Avenue in the City of Los Angeles. 202 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 8's fleet consists of 61 40-foot, 107 45-foot, 33 60-foot, and one 65-foot bus. Bus parking predominates the site and buses are parked in diagonal stacked rows in the south and west portions of the division. As part of a recent reconfiguration of the parking, two diagonal rows have been combined to be nose-to-tail.

10 ABB 150-kW plug-in chargers will be installed on western wall of the Division. However, this work preceded the ZEB Master Plan which is recommending a different charging strategy and layout.

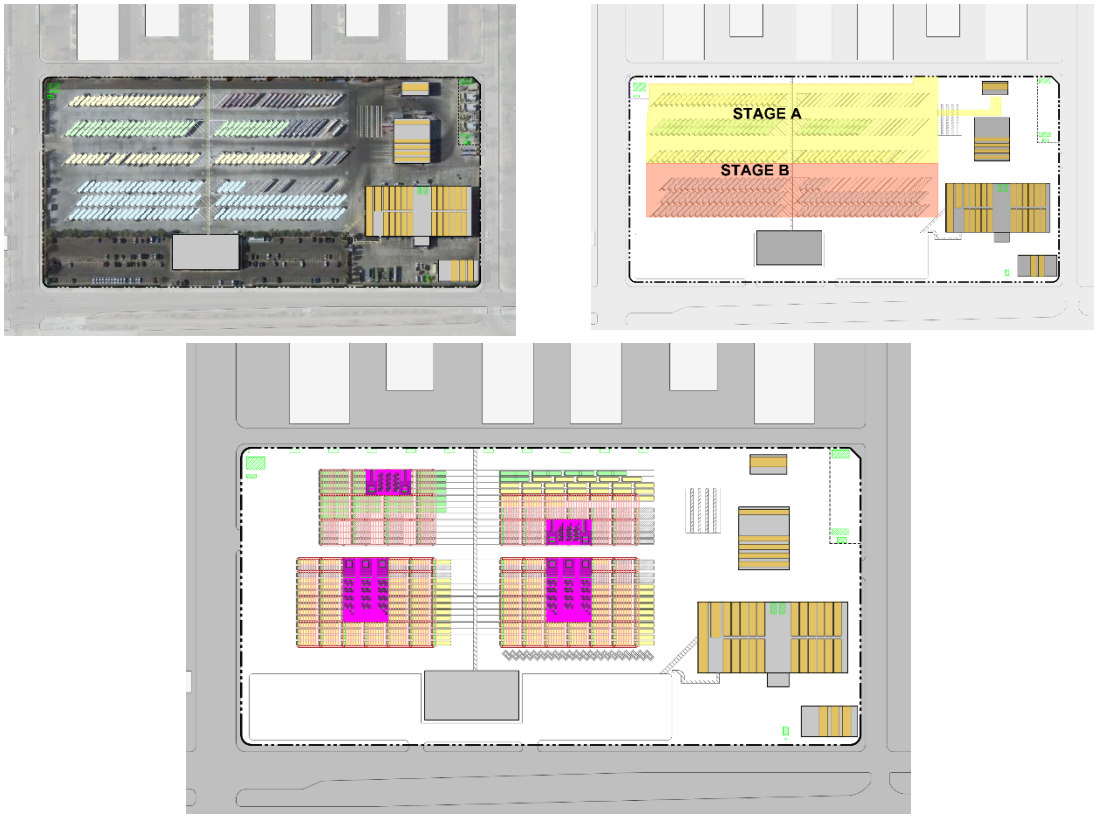
Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses Division 8. Based on preliminary demand modeling, approximately 14 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years. It should be noted that additional capacity was installed at the division to accommodate the 10 plug-in chargers.

To accommodate additional buses and future BEB equipment, the division is being designed for nose-to-tail track parking. Construction for Division 8 and its associated BEB charging equipment and support systems will be completed in two, six-month stages. Due to available storage capacity at Division 8 and the adjacent Marilla Lot (Metro-owned parking lot), buses can be rearranged on site and/or moved temporarily to Marilla Lot during construction.

Ultimately, Division 8 is expected to have 101 150-kW and three 450-kW chargers and will be BEB-operational in 2024. Figure 3-16 illustrates the process that Division 8 will undergo towards full electrification.

Figure 3-16. Division 8 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.7 Division 9

Existing Conditions

Division 9 is located at 3449 Santa Anita Avenue in the City of El Monte. 223 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 9's fleet consists of 161 40-foot and 62 45-foot buses. Division 9 has both nose-to-tail parking and diagonal parking. Buses assigned to the division are parked in one of 11 parallel rows at the western end of the site. Overflow parking is provided for buses in the diagonal-arranged lot to the east.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 9. Based on preliminary demand modeling, approximately 19 MW of power will be needed to be provided by SCE to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take three to five years. Existing diagonal parking will be transitioned to nose-to-tail to accommodate more buses and conform with BEB infrastructure plans.

Construction for Division 9 and its associated BEB charging equipment and support systems will be completed in two, six-month stages. Due to available storage capacity at Division 9, buses can be rearranged on site without temporary displacement. Ultimately, Division 9 is expected to have 112 150-kW and four 450-kW chargers and will be BEB-operational in 2026. Figure 3-17 illustrates the process that Division 9 will undergo towards full electrification.

Figure 3-17. Division 9 – Existing, Construction Staging, and Buildout

Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout
Source: ZEBGO, December 2018

3.5.8 Division 10

Division 10 is located at 742 N. Mission Road in the City of Los Angeles.

As of September 2020, due to future anticipated service needs, Metro has permanently closed Division 10 for revenue service. However, Division 10 is expected to be a key component in Metro's ZEB transition as it will be relied upon for temporary storage and bus relocations as other divisions are being improved.

3.5.9 Division 13

Existing Conditions

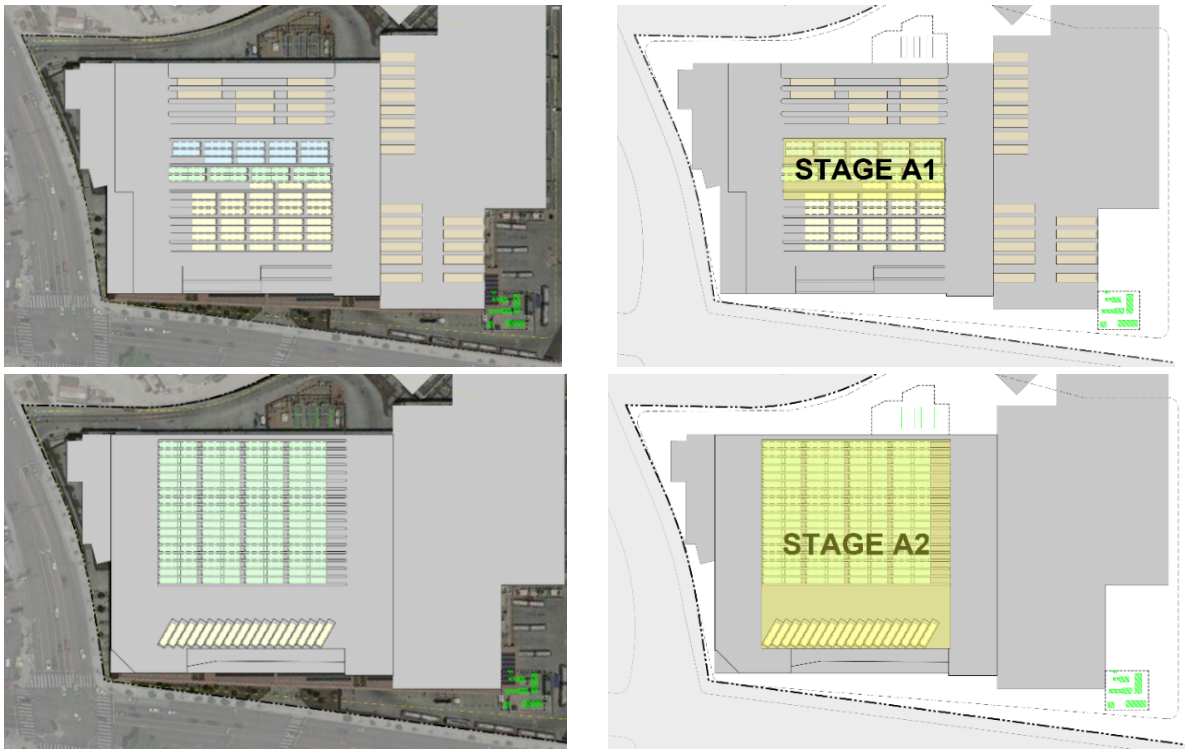
Division 13 is located at 920 N. Vignes Street in the City of Los Angeles. Division 13 is also connected to Metro's Central Maintenance Facility (CMF). 163 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 13's fleet consists of 56 40-foot, 14 45-foot, and 93 60-foot buses. Division 13 is a multi-level structure. The "Lower Level" (subterranean) is for employee parking, "Level 1" (street level) is for 40- and 45-foot bus parking, maintenance, fueling, and wash, and the "Upper Level" is for 60-foot bus parking. Buses are parked in unassigned, numbered tracks (nose-to-tail).

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 13. Based on preliminary demand modeling, approximately 10 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

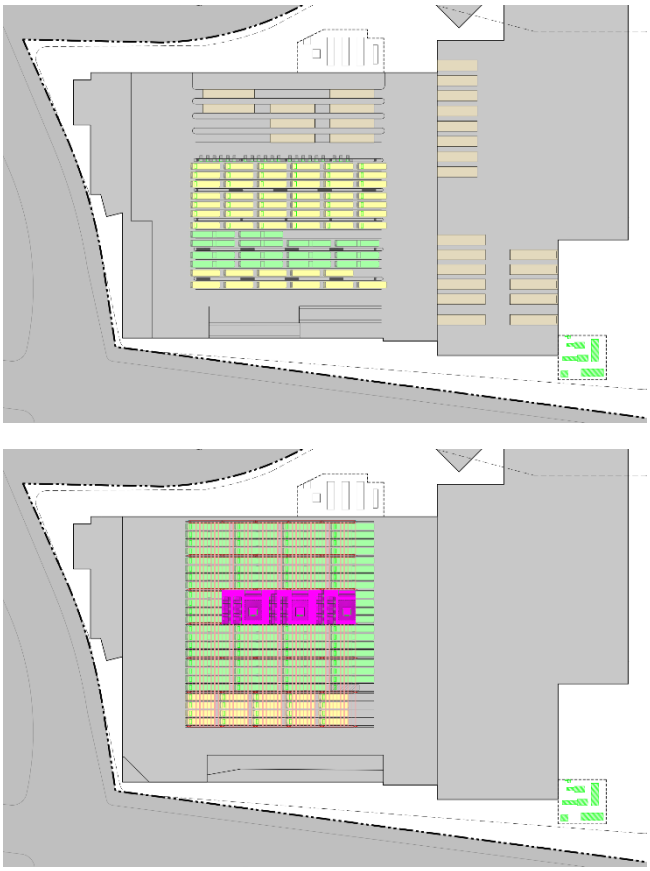
Construction for Division 13 and its associated BEB charging equipment and support systems will be completed in one six-month stage. Buses are anticipated to be temporarily stored at Division 10 and CMF during these stages. Ultimately, Division 13 is expected to have 95 150-kW and three 450-kW chargers and will be BEB-operational in 2026. Figure 3-18 illustrates the existing (December 2018) and construction staging for the 2nd and 3rd levels, and Figure 3-19 illustrates these levels at full buildout.

Figure 3-18. Division 13 – Existing and Construction Staging (2nd and 3rd Levels)



Source: ZEBGO, December 2018

Figure 3-19. Division 13 – Buildout (2nd and 3rd Levels)



Source: ZEBGO, December 2018

3.5.10 Division 15

Existing Conditions

Division 15 is located at 11900 Branford Street in the City of Los Angeles. 241 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 15's fleet consists of 82 40-foot, 109 45-foot, and 50 60-foot buses. Bus parking comprises the majority of the site in the south and west portions of the division. Parking is single row diagonal and has recently been expanded into an underutilized space.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 15. Based on preliminary demand modeling, approximately 17 MW of power will be needed to be provided by LADWP to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take two to three years.

Given the current layout, making room for charging equipment could be challenging but rearranging two or more rows, as was done at Division 8, would provide ample parking space.

Construction for Division 15 and its associated BEB charging equipment and support systems will be completed in two, six-month stages. Due to available storage capacity at Division 15 and the nearby Marilla Lot (Metro-owned parking lot), buses can be rearranged on site and/or moved temporarily to Marilla Lot during construction. Ultimately, Division 15 is expected to have 121 150-kW and three 450-kW chargers and will be BEB-operational in 2025. Figure 3-20 illustrates the process that Division 15 will undergo towards full electrification.

Figure 3-20. Division 15 – Existing, Construction Staging, and Buildout

Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout.
Source: ZEBGO, December 2018

3.5.11 Division 18

Existing Conditions

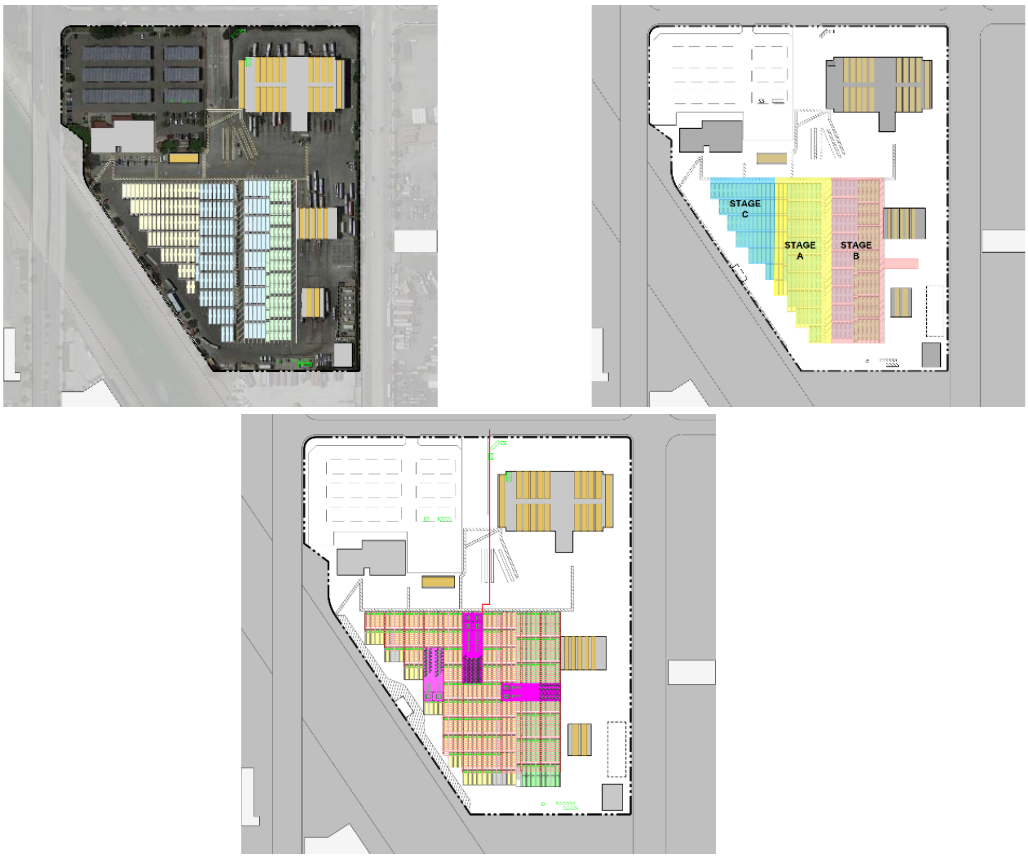
Division 18 is located at 450 W. Griffith Street in the City of Gardena. 252 CNG-powered buses are stored, maintained, fueled, and serviced at the division. Division 18's fleet consists of 74 40-foot, 116 45-foot, and 62 60-foot buses. Buses are parked in unassigned, numbered tracks (nose-to-tail). The division is constrained with no significant space for future ground-level BEB charging equipment.

Planned ZEB Modifications and Timeline

Additional electrical capacity will be required to meet the service needs of buses at Division 18. Based on preliminary demand modeling, approximately 17 MW of power will be needed to be provided by SCE to support the current fleet. Construction and enhancements to bring this additional capacity is anticipated to take three to five years.

Construction for Division 18 and its associated BEB charging equipment and support systems will be completed in three, six-month stages. Due to available storage capacity at Division 18, buses can be rearranged on site without temporary displacement. Ultimately, Division 18 is expected to have 126 150-kW and five 450-kW chargers and will be BEB-operational in 2026. Figure 3-21 illustrates the process that Division 18 will undergo towards full electrification.

Figure 3-21. Division 18 – Existing, Construction Staging, and Buildout



Clockwise (from the upper left), from existing conditions (December 2018), to construction staging, to full buildout.
Source: ZEBGO, December 2018

4 DISADVANTAGED COMMUNITIES

The following section provides an overview of disadvantaged communities (DACs) in Metro's service area and the strategy to prioritize them for ZEB adoption.

4.1 Disadvantaged Communities Served

73 percent of Metro's divisions are located in communities that are classified as "disadvantaged" according to CalEnviroScreen. The conversion of existing CNG operations to BEB operations will directly benefit the communities in the vicinity of these divisions by way of a reduction in noise and local emissions. These divisions also serve multiple routes that traverse multiple DACs across Los Angeles County.

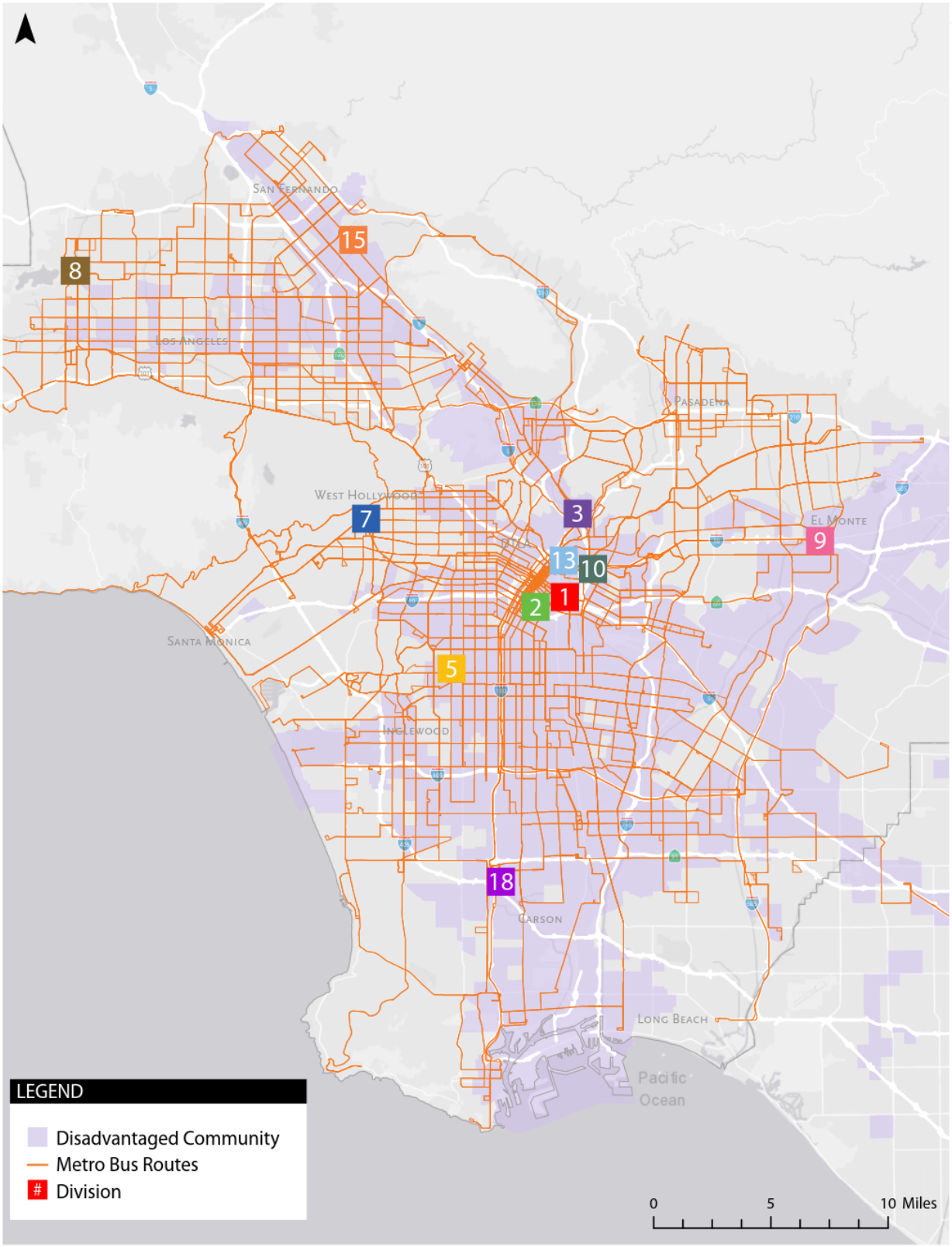
Table 4-1 summarizes whether or not divisions are located in DACs and the number and percentage of DACs that its respective routes serve. Figure 4-1 illustrates Metro divisions and routes in DACs.

Table 4-1. Disadvantaged Communities

Division	In DAC?	NOx Exempt Area?	Communities (Tracts) Served	DACs Served (#)	DACs Served (%)
1	Yes	No	299	206	69%
2	Yes	No	299	234	78%
3	Yes	No	343	213	62%
5	Yes	No	285	211	74%
7	No	No	362	194	54%
8	No	No	283	114	40%
9	Yes	No	343	188	55%
13	No	No	251	148	59%
15	Yes	No	404	181	45%
18	Yes	No	480	339	71%

Source: CalEnviroScreen 3.0, June 2018

Figure 4-1. DACs in Service Area



Source: ZEBGO, CalEnviroScreen 3.0, June 2018

4.2 DAC Prioritization Strategy

As previously mentioned, Phase 1's ZEB transition is focused on the Silver and Orange BRT lines. The second and third phases will focus on Metro's other routes and services.

Since ZEBs cannot operate unless infrastructure is in place to charge buses, Metro's transition (primarily Phases 2 and 3) largely focuses on division electrification and not individual routes. Once divisions are electrified, buses will be strategically deployed to routes and service blocks with a priority of DAC service. It should be noted that in Phase 2, three of the four divisions to be electrified divisions are in DACs, the remaining four DAC divisions will be electrified in Phase 3.

The population that resides in DACs tend to be society's most vulnerable. They typically rely on the public transit system, are more likely to be impoverished, and are more frequently exposed to harmful emissions and pollutants that result in negative health outcomes. Thus, DAC communities will benefit the most once ZEBs are adopted and this is why Metro is making a concerted effort to ensure that divisions and routes within and that service DACs are among the first to be transitioned to ZEBs, as shown in Table 4-1.

5 WORKFORCE TRAINING

The following section provides an overview of Metro's plan and schedule to train personnel on the impending transition.

5.1 Training Requirements

The transition to ZEBs will significantly alter Metro's service and operations. Converting to ZEBs from CNG is an arduous endeavor and will impact all ranks of the organization. This will require extensive change management and training which will be provided by the OEMs and Metro. Training will need to be conducted after buses are procured and in advance of the delivery of said buses. Therefore, it is expected that all personnel will be sufficiently trained before the buses arrive. Training conditions and schedules will be included in procurement documents, as they are with all existing procurements. If other OEM-provided buses are procured in the future and/or if new components, software, or protocols are implemented, it is expected that Metro's staff will be trained well in advance of the commissioning of these additions. Since battery technology is rapidly evolving, it is likely that buses and supporting battery chemistries and software will change between 2020 and 2040, therefore, Metro's future procurements/deliveries will require refresher or updated trainings for relevant staff.

The following provides a list of personnel and positions that will need to be retrained upon adoption of ZEBs (this list is not exhaustive):

- **Bus Operators**
  Bus operators will need to be familiarized with the buses, safety, bus operations, and pantograph operations.
- **Facilities Maintenance Staff and Maintenance**
  Facilities staff will need to be familiarized with scheduled and unscheduled repairs, high-voltage systems, and the specific maintenance and repair of equipment.
- **First Responders**
  Local fire station staff will need to be familiarized with the new buses and supporting facilities.
- **Mechanics**
  Mechanics will need to be familiarized with the safety-related features and other components of ZEBs.
- **Instructors**
  For both Operator Central Instruction and Maintenance, instructors will need to understand all aspects of the transition of ZEBs to train others.
- **Service Attendants**
  Service attendants will become familiarized with proper charging protocol and procedures that are ZEB-specific.
- **Management Staff**
  All management staff (supervisors, directors, etc.) will be familiarized with ZEB operations and safety procedures.

6 COSTS AND FUNDING

The following section identifies potential funding sources that Metro may pursue in its adoption of ZEBs.

6.1 Preliminary Costs

Based on preliminary estimates, Metro's transition is expected to cost between $1.3 billion and $1.6 billion. Infrastructure will cost between $900 million and $1.4 billion. and BEBs are expected to cost $222 million more than the conventional CNG buses. These costs only reflect capital infrastructure. Various operations and maintenance costs, including utility, operating, and maintenance costs are still be analyzed.

6.2 Funding Sources

There are a number of potential federal, state, local, and project-specific funding, and financing sources at Metro's disposal. To date, Metro has applied for and been awarded various Federal, State, and Local funds for ZEB projects, as indicated in Table 6-1.

Table 6-1. Metro's ZEB Funding

Type	Agency	Funding Mechanism	Year	Status	Award
Federal	FTA	Low- or No-Emission Vehicle Grant	2015	Awarded	$4.3M
Federal	FTA	Low- or No-Emission Vehicle Grant	2016	Not Awarded	N/A
State	Caltrans	Transit and Intercity Rail Capital Program	2016	Not Awarded	N/A
Local	SQAMD	AB2766 Discretionary Fund	2017	Awarded	$2M
State	CARB	Carl Moyer Memorial Air Quality Standards Attainment Program	2018	Not Awarded	N/A
State	Caltrans	Transit and Intercity Rail Capital Program	2020	Not Awarded	N/A

Source: Los Angeles Metropolitan Transportation Authority, February 2020

Metro is also leveraging utility-based programs such as LADWP's Commercial EV Charging Station Rebate Program and SCE's Charge Ready Program. For funding, Metro will also continue to use local tax measure(s) and other strategies to meet its 2030 goals, such as public-private partnerships, and other grant opportunities.

7 START-UP AND SCALE-UP CHALLENGES

As mentioned, Metro has a very aggressive ZEB transition schedule – 10 years before the ICT regulation requires. To meet both deadlines, there are several challenges and opportunities that Metro has identified. The following briefly described some of the challenges that Metro faces for its transition:

- **Technological adaptation.** Currently, Metro is modeling and planning for a transition based on December 2018 service levels and existing ZEB technology. With challenging 2030 and 2040 deadlines looming, it is difficult to anticipate future technological enhancements and changes, such as improved batteries and chargers. Slight changes in these technologies could improve bus ranges, in turn, reducing costs. Metro (and the market) must be aware of these changes as it would be counterproductive to invest in technologies that will soon be outdated.
- **Costs.** Adoption of ZEBs has many benefits, including potential lifecycle cost savings. However, the investment required for capital and change management will be very expensive. Metro will have to be creative with funding mechanisms and sources to ensure that the transition to ZEB will not be detrimental to its operations and service.
- **Market Production Factors.** The ICT regulation will put a lot of pressure on OEMs to produce ZEBs at unprecedented rates. However, it is not only California that is interested in converting to ZEBs. These multi-state policy changes will have a great impact on these transitions; however, it will also make it challenging to meet ZEB goals for agencies if supply of buses can meet with demand.
- **Phasing and Transition.** Metro has the second largest transit fleet in the United States. Transitioning to ZEBs without any service interruptions will be very challenging due to the limited space for construction, staging buses, and maintaining service.
- **Utility Upgrades.** Metro's divisions are currently under the jurisdiction of two utilities, whereas potential on-route charging locations are under nine. These utilities have different rate structures and protocols to apply for and receive additional power. How each utility is sanctioned (whether municipal or private) also dictates procedural requirements. These nuances will make it challenging to plan for due to the variances in schedule and process.
- **Managing Power Demand.** The transition to BEBs will require strategies to ensure that Metro can utilize power in the most cost-efficient way. Metro is currently doing this via utility negotiations and demand modeling to determine methods to reduce peak demands. However, shaving demand may also come at a hefty capital cost, something that staff is currently analyzing.
- **Uncertainty of COVID-19.** COVID-19 has impacted all facets of our global economy, transit is not an exclusion. During the pandemic, ridership has plummeted and caused major shortfalls in Metro's budget which has impacted capital programs and operations. At this time, it is unclear what short- and long-term impacts will be for service. There is a possibility that service ridership levels may not return to previous levels resulting in changes to procurement and funding. Metro will continue to analyze trends to determine service changes and plans.

In conclusion, Metro is still determining the path forward towards its transition goals. At this time, Metro is slated to convert its entire fleet to ZEBs by 2030, 10 years in advance of what is required by the ICT. Metro's next steps in this process is to continue refining analysis and Master Planning efforts.

ITEM 41

ZEB Program
Master Plan Update

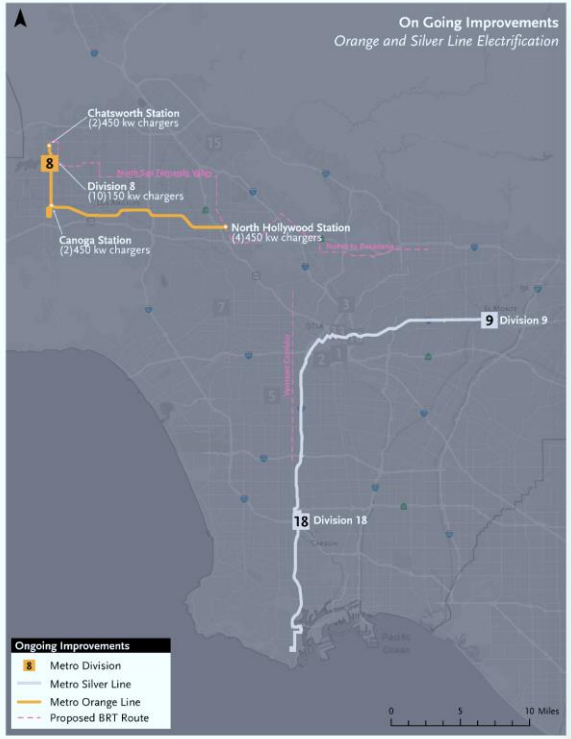
Metro

Executive Management Committee

March 2021

Transition Phasing

Phase 1



Orange & Silver Lines
Divisions: 8,9,18

Phase 2

Independent Divisions
Divisions: 8, 9, 10, 15, 18

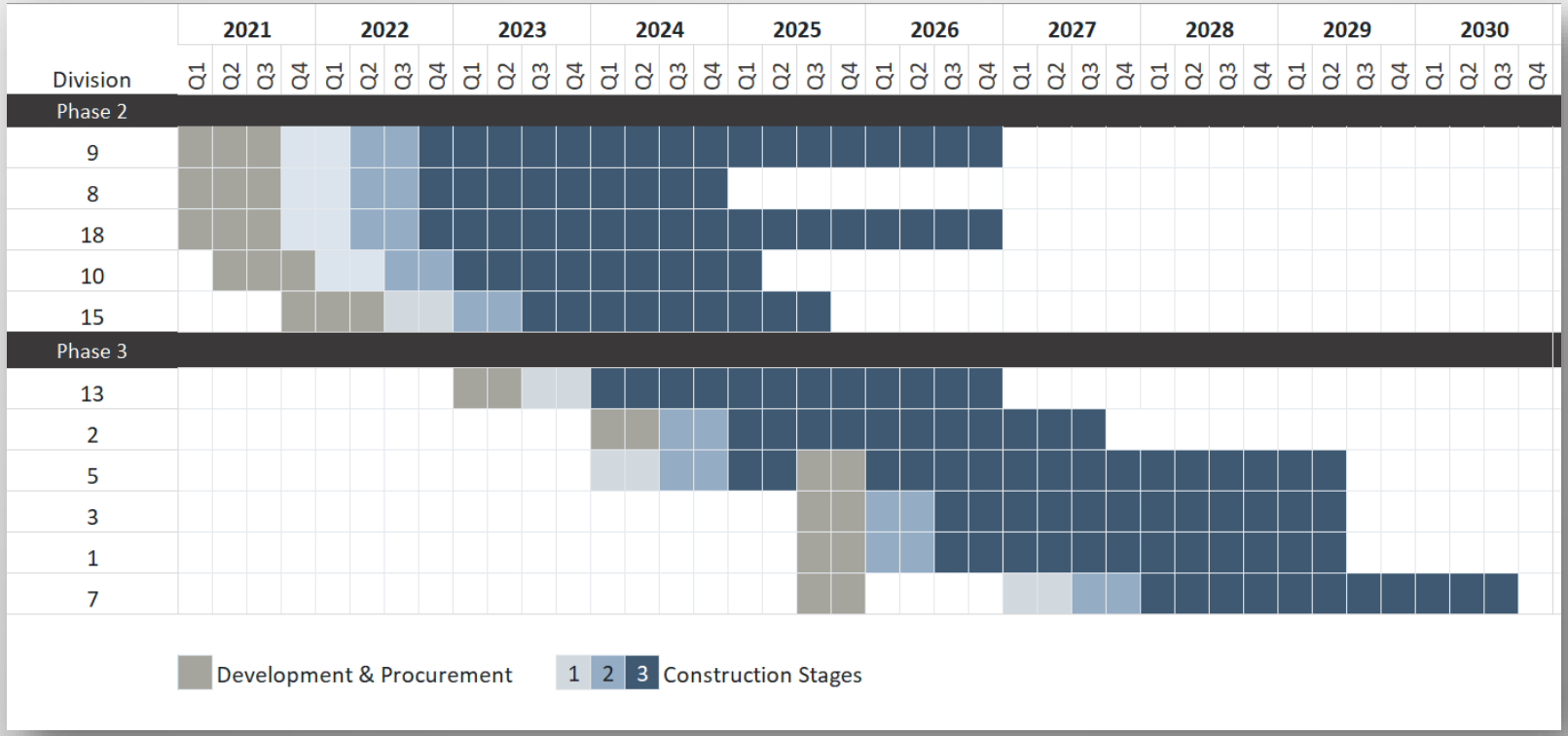
Phase 3

Dependent Divisions
Divisions: 1, 2, 3, 5, 7, 13

Metro

Infrastructure Phasing Schedule 2030

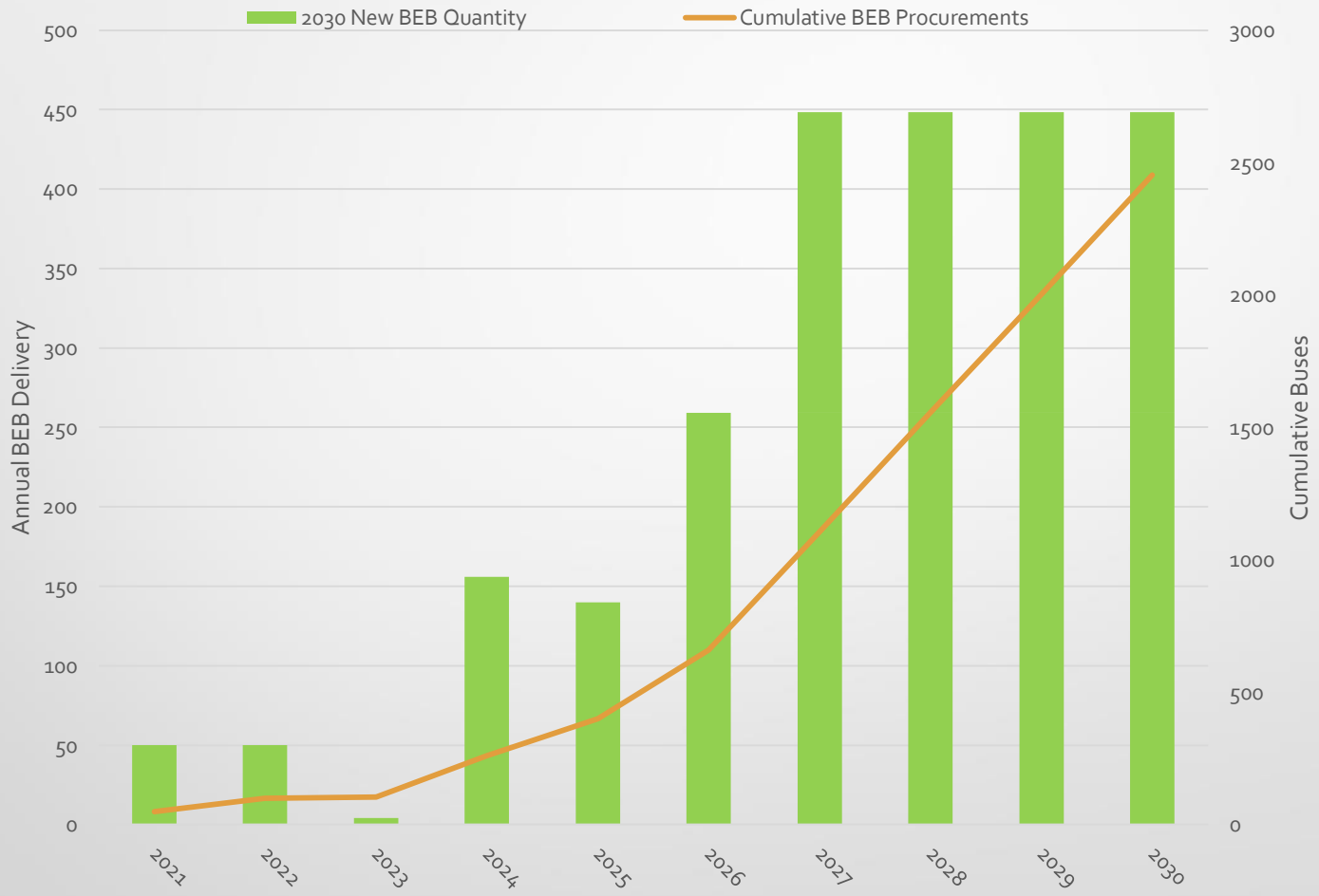
Division Modification and En-route Charger Installation Schedule



Bus deliveries are timed with completion of construction stages and en-route charging installations.

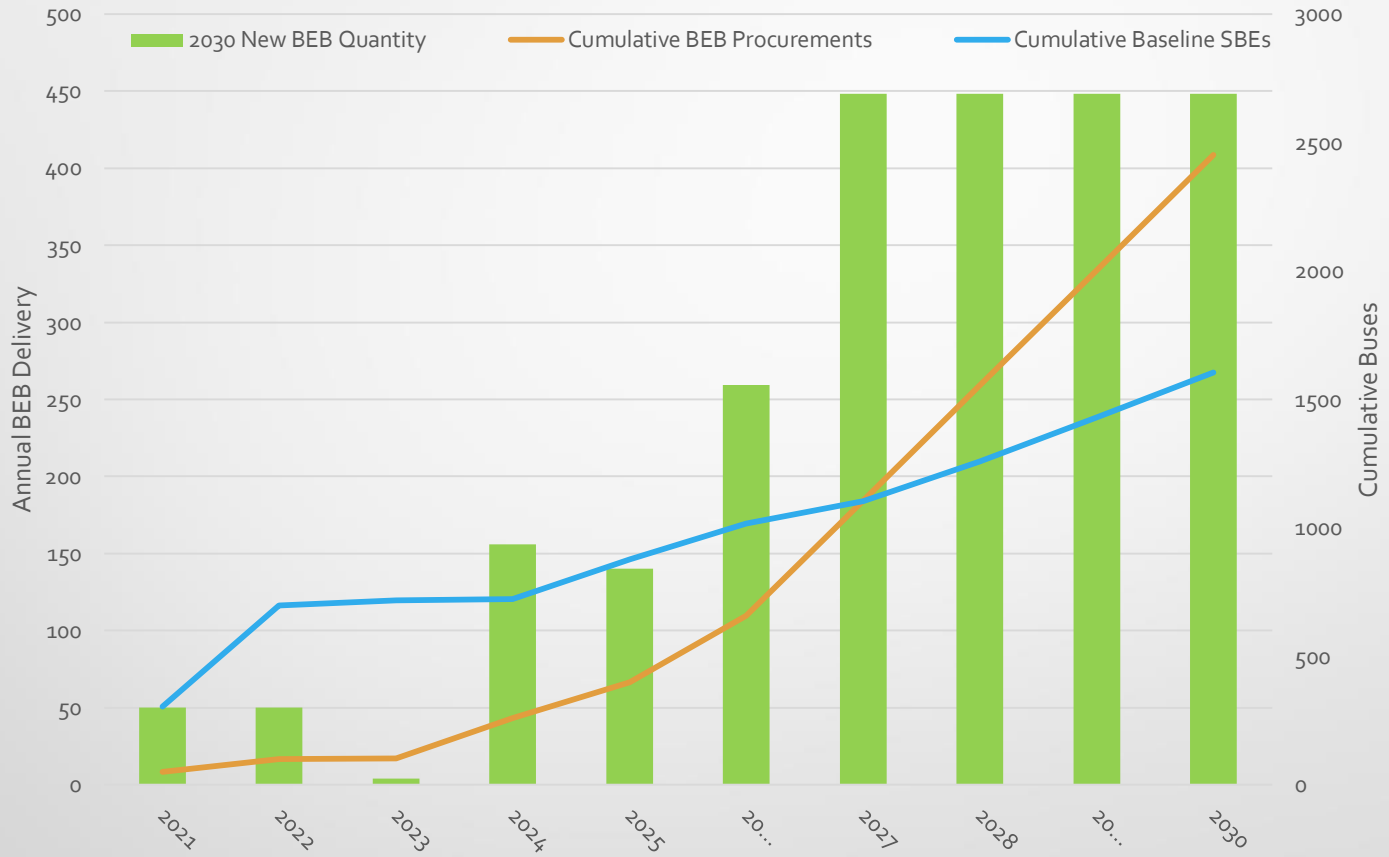
Metro

Bus Delivery Schedule 2030



Metro

Bus Delivery Schedule 2030



Note: Current BEB scheduled procurements exceeds baseline procurements to meet service needs by 848 Standard Bus Equivalent (SBE) 40' Buses.

Metro

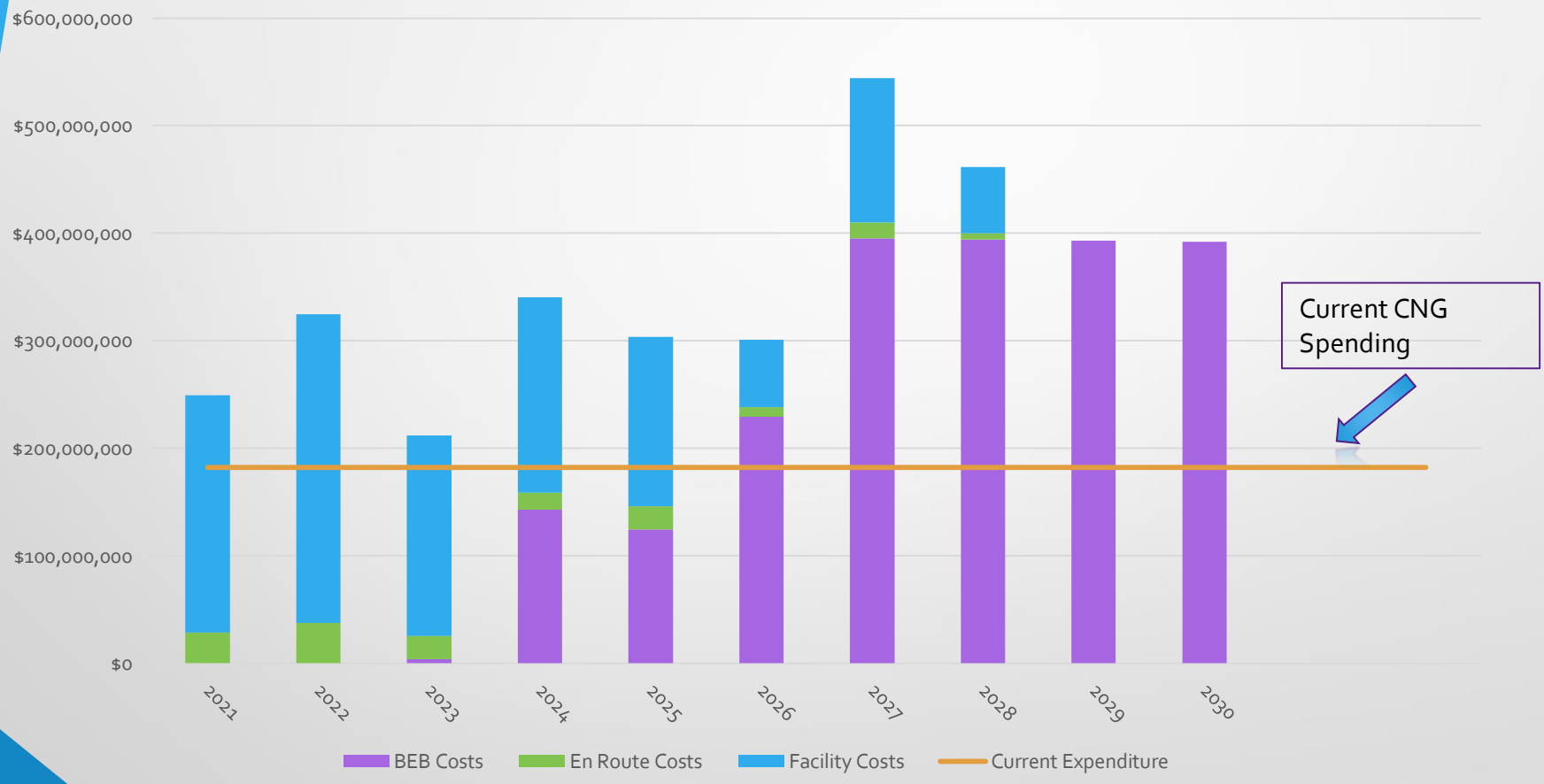
Costs by Division

Division	Bus Qty	Infrastructure		En-Route	Buses	Total[2]
		Min[1]	Max[2]			
1	171	$70.9M	$100.1M	$14.2M	$150.8M	$265.1M
2	169	$67.3M	$95.1M	$16.8M	$149.0M	$261.0M
3	151	$62.6M	$88.4M	$13.0M	$133.2M	$234.6M
5	167	$66.5M	$94.0M	$8.4M	$147.3M	$249.6M
7	240	$101.4M	$143.3M	$11.1M	$211.6M	$366.1M
8	358	$134.0M	$189.3M	$16.7M	$315.7M	$521.7M
9	176	$65.9M	$93.1M	$17.8M	$155.2M	$266.1M
10	175	$65.5M	$92.5M	$4.5M	$154.3M	$251.4M
13	316	$123.4M	$174.3M	$7.1M	$278.7M	$460.1M
15	245	$93.7M	$132.3M	$17.6M	$216.0M	$366.0M
18	185	$70.7M	$99.9M	$27.4M	$163.1M	$290.4M
Totals	**2,353**	**$921.9M**	**$1.30B**	**$154.7M**	**$2.07B**	**$3.53B**

1. Baseline BEB Infrastructure Only
2. Baseline Infrastructure + On-Site Storage + Solar

Metro

Annual Cashflow vs. Current Spending



Metro

File #: 2021-0065, **File Type:** Agreement **Agenda Number:** 42.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: INGLEWOOD TRANSIT CONNECTOR JOINT POWERS AUTHORITY

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. AUTHORIZING AND DIRECTING the Chief Executive Officer (CEO) to execute the Inglewood Transit Connector Joint Powers Authority Joint Exercise of Powers Agreement to join with the City of Inglewood to own, manage, and oversee the design, construction, financing, operation and maintenance of the 1.6-mile Inglewood Transit Connector Project, an elevated automated people mover to provide a critically needed direct transit connection between Metro's network, the soon to be completed regional Crenshaw/LAX Line, and key housing and employment centers, and sports and entertainment venues within the City.

B. AUTHORIZING the CEO to take such further actions incident to execution of the Joint Exercise of Powers Agreement as are necessary to formalize formation and establishment of the Inglewood Transit Connector Joint Powers Authority as a separate legal entity.

ISSUE

Over the past two years, the City of Inglewood (City) has engaged in discussions with Metro while the City has examined various ownership structures for the Inglewood Transit Connector Project (Project). Recognizing their mutual interest in the successful completion of the Project and commencement of passenger service prior to the 2028 Los Angeles Olympics, Metro and City executive management believe that the formation of the Inglewood Transit Connector Joint Powers Authority (Authority) will combine the City's understanding of local mobility needs with Metro's experience successfully developing rail transit projects and would provide the optimal solution for Project ownership, management and governance without obligating Metro to make financial contributions.

The City and Metro executed a non-binding Memorandum of Understanding on November 2, 2020, agreeing to work together to negotiate a Joint Exercise of Powers Agreement (JPA) for establishment of the Authority pursuant to the Joint Powers Exercise of Powers Act (Gov. Code §§6500 *et. seq*.) (the Joint Powers Act). The purpose of the Authority is to exercise the City's and Metro's mutual

powers to own, manage, and oversee the design, construction, financing, operation and maintenance of the Project.

City and Metro staff have completed negotiation of the JPA, and concur that execution of the JPA in the form provided in Attachment A will establish the optimal governance structure to achieve timely, efficient and successful development of the Project, and will be in the best interest of Metro, the City, and the public. The City Council has approved the JPA and authorized City's Mayor to execute the JPA.

Metro Board approval is now needed to authorize the CEO to execute the JPA in order to support advancement of the Project. Approval of the JPA supports Project development, and authorizes establishment of the Authority, which the City and Metro have identified as the Project governance structure best suited to provide a critically needed direct transit connection between the City's emerging sports and entertainment district and Metro's transit network. By participating as members in a joint powers authority, City and Metro will leverage and combine their respective expertise, resources and capabilities for the benefit of the public traveling to, from and within the City.

BACKGROUND

To improve transit and mobility for its residents and community stakeholders, and to accommodate new residents, businesses, and visitors arriving in record numbers due to the City's rapid economic revitalization and transformation, the City is planning to construct the Inglewood Transit Connector Project. The Project is an approximately 1.6-mile elevated fixed-guideway transit system with three stations that will provide direct transit connections to:

- Metro Crenshaw/LAX line, Downtown Inglewood Station
- The Forum
- SoFi Stadium and the Los Angeles Sports and Entertainment District at Hollywood Park
- The Inglewood Basketball and Entertainment Center (IBEC)

The Project incorporates Metro's policies to closing critical first/last mile gaps by extending the Crenshaw/LAX Line to the City's major housing, commercial, entertainment and employment centers.

Over the last year, the City has made significant strides towards the goal of completing the Project before the start of the 2028 Summer Olympics, including:

- issuing a Draft Environmental Impact Report, pursuant to the California Environmental Quality Act (CEQA), for the development of the Project;

- receiving a $95.2 million grant from the California State Transportation Agency;

- receiving a $233.7 million commitment from the South Bay Cities Council of Governments of Metro Measure R funds, projected to become available July 2021 as provided in the Board-approved 2020 Measure R Decennial Transfer;

- securing commitments of certain new City revenue streams, which include future ticket tax pledges from the IBEC;
- garnering world class support from key stakeholders, including elected officials, business leaders, community groups, surrounding cities, transit advocates, environmental organizations, labor, and the Los Angeles Olympic and Paralympic Organizing Committee (see Attachment B for a list of additional Project supporters); and
- engaging a multi-disciplinary consulting team for financial, technical, legal, and program management advisory services.

DISCUSSION

As identified by the Los Angeles County Assessor's 2020 Annual Report, the City of Inglewood is the fastest growing city in Los Angeles County (13.6% growth in the last year), with exponential growth in housing and regional employment opportunities. This rapid economic revitalization and historic transformation, with projected significant increases in population, housing, and employment density over the next 20 years will have significant effects on mobility within the City and surrounding subregion. It is critically important that City's residents and visitors have a direct means of connecting to Metro's Metro Crenshaw/LAX line, and Downtown Inglewood Station.

The City identified this urgent need and began investing significant resources in developing the best solution to meet the need several years ago. In 2017, the City contracted with Metro to perform a focused analysis of a 1.2-mile transit connection from the Metro Crenshaw/LAX light rail line to the Inglewood NFL Stadium/Hollywood Park mixed use development, exploring the implementation of a convenient, reliable, high-capacity transit service connecting to the regional Metro Rail system. The study's findings, set forth in the *City of Champions/Inglewood (NFL) Project Focused Analysis of Transit Connection*, dated July, 2017 (the Study), recommended that the City undertake further steps to evaluate potential transit connection projects, select a project to be environmentally cleared pursuant to CEQA and possibly the National Environmental Protection Act, initiate an Enhanced Infrastructure Financing District process, and engage stakeholders and conduct public outreach.

The City followed the Study's recommendations and has been engaged in the recommended activities to the present date. Now, given the progress the City has made, the time has come to put in place a governance structure to facilitate the Project's ownership and operation.

Pursuant to the California Constitution, the City has broad plenary power to establish, purchase and operate public works to furnish transportation to its inhabitants. As a charter city, it has the additional power to develop, operate and maintain transportation equipment and facilities such as the Project, and to join with other public agencies to accomplish the same. Likewise, Metro has the power to provide mass transit guideway projects in Los Angeles County and to participate in a joint powers authority to do so.

After careful study and evaluation, the City and Metro management have determined that the best option for Project governance is formation of a new joint powers authority as a separate legal entity for the sole purpose of developing, owning, financing, operating and managing the Project. To that

end, City and Metro have negotiated the terms and conditions for their formation and participation in the Authority, as set forth in the JPA.

The City is currently carrying out Project planning and development activities which include finalizing CEQA compliance documentation, planning a procurement to award a contract to design, build, finance, operate and maintain the Project (the Project Agreement), and the refinement of a feasible plan of finance and preparation for property acquisition. The City and Metro intend for the City to continue in that role until the Authority is ready to assume such responsibilities, at or about the time that the City completes award of the Project Agreement, and the close of financing for the Project (Project Financial Close).

In furtherance of its development activities, the City is in the process of adopting a Project-specific ordinance to authorize procurement authority of the Project Agreement. As currently envisioned, upon Project Financial Close, the City will transfer the Project Agreement and other essential Project assets to the Authority, and the Authority will assume responsibility thereafter for delivery, operation and maintenance.

Until Project Financial Close, the City and Metro will consult and coordinate regarding Project progress and the tasks being performed and conclusions being derived from key work product. The City will serve as administrator of the Authority, and the Authority will operate with limited and potentially seconded staff necessary to its early activities to establish itself so that it is ready to assume ownership and responsibility for the Project upon Project Financial Close. To this end, any services that Metro staff provide to assist the Authority will be compensated pursuant to a separate agreement between the Authority and Metro.

The JPA provides the terms and conditions for the Authority's establishment and governance. Key terms include:

- The City and Metro are the initial parties to the JPA and Members of the Authority. Additional Members would require amendment of the JPA, and approval by the governing body of each party.

- The JPA creates the Authority as a separate legal entity. To the maximum extent permitted by law, no Member will have liability for the debts, liabilities or obligations of the Authority.

- No Member may be compelled to contribute funding or other resources to the Authority or the Project. Members may make contributions of money or assets and provide loans, or contribute personnel, equipment or property subject to separate agreement between the Member and the Authority, approved by the Member's governing body and the Authority's Board.

- The purpose of the Authority is to carry out the planning, financing, acquiring of property for (including through the exercise of the power of eminent domain as necessary), owning, designing, building, operating, maintaining, repairing, reconstructing and replacing the Project.

- The Authority will be governed by a five-member Board of Directors:

- Two Metro representatives (senior staff members with appropriate expertise appointed by the CEO).
- Two City representatives (Mayor and councilperson elected by City Council)
- Los Angeles County Second District Supervisor.
- Each Director will have an alternate who may act in the Director's absence.
- City's Mayor will Chair the Board; City Councilperson will be Vice Chair.
- 3 Directors constitute a quorum for Board action.
- Except for specified matters of unique and particular significance to the City, listed on Exhibit A of the JPA, a majority vote of Directors present at a meeting is required to pass matters voted on by the Board.
- Board may establish advisory committees, including community advisory committees that may include key venue stakeholders and members of the public.
- No Director shall be personally liable on any Authority indebtedness, or subject to any personal liability or accountability by reason of the Authority's obligations.
- The Authority does not compensate directors and alternate Directors, but Board may authorize reimbursement of direct expenses.

- 30-year term of JPA, with automatic 5-year extensions unless sooner terminated.

- Authority has power to exercise powers common to the City and Metro to accomplish purposes of the JPA. Specific enumerated powers include:

  - Enter into contracts, including assumption of the Project Agreement and other essential Project assets.
  - Incur debts, liabilities and obligations.
  - Acquire, hold and dispose of real and personal property, infrastructure and equipment.
  - Finance or refinance acquisition of transit equipment.
  - Receive contributions and donations of property, funds, services and assistance.
  - Apply for licenses, grants, loans and other forms of aid.
  - Sue and be sued in its own name.
  - Employ agents and employees.
  - Receive, collect and disburse moneys, including farebox revenue.
  - Contract with a Member to act as an administrator.
  - Consult with and coordinate Project planning with the Members, and owners and operators of destinations within the City.
  - Approve and implement marketing, fare structure and operational policies.
  - Set fare rates and charge fares for ridership on the completed Project.
  - Enter into agreements with Members.
  - Adopt rules, regulations, policies, bylaws and procedures governing operation of the Authority.
  - Support and oppose legislation.
  - Exercise all powers provided in the Joint Powers Act, including those related to

issuance of bonds in Government Code sections 6584 *et. seq*.
- All other powers necessary to carry out the purposes of the JPA.

- Pursuant to Government Code section 6509, the powers of the Authority are subject to the restrictions upon the manner of exercising power possessed by the City and any other restrictions on exercising powers of the Authority that the Board may adopt.

- JPA Board will retain a Chief Executive Officer to oversee day-to-day Authority operations. Other officers include Secretary and Treasurer/Controller.

  - The City's secretary or board clerk serves as Authority's secretary until Board elects its own.
  - The City's Assistant Finance Director serves as the Authority's Treasurer/Controller until Board elects its own.

- The City will serve as Administrator of Authority prior to Project Financial Close, performing such services:

  - Coordination/preparation for Board meetings.
  - Identification of City staff/consultants to provide services to Board.
  - Appointment, employment, management and termination of personnel, contractors and consultants.
  - Provision of legal services to the Authority.
  - Implementing policies, decisions and directions of the Board.
  - Coordinating and conferring with Members' technical staff.

- Authority Board will adopt the annual budget.

- Upon Project Financial Close, the City will transfer to the Authority, and the Authority will accept and assume from City, the Project essential assets, including the Project Agreement and all grant and funding agreements, consultant and advisory services contracts, and all other agreements and real and personal property that are material to the Authority's continued development and management of the Project. Upon such transfer, the City shall have no further rights, obligations or liability arising from such agreements.

- Minimum 18 months prior written notice to withdraw; City has option to purchase Project upon termination.

Consistency with Metro's Equity Platform Framework

To help address disparities in access to opportunities across Los Angeles County, the Metro Board adopted the Equity Platform policy framework in February 2018 and a working definition of Equity Focus Communities in June 2019.

The Project is consistent with Metro's Equity Platform in that the Project alternatives help address accessibility for residential and employment centers in disadvantaged communities, support transit-

oriented community policies, support first/last-mile connections, and investment in disadvantaged communities. In addition, ridership estimates suggest that a large share of the ridership demand will include low-income riders.

To date, the City has conducted robust community engagement and public outreach to all stakeholders in the Project. As of the close of the Project Draft Environmental Impact Report public comment period on February 8, 2021, the City received 73 comment letters from local agencies, organizations and residents. The City has held over 50 community and stakeholder meetings over the past three years. Key stakeholders (see Attachment B) have all expressed support for the Project.

DETERMINATION OF SAFETY IMPACT

The Project will be a world class, state-of-the-art transit connector, designed, built and operated to the highest safety standards. Metro's participation in the Authority will enhance Metro's role in ensuring that its own customers have a safe, optimal experience as they transfer to and from Metro's lines to access destinations in City.

FINANCIAL IMPACT

The JPA does not require Metro to make any capital contributions to the Authority. Any future contributions of capital or services will be made at Metro's discretion, pursuant to separate agreements between Metro and the Authority.

Impact to Budget
Participation in the Authority pursuant to the terms and conditions of the JPA does not impact Metro's budget.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Execution of the JPA and formation of the Authority to collaborate with City in development and operation of the Project, bringing Metro's experience and record of success in development and operation of rail transit projects, will support each of the goals specified in Metro's Vision 2028 Metro Strategic Plan:

- A direct, convenient and environmentally sustainable transit connection, the Project will provide an additional high-quality mobility option, enabling people to spend less time traveling to and from the City's new major employment, commercial, housing and entertainment centers, and will reduce gridlock experienced during major events at SoFi Stadium, the Forum, the Los Angeles Sports and Entertainment District and the Inglewood Basketball and Entertainment Center.

- Participation with the City in a special-purpose entity dedicated to the sole purpose of delivering and operating the Project will enhance Metro's role in ensuring that its customers continue their outstanding trip experience as they transfer from the Metro Crenshaw/LAX line and the Downtown Inglewood Station to and from the Project.

- By supporting the City's economic revitalization and redevelopment, the Project will enhance communities and lives through mobility and access to opportunities.

- Participating in the Authority to deliver and operate a state-of-the-art, sustainable transit connection furthers Metro's goal of transforming LA County through regional collaboration and leadership.

- By joining in governance of the Authority, Metro will play a significant role in ensuring the responsive, accountable and trustworthy governance of the Project.

ALTERNATIVES CONSIDERED

The Board could choose not to approve the recommendation. This is not recommended as Metro's participation in the Authority will enhance the prospects for successful delivery of the Project to provide a critically needed direct transit connection between Metro's network, the soon to be completed regional Crenshaw/LAX line, and key housing and employment centers in a disadvantaged community, and sports and entertainment venues within City, and will facilitate focused and effective collaboration and coordination between the Authority and Metro in delivering this Project in time for the 2028 Los Angeles Olympics.

NEXT STEPS

Upon Board approval, Metro staff will continue to assist City in its efforts to advance Project development to demonstrate economic feasibility. Metro's CEO and the City's Mayor will execute the JPA at the appropriate time in this process, whereupon the City and Metro will take the steps required by the Joint Powers Act to formalize formation of the Authority as a separate legal entity.

ATTACHMENTS

Attachment A - Inglewood Transit Connector Joint Exercise of Powers Agreement
Attachment B - Project Supporters

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Phillip A. Washington
Chief Executive Officer

INGLEWOOD TRANSIT CONNECTOR JOINT POWERS AUTHORITY
JOINT EXERCISE OF POWERS AGREEMENT

THIS JOINT EXERCISE OF POWERS AGREEMENT ("Agreement"), is made and entered into by and between the CITY OF INGLEWOOD (the "City"), a charter city organized and operating under Article XI of the California Constitution, and the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY ("Metro"), a county transportation authority. The City and Metro are sometimes referred to in this Agreement individually as a "Member" and collectively as the "Members." Capitalized terms used in the Recitals and not separately defined in the Recitals have the meanings provided in Section 1.1.

RECITALS

A. The Members are public agencies sharing various powers under California law.

B. The Members desire to use any power common to them to participate jointly in and/or contract with third parties for the design, construction, financing, operation and maintenance of the proposed approximately 1.6 mile Inglewood Transit Connector Project (the "ITC"), an elevated automated people mover to provide a critically needed direct transit connection between Metro's network, the soon to be completed regional Crenshaw/LAX Line, and key City housing and employment centers, and sports and entertainment venues wholly within the City.

C. Section 9, Article XI of the California Constitution expressly provides broad plenary power to any California city to establish, purchase and operate public works to furnish transportation to its inhabitants.

D. As a charter city, the City has constitutional home rule power over municipal affairs such as the ITC, as a concurrent, additional and distinct source of power from those set forth in Article XI, Section 9 of the California Constitution.

E. The City's charter powers include the power to design, build, finance, operate and maintain transportation equipment and facilities such as the ITC, and to join with any other city or cities, district or county to accomplish the same.

F. Metro's powers include the power to design, build, finance, operate and maintain public mass transit guideway projects in Los Angeles County pursuant to the Rapid Transit District Law ("Public Utilities Code ["PUC"] §§ 30000 *et. seq*., the "RTD Law") and the County Transportation Commissions Act (PUC §§ 130000 *et. seq.,* the "CTC Act").

G. Consistent with the City's power to furnish transportation to its inhabitants, the RTD Law provides, at PUC § 30367, that the laws governing rapid transit facilities and services shall not be construed as in any way preventing or restricting any city from exercising any powers that it has under Section 9, Article XI of the California Constitution, including, without limitation, establishing and operation of any point to point lines or system of rapid transit in connection with any other transportation services established and operated by such city.

H. The Members have determined that a new joint powers authority (the "Authority") should be formed as a separate legal entity for the sole purpose of developing, owning, financing, operating and managing the ITC.

I. By participating as Members in a joint powers authority for such purpose the City and Metro will leverage and combine their respective expertise, resources and capabilities for the benefit of the public traveling to, from and within the City.

J. The Authority will be governed by a Board of Directors that will establish policies, approve agreements, establish fares and, over time, provide direction to its engaged resources.

K. Taking into account the Project's unique technology, financing and risk challenges, the City concluded that the most cost effective delivery model that will achieve ITC objectives involves the competitive award to a qualified Design-Build-Finance-Operate & Maintain entity of a contract to design, build, finance, operate and maintain the ITC (the "Project Agreement") pursuant to the City's procurement authority.

L. The City is currently carrying out ITC planning and development and the Members intend for the City to continue in that role until the Project is at the point at which it is prudent for the Authority to assume such responsibilities, potentially on or about the time of the close of financing for the ITC ("ITC Financial Close") and the notice to proceed under the Project Agreement.

M. At such point the Authority and City will enter into an agreement ("Transfer Agreement") setting forth the terms and conditions under which the City will transfer such responsibilities to the Authority, including the transfer of the City's rights and obligations under the Project Agreement; the other contracts the City has in place for ITC consultant and advisory services and such other assets and funding commitments the City holds that are essential for the Authority to carry out the transferred ITC responsibilities ("Essential ITC Assets").

N. From the Effective Date of this Agreement (hereinafter defined) until the ITC Financial Close, the Members desire to establish that the City serve as the Authority's Administrator in order to provide consistent project management, financing, legal and vendor contract support, as well as clerk and Treasurer services, and to work with direct Authority hires as they are engaged.

O. Upon the formation of the Authority, the City and the Authority will enter into an agreement setting forth the terms and conditions pursuant to which the City will use grant funds dedicated to ITC activities to cover allowable costs of the Authority's operations until the transfer of ITC responsibilities to the Authority upon the effective date of the Transfer Agreement.

P. During this period the Authority, working with the Administrator, will assemble an executive management team capable of assuming as needed responsibility over Authority functions, utilizing a combination of internal staff, some of whom may be Member-seconded, and consultants and contractors with capabilities in specific areas.

Q. The Members anticipate that the Authority's Board of Directors may establish advisory committees to assist it in carrying out its functions and implementing the ITC, including community advisory committees and technical advisory committees that may include key venue stakeholders and members of the public who are not members of the Board of Directors.

R. The City is the Lead Agency under CEQA in connection with the consideration and analysis of the environmental impacts of the ITC Project. The City will prepare, process, and complete environmental clearance for the Project pursuant to the California Environmental Quality Act ("CEQA"), any other public review and hearing processes and subject to all applicable governmental approvals.

S. Because the City has not completed a CEQA review, this Agreement does not constitute or evidence an approval by the Members of, or commitment of the Members to, any action for which prior environmental review is required under CEQA. The City, as the CEQA Lead Agency, retains the absolute discretion to make decisions under CEQA, which discretion includes, without limitation (i) deciding not to proceed with the Project (known as the "no build" alternative), and (ii) deciding to approve the Project and/or any of the agreements contemplated in this Agreement (the Potential Actions"). This Agreement is not intended to evidence an approval or commitment by the Members regarding development of the ITC, and the Members do not intend to enter into an agreement or make a commitment to develop the ITC unless and until the City, as the CEQA Lead Agency, and Metro, as a potentially responsible agency, have considered the impacts of the ITC based upon information resulting from the CEQA environmental review process.

T. Except for limited purposes required by law and specified in this Agreement, no Member will be required to contribute funds, property or services to the Authority, except as may be established by separate written agreement(s) between a Member and the Authority.

U. Metro's funding obligations under the Measure R Decennial Transfer Funding Agreement, consistent with South Bay Cities Council of Governments approval and other sources of funds that are subject to Metro budget approvals, are not modified by this Agreement.

V. In accordance with the foregoing premises, the Members desire, by means of this Agreement, to establish the Authority as a separate public entity for the sole purpose of undertaking, and/or contracting with third parties for, the planning, design, construction, financing, operation, maintenance, and administration of the ITC following the City's procurement of the Project Agreement and assignment of the Essential Project Assets to the Authority, and the Authority's acceptance of the Essential Project Assets and assumption of such responsibilities.

W. Each Member's respective Governing Body, has determined independently that the public interest requires, and applicable law permits, entering into this Agreement, and has taken all steps required by law or its procedures, to authorize such Member to execute this Agreement.

NOW THEREFORE, in consideration of the above Recitals and of the mutual promises and agreements contained herein, the Members agree as follows:

ARTICLE 1
GENERAL PROVISIONS

1.1 **Definitions**. Unless the context otherwise requires, the words and terms defined in this Section 1.1 shall, for the purposes of this Agreement, have the meanings herein specified.

1.1.1 **Act** means Articles 1 through 4, Chapter 5, Division 7, Title 1 of the Government Code of the State of California (commencing with Section 6500) relating to the joint exercise of powers common to public agencies.

1.1.2 **Administrator** means the Member designated by this Agreement to manage and administer the Authority, or the Board of Directors constituted by this Agreement. If the Member designated by this Agreement is unable or unwilling to act as the Administrator, the Board of Directors shall manage and administer the Authority or appoint officers or employees for such purposes.

1.1.3 **Agreement** means this Joint Exercise of Powers Agreement.

1.1.4 **Annual Budget** means the budget adopted pursuant to Section 7.2.2 of this Agreement.

1.1.5 **Authority** means the Inglewood Transit Connector Joint Powers Authority created by this Agreement, as defined in Recital H.

1.1.6 **Board** or **Board of Directors** means the Board of Directors referred to in ARTICLE 2 of this Agreement, which is the governing body of the Authority.

1.1.7 **Board Member** means a Director.

1.1.8 **Bylaws** means bylaws adopted by the Board for governance of the Authority's day-to-day operations. Each Member shall receive a copy of any bylaws developed and adopted under this Section

1.1.9 **City** means the City of Inglewood, a California charter city, organized and operating under Article XI of the California Constitution.

1.1.10 **CTC Act** has the meaning provided in Recital G.

1.1.11 **Director** means a member of the Board appointed pursuant to Section 2.2 of this Agreement.

1.1.12 **Effective Date** means the last date on which all parties to this Agreement have executed the Agreement.

1.1.13 **Essential ITC Assets** has the meaning provided in Recital M, and will be defined in more particularity and set forth in the Transfer Agreement to be executed concurrent with ITC Project Financial Close, as further described in Recital M.

1.1.14 **Fiscal Year** means the period commencing on October 1 of each year and ending on and including the following September 30.

1.1.15 **Governing Body** means, for the City, its City Council; for Metro, its Board of Directors; and for any other public agency, the equivalent policy making body that exercises ultimate decision-making authority over such agency.

1.1.16 **ITC** means the Inglewood Transit Connector currently planned to be built and operated pursuant to this Agreement, as further described in Recital B.

1.1.17 **ITC Financial Close** means the point in time when the City assigns the Project Agreement and other Essential ITC Assets to the Authority and the Authority assumes full responsibility for the ITC, as further described in Recital L.

1.1.18 **Member(s)** means the City and Metro, and any other entity that has been added to this Agreement by a subsequent amendment and that has not withdrawn from the Authority.

1.1.19 **Metro** means the Los Angeles County Metropolitan Transportation Authority, a California transit district and county transportation commission.

1.1.20 **Metro CEO** means the Chief Executive Officer of Metro.

1.1.21 **Project Agreement** has the meaning provided in Recital K.

1.1.22 **RTD Law** has the meaning provided in Recital F.

1.1.23 **Second District Supervisor** means the member of the Los Angeles County Board of Supervisors representing the Second District of Los Angeles County.

1.1.24 **Start-Up Period** means the period of time from the Effective Date until the ITC Financial Close.

1.1.25 **Transfer Agreement** has the meaning provided in Recital M.

1.2 **Purpose**. This Agreement is made pursuant to the Act by the Members, each of which is authorized to contract with the other. The purposes of this Agreement are to: (1) create the Inglewood Transit Connector Project Joint Powers Authority; (2) provide for the governance and administration of the Authority; (3) undertake to, and/or contract with third parties to, plan for, finance (including issuance of revenue bonds) and/or obtain funding to, design, construct, own, lease, operate, maintain, repair, reconstruct and replace the ITC; (4) coordinate the development of the ITC and connect it with the regional transit system and housing, business, sports and entertainment venues within the City; (5) perform services related to the ITC, or assume obligations of the Members and non-member Agencies specifically related to the ITC and approved by the Board; (6) define the rights and obligations of the Members in connection with the Authority's purposes; and (7) any other purposes authorized by the Act.

1.3 **Inglewood Transit Connector Joint Powers Authority Created as Separate Legal Entity**. Pursuant to Government Code sections 6506 and 6507, there is hereby created a public entity known as the "Inglewood Transit Connector Joint Powers Authority." The Authority shall be a legal public entity separate and apart from the Members and shall administer this Agreement as provided herein.

1.4 **Term**. The term of this Agreement shall commence on the Effective Date and shall continue for an initial minimum term of thirty (30) years, which term shall thereafter automatically extend for successive periods of five (5) years each unless and until terminated by the Members as provided in ARTICLE 8 of this Agreement.

1.5 Powers of Authority.

1.5.1 General Powers. The Authority shall exercise, in the manner herein provided, the powers common to the Members, powers otherwise permitted under the Act, and powers necessary to accomplish the purposes of this Agreement. The Authority shall not possess the authority to compel any of the Members to contribute funding or other resources to the ITC. The goal and intent of the Authority is one of voluntary cooperation among the Members for the collective benefit of the Members, other public agencies and the general public that will result from successful completion and operation of the ITC. Notwithstanding the foregoing, any Member may make contributions of money or assets to the Authority, advance payments of public funds or provide loans to defray the cost of ITC operations or provide operating capital, and contribute personnel, equipment or property to the Authority for the ITC, subject to a separate agreement between the Authority and the Member approved by the Authority's Board of Directors and the Member's Governing Body.

1.5.2 Specific Powers. The Authority is hereby authorized, in its own name, to do all acts necessary, convenient and appropriate for the exercise of the foregoing powers for the purposes set forth in this Agreement and to do any or all of the following:

(a) Make, enter into and assume contracts, including but not limited to accepting and assuming any and all rights and obligations in the Essential ITC Assets, including the Project Agreement,

(b) Incur debts, liabilities and obligations, provided that no debt, liability or obligation of the Authority shall be a debt, liability or obligation of any Member except as separately agreed to in writing by a Member,

(c) Acquire, lease, hold, construct, manage, maintain, sell or otherwise dispose of, in whole or in part, land, facilities, appurtenances and other real and personal property and infrastructure and equipment necessary or convenient for the development and operation of the ITC by appropriate means, including through the exercise of the power of eminent domain, and including by acceptance of Essential ITC Assets from the City or third parties,

(d) Finance or refinance the acquisition or transfer of transit equipment or transfer federal income tax benefits with respect to any transit equipment by executing agreements, leases, purchase agreements, and equipment trust certificates in the forms customarily used by a private corporation engaged in the transit business to effect purchases of transit equipment, and dispose of the equipment trust certificates by negotiation or public sale upon terms and conditions authorized by the Members,

(e) Receive contributions and donations of property, funds, services and other forms of assistance from any source,

(f) Apply for, accept, and receive licenses, and apply for, accept, receive and disburse grants, loans and other aids from any agency of the United States of America, the State of California, or any other public or private institution,

(g) Sue and be sued in its own name,

(h) Employ agents and employees,

(i) Lease real or personal property as lessee and as lessor,

(j) Receive, collect, invest and disburse moneys,

(k) Execute and deliver certificates of participation, issue revenue bonds and issue other forms of indebtedness, as provided for and permitted by law,

(l) Carry out other duties as required to accomplish its purposes and other responsibilities as set forth in this Agreement,

(m) With Board approval, assign, delegate or contract with a Member or third party to perform any of the duties of the Board, including but not limited to, acting as an administrator for the Authority,

(n) Consult with and coordinate, ITC planning and development activities with members of the public, including owners and operators of major destinations within the City,

(o) Approve and implement all marketing, fare structure and operational policies,

(p) Set fare rates and charge fares for ridership on the completed ITC, and any other improvements developed by the Authority in carrying out its powers in connection with the ITC,

(q) Enter into and approve agreements with the Members, including the lease or license of necessary rights in ITC related assets from or to Members, to ensure that the ITC maximizes the usefulness of the resources available to the Authority, and maximizes the usefulness of the ITC facilities for transit operations and pedestrian circulation,

(r) Adopt rules, regulations, policies, bylaws and procedures governing the operation of the Authority,

(s) Support and oppose legislation related to the Authority or the ITC,

(t) Exercise any and all powers which are provided for in the Act and in Government Code Section 6584 *et seq.*, including without limitation Government Code Section 6588, as they exist on the Effective Date of this Agreement or may hereafter be amended, and

(u) Exercise all other powers necessary and proper to carry out fully the purposes of this Agreement.

1.5.3 **Additional Powers to be Exercised.** In addition to those powers common to each of the Members, the Authority shall have those powers that may be conferred upon it by law and subsequently enacted legislation.

1.5.4 **Limitation on Powers**. As required by Section 6509 of the Act, the powers of the Authority are subject to the restrictions upon the manner of exercising power possessed by the City and any other restrictions on exercising powers of the Authority that may be adopted by the Board.

1.5.5 **Obligations of the Authority**. The debts, liabilities and obligations of the Authority shall not be the debts, liabilities and obligations of any Member unless the Member separately agrees in writing to assume any of the debts, liabilities and obligations of the Authority with the approval of such Member's Governing Body, in its sole discretion. In addition, pursuant to the Act, no Director shall be personally liable on any Authority indebtedness, or subject to any personal liability or accountability by reason of the Authority's obligations.

ARTICLE 2
GOVERNANCE

2.1 Board of Directors.

2.1.1 **Creation**. The Authority shall be governed by a five-member Board of Directors, which is hereby established and which shall be composed of two representatives from the City, two representatives from Metro, and the Second District Supervisor, as appointed in accordance with Section 2.2.1. The governing board shall be known as the "Board of Directors of the Inglewood Transit Connector Joint Powers Authority." All voting power shall reside in the Board.

2.1.2 **Modification**. Any change in the size and composition of the Board other than what is described in this ARTICLE 2 shall require an amendment of this Agreement in accordance with Section 8.2.

2.2 Members of the Board of Directors.

2.2.1 **Directors and Alternates Appointed**.

(a) The City shall appoint the Mayor and one other member of the City Council to be Directors. Each Director representing City shall appoint an alternate Director.

(b) The Metro CEO shall appoint two Directors who are Metro senior executive level staff with expertise most valuable for the then applicable stage of development or operation of the ITC. The Chief Executive Officer of Metro shall appoint an alternate Director for each Director representing Metro. The terms served by Directors appointed by Metro shall be determined at the pleasure of the Metro CEO.

(c) The Second District Supervisor shall be a Director and shall appoint an alternate Director.

(d) In the absence of the Director, the alternate Directors may vote on matters before the Board, in committees, may chair the Board and committees committee meetings, and may fully participate in discussion and debate during meetings of committees. All Directors and alternates shall be subject to the Board's adopted Conflict of Interest Code.

(e) Each Member shall determine the term of office for its alternate Directors.

2.2.2 **Compensation**. Directors and alternate Directors are not entitled to compensation. The Board may authorize reimbursement of expenses directly incurred by Directors or alternate Directors. The Member appointing each Director and alternate may approve the payment of compensation to its appointed Directors and alternates, in which case any such compensation will be solely the responsibility of such Member, and for the avoidance of doubt, shall not be treated as a contribution by such Member to the Authority.

2.3 **Powers of the Board**. The Board shall have and exercise all the power and authority of the Authority. All Directors are eligible for appointment to one or more committees that the Board may establish pursuant to ARTICLE 2. The Board may in its discretion delegate certain powers to committees but may not delegate the power to amend the Bylaws.

2.3.1 **Purposes of the Board**. The general purposes of the Board are to:

(a) Provide structure for administrative and fiscal oversight;

(b) Retain a Chief Executive Officer to oversee day-to-day operations of the Authority as and when deemed necessary by the Board;

(c) Identify and pursue funding sources;

(d) Set policy;

(e) Maximize utilization of available resources; and

(f) Oversee all committee activities.

2.3.2 **Specific Responsibilities of the Board**. The specific responsibilities of the Board shall be as follows:

(a) Identify ITC needs and requirements;

(b) Formulate and adopt an annual budget and appropriate funds prior to the commencement of the fiscal year;

(c) Develop and implement a financing and/or funding plan for ongoing Authority operations and capital improvements, if applicable;

(d) Retain necessary and sufficient staff and adopt personnel and compensation policies, rules and regulations;

(e) Implement and administer a workforce policy that promotes a local, sustainable and inclusive workforce;

(f) Implement and administer policies for procuring contracts necessary to meet operational needs after ITC Financial Close, such as contracts for professional and advisory services, equipment and/or supplies;

(g) Implement and administer procedures for acquisition of real property, including without limitation, the approval of negotiated right-of-way acquisitions, adoption of Resolutions of Necessity, and approval of settlement agreements, in connection with the exercise of the Authority's power of eminent domain or otherwise;

(h) Implement and administer rules for the disposal of surplus property;

(i) Establish standing and ad hoc committees as necessary to ensure that the interests of the Authority and concerns of each Member are represented to ensure effective operational, technical and financial functioning of the Authority;

(j) Wind up and resolve all obligations of the Authority in the event the Authority is terminated pursuant to ARTICLE 8;

(k) Address community concerns and concerns of the ITC's customers;

(l) Conduct and oversee Authority operational audits at appropriate intervals determined by the Board;

(m) Arrange for an annual independent fiscal audit;

(n) Adopt such Bylaws, rules and regulations as are necessary or desirable for the Authority to govern its day-to-day operations and to achieve the purposes hereof; provided that nothing in the Bylaws, rules and regulations shall be inconsistent with this Agreement. Each Member shall receive a copy of any Bylaws, rules and regulations adopted under this Section;

(o) Establish a fare setting mechanism and implement a fare structure for ridership on the completed ITC; and

(p) Discharge other duties as appropriate and/or required by law, including by delegation of powers that may be delegated lawfully to Members or third parties to carry out on behalf of the Board. However, the Board may not delegate its power to adopt or amend Bylaws.

2.4 **Ex Officio Members**. The Board may provide in Bylaws adopted pursuant to Section 2.3(n) for ex officio members or alternates to participate in meetings of the Board. Any ex officio member or alternate shall not be entitled to vote, shall not be counted toward a quorum of the Board, and shall serve without compensation from the Authority.

2.5 **Start-Up Period.** During the Start-Up Period, the City shall continue to act on its own behalf in conducting activities that the City considers necessary and appropriate to achieve ITC Financial Close, including but not limited to completing the environmental review process, conducting community outreach, pursuing public and private financing opportunities, and procuring the Project Agreement. As provided in Section 4.7 of this

Agreement, prior to ITC Financial Close, the City, when acting as the Authority's Administrator, will provide such limited services to the Board as are necessary for the Board to carry out the Authority's purposes during the Start-Up Period.

During the Start-Up Period, the Board shall, without limitation, have the duties to:

(a) Obtain financing and/or funding necessary to support its Start-Up Period activities and working capital needs;

(b) Evaluate the need for, acquire and maintain insurance;

(c) At the appropriate time(s), consider and take action on the execution of agreements with Members for the Members' provision of services and and/or personnel to the JPA;

(d) At the appropriate time(s), consider and take action on consulting and services agreements related to the Authority's start up and implementation activities, subject to the City advancing payment pursuant to separate agreement between the Authority and City; and

(e) At the appropriate time(s), consider and take action on the assumption of the City's rights and obligations with respect to the ITC Essential Assets and acceptance of title to or ownership of ITC Essential Assets.

ARTICLE 3
MEETINGS OF THE BOARD

3.1 Meetings.

(a) All regular meetings of the Board shall be held in the State of California at the principal office of the Authority or such other places in the State as determined by the Board. When authorized by law or executive order, the Board may hold its meetings via teleconferencing during any period in which state or local public health authorities have imposed or recommended social distancing measures.

(b) The Board shall provide for regular meetings provided that it shall hold at least one regular meeting in each quarter of each year and such further meetings as may be reasonable depending upon the Authority's business needs. The dates upon which and the hour and place at which regular meetings shall be held shall be communicated in a timely manner to each Member.

3.2 Ralph M. Brown Act. All meetings of the Board and its standing committees, including without limitation, regular, adjourned regular, and special meetings, shall be called, noticed, held, and conducted in accordance with the provisions of the Ralph M. Brown Act, commencing with Section 54950 of the Government Code.

3.3 Voting. Each Board Member shall have one vote. Except as otherwise provided by law or by this Agreement, all actions of the Board shall be approved on the affirmative vote of a majority of the Members of the Board.

(a) Matters that may come before the Board that uniquely affect the City, such as matters concerning the exercise of the power of eminent domain to acquire property within the City, the location of stations and connections between the ITC and Metro's transit facilities, closing and rerouting of traffic within the City for the ITC, the definition of ITC Essential Assets and the scope of the title to such ITC Essential Assets that the City will assign to the Authority, and similar matters with significant impact on the legal rights to assets associated with the ITC acquired by the City, shall require the affirmative vote of the Directors representing the City.

(b) A list of specific matters that shall require the City's affirmative vote is set forth in Exhibit A hereto.

3.4 **Quorum**. Three Members of the Board shall constitute a quorum for the transaction of business, except that less than a quorum may adjourn from time to time.

3.5 **Board Action**. The Board may act by ordinance, resolution or motion. Unless otherwise provided in the Bylaws, ordinances shall not be required to be introduced and adopted at separate meetings of the Board. The enacting clause of all ordinances shall be, "The Board of Directors of the Inglewood Transit Connector Joint Powers Authority does ordain as follows."

3.6 **Minutes**. The Secretary of the Authority shall cause minutes of regular, adjourned regular, and special meetings to be kept and shall, as soon as possible after each meeting, cause a copy of the minutes to be forwarded to each Director, each alternate Director, and to each Member.

ARTICLE 4
INTERNAL ORGANIZATION; OFFICERS AND EMPLOYEES OF THE AUTHORITY

4.1 **Officers and Employees**. The officers of the Authority are the Chair, Vice Chair, Chief Executive Officer, Secretary, Treasurer/Controller and such other officers with titles and duties as shall be determined by the Board as and when the Board determines such officers are necessary and appropriate to carry out the Authority's purposes. Any number of offices may be held by the same person, provided that the Chair and Vice Chair shall not also serve as the Treasurer. As provided in Section 6505.5 of the Act, the Board may authorize the Treasurer of one of the Members to serve as the Treasurer, provided that the funds of the Authority are kept in accounts separate from those of that Member.

4.2 **Chair.** The Mayor of the City shall be the Chair of the Board.

4.3 **Vice-Chair**. The City's Director of Public Works shall be the Vice Chair of the Board.

4.4 **Chief Executive Officer**. The Authority shall employ a Chief Executive Officer to carry out the Board's policies, purposes and goals. The Chief Executive Officer shall report directly to the Board and shall:

(a) Serve as the Board's chief advisor on all policy and operational issues,

(b) Recommend policies to the Board and then implement policies approved by the Board,

(c) Prepare an annual budget for approval by the Board, and

(d) Take all personnel actions, consistent with the policies of the Board and applicable law, with respect to all other employees.

4.5 **Secretary**. The Authority's Secretary shall be the Administrator's secretary or board clerk, or his or her designee, unless the Board elects to appoint as the Secretary another individual of its own choosing. If the Board does not elect to appoint another individual of its own choosing as the Secretary, the Secretary shall serve at the pleasure of the Administrator and may be removed at any time, with or without cause, in the sole discretion of the Administrator's governing board or management-level employee. The Secretary shall be responsible for the minutes and other records of the proceedings of the Board of Directors and shall perform such other duties as specified by the Administrator pursuant to a written agreement between the Authority and the Administrator. If the Board elects to appoint another individual of its own choosing, the Secretary shall perform such other duties as the Board of Directors specifies.

4.6 **Treasurer/Controller**. Pursuant to Government Code Sections 6505.5 and 6505.6, the Authority's Treasurer/Controller shall be the City's Assistant Finance Director, unless the Board elects to appoint as the Treasurer Controller another individual of its own choosing. The Treasurer/Controller shall have authority as is delegated to it by the Board. The Treasurer/Controller shall be the depository and have custody of all money of the Authority, from whatever source, and shall have all the duties and obligations set forth in Sections 6505 and 6505.5 of the Government Code. The offices of Treasurer/Controller may be held by separate individuals, or combined and held by one individual as the Board may elect. If the Board does not elect to appoint another individual of its own choosing as the Treasurer/Controller, the Treasurer and Auditor/Controller shall serve at the pleasure of the Administrator and may be removed at any time, with or without cause, in the sole discretion of the Administrator's governing board or management-level employee.

4.7 **Other Employees/Agents**. The Board shall have the power by resolution to hire employees or appoint or retain such other agents, including officers, loan-out employees or independent contractors, as may be necessary or desirable to carry-out the purposes of this Agreement, pursuant to the terms and conditions adopted by the Board.

4.8 **Administrator**. Upon ITC Financial Close, the Board shall serve as the Administrator.

During the Start-Up Period, the City shall serve as the Authority's Administrator, unless and until the Board elects to administer this Agreement on its own behalf or appoints officers or employees to do so. As Administrator, the City shall perform services reasonably necessary for the management and administration of the Authority during the Start-Up Period, including but not limited to:

(a) Coordinating and preparing for Board meetings,

(b) Identifying key City staff and consultants who will provide services to the Board and the Authority on behalf of the City as the Administrator, including staff who shall serve as Secretary and Treasurer in accordance with the directions given by the Board,

(c) Being responsible for the appointment, employment, management and termination of any personnel, contractors or consultants providing services to the Authority including, but not limited to, contractors and consultants necessary to prepare the Authority to assume its responsibilities with respect to delivery and operation of the ITC following the ITC Financial Close,

(d) Providing legal services to the Authority,

(e) Implementing the policies, decisions and directions of the Board, and

(f) Coordinating and conferring with the Members' technical staff.

For purposes of clarification, the agreements and employment relationships referenced in clause (c), above, are agreements and employment relationships directly between the Authority and the agreement counter-parties, or employees. For purposes of its role as developer of the ITC prior to ITC Financial Close, the City shall enter into those agreements and employment relationships as it deems necessary on its own behalf, and assignment to and assumption by the JPA of such agreements and employment relationships shall be subject to both the City's and the JPA's approval of the transfer agreement effecting such assignment and assumption. The terms and conditions pursuant to which the Authority shall compensate the City for performance of services as Administrator shall be set forth in a separate services agreement between the Authority and the City. In performing services as Administrator, the City shall be an independent contractor and not an employee of the Authority. No employee or agent of the City shall become an employee of the Authority by virtue of performing interim administrative services. The City employees or agents assigned to provide services shall remain under the exclusive control of the City.

The Authority shall defend, indemnify and hold harmless the City and its officials, officers, employees, contractors, agents and authorized volunteers from any and all claims, demands, damages, liabilities, fines, expenses, and related costs and fees, including attorney's fees, arising from or related to the City's performance of services as the Administrator.

If the City is still serving as the Administrator when ITC Financial Close occurs, then upon the ITC Financial Close, the City shall cease to be the Administrator, and the Board shall be the Administrator.

4.9 **Official Bond**. Pursuant to Government Code section 6505.1, the public officer, officers or persons who have charge of, handle or have access to any property of the Authority shall be so designated and empowered by the Board. Each such officer or person shall file an official bond with the Board in an amount to be fixed by the Board. The premiums on any such bonds attributable to the coverage required herein shall be appropriate expenses of the Authority.

4.10 **Status of Officers and Employees**. In accordance with Government Code section 6513, all of the privileges and immunities from liability, exemption from laws, ordinances and rules, all pension, relief, disability, workers compensation and other benefits which apply to the activities of officers, agents or employees of any of the Members when performing their respective functions shall apply to them to the same degree and extent while

engaged in the performance of any of the functions or other duties under this Agreement. None of the officers, agents or employees appointed by the Board shall be deemed, by reason of their employment by the Board, to be employed by any of the Members, or by reason of their employment by the Board, to be subject to any requirements of such Members.

ARTICLE 5
COMMITTEES

5.1 **Committees**. The Board of Directors, by a majority vote, may form committees for any purpose that the Board deems appropriate to assist the Board in carrying out its functions and implementing the provisions of this Agreement and the ITC. Such vote shall designate the criteria to qualify for appointment on said committees, the method for appointing committee members, the scope of the duties and responsibility of the committee, whether the committee is a standing or ad hoc committee, rules, regulations, policies, or procedures to govern such committees and whether members shall be compensated or entitled to reimbursement for expenses, and such other matters as the Board may deem appropriate. Committees, unless otherwise provided by law, this Agreement, the Bylaws or direction of the Board, may be composed of Directors, alternate Directors and non-Directors.

5.2 **Community Advisory Committee**. The Board may establish a Community Advisory Committee comprised of non-Board members, with the primary purpose of advising the Board and providing a venue for ongoing citizen support and engagement in the strategic direction, goals and programs of the Authority. The Community Advisory Committee, if established, shall be advisory only, and shall not have decision-making authority, nor receive any delegation of authority from the Board. Each Member may nominate a committee member(s) and the Board shall determine the final selection of committee members.

5.3 **Meetings of Advisory Committees**. All meetings of the standard committees and committees consisting of a quorum of the Board of Directors shall be held in accordance with the Brown Act. For the purposes of convening meetings and conducting business, unless otherwise provided in the Bylaws, a majority of the members of the committee shall constitute a quorum for the transaction of business, except that less than a quorum or the secretary of each committee may adjourn meetings from time to time. As soon as practicable, but no later than the time of posting, the Secretary of the committee shall provide notice and agenda to each Member, Director(s) and alternate Director(s).

5.4 **Officers of Advisory Committees**. Unless otherwise determined by the Board, each committee shall choose its officers, comprised of a Chair, a Vice Chair, and a Secretary.

ARTICLE 6
PROJECT COORDINATION

6.1 **Coordination with the Members**. The Members may convene their respective staffs to review issues associated with the Project and the other purposes of this Agreement from time to time. If authorized by a written agreement between the Authority and a public agency, which is not a Member, or authorized by the Board, a non-Member may designate a representative to review such issues with staff of the Members as appropriate.

ARTICLE 7
FINANCES

7.1 **Fiscal Year**. The Fiscal Year of the Authority shall be as defined in Section 1.1 of this Agreement.

7.2 **Annual Budget**.

7.2.1 **Interim Budget.** The Board shall, within 120 days of the Effective Date of this Agreement, approve an interim budget, which shall constitute the operating budget until the Annual Budget is adopted. The Board may revise the interim budget from time to time as may be reasonably necessary to address contingencies and unexpected expenses

7.2.2 **Annual Budget.** Annually, prior to [July 1] of each year, the Board shall adopt a budget for all expenditures to be made by the Authority during the upcoming Fiscal Year. The Annual Budget shall reflect the Board's budget and expenditure plan based on annual projections of funding sources and uses for the upcoming Fiscal Year. The budget shall include separate components for administrative, operations and capital costs anticipated to be incurred by the Authority during the fiscal year. Each Annual Budget shall be adopted and shall be effective on the affirmative vote of a majority of the Directors.

7.2.3 **Contingencies and Unexpected Expenses**. The Board may revise the interim budget and annual budget from time to time as reasonably necessary to address contingencies and unexpected expenses.

7.3 **Funds, Accounts and Reports**. There shall be strict accountability of all funds and reporting of all Authority receipts and disbursements.

7.3.1 **Sources of Funds**. The Authority shall arrange for the receipt of funds from any sources available to the Authority that are necessary and appropriate for the conduct of the Authority's activities. Funds may be received directly, or through pledges of funds from other public agencies. Members shall not be required to make any financial contributions or payments to the Authority, or to contribute to the cost of operating and maintaining the ITC, and the Authority shall have no right to require such a contribution or payment unless expressly set forth herein, such as provided in Section 8.6 with respect to retirement benefits upon termination, or except as otherwise required by law. Notwithstanding the foregoing, a Member may volunteer to provide, or negotiate terms with the Authority to provide the following:

(a) contributions from its treasury for the purposes set forth in this Agreement;

(b) advances of public funds to defray the cost of the purposes of the Agreement and Authority, such advances to be repaid as provided by written agreement; or

(c) its personnel, equipment or property in lieu of other contributions or advances.

Any agreement with the Authority to provide any of the above-referenced contributions or payments shall require a vote of the Board. No Member shall be required, by or for the benefit of the Authority, to adopt any local tax, assessment, fee or charge under any circumstances.

7.3.2 **Accounts**. Revenues or funds received or made available to the Authority from any source whatsoever, shall be deposited into separate accounts established by the Authority in its own name, and not commingled with funds of any Member or any other person or entity. The Authority may expend its funds in any legal manner, subject to such reservations as may be imposed by the Authority from time to time.

7.3.3 **Reports**. The Treasurer shall, within one hundred and eighty (180) days after the close of each Fiscal Year, give a complete written report of all financial activities for such Fiscal Year to the Board and to each Member. The Authority's books and records shall be open to inspection at all reasonable times by representatives of each Member. The Treasurer shall prepare and provide such additional reports, including audited financial statements and ongoing disclosure reports, as are required by separate agreements entered into by the Authority. Annual financial statements shall be prepared in accordance with Generally Accepted Accounting Principles of the Governmental Accounting Standards Board.

7.4 **Payments and Advances**. No expenditures in excess of those budgeted and appropriated shall be made unless otherwise approved by the Authority's Board.

7.5 **Audit**. In accordance with Sections 6505 through 6505.6 of the Government Code, the Treasurer shall cause an annual audit of the accounts and records of the Authority to be made and reported. The audit shall be conducted by an independent certified public accountant or public accountant. The audit shall conform to generally accepted auditing standards. Such report shall be filed within twelve (12) months of the end of the Fiscal Year under examination.

7.6 **Procurement Methods**. The Board may adopt, implement and administer such policies relating to procurement of services, equipment, supplies and other materials needed to accomplish the purposes of this Agreement.

7.7 **Cost Reimbursement**. The Authority shall, to the extent allowed by law or outside funding sources, reimburse each Member for its individual contributions toward technical, engineering, environmental, financial, permitted, and other pre-procurement activities associated with the ITC prior to execution of the Project Agreement.

7.8 **Agreement to Transfer and Accept ITC**. Upon the ITC Financial Close, the City will transfer and assign to the Authority, and the Authority will accept and assume from the City, the ITC Essential Assets, including but not limited to the Project Agreement and all grant and funding agreements, consultant and advisory services contracts, and all other agreements and real and personal property that the City has determined and the Authority agrees are material to the Authority's continued planning, design, construction, financing, owing, leasing, operation, maintenance, repair, and/or replacement of the ITC. Upon such assignment and assumption, the City shall have no further rights, obligations or liability arising under any of the foregoing agreements.

7.9 **Excess Operating Revenues.** If the ITC's fare box revenues exceed the Authority's operating and maintenance expenses in a Fiscal Year, all reserve accounts are fully funded, and all obligations to persons having priority for distributions or allocations of cash from operation of the ITC have been satisfied, the Authority may use the excess revenues for purposes relating to and supporting City's facilitation of transportation-related services within the City.

ARTICLE 8
AMENDMENT/TERMINATION

8.1 **Duration and Termination**. This Agreement shall become effective as of the Effective Date and shall continue in full force and effect until terminated by the mutual written consent of all Members. If there are only two Members and one Member intends to withdraw, the other Member's written consent to terminate this Agreement shall not be unreasonably conditioned or delayed, provided that the Member wishing to terminate its membership in the Authority shall give at least eighteen months' written notice to the Authority. Notwithstanding the prior provisions of this Section 8.1, this Agreement and the Authority shall continue to exist for the purpose of disposing of all claims, distribution of assets, and all other functions necessary to conclude the affairs of the Authority.

8.2 **Amendment**. This Agreement may be amended at any time by the written consent of the Governing Body of each Party hereto.

8.3 **Successor Statutes**. All statutes cited herein shall be deemed to include future amendments and/or successor statutes.

8.4 **Admission to Membership**. Any public agency that has not executed this Agreement on or before the Effective Date may be admitted to membership upon the unanimous approval of the Directors appointed by the City and Metro, payment of costs of preparation of any necessary documents, and execution by such public agency and all Members of an amendment to this Agreement providing that such public agency shall be a party to the Agreement and added as a Member of the Authority.

8.5 **Withdrawal**. Notwithstanding any other provision of this Agreement, any Member may withdraw from the Authority by providing the Authority with at least 18 months' written notice of its intent to withdraw. A withdrawal from the Authority constitutes a withdrawal of that Member's representatives from the Board of Directors. If at any time there are only two Members, any desired withdrawal shall be subject to the termination provisions of this Agreement.

8.6 **Effect of Withdrawal**. Subject to Section 9.2 hereof, the withdrawal of a Member shall not terminate its responsibility to contribute its share, if any, of any obligation incurred by the Authority through the date of withdrawal, or to perform any other obligation arising from a separate agreement or other legally binding obligation created through the date of withdrawal, including amounts determined by the Board for future obligations arising from retirement benefits for past and existing employees of the Authority, if any.

8.7 **Purchase Option**.

8.7.1 Upon termination of this Agreement, but prior to disbursement of any assets of the Authority, the City shall have the option, exercisable in its discretion, to purchase

the ITC, in whole or in part, for the lesser of fair market value or the outstanding financial obligations of the terminating or withdrawing Member(s) at the time of the exercise of the option, by providing the Authority and other Members with one hundred twenty (120) days' notice in advance of termination. As soon as practicable after receipt of the City's notice, the Authority shall notify the City of the Authority's reasonable determination of the amount of the purchase price for the ITC assets, including a detailed calculation of such fair market value, which valuation shall be based upon commonly accepted appraisal methodologies used by professional financial advisors to value P3 transportation infrastructure projects in similar urban areas in the United States. Upon mutual agreement on a purchase price determined under this section and payment thereof, the Authority will sell, assign, transfer, convey and deliver to the City all of its right, title and interest in the purchased assets. The City shall receive a credit against the purchase price for the time-adjusted value of the assets that the City contributed to the Authority for ITC purposes, and for the reasonable cost of all obligations to be assumed by the City in connection with the Authority's assignment of the ITC to the City.

8.7.2 Subject to applicable law, the City shall also have the option, exercisable in its discretion, to purchase any ITC Assets that the Board deems surplus and unnecessary for the ITC. Such purchase option for surplus property shall be on the same terms and conditions set forth in Section 8.7.1, provided that the City shall give the Authority written notice of the City's intent to exercise such purchase option within no more than forty- five (45) days following the Board's determination to dispose of such excess property.

8.8 **Disbursement**. Upon termination of this Agreement and after payment of all liabilities, costs, expenses and charges validly incurred under this Agreement, and resolution of any purchase option exercised by the City, all remaining assets of the Authority shall be disbursed among the Members, including any Members that previously withdrew from the Authority. Real and personal property assets shall first be returned to the Member who contributed them. Remaining assets shall be divided pro rata among the Members in accordance with and proportionate to their respective contributions (including payments for services received and the fair market value of any real or personal property at the time when the Member transferred such property to the Authority) made during the term of this Agreement, if feasible to do so. Remaining assets may be sold to the highest bidder, in which case each of the Members shall have a right of first refusal. The Board may, in its discretion, and only by unanimous vote of the then-current Directors immediately prior to termination of this Agreement, distribute assets without regard to a Member's respective contributions.

ARTICLE 9
SPECIAL PROVISIONS

9.1 **Insurance**. The Authority shall maintain types and levels of insurance coverage for the Authority as the Board determines to be reasonably adequate. The Members shall be named additional insureds on the Authority's general commercial liability insurance and automobile liability insurance policies, and such other policies with respect to which such coverage is available.

9.2 **Liability of Authority, Board, Officers, Employees**. Pursuant to Government Code Section 6508.1, with the exception of retirement liabilities of the Authority, the debts,

liabilities, and obligations of the Authority, whether they sound in tort, contract or otherwise, shall not be the debts, liabilities and obligations of any of the Members or any of their respective members, officers, directors, employees or agents. Without limiting the Authority's commitment to ensure that the ITC operates with the utmost care and diligence in transporting passengers, The Authority, its Members, Directors, officers, employees, staff and agents shall use ordinary care and reasonable diligence in the exercise of their powers and in the performance of their duties pursuant to this Agreement. They shall not be liable for any mistakes of judgment or any other action made, taken or omitted by them in good faith, nor for any action with reasonable care, nor for loss incurred through investment of joint powers agency funds, or failure to invest. No Member, Director, alternate Director, officer or employee shall be responsible for any action taken or omitted by any other director, officer, employee, staff member or agent. No Member, its directors, council members, officers, or employees, or any of Authority's Directors, officers, employees, staff members or agents shall be responsible for any action taken or omitted by any other Member, or its directors, officers, council members, employees, staff members or agents. The Authority, its Members, Directors, officers, and employees shall be entitled to all immunities provided by law, for actions taken in good faith, without malice or fraud.

9.3 **Retirement System**. The Authority shall not provide retirement benefits for its Directors, alternate Directors, officers, or employees without the written consent of each Member, which shall not be unreasonably withheld, conditioned or delayed.

9.4 **Indemnity**. The Authority shall indemnify, defend and hold harmless the Directors, alternate Directors, the individual Members, and their members, officers, directors, employees and agents from and against any and all liability, loss, damages, expenses, costs (including, without limitations, costs and fees of litigation or arbitration) of every nature, arising out of any act or omission of the Authority related to this Agreement, except such loss or damage which was caused by the willful misconduct of the Board of Directors, any individual Member, or their members, officers, directors, employees and agents. The Authority's duty to indemnify each Member pursuant to this Agreement shall survive that Member's withdrawal from the Agency.

9.5 **Conflict of Interest Code**. The Authority shall adopt, by resolution, a conflict of interest code as required by law.

ARTICLE 10
MISCELLANEOUS PROVISIONS

10.1 **Dispute Resolution.** The Members and the Authority shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. Before exercising any remedy provided by law, a Member or the Members and the Authority shall engage in nonbinding mediation in the manner agreed upon by the Member or Members and the Authority. The Parties agree that each Party may specifically enforce this section. In the event that nonbinding mediation is not initiated or does not result in the settlement of a dispute within 60 days after the demand for mediation is made, any Member and the Authority may pursue any remedies provided by law.

10.2 **Severability**. If any section, clause or phrase of this Agreement or the application thereof to any Party or any other person or circumstance is for any reason held to be invalid by a court of competent jurisdiction, it shall be deemed severable, and the remainder of the

Agreement or the application of such provisions to any other Party or to other persons or circumstances shall not be affected thereby. Each Party hereby declares that it would have entered into this Agreement, and each subsection, sentence, clause and phrase thereof, irrespective that one or more sections, subsection sentences, clauses or phrases or the application thereof might be held invalid.

10.3 **Notices**. Notices required or permitted hereunder shall be sufficiently given if made in writing and delivered either personally or by registered or certified mail, postage prepaid to the respective Members, as follows:

CITY OF INGLEWOOD:
City Clerk
One Manchester Blvd.
Inglewood, CA 90301

With copy to:
City of Inglewood City Attorney
Suite 860
One Manchester Blvd.
Inglewood, CA 90301

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY:

Metro Chief Executive Officer
One Gateway Plaza, 25th Fl.
Los Angeles, CA 90012

With copy to:

Metro General Counsel
One Gateway Plaza, 24th Fl.
Los Angeles, CA 90012

The Members may from time to time change the address to which notice may be provided by providing written notice of the change to the other Members.

10.4 **Consent**. Whenever in this Agreement or in any amendment thereto, consent or approval is required, the same shall not be unreasonably withheld.

10.5 **Other Agreements Not Prohibited**. Other agreements by and between Members as other than as parties to this Agreement or any other entity are neither prohibited nor modified in any manner by execution of this Agreement.

10.6 **Section Headings**. The section headings herein are for convenience of the Members only, and shall not be deemed to govern, limit, modify or in any manner affect the scope, meaning or intent of the provisions or language of this Agreement.

10.7 **Laws of California**. This Agreement is made in the State of California, under the Constitution and laws of such State, and shall be construed and enforced in accordance with the laws of such State.

10.8 **Construction of Language**. It is the intention of the Members that if any provision of this Agreement is capable of two constructions, one of which would render the provision void and the other of which would render the provision valid, then the provision shall have the meaning that renders it valid.

10.9 **Cooperation**. The Members recognize the necessity and hereby agree to cooperate with each other in carrying out the purposes of this Agreement.

10.10 **Successors**. This Agreement shall be binding upon and shall inure to the benefit of the successors of the Members.

10.11 **Enforcement**. The Authority is hereby authorized to take any and all legal or equitable actions, including but not limited to seeking injunctive relief and specific performance, necessary or permitted by law to enforce this Agreement.

10.12 **Integration**. This Agreement constitutes the full and complete Agreement of the Members.

10.13 **Counterparts**. This Agreement may be executed in counterparts, each of which shall constitute an original and all of which together shall constitute one and the same agreement.

SIGNATURES ON FOLLOWING PAGE(S)

IN WITNESS WHEREOF, the Members have caused this Joint Exercise of Powers Agreement to be executed and attested by their proper officers thereunto duly authorized on the day and year set forth below, making the same effective on the date signed by the last of all Parties hereto.

CITY OF INGLEWOOD

By: _____
James T. Butts, Jr., Mayor

Date: _____

ATTEST:

By: _____
Aisha L. Thompson, City Clerk

APPROVAL AS TO FORM:

_____
KENNETH R. CAMPOS
City Attorney

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

By: _____
Phillip A. Washington, Chief Executive Officer

Date: _____

APPROVAL AS TO FORM:

RODRIGO CASTRO-SILVA
County Counsel

_____
Ronald W. Stamm
Principal Deputy County Counsel

EXHIBIT A

MATTERS REQUIRING AFFIRMATIVE VOTE OF DIRECTORS APPOINTED BY CITY

Board action on the following matters shall require the unanimous affirmative vote of City-appointed Directors:

1. Actions that would affect the ITC Project in a manner requiring supplemental environmental analysis, entitlements, approvals or discretionary, non-ministerial permits.

2. Actions that would create or allow use of any Essential ITC Project Assets that City transferred to the JPA for any purpose other than those strictly necessary for construction, operation and maintenance of the ITC Project.

3. Actions that would result in the disposition to any person other than City of any ITC Essential Assets.

4. Actions that would require the permanent or temporary closure of any lanes of traffic or pedestrian or bike pathways in the City
.
5. Actions that would require variances from noise and sound regulations applicable to construction and operation of equipment in the City.

6. Actions that directly would result in the termination of any transportation service currently available within the City.

7. Actions that would eliminate or reduce previously approved and scheduled service of the ITC Project to any location within the City (which, for the avoidance of doubt, includes approval of change orders that authorize departures from performance-based criteria required under the Project Agreement).

8. Actions that would initiate or authorize settlement of any litigation in a manner that would affect any of the actions included on this Exhibit A.

9. Actions with respect to any matter that directly would result in a change in the physical character of the area of the City immediately adjacent to the ITC Project right of way.

10. Actions that would result in early termination of any contract that City assigned to JPA.

11. Action to terminate the ITC Project.

12. Action to initiate the acquisition of any additional property rights for the ITC Project (whether on a voluntary or eminent domain basis, and whether involving an easement, restriction, fee interest, air rights parcel interest, or any other form of property right).

ATTACHMENT B

PROJECT SUPPORTERS

- State Senate and Assembly representatives for the City of Inglewood
- Assemblywoman Autumn R. Burke, 62nd District
- Senator Steven Bradford, 35th District
- Councilman Mark Ridley-Thomas, Council District 10, City of Los Angeles
- Supervisor Janice Hahn, Fourth District
- Supervisor Hilda L. Solis, First District
- Mayor James T. Butts, Jr., City of Inglewood
- Councilman George W. Dotson, Council District 1, City of Inglewood
- Councilman Alex Padilla, Council District 2, City of Inglewood
- Councilman Eloy Morales, Jr., Council District 3, City of Inglewood
- Councilman Ralph L. Franklin, Council District 4, City of Inglewood
- Mayor Drew Boyles, City of El Segundo
- Casey Wasserman, Chairperson, LA 2028
- Stadco LA, LCC, owner of SoFi Stadium
- Los Angeles Rams
- Los Angeles City Council
- City of El Segundo
- Los Angeles Chargers
- Los Angeles County Metropolitan Transportation Authority
- Southern California Association of Governments
- Los Angeles World Airports
- University of California, Los Angeles
- Los Angeles/Orange Counties Building and Construction Trades Council
- Coalition for Clean Air
- Southwest Regional Council of Carpenters
- Move LA
- Los Angeles Cleantech Incubator
- Champions for Progress
- Faithful Central Bible Church
- Gateway Los Angeles
- The Inglewood Airport Area Chamber of Commerce

- LAX Coastal Chamber of Commerce
- The NAACP Inglewood Chapter
- The Renaissance HOA
- South Bay Cities Council of Governments
- St. John Chrysostom Catholic Church and School
- Thomas Uwal, Transit Services Operations Manager, City of Inglewood
- Century Heights Neighborhood Watch Association
- Ironworkers Local 433
- I.U.O.E. Local Union No. 12
- Laborers Local 300- LiUNA
- United Association Local Union 250
- Painters & Allied Trades, District Council 36
- United Association Local 398
- Van Wick Block Club Aero Collective
- A Toast to Artistry
- Doppelmayr
- Eye on Ingelwood
- FastSigns Inglewood/LAX
- Glaser Weil
- Hilltop Coffee + Kitchen
- Jamz Creamery
- Legatum Holdings LLC
- Miracle Theater
- R. Hicks Realty
- The Sammiche Shoppe
- Three Weavers Brewing Company
- Toragrafix
- WLM Financial

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2020-0931, **File Type:** Budget **Agenda Number:** 44.

CONSTRUCTION COMMITTEE
MARCH 18, 2021

SUBJECT: EASTSIDE ACCESS IMPROVEMENTS PROJECT

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

A. ESTABLISH a life-of-project budget for the Eastside Access Improvements Project (Project) in the amount of $29,703,098 consistent with the provisions of the Board-adopted Measure R and Measure M Unified Cost Management Policy (Attachment B).

B. AUTHORIZE the Chief Executive Officer to negotiate and execute project related agreements, including contract modifications, up to the authorized Life-of-Project budget.

ISSUE

The establishment of the LOP Budget for the Project at the time of construction contract award is consistent with the recommendations in the Office of the Inspector General (OIG) Construction Management Best Practices Study Report and lessons learned regarding establishing final budgets, when adequate information (such as the receipt of hard bids) is available. Bids for the design-bid-build construction of the project were received on January 25, 2021 and the recommended award under the CEO's delegated authority.

BACKGROUND

The Project was awarded funding through Federal TIGER Grant CA-79-0005-00 ($11,800,000) and $30,000,000 is included in the Measure R Ordinance for the "Eastside Light Rail Access (Gold Line)" transit project. The Project is intended to improve multi-modal access to Metro's bus and rail facilities located at Union Station and enhancements in the Little Tokyo and surrounding neighborhoods.

The Project elements include:

Segment 1: 1st Street: (From Los Angeles Street to Mission Road)

This segment includes construction of bike lanes, LED street light upgrades, and wayfinding signage

Segment 2: Alameda Esplanade: (From 1st Street to Commercial Street)

This segment includes construction of an esplanade including installation of bike lanes, pedestrian walkway, trees, streetlights, pedestrian lights, low impact development improvements, crosswalks, landscaping, wayfinding signage

Segment 3: Los Angeles Street: (From Arcadia Street to 2nd Street)

This segment includes construction of crosswalks, LED street light installation and upgrades, trees, and wayfinding signage

Segment 4: People Street: (2nd Street and Traction)

This segment includes installation of wayfinding signage

Segment 5: Central Avenue: (1st Street and 3rd Street)

This segment includes LED street light installation and upgrades, street furniture restoration, decorative crosswalks restoration, and wayfinding signage

Segment 6: Judge John Aiso and San Pedro Street (From Temple to 3rd Street)

This segment includes LED street light upgrades, decorative crosswalks restoration, and wayfinding signage

Segment 7: Santa Fe Spine: (From 4th Street and Vignes Street)

This segment includes LED street light installation and upgrades, crosswalks, vehicle and pedestrian traffic lights, mid-block crossing, trees, bike lanes, curb ramps, and wayfinding signage

DISCUSSION

To date, the Project has been funded on a fiscal year basis. The proposed LOP budget for this project has been based on total project costs incurred, the bid prices, and contingency.

The Project will be funded through a combination of Federal grant funding and Metro local funding, as shown in Attachment A Funding and Expenditures Plan.

Funding for the Eastside Light Rail Access (Gold Line) has also been expended on two separate phases of this transit project.

DETERMINATION OF SAFETY IMPACT

This project includes new bike lanes, lighting upgrades, signage, crosswalks, and curb ramp upgrades in the Union Station, Little Tokyo, and Arts District neighborhoods. As such, approval of this

item will have a positive safety impact for Metro bus and rail passengers, pedestrians, and active transportation users.

FINANCIAL IMPACT

The Board approval of $29.7 million LOP for Eastside Access Phase 3 will exceed the $30 million allotment of Measure R 35% Transit funds for the combined three phases for Eastside Access Improvements efforts. As such, Unified Cost Management Policy analysis is provided in Attachment B. The $3.3 million required in FY21 for Phase 3 is included in the adopted budget. This is a multi-year project and it is the responsibility of the Project Manager and Chief Program Management Officer to budget for this project in future fiscal years.

Impact to Budget

The sources of funds for the recommended actions are Federal TIGER VII Grant, Measure R Transit Capital (35%), federal formula, and Proposition C Transit-Related Streets and Highways (25%). Metro staff will concurrently work with the subregion to provide the required 120 day written notification and seek formal approval from the governing body for use of the subregional equity program as a reimbursement or funding source for future expenditures. Should the subregion not approve the use of the funds, Metro staff will return to the Board with an update on the funding sources and a fiscal impact analysis of the use of these funds for the project.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This recommendation supports strategic plan goal # 3 by providing people with alternative mobility options near public transit and downtown Los Angeles.

ALTERNATIVES CONSIDERED

The Board may choose not to move forward with the establishment of an LOP budget. This is not recommended as this may jeopardize current and future grant opportunities.

NEXT STEPS

Upon Board approval of the recommendations, staff will move the Project forward into construction.

ATTACHMENTS

Attachment A - Funding and Expenditure Plan
Attachment B - Measure R and Measure M Unified Cost Management Policy

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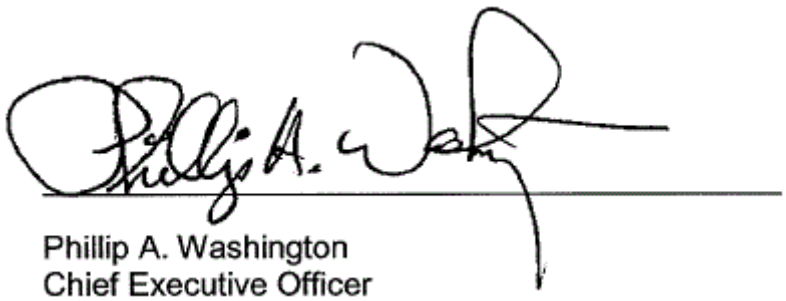

Phillip A. Washington
Chief Executive Officer

Eastside Light Rail Access (pedestrian) - Phase I & II ATTACHMENT A

Uses of Funds (millions $)

Phase	Thru FY20	FY21	FY22	FY23	FY24	Total
Phase 1 - City of LA (460300)	$ 12.8	$ 0.1	$ -	$ -	$ -	$ 12.9
Phase 2 - County of LA (460300)	$ 2.2	$ 0.0	$ 1.8	$ 3.5	$ 3.5	$ 11.1
TOTAL USES	**$ 15.0**	**$ 0.1**	**$ 1.8**	**$ 3.5**	**$ 3.5**	**$ 24.0**

Sources of Funds

Local Revenue

Measure R - Transit Capital (35%)	$ 15.0	$ 0.1	$ 1.8	$ 3.5	$ 3.5	$ 24.0
Local Revenue Subtotal	**$ 15.0**	**$ 0.1**	**$ 1.8**	**$ 3.5**	**$ 3.5**	**$ 24.0**

TOTAL SOURCES	**$ 15.0**	**$ 0.1**	**$ 1.8**	**$ 3.5**	**$ 3.5**	**$ 24.0**
	-	-	-	-	-	-

Eastside Light Rail Access (pedestrian) - Phase III

Uses of Funds (millions $)

Phase	Thru FY20	FY21	FY22	FY23	FY24	Total
Phase 3 - 1st & Central (460300/463300)	$ 5.6	$ 6.0	$ 12.8	$ 5.3	$ -	$ 29.7
TOTAL USES	**$ 5.6**	**$ 6.0**	**$ 12.8**	**$ 5.3**	**$ -**	**$ 29.7**

Sources of Funds

Federal Revenue

TIGER Grants	$ 5.6	$ 4.2	$ 1.9	$ -	$ -	$ 11.8
Federal Revenue Subtotal	**$ 5.6**	**$ 4.2**	**$ 1.9**	**$ -**	**$ -**	**$ 11.8**

Local Revenue

Measure R - Transit Capital (35%)		$ 1.8	$ 4.2	$ -	$ -	$ 6.0
Other Local Funds	$ -	$ -	$ 6.6	$ 5.3	$ -	$ 11.9
Local Revenue Subtotal	**$ -**	**$ 1.8**	**$ 10.8**	**$ 5.3**	**$ -**	**$ 17.9**

TOTAL SOURCES	**$ 5.6**	**$ 6.0**	**$ 12.8**	**$ 5.3**	**$ -**	**$ 29.7**
	-	-	-	-	-	-

ATTACHMENT B

Eastside Light Rail Access (Gold Line) Project

Measure R and Measure M Unified Cost Management Policy Analysis

Introduction

The Measure R and Measure M Unified Cost Management Policy (the Policy) was adopted by the Metro Board of Directors in June 2018. The precursor Measure R cost management policy was adopted in March 2011. The intent of the Policy is to inform the Metro Board of Directors regarding cost increases to Measure R- and Measure M-funded projects and the strategies available to close a funding gap. The Eastside Light Rail Access (Gold Line) is subject to this policy analysis.

The total cost for the project is listed at $30,000,000 in the Measure R Ordinance Expenditure Plan. The project is subject to the Policy analysis now due to a proposed $29,703,098 LOP budget for the Eastside Access Improvements Project, which together with expenditures on Phase I and Phase II of the broader "Eastside Access Project" exceed the Expenditure Plan cost. Funding for the cost increase is needed through FY 2023. This analysis recommends trade-offs required by the Policy to identify the funds necessary to meet the cost increase.

Measure R and Measure M Unified Cost Management Policy Summary

The adopted Policy stipulates the following.

If a project cost increase occurs, the Metro Board of Directors must approve a plan of action to address the issue prior to taking any action necessary to permit the project to move to the next milestone. Increases will be measured against subsequent actions on cost estimates taken by the Metro Board of Directors, including the determination of the budget. Shortfalls will first be addressed at the project level prior to evaluation for any additional resources using these methods in this order as appropriate:

1) Scope reductions;
2) New local agency funding resources;
3) Value Engineering;
4) Other cost reductions within the same transit or highway corridor;
5) Other cost reductions within the same sub-region; and finally,
6) Countywide transit or highway cost reductions or other funds will be sought using pre-established priorities.

Scope Reductions

The schedule for the Eastside Access Improvements Project has been delayed significantly due to the needed interface with adjacent Metro projects Regional Connector, Center Street, Division 20, and Patsaouras Plaza. Extensive iterations were also required from the design review process that further delayed this project. Because of the delays, Metro needed to request an extension in the TIGER grant period of performance until September 2022. Any attempt to identify and negotiate agreeable

reductions to the scope may result in further delays, potential additional costs, and loss of a portion of the TIGER grant. Because of this, we recommend moving to the next step.

New Local Agency Funding Resources

Local funding resources (i.e., specific to the affected corridor or subregion) are considered in the next step as opposed to countywide or regional sources so as not to impact the funding of other Metro Board-approved projects and programs or subregions in the County.

The project is eligible for both Measure M and Measure R funding and is currently eligible for $30,000,000 of funding that is identified in the Measure R sales tax ordinance Expenditure Plan, less expenditures already made on Phase I and Phase II.

The project is located in the Central City Area subregion (as defined in the Policy, as amended), with improvements located in the city of Los Angeles. Local funding resources from the subregion and city could be considered for the cost increase.

Subregional Programs and Local Agency Contributions

Measure M includes funding for a transit-eligible multi-year subregional program (MSP) for the Central City Area subregion. The subregion (represented by its Council of Governments) could allocate a portion of the funding for the project. The Central City Area subregion has a Subregional Equity Program (SEP) that is transit-eligible. The Measure M Expenditure Plan includes $235 million for the Central City Area SEP. The SEP funds are programmed beginning in FY 2043 in the Long Range Transportation Plan Financial Forecast due to limited financial capacity. Staff has previously recommended that the South Bay and Central City Area subregions allocate a portion of the SEP to address a $90 million cost increase on the Crenshaw/LAX Transit Project, and the San Gabriel Valley subregion allocate $126 million for Gold Line Foothill 2B.

Per Board action in May 2020 (Motion 38.1 # 2020-0356), use of the SEP requires approval by and 120 days notice to the subregional governing body. Staff is also developing, in partnership with all Board offices, a uniform process by which subregions can elect to use SEP funding.

Local Agency Contributions

Measure M, as well as Measure R and Propositions A and C, provide “local return” funding to Los Angeles. However, prior Board actions relating to the Twenty-Eight by '28 Initiative and funding for the cost increase to Foothill Extension to Pomona did not support use of local return, and it is presumed these funds would not be available for the cost increase to the project.

State and Federal Funding (Discretionary)

The USDOT provided funding in 2015 through a $11.8 million TIGER grant. Additional State or federal discretionary funding (where Metro would compete for the funding) is not probable, given the project has experienced multiple delays.

Value Engineering
Any attempt to identify and negotiate agreeable value engineering may result in further delays, potential additional costs, and loss of a portion of the TIGER grant. Because of this, we recommend moving to the next step.

Other Cost Reductions within the Same Transit or Highway Corridor, or within the Same Sub-region
The city receives funding through the Call-For-Projects, the competitive grant program that is funded and managed by Metro for the benefit of LA County cities, transit operators, and State highway projects that was last held in 2015. At times the funding for certain projects in the Call-For-Projects is "de-obligated" if not spent within a reasonable timeframe and this can be a funding source for other uses. Currently there is not a meaningful amount of de-obligated funds available, and all other projects are moving through their respective development process.

Countywide Cost Reductions and/or Other Funds
If new local agency resources are not allocated to the project cost increase, regional or countywide funding could be considered. These funds are programmed for other uses in Metro's financial forecast, during the timeframe when funds are needed for the project cost increase. A reallocation of the funds to the cost increase would divert the funding from other Board-approved uses and or require additional debt financing. Eligible sources of countywide funding include Proposition C 25% (Transit-Related Streets and Highways), Proposition C 40% (Discretionary), and Proposition A 35% (Rail Development).

Through FY 2023, the Proposition C 25% funds are currently planned, from highest to lowest, for debt service on Metro bonds, I-5 South Carpool and Mixed Flow Lanes I-605 to OCL, Freeway Service Patrol, Blue Line Track and System Refurbishment, and the Crenshaw/LAX Locally Funded Activities Project. The Proposition C 40% is planned for Metro bus operations, ADA-paratransit operations, debt service, Metro bus fleet replacement, and the municipal and non-Metro operators. The Proposition A 35% is planned for debt service on Metro bonds, Metro rail operations, Division 20, Heavy Rail Vehicles, and Light Rail Vehicles.

State and Federal Funding (Formula)
Metro receives quasi-formula funding from the State through the Regional Improvement Program (RIP) and Local Partnership Program (LPP). This is considered regional funding as it can be applied countywide to both transit and highway spending. There is currently no capacity in the RIP or LPP through FY 2025. The RIP has been allocated to projects submitted in Metro's 2020 RTIP and the next cycle of the LPP is planned to be used on the $801 million Division 20 project.

Metro receives federal formula funding from the Congestion Mitigation and Air Quality (CMAQ) Improvement Program and the Surface Transportation Block Grant Program (STBG). These funds are eligible for use on the project, but are currently programmed

for other Metro projects and programs in the Long Range Transportation Plan. Metro also receives an allocation of funds from the “Highway Infrastructure Program,” which is a federal formula grant created in 2018 for uses that include the construction of highways, bridges, tunnels, transit capital, and ITS; operational improvements; highway and transit safety improvements; and pedestrian and bicycle projects, among others. Funding from this grant will be programmed in the pending 2021 Short Range Transportation Plan.

Recommendation

Metro staff recommends the use of $11.9 million from federal formula funds and Proposition C 25% to fund the cost increase. The programming of the funds does not require subregional approval and can allow the construction contract award to proceed. This reduces the risk that costs are not reimbursed from the federal TIGER grant, which has a deadline of September 2021. Metro staff will concurrently work with the subregion to provide the required 120 day written notification and seek formal approval from the governing body for use of the subregional equity program as a reimbursement or funding source for future expenditures. Should the subregion not approve the use of the funds, Metro staff will return to the Board with an update on the funding sources and a fiscal impact analysis of the use of these funds for the project.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2020-0919, **File Type:** Policy **Agenda Number:** 7.

FINANCE, BUDGET AND AUDIT COMMITTEE
MARCH 17, 2021

SUBJECT: CORONAVIRUS RESPONSE AND RELIEF SUPPLEMENTAL APPROPRIATIONS (CRRSA) ACT FUNDING

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. APPROVING the allocation of $784,942,958 from Los Angeles County's partial share of Federal Transit Administration (FTA) Section 5307/ Section 5337 funds from the CRRSA Act to transit operators, as described in Attachment A, for operating expenses;

B. AUTHORIZING the Chief Executive Officer (CEO) or his designee to solicit proposals and allocate $1,327,107 from Los Angeles County's share of FTA funds from the CRRSA Act, as described in Attachment B, to Metro's existing subrecipients of Federal Section 5310 funds for operating expenses;

C. AUTHORIZING the CEO to allocate Los Angeles County's share of FTA Section 5311 funds from the CRRSA Act (estimated to be about $1,127,870) for transit service in rural areas upon notification by the California Department of Transportation (Caltrans), as described in Attachment B, for operating expenses;

D. APPROVING exchanges of CRRSA Act funding allocations, as appropriate, with other local or eligible State or Federal funds to accelerate grant approval and disbursement of funds by the FTA;

E. AUTHORIZING the CEO or his designee to negotiate and execute all necessary agreements to implement Board approved support of transit programs in Los Angeles County; and

F. DELEGATING to the CEO or his designee the authority to administratively approve minor changes to the allocations to reflect any revisions made by the Southern California Association of Governments (SCAG), FTA and/or Caltrans that may impact Los Angeles County's share of the funds.

ISSUE

Public transportation systems nationwide continue to face challenges including to ridership, revenue, and overall operations due to the negative impacts of the Coronavirus pandemic (COVID-19). The CRRSA Act makes available $14 billion nationwide for transit operators to prevent, prepare for, and respond to COVID-19. As the County Transportation Commission (CTC) for Los Angeles County, Metro is responsible for allocating Los Angeles County's share of CRRSA Act funds to transit agencies to support the continuing provision of safe and reliable service in our region for essential workers and other riders who depend on public transportation to meet their travel needs.

The FTA apportioned $954,900,781 in Section 5307/ Section 5337 funds to the Los Angeles-Long Beach-Anaheim Urbanized Area (UZA), which comprises areas in Los Angeles, Orange, San Bernardino, Riverside and Ventura counties. SCAG, as the federally "Designated Recipient" of the funds, shared early February the inter-county allocation methodology and corresponding funding allocation for each county with the CTCs in the region for their review and concurrence. Staff concurred with SCAG's staff proposed methodology as it is fair, transparent, and implements the intent of the CRRSA Act. The Orange County Transportation Authority (OCTA), San Bernardino County Transportation Authority (SBCTA) and Riverside County Transportation Commission (RCTC) asked SCAG to reconsider the proposed methodology but supported the allocation of a portion of the funding "not in dispute". The balance of $126,838,551 is the amount these agencies dispute, as per SCAG's proposed methodology would be allocated to Los Angeles County. SCAG staff took their recommendation to the Regional Council for approval at its March 4, 2021 meeting. The item was pulled from the consent calendar, with direction from the Regional Council's President to move forward with the partial "Round 1" inter-county allocation of $828,062,230. SCAG staff will seek approval for the allocation of the balance of the funds from the Regional Council at its April 1, 2021 meeting.

BACKGROUND

The CRRSA Act, signed into law on December 27, 2020, appropriated $14 billion for transit nationwide, to remain available until expended, for eligible expenses incurred starting on January 20, 2020. These funds are in addition to the $25 billion that were appropriated by the "Coronavirus Aid, Relief, and Economic Security Act'' (CARES Act) that was signed into law on March 27, 2020. The Metro Board approved the allocation of Los Angeles County's share of CARES Act funds totaling about $1.069 billion at its May 28, 2020 regular meeting.

DISCUSSION

On January 11, 2021, the FTA released the funding apportionments for UZAs and states nationwide. Following the publication of the apportionments, the FTA hosted a series of webinars through January 14, 2021 to describe eligibility requirements and answer questions about the funding allocation and grant application processes. Staff's January 19, 2021 Board Box summarized the transit provisions of the CRRSA Act, as well as our agency's outreach and inter-agency consultation efforts.

Transit Funding Apportionments and Los Angeles County's Allocations

Attachment B summarizes the CRRSA Act transit apportionments and Los Angeles County's share of the funds that Congress appropriated for the FTA's Section 5307 UZA Formula Grants, Section 5311 Formula Grants for Rural Areas, and Section 5337 State of Good Repair Grants programs. The funding allocations for Los Angeles County from Section 5307/ Section 5337 (including partial "Round 1" allocations) and Section 5310 are per the methodology proposed by SCAG to Metro and other CTCs in the SCAG region. Los Angeles County's share of Section 5311 funds assumes Caltrans will use the same allocation process as for the CARES Act. The CRRSA Act requires the FTA to apportion the $14 billion in transit funds, after a set aside of up to $10 million for its program management and oversight, according to the existing shares and apportionment formulas for the following programs:

Section 5307 and Section 5337- About $13.26 billion has been apportioned to UZAs nationwide. The apportionments are adjusted such that no UZA receives additional funding from the CRRSA Act when the combined Section 5307 and Section 5337 apportionments from the CARES Act and the CRRSA Act within the UZA exceeds 75% of the aggregated 2018 operating costs as reported by individual transit operators within the UZA to the National Transit Database (NTD).

Per the FTA, the apportionments are: i) $954,900,781 for the Los Angeles-Long Beach-Anaheim UZA, which comprises most of Los Angeles County and parts of Orange, Riverside, San Bernardino, and Ventura counties; and, ii) $224,351 for the Santa Clarita UZA, which is fully comprised within Los Angeles County. The combined share of Los Angeles County requested to be allocated by the Metro Board from the apportionment to the Los Angeles-Long Beach-Anaheim and the Santa Clarita UZAs, while taking into consideration SCAG's limitation for "Round 1"allocations, is $784,942,958.

Section 5310- About $50 million has been apportioned to UZAs and States (for UZAs with populations less than 200,000 and for non-UZAs) nationwide for the Enhanced Mobility of Seniors and Individuals with Disabilities Program. Per the FTA, the apportionments are: i) $1,629,631 for the Los Angeles-Long Beach-Anaheim UZA; ii) $41,990 for the Lancaster- Palmdale UZA, which is fully comprised within Los Angeles County; and, iii) $30,300 for the Santa Clarita UZA. The share of Los Angeles County from the apportionment to the Los Angeles-Long Beach-Anaheim UZA, per SCAG's inter-county allocation methodology of the funds, is $1,254,817.

Section 5311- About $679 million has been apportioned to States for rural areas nationwide. The CRRSA Act requires apportionments to be adjusted such that no State receives additional funding when the combined Section 5311 apportionments from the CARES Act and the CRRSA Act for individual transit operators in rural areas within the State exceeds 125% of the 2018 operating costs as reported by individual transit operators in rural areas within the State to the NTD. Per the FTA, California will receive $74,423,500. Los Angeles County's share of the funds is estimated to be $1,127,870. Caltrans has not finalized the allocation methodology. Staff recommends Caltrans using the same county CARES Act percentage shares for the allocation of CRRSA Act funds.

Funding Eligibility

The CRRSA Act makes funds available for the "operating expenses of transit agencies related to the response to a COVID-19 public health emergency, including, beginning January 20, 2020, reimbursement for operating costs to maintain service and lost revenue due to the COVID-19 public health emergency, including the purchase of personal protective equipment (PPE), and paying the administrative leave of operations or contractor personnel due to reductions in service". It requires, "to the maximum extent possible", CARES Act and CRRSA Act funds to be directed to payroll and operations of public transportation (including payroll and expenses of private providers, as eligible subrecipients), unless the recipient certifies to the U.S. Secretary of Transportation that it has not furloughed any employees. The funds are available until expended (on a reimbursement basis by the FTA) for up to 100% of eligible expenses.

Stakeholder Outreach

On January 7, 2021, the CEO sent a letter to transit operators in our region to provide a brief update on the CRRSA Act, including our agency's current and anticipated actions. Among these actions, the CEO referred to: i) Metro staff working closely with federal and regional counterparts to determine Los Angeles County's share of the funds that will ultimately de subject to distribution by the Metro Board; ii) recipients of CARES Act funds to draw down their allocations as quickly as possible to help position Los Angeles County for any future new stimulus funding; and iii) Metro conducting a series of outreach meetings to gather input and discuss the allocations that Metro staff will be recommending to the Board of Directors for approval.

Staff reached out to SCAG on the timeline for completing the inter-county allocation of Section 5307/ Section 5337 funds, as well as of Section 5310 funds, apportioned to the Los Angeles-Long Beach-Anaheim UZA. Staff also reached out to Caltrans to inquire about the timeline for completing the statewide allocation of Section 5311 funds. Staff also presented to the General Managers (GM), Bus Operations Subcommittee (BOS), Local Transit Systems Subcommittee (LTSS), and Accessibility Advisory Committee (AAC). The CEO also sent a letter to SCAGs' Executive Director supporting the proposed inter-county allocation methodology. Staff also briefed members and staff of elected officials that represent Los Angeles County in SCAG's Regional Council. Staff also reached out to transit operators in the region asking to express their support.

Following SCAG's Regional Council meeting, the CEO sent letters to transit operators in Los Angeles County to brief them about SCAG's partial allocation of the funds and Metro's proposed methodology to allocate our region's share of the CRRSA Act funds. The CEO's letter also included the estimated funding allocation from the CRRSA Act for each transit operator. Following a staff presentation, the GM concurred with Metro's proposed methodology and allocations for transit operators at their March 10, 2021 meeting.

Funding Allocations

At its May 2020 meeting, the Metro Board approved the allocation of CARES Act funding premised on the countywide reduction in anticipated sales tax revenues available to support transit programs throughout the county. Further consideration was given to the projected loss in associated operating

and ancillary revenues of operators. As included in its title, the CRRSA Act is a “supplemental” allocation to the original CARES Act. The initial conditions prompting Board approval for the CARES Act allocation of funds have remained largely unchanged. Economic activity continues to lag conditions prior to the onset of the pandemic and transit ridership remains at historic lows. Though the introduction of the vaccines provides a positive indicator for future recovery, staff believe the original premise for allocating the CARES Act remains the best basis for the allocation of CRRSA Act funds.

SCAG’s notice to Metro and other CTCs in the region about its inter-county allocation methodology highlighted that the CRRSA Act limits the total combined CARES Act and CRRSA Act allocations for UZAs to 75% of the total 2018 operating costs reported to the NTD. With this requirement into consideration, SCAG indicated that it followed the same methodology as in the CRRSA Act for allocating the Section 5307/ Section 5337 funds. SCAG staff recommended its Regional Council to approve this methodology.

SCAG followed the existing process for the inter-county funding allocation of CRRSA Act apportionments to the Los Angeles-Long Beach-Anaheim UZA from the FTA’s Section 5310 Program among Metro and other CTCs in the region, as the CRRSA Act does not link the operating expenses reported to the NTD in 2018 to the Section 5310 apportionment that an UZA receives.

Staff concurred with SCAG’s methodology for the inter-county allocation of CRRSA Act funds apportioned to the Los Angeles-Long Beach-Anaheim UZA from the FTA’s Section 5307/ Section 5337 and Section 5310 programs.

Included in Metro’s proposed allocation methodology of Los Angeles County’s share of CRRSA Act funds from the Section 5307/ Section 5337 programs are funding allocations for Metro and the Municipal Operators, Metrolink, Access Services, as well as local and regional small operators and countywide transit programs. The allocation shares of each transit operator/agency from Los Angeles County’s share of Section 5307/ Section 5337 funds apportioned to the Los Angeles-Long Beach-Anaheim UZA will be the same as for the CARES Act. The Section 5307/ Section 5337 apportionment to the Santa Clarita UZA is to be fully allocated to Santa Clarita Transit. Attachment A includes the allocations of Los Angeles County’s share of Section 5307/ Section 5337 funds from the CRRSA Act. Attachment B describes the proposed allocation of Los Angeles County’s share of Section 5310 and Section 5311 funds from the CRRSA Act.

CARES Act Funding Drawdown Update

Attachment C summarizes the drawdowns of CARES Act funds by transit operators in Los Angeles County through March 1, 2021. Transit operators in Los Angeles County have collectively drawn down over 95% of their CARES Act allocations. A balance of about $51 million in CARES Act funding remains to be drawn down by ten of the Municipal Operators. Based on discussions with transit operators with balances that remain available for disbursements by the FTA, the common reasons are mostly administrative. Some agencies reported having already spent all their CARES Act allocations, with requests for reimbursement being finalized for submittal to the FTA. Drawing down the CARES Act funding demonstrates Los Angeles County’s needs and better positions our region and transit operators to receive additional stimulus funding.

DETERMINATION OF SAFETY IMPACT

Adoption of this item will provide funding for increased safety efforts by providing continued supplemental relief funding to Los Angeles County transit agencies impacted by the pandemic, ensuring resources available to continue enhanced cleaning routines, access to PPE, and maintaining service levels.

FINANCIAL IMPACT

A total of $784,942,958 in CRRSA Act funding will be distributed to transit agencies throughout Los Angeles County as shown in Attachment A. The additional estimated total of $2,454,977 in CRRSA Act funding will be allocated as described in Attachment B. Los Angeles County's share of CRRSA Act funding, taking into consideration partial "Round 1" allocation, is estimated to be $787,397,935.

Impact to Budget

Use of the CRRSA Act funds will continue to help mitigate, but not eliminate the funding gaps experienced by transit operators throughout Los Angeles County.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

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

ALTERNATIVES CONSIDERED

The Board may choose not to approve the staff's proposed CRRSA Act funding allocation method and instruct staff to allocate funds through some other Board directed process. This is not recommended, as this will cause significant delays in the receipt of funds for all transit operators and agencies in Los Angeles County.

NEXT STEPS

Should the Board approve the staff recommendation:

- Staff will work with operators and agencies on final administrative requirements and fund distribution details;
- Staff will notify SCAG of the allocation of Los Angeles County's share of the CRRSA Act funds for inclusion in its "split letter" to the FTA;
- SCAG will send the "split letter" to the FTA to allow the designated recipients of the funds to submit grant applications to the FTA for approval and begin drawing down CRRSA Act funding; and

- Staff will follow up with SCAG, transit operators in Los Angeles County, and members and staff of elected officials that represent Los Angeles County in SCAG's Regional Council regarding the allocation of the balance of $126,838,551 from the CRRSA Act.

Staff will also continue to update the Board on the impacts of the COVID-19 pandemic to Metro and the region, as well as bring for approval the allocation of Los Angeles County's share of the funds from the American Rescue Plan that Congress approved earlier this month.

ATTACHMENTS

A. CRRSA Act Funding Allocation by Transit Operator/Agency
B. CRRSA Act Apportionments and Los Angeles County's Share of the Funds
C. CARES Act Funding Drawdown Update

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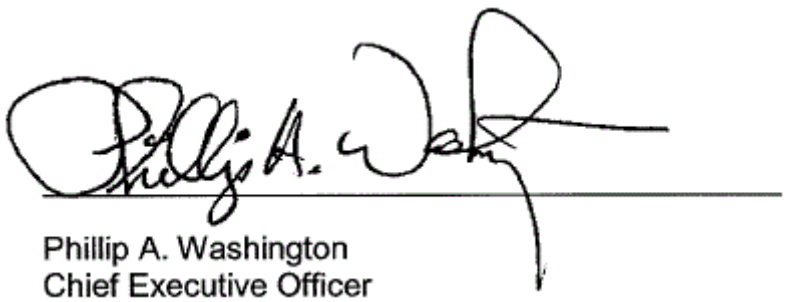

Phillip A. Washington
Chief Executive Officer

ATTACHMENT A

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act
Proposed "Round 1" Funding Allocation by Transit Operator/ Agency
Section 5307/ Section 5337 Apportionments to the Los Angeles- Long Beach- Anaheim UZA

Transit Operator/ Agency	Metro Board Approved CARES Act Allocation	Allocation %	Proposed CRRSA Act Allocation
Metro Bus Ops	$ 334,196,361	33.4838%	$ 262,753,645
Metro Rail Ops	252,941,922	25.3428%	198,869,346
Municipal Operators			
Arcadia	$ 413,118	0.0414%	$ 324,804
Claremont	153,038	0.0153%	120,322
Commerce	834,418	0.0836%	656,041
Culver City	6,573,119	0.6586%	5,167,953
Foothill Transit	29,856,920	2.9914%	23,474,267
Gardena	6,650,248	0.6663%	5,228,594
La Mirada	123,098	0.0123%	96,783
Long Beach	29,203,837	2.9260%	22,960,796
Montebello	10,175,268	1.0195%	8,000,054
Norwalk	3,807,217	0.3815%	2,993,331
Redondo Beach	906,679	0.0908%	712,854
Santa Monica	24,360,412	2.4407%	19,152,773
Torrance	7,910,110	0.7925%	6,219,129
Subtotal - Municipal Operators	**$ 120,967,484**	**12.1200%**	**$ 95,107,700**
Eligible Operators			
Antelope Valley	$ 4,239,043	0.4247%	$ 3,332,843
LADOT	15,831,270	1.5862%	12,446,945
Santa Clarita	3,776,194	0.3783%	2,968,940
Foothill BSCP	3,160,600	0.3167%	2,484,944
Subtotal - Eligible Operators	**$ 27,007,107**	**2.7059%**	**$ 21,233,671**
Tier 2 Operators			
LADOT Community Dash	$ 3,612,073	0.3619%	$ 2,839,903
Glendale	524,420	0.0525%	412,312
Pasadena	305,610	0.0306%	240,278
Burbank	91,935	0.0092%	72,282
Subtotal - Tier 2 Operators	**$ 4,534,038**	**0.4543%**	**$ 3,564,775**
Other Operators			
Metrolink	$ 56,432,000	5.6540%	$ 44,368,268
Access Services	$ 33,500,000	3.3564%	$ 26,338,549
Regional Transit Support	$ 160,220,592	16.0528%	$ 125,969,488

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act
Proposed "Round 1" Funding Allocation by Transit Operator/ Agency
Section 5307/ Section 5337 Apportionments to the Los Angeles- Long Beach- Anaheim UZA

Transit Operator/ Agency	Metro Board Approved CARES Act Allocation	Allocation %	Proposed CRRSA Act Allocation
Regional Paratransit Operators			
Agoura Hills	$ 48,095	0.0048%	$ 37,814
Antelope Valley, Elderly & Disabled	243,028	0.0243%	191,075
Beverly Hills Taxi & Lift Van	2,721	0.0003%	2,139
Culver City Community Transit and LA County	43,774	0.0044%	34,416
Gardena, Hawthorne and LA County	139,616	0.0140%	109,770
Glendale Paratransit and La Canada Flintridge	192,538	0.0193%	151,378
Inglewood Transit and LA County	151,856	0.0152%	119,393
LA County (Whittier et al)	151,691	0.0152%	119,263
LA County (Willowbrook)	31,049	0.0031%	24,411
Los Angeles Taxi & Lift Van, City Ride	290,748	0.0291%	228,594
Los Angeles Dial-a-Ride, City Ride	792,892	0.0794%	623,392
Monrovia D.A.R. and LA County	77,486	0.0078%	60,921
Palos Verdes PTA D.A.R.	30,357	0.0030%	23,867
Palos Verdes PTA - PV Transit	286,240	0.0287%	225,049
Pasadena Community Transit, San Marino and LA County	342,211	0.0343%	269,055
Pomona Valley TA - E&D (Get About)	574,519	0.0576%	451,702
Pomona Valley TA General Public (VC)	54,589	0.0055%	42,919
Redondo Beach Community Transit and Hermosa Beach	2,961	0.0003%	2,328
Santa Clarita D.A.R.	663,633	0.0665%	521,765
West Hollywood (DAR)	186,218	0.0187%	146,409
West Hollywood (Taxi)	10,038	0.0010%	7,892
Whittier (DAR)	208,253	0.0209%	163,733
Subtotal - Regional Paratransit Operators	**$ 4,524,511**	**0.4533%**	**$ 3,557,285**
Voluntary Reporters			
City of Alhambra (MB and DR)	$ 84,471	0.0085%	$ 66,413
City of Artesia (DR)	3,914	0.0004%	3,077
City of Azusa (DR)	29,336	0.0029%	23,065
City of Baldwin Park (MB and DR)	72,257	0.0072%	56,811
City of Bell (MB/DR)	17,398	0.0017%	13,679
City of Bell Gardens (MB and DR)	46,183	0.0046%	36,310
City of Bellflower (MB and DR)	30,034	0.0030%	23,613
City of Burbank (MB)*	82,583	0.0083%	64,929
City of Calabasas (MB and DR)	40,163	0.0040%	31,577
City of Carson (MB and DT)	137,089	0.0137%	107,783
City of Cerritos (MB)	74,555	0.0075%	58,617
City of Compton (MB)	40,566	0.0041%	31,894
City of Covina (DR)	19,094	0.0019%	15,012
City of Cudahy (MB and DR)	17,293	0.0017%	13,597
City of Downey (MB and DR)	62,640	0.0063%	49,249
City of Duarte (MB)	19,643	0.0020%	15,444
City of El Monte (MB and DR)	94,913	0.0095%	74,623
City of Glendora (MB and DR)	57,825	0.0058%	45,464
City of Glendale (MB)*	207,050	0.0207%	162,788
City of Huntington Park (MB)	67,347	0.0067%	52,950
City of Los Angeles -- Community DASH* (MB)	803,714	0.0805%	631,900
City of Los Angeles -- Department of Aging (DR)	124,047	0.0124%	97,529
LA County Dept. of Public Works -- Avocado Heights (MB)	12,214	0.0012%	9,603
LA County Dept. of Public Works -- East Valinda (MB)	13,745	0.0014%	10,806
LA County Dept. of Public Works -- East LA (MB and DR)	99,948	0.0100%	78,582
LA County Dept. of Public Works -- Willowbrook (MB)	25,658	0.0026%	20,173
LA County Dept. of Public Works -- King Medical (MB)	11,017	0.0011%	8,662
LA County Dept. of Public Works -- Athens (MB)	11,502	0.0012%	9,043
LA County Dept. of Public Works -- Lennnox (MB)	9,012	0.0009%	7,085
LA County Dept. of Public Works -- South Whittier (MB)	63,799	0.0064%	50,161
LA County Dept. of Public Works -- Florance/Firestone (MB)	15,080	0.0015%	11,856
City of Lakewood (DR)	19,546	0.0020%	15,368
City of Lawndale (MB)	24,480	0.0025%	19,247
City of Lynwood (MB)	42,490	0.0043%	33,407
City of Malibu (DT)	4,623	0.0005%	3,635
City of Manhattan Beach (DR)	15,286	0.0015%	12,018
City of Maywood (DR)	17,879	0.0018%	14,057
City of Monterey Park (MB and DR)	76,017	0.0076%	59,767

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act
Proposed "Round 1" Funding Allocation by Transit Operator/ Agency
Section 5307/ Section 5337 Apportionments to the Los Angeles- Long Beach- Anaheim UZA

Transit Operator/ Agency	Metro Board Approved CARES Act Allocation	Allocation %	Proposed CRRSA Act Allocation
City of Pasadena (MB)*	205,942	0.0206%	161,917
City of Pico Rivera (DR)	6,470	0.0006%	5,087
City of Rosemead (MB and DR)	54,916	0.0055%	43,177
City of Santa fe Springs (DR)	6,262	0.0006%	4,923
City of South Gate (DT and MB)	110,407	0.0111%	86,804
City of South Pasadena (DR)	11,118	0.0011%	8,742
City of West Covina (MB and DR)	71,080	0.0071%	55,885
City of West Hollywood (MB)	35,696	0.0036%	28,065
Subtotal Voluntary Reporters	**$ 3,096,305**	**0.3102%**	**$ 2,434,394**
Other Special Projects			
Avalon Ferry Subsidy	$ 324,669	0.0325%	$ 255,263
Avalon Transit Services (Jitney and Dial-a-Ride)	74,858	0.0075%	58,855
Hollywood Bowl Shuttle Service	263,750	0.0264%	207,367
Subtotal - Other Special Projects	**$ 663,277**	**0.0665%**	**$ 521,485**
Grand Total*	**$ 998,083,598**	**100.0000%**	**$ 784,718,607**

* The CARES Act total represents the funds available for countywide allocation per the May 2020 Board Report.

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act
Funding Allocation by Transit Operator/ Agency
Section 5307/ Section 5337 Apportionments to the Santa Clarita UZA

Transit Operator/ Agency	Metro Board Approved CARES Act Allocation	Allocation %	Proposed CRRSA Act Allocation
Metro	$ 6,378,739	~~100.0000%~~	~~$ 224,351~~
		0.0000%	0
Santa Clarita Transit	$ 14,486,864	~~0.0000%~~	~~0~~
		100.0000%	$ 224,351
Grand Total*	**$ 20,865,603**	**100.0000%**	**$ 224,351**

* Santa Clarita Transit's share of CARES Act funds was about 69.43%, but proposed to receive 100% of the CRRSA Act funds apportioned to the UZA.

CRRSA Act Apportionments and Los Angeles County's Share of the Funds

FTA Program Urbanized Area/ County[1]	Urbanized Area/ State Apportionment	Los Angeles County Share[2] Full Allocation	Los Angeles County Share[3] Partial/ "Round 1"	Transit Operator/ Agency Allocation
Section 5307/Section 5337				
Santa Clarita UZA	$224,351	$224,351	N/A	Per Attachment A
Los Angeles- Long Beach- Anaheim UZA	$954,900,781	$911,525,690	$784,718,607	Per Attachment A
Section 5310				
Los Angeles- Long Beach- Anaheim UZA	$1,629,631	$1,254,817	N/A	TBD (CEO)
Lancaster- Palmdale UZA	$41,990	$41,990	N/A	TBD (CEO)
5310 Santa Clarita UZA	$30,300	$30,300	N/A	TBD (CEO)
Section 5311				
State of California	$74,423,500	$1,127,870	N/A	TBD (CEO)
Total	**$1,031,250,553**	**$914,205,018**	**$784,718,607**	**N/A**

1. Los Angeles County's share of Section 5307/Section 5337 and Section 5310 funds are per SCAG's inter-county allocation methodology. Los Angeles County's share of Section 5311 funds is an estimate by Metro staff that assumes the same share of such funds from the CARES Act as allocated by Caltrans.
2. Per SCAG staff recommended inter-county allocation methodology based on 75% of reported operating costs to the National Transit Database.
3. Per SCAG'S Regional Council partial inter-county allocation methodology based on "proportionate" CARES Act allocation share for each county.

CARES Act Funding Drawdown Update
(as of March 1, 2021)

UZA Transit Operator/Agency	Allocation Amount	Obligation Amount	Disbursed Amount	Unliquidated Amount	% Disbursed
Los Angeles- Long Beach- Anaheim UZA					
Metro[1]	**$ 855,531,526.00**	**$ 855,531,526.00**	**$ 855,531,526.00**	**$ -**	**100.00%**
Municipal Operators					
Arcadia	$ 413,118.00	$ 413,118.00	$ -	$ 413,118.00	0.00%
Claremont	$ 153,038.00	$ 153,038.00	$ 153,038.00	$ -	100.00%
Commerce	$ 834,418.00	$ 834,418.00	$ 724,779.00	$ 109,639.00	86.86%
Culver City	$ 6,573,119.00	$ 6,573,119.00	$ 6,245,987.00	$ 327,132.00	95.02%
Foothill Transit	$ 33,017,520.00	$ 33,017,520.00	$ 33,017,520.00	$ -	100.00%
Gardena	$ 6,650,248.00	$ 6,650,248.00	$ 6,334,889.00	$ 315,359.00	95.26%
La Mirada	$ 123,098.00	$ -	$ -	$123,098	0.00%
Long Beach	$ 29,203,837.00	$ 29,203,837.00	$ 29,203,837.00	$ -	100.00%
LADOT	$ 15,831,270.00	$ 15,831,270.00	$ 15,831,270.00	$ -	100.00%
Montebello	$ 10,175,268.00	$ 10,175,268.00	$ -	$ 10,175,268.00	0.00%
Norwalk	$ 3,807,217.00	$ 3,807,217.00	$ 3,807,217.00	$ -	100.00%
Redondo Beach	$ 906,679.00	$ 906,679.00	$ 539,232.00	$ 367,447.00	59.47%
Santa Monica	$ 24,360,412.00	$ 24,360,412.00	$ 24,360,412.00	$ -	100.00%
Torrance	$ 7,910,110.00	$ 7,910,110.00	$ 5,621,034.00	$ 2,289,076.00	71.06%
Santa Clarita	$ 3,776,194.00	$ 3,776,194.00	$ 3,776,194.00	$ -	100.00%
Total Municipal Operators	**$ 143,735,546.00**	**$ 143,612,448.00**	**$ 129,615,409.00**	**$ 14,120,137.00**	**90.18%**
Total UZA	**$ 999,267,072.00**	**$ 999,143,974.00**	**$ 985,146,935.00**	**$ 14,120,137.00**	**98.59%**
Santa Clarita UZA					
Metro[1]	$ 6,378,739.00	$ 6,378,739.00	$ 6,378,739.00	$ -	100.00%
Santa Clarita	$ 14,486,864.00	$ 14,486,864.00	$ 10,180,188.00	$ 4,306,675.31	70.27%
Total UZA	**$ 20,865,603.00**	**$ 20,865,603.00**	**$ 16,558,927.00**	**$ 4,306,675.31**	**79.36%**
Lancaster- Palmdale UZA					
AVTA[1]	$ 47,875,609.00	$ 47,875,609.00	$ 15,191,241.00	$ 32,684,368.00	31.73%
Total UZA	**$ 47,875,609.00**	**$ 47,875,609.00**	**$ 15,191,241.00**	**$ 32,684,368.00**	**31.73%**
Grand Total	**$1,068,008,284.00**	**$1,067,885,186.00**	**$1,016,897,103.00**	**$51,111,180.31**	**95.21%**

1. After funding exchanges.

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act Funding

Finance, Budget and Audit Committee

March 17, 2021

Metro

Transit Infrastructure Grants Provisions

- $14.0 B nationwide for the "*operating expenses of transit agencies related to the response to a COVID-19 public health emergency"* beginning on January 20, 2020.

  - About $13.27 B to urbanized areas (UZAs) apportioned by the formulas for FTA's 5307 Urbanized Area Formula Grant Program & Section 5337 State of Good Repair Grant Program.

    UZA CARES + CRRSA Act funds cannot exceed 75% of UZA's 2018 operating costs.

  - About $50 M to UZAs apportioned by the formula for FTA Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities Program.

  - About $679 M to states apportioned by FTA's Section 5311 Formula Grants for Rural Areas Program.

    - **State CARES + CRRSA Act funds cannot exceed 125% of state's rural 2018 operating costs.**

Los Angeles County's Funding Share

- $784,718,607 from SCAG's partial/ "Round 1" inter-county allocation of Section 5307/ Section 5337 funds apportioned to the Los Angeles- Long Beach- Anaheim UZA

	Allocations Based on 75% Operating Cost	Allocations Proportionate to CARES Act	CRRSAA Round 1 Distribution - Unconstrained
Los Angeles	$911,525,690	$784,718,607	**$784,718,607**
Orange	$43,097,849	$142,241,634	**$43,097,849**
San Bernardino	$0	$27,694,766	**$0**
Riverside	$277,242	$245,774	**$245,774**
Ventura	$0	$0	**$0**
Total:	**$954,900,781**	**$954,900,781**	**$828,062,230**
		CRRSAA Apportionment:	$954,900,781
		Remaining Balance - Round 2 Distribution:	**$126,838,551**

- $224,351 in Section 5307/ Section 5337 funds from the Santa Clarita UZA.
- $1,327,107 in Section 5310 funds from the Los Angeles, Santa Clarita & Lancaster-Palmdale UZAs proposed to be allocated by the CEO through a solicitation for proposals.
- $1,127,870 in Section 5311 funds estimated from Caltrans and proposed to be allocated by the CEO.

Proposed Section5307/ Section 5337 Allocation

CRRSA Act supplements CARES Act

Evidenced with total appropriations (CARES + CRRSA) to UZAs are capped at 75% of 2018 Operating Expenses

Following intent

CRRSA Act allocation should follow CARES allocation method

CARES % share will be applied to CRSSA

Section 5307/ Section 5337 Allocations

Round 1 - Represents SCAG Regional Council's partial allocation

- Partial allocation Los Angeles UZA: $828.1 M of $954.9 M, LA County share of $784.7 M.
- This Board Report seeks Metro Board approval of Round 1 allocations.

	Metro Board Adopted CARES Act Allocation	Distribution %	CARES Based CRRSA Act Allocation
Metro	$ 747,358,876	74.8794%	$ 587,592,479
Municipal Operators *	124,128,084	12.4366%	97,592,644
Eligible Operators*	23,846,507	2.3892%	18,748,728
Tier 2 Operators	4,534,038	0.4543%	3,564,775
Metrolink	56,432,000	5.6540%	44,368,268
Access Services	33,500,000	3.3564%	26,338,549
Regional Paratransit/Vol. Reporters	8,284,094	0.8300%	6,513,164
	$ 998,083,598	100.0000%	$ 784,718,607

Round 2 - Balance of $127 M is to be considered by SCAG Regional Council on April 1st

- Staff will return to the Board upon final resolution, with the intent to allocate based on Metro's CARES Act methodology.

CRRSA Act Timeline

December 27, 2020	**Signed into law- $14 B nationwide for transit**
January 11, 2021	• FTA publishes apportionment tables
February 2021	• SCAG releases proposed inter-county allocations • Metro concurs; OCTA, SBCTA & RCTC disagree
March 4, 2021	• SCAG releases partial “Round 1” allocations
March 2021	• Proposed allocation of LA County’s share of Round 1 funds • Stakeholder review of proposed allocations • Request Metro Board approval of funding allocations • SCAG sends “split letter” for Round 1 allocations to FTA
April 1, 2021	• SCAG’s Regional Council approves Round 2 allocations
April – May 2021	• Request Metro Board approval of Round 2 funding allocations • SCAG amends “split letter” to include Round 2 allocations • Operators submit grant applications to FTA
May - July 2021	• FTA grant approval process • Grant recipients begin drawing down funds
June - August 2021	• Metro CEO requests proposals to allocate Section 5310 funds • Metro CEO allocates Section 5311 funds

Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act Funding

Metro Board

March 25, 2021

Metro

Transit Infrastructure Grants Provisions

- $14.0 B nationwide for the "*operating expenses of transit agencies related to the response to a COVID-19 public health emergency"* beginning on January 20, 2020.

  - About $13.27 B to urbanized areas (UZAs) apportioned by the formulas for FTA's 5307 Urbanized Area Formula Grant Program & Section 5337 State of Good Repair Grant Program.

    UZA CARES + CRRSA Act funds cannot exceed 75% of UZA's 2018 operating costs.

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San Bernardino	$0	$27,694,766	**$0**
Riverside	$277,242	$245,774	**$245,774**
Ventura	$0	$0	**$0**
Total:	**$954,900,781**	**$954,900,781**	**$828,062,230**
		CRRSAA Apportionment:	$954,900,781
		Remaining Balance - Round 2 Distribution:	**$126,838,551**

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Section 5307/ Section 5337 Allocations

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- Partial allocation Los Angeles UZA: $828.1 M of $954.9 M, LA County share of $784.7 M.
- This Board Report seeks Metro Board approval of Round 1 allocations.

	Metro Board Adopted CARES Act Allocation	Distribution %	CRRSA Act Allocation Round 1	CRRSA Act Allocation Round 2 (TBD)
Metro	$ 747,368,876	74.8794%	$ 587,592,479	$ 94,952,366
Municipal Operators	124,128,084	12.4366%	97,592,644	15,770,543
Eligible Operators	23,846,507	2.3892%	18,748,728	3,029,712
Tier 2 Operators	4,534,038	0.4543%	3,564,775	576,052
Metrolink	56,432,000	5.6540%	44,368,268	7,169,717
Access Services	33,500,000	3.3465%	26,338,549	4,256,194
Regional Paratransit/Vol. Reporters	8,284,094	0.8300%	6,513,164	1,052,499
	$ 998,093,599	**100.0000%**	**$ 784,718,607**	**$ 126,807,083**

Round 2 - Balance of $127 M is to be considered by SCAG Regional Council on April 1st

- Staff will return to the Board upon final resolution.

CRRSA Act Timeline

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June - August 2021	• Metro CEO requests proposals to allocate Section 5310 funds • Metro CEO allocates Section 5311 funds

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2021-0039, **File Type:** Resolution **Agenda Number:** 8.

FINANCE, BUDGET & AUDIT COMMITTEE
MARCH 17, 2021

SUBJECT: PROPOSITION C BONDS

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

CONSIDER:

A. ADOPTING a Resolution, Attachment A, that:

1. AUTHORIZES the competitive sale and issuance of up to $450 million in aggregate principal amount of Proposition C Senior Sales Tax Revenue Bonds in one or more series, to finance capital projects; and refinance outstanding revolving credit notes;

2. APPROVES the forms of the Notice of Intention to Sell Bonds, Notice Inviting Bids, Supplemental Trust Agreement, Continuing Disclosure Certificate, Preliminary Official Statement and such other documents as required for the issuance of the bonds, and approves related documents on file with the Board Secretary as set forth in the resolution all as subject to modification as set forth in the Resolution; and

3. AUTHORIZES taking all action necessary to achieve the foregoing, including, without limitation, the further development and execution of the bond purchase contract and bond documentation associated with the issuance of the Proposition C Senior Sales Tax Revenue Bonds (the “Bonds”).

(REQUIRES SEPARATE, SIMPLE MAJORITY BOARD VOTE.)

ISSUE

The Debt Policy provides guidelines for new money financings that may be long-term or short-term. Proposition C new money bond issues are permitted to provide funding for eligible expenditures on highway, commuter rail, bus and rail capital projects (collectively, the “Projects”).

BACKGROUND

Approval of the above recommendations will authorize the issuance of the Bonds, with a par amount

not to exceed $450 million of fixed rate bonds, will fund or reimburse LACMTA for Proposition C eligible capital projects and expenditures and refinance revolving credit notes, the proceeds of which financed such costs.

DISCUSSION

Based on current market conditions, the LACMTA expects to issue the 2021 Prop C Bonds in an aggregate par amount of approximately $450 million. A portion of the proceeds from the issuance of the Bonds will be used to redeem $105 million of outstanding revolving credit notes and to pay the costs of issuance related to the transaction.

The Bonds will be issued using a competitive sale process whereby prospective underwriters bid for the bonds on a selected sale date. The 2021 Prop C Bonds will be sold to the underwriter offering the lowest true interest cost. In the event that bids do not meet our criteria, all bids will be rejected. The Bonds will be sold with a final maturity not to exceed 30 years.

The Bond proceeds will be used to fund capital projects totaling approximately $345 million and refinance approximately $105 million in revolving credit notes that were spent to purchase buses. The issuance of the Bonds enables the LACMTA to allocate the long-term debt service cost of the Projects over the estimated useful life of the capital assets.

KNN Public Finance was selected by LACMTA as the Municipal Advisor for this transaction. Orrick Herrington & Sutcliffe LLP and Kutak Rock LLP were selected by Treasury staff and County Counsel to serve as Bond Counsel and Disclosure Counsel, respectively.

DETERMINATION OF SAFETY IMPACT

Approval of this item will not impact the safety of Metro’s patrons or employees.

FINANCIAL IMPACT

The costs of issuance for the Bonds will be paid from proceeds of the financing and will be budget neutral. Funding for bond principal and interest expense for this Proposition C financing will be added to FY22 and subsequent fiscal year budgets depending on the actual debt service schedule. The funding sources for debt service of this financing are eligible for bus and rail operating and capital expenditures.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports the following Metro Strategic Plan Goal:

Goal #5: Provide responsive, accountable, and trustworthy governance within the Metro organization.

ALTERNATIVES CONSIDERED

The Board could defer the issuance of the 2021 Prop C Bonds to a later time or indefinitely. This is

not recommended because the bond proceeds are needed to pay or reimburse Project expenses.

NEXT STEPS

- Obtain ratings on the bonds
- Distribute the preliminary official statement and Notice Inviting Bids to prospective underwriters and potential investors and publish the Notice of Intention to Sell Bonds
- Receive electronic bids from underwriters

ATTACHMENTS

Attachment A - Authorizing Resolution

Prepared by: Donna R. Mills, Treasurer, (213) 922-4047
Rodney Johnson, Deputy Executive Officer, Finance
(213) 922-3417

Reviewed by: Nalini Ahuja, Chief Financial Officer, (213) 922-3088

Phillip A. Washington
Chief Executive Officer

Additional Documents

http://libraryarchives.metro.net/DB_Attachments/2021-0039/1)%20Notice%20of%20Intention%20to%20Sell%20Bonds.pdf

http://libraryarchives.metro.net/DB_Attachments/2021-0039/2)%20Notice%20Inviting%20Bids.pdf

http://libraryarchives.metro.net/DB_Attachments/2021-0039/3)%20Thirty-Second%20Supplemental%20Trust%20Agreement.pdf

http://libraryarchives.metro.net/DB_Attachments/2021-0039/4)%20Continuing%20Disclosure%20Certificate.pdf

http://libraryarchives.metro.net/DB_Attachments/2021-0039/5)%20Preliminary%20Official%20Statement.pdf

ATTACHMENT A

Authorizing Resolution

RESOLUTION OF THE LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY AUTHORIZING THE ISSUANCE AND SALE OF ONE OR MORE SERIES OF ITS LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY PROPOSITION C SALES TAX REVENUE BONDS, APPROVING THE EXECUTION AND DELIVERY OF ONE OR MORE SUPPLEMENTAL TRUST AGREEMENTS, CONTINUING DISCLOSURE CERTIFICATES, NOTICES OF INTENTION TO SELL BONDS, NOTICES INVITING BIDS, PRELIMINARY AND FINAL OFFICIAL STATEMENTS, AND THE TAKING OF ALL OTHER ACTIONS NECESSARY IN CONNECTION THEREWITH.

(PROPOSITION C SALES TAX)

W I T N E S S E T H :

WHEREAS, the Los Angeles County Metropolitan Transportation Authority (the "LACMTA"), as successor to the Los Angeles County Transportation Commission (the "Commission"), is authorized, under Chapter 5 of Division 12 of the California Public Utilities Code (the "Act"), to issue bonds to finance and refinance the acquisition, construction or rehabilitation of facilities to be used as part of a countywide transit system; and

WHEREAS, pursuant to the provisions of Section 130350 of the California Public Utilities Code, the Commission was authorized to adopt a retail transactions and use tax ordinance applicable in the incorporated and unincorporated territory of the County of Los Angeles (the "County") subject to the approval by the voters of the County; and

WHEREAS, the Commission, by Ordinance No. 49 adopted August 28, 1990 ("Ordinance No. 49"), imposed a ½ of 1% retail transactions and use tax upon retail sales of tangible personal property and upon the storage, use or other consumption of tangible personal property in the County, the proceeds of the tax to be used for public transit purposes (the "Proposition C Tax"), and such tax was approved by the electors of the County on November 6, 1990; and

WHEREAS, the revenues received by the LACMTA from the imposition of the transactions and use tax are, by statute, directed to be used for public transit purposes, which purposes include a pledge of such tax to secure any bonds issued pursuant to the Act and include the payments or provision for the payment of the principal of the bonds and any premium, interest on the bonds and the costs of issuance of the bonds; and

WHEREAS, the LACMTA is planning and engineering a Countywide rail, bus and highway transit system (the "Rail, Bus and Highway Transit System") to serve the County and has commenced construction of portions of the Rail, Bus and Highway Transit System; and

WHEREAS, to facilitate the development and construction of the Rail, Bus and Highway Transit System, the LACMTA, as authorized by the Act, pursuant to the terms of the Amended and Restated Trust Agreement, dated as of January 1, 2010, as amended and supplemented (the "Trust Agreement"), by and between the LACMTA and U.S. Bank National Association, as trustee (the "Trustee"), has issued multiple series of bonds, including its Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2012-A; Proposition C Sales Tax Revenue Refunding

Bonds, Senior Bonds, Series 2012-B; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2013-A; Proposition C Sales Tax Revenue Bonds, Senior Bonds, Series 2013-B; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2013-C; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2014-A; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2016-A; Proposition C Sales Tax Revenue Bonds, Senior Bonds, Series 2017-A; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2018-A; Proposition C Sales Tax Revenue Bonds, Senior Bonds, Series 2019-A (Green Bonds); Proposition C Sales Tax Revenue Bonds, Senior Bonds, Series 2019-B; Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2019-C; and Proposition C Sales Tax Revenue Refunding Bonds, Senior Bonds, Series 2020-A (collectively, the "Prior Senior Bonds"); and

WHEREAS, the Trust Agreement permits the issuance of additional bonds subject to the limitations, and upon the terms, set forth therein, specifies applicable defaults and remedies, and provides for the procedures by which it may be amended and supplemented; and

WHEREAS, the LACMTA now desires to provide for the issuance of one or more series of its Proposition C Sales Tax Revenue Bonds, Senior Bonds, from time to time and in one or more transactions (collectively, the "New Money Bonds") to: (a) finance, refinance (through the refunding and repayment of the LACMTA's Subordinate Proposition C Sales Tax Revenue Revolving Obligations (the "Proposition C Revolving Obligations")), or reimburse itself for prior expenditures with respect to, additional portions of the Rail, Bus and Highway Transit System; and (b) pay certain costs of issuance related thereto (collectively, the "Financing"); and

WHEREAS, in connection with each issuance of New Money Bonds, the LACMTA may undertake a competitive process for the sale of the New Money Bonds to one or more underwriters (the "Underwriters"); and

WHEREAS, the sale of the New Money Bonds shall be in accordance with the Debt Policy of the LACMTA; and

WHEREAS, the forms of the following documents are on file with the Secretary or Acting Secretary (the "Secretary") of the Board of Directors of the LACMTA (the "Board") and have been made available to the members of the Board:

(a) a Supplemental Trust Agreement (the "New Money Supplemental Trust Agreement"), one or more of which will be by and between the LACMTA and the Trustee, which would supplement the Trust Agreement for purposes of providing the terms and conditions of the New Money Bonds;

(b) a Preliminary Official Statement (the "Preliminary Official Statement"), one or more of which will provide information about the New Money Bonds, the LACMTA, the Proposition C Tax and certain other related matters, and will be used, from time to time, in connection with the offer and sale of the New Money Bonds;

(c) a Notice of Intention to Sell Bonds (the "Notice of Intention to Sell Bonds"), which will be published in connection with any proposed sale of the New Money Bonds;

(d) a Notice Inviting Bids (the "Notice Inviting Bids"), which will set forth the terms and the manner in which proposals from qualified bidders for the purchase of the New Money Bonds shall be received; and

(e) a Continuing Disclosure Certificate (the "Continuing Disclosure Certificate"), one or more of which will be executed by the LACMTA, which will be used in order to assist the Underwriters in complying with Securities and Exchange Commission Rule 15c2-12(b)(5), and which will provide for the annual and periodic update of certain financial and operating information with respect to the LACMTA and the collection of the Proposition C Tax, among other things, and certain enumerated events;

WHEREAS, the LACMTA hereby acknowledges that said documents will be modified and amended to reflect the various details applicable to the New Money Bonds, whether the New Money Bonds are issued in a single issuance or multiple issuances, and that said documents are subject to completion to reflect the results of the sale of the New Money Bonds; and

WHEREAS, the LACMTA has pledged the Proposition C Tax (less the 20% local allocation and the California Department of Tax and Fee Administration's costs of administering such tax) (the "Pledged Taxes") pursuant to the terms of the Trust Agreement to secure the Prior Senior Bonds and certain other obligations of the LACMTA, and once issued, the New Money Bonds will be "Bonds" and "Senior Bonds" as defined in the Trust Agreement and will be secured by the pledge of the Pledged Revenues under the Trust Agreement; and

WHEREAS, the LACMTA desires to designate the Chief Financial Officer of the LACMTA, the Treasurer of the LACMTA, any Deputy Executive Officer, Finance of the LACMTA, any Assistant Treasurer of the LACMTA (or such other titles as the LACMTA may from time to time assign for such respective positions), and any such officer serving in an acting or interim capacity, and any written designee of any of them as an "Authorized Authority Representative" for all purposes under the Trust Agreement, the New Money Supplemental Trust Agreement, and the Subordinate Trust Agreement, dated as of June 1, 1993, as amended and supplemented (the "Subordinate Trust Agreement"), by and between LACMTA and U.S. Bank National Association, as trustee, and as an "Authorized Representative" under the Second Amended and Restated Revolving Credit Agreement, dated as of April 1, 2019 (the "Second Amended and Restated Revolving Credit Agreement"), by and between the LACMTA and Wells Fargo Bank, National Association, relating to the Proposition C Revolving Obligations, and any related documents; and

WHEREAS, Section 5852.1 of the California Government Code requires that the governing body of a public body obtain from an underwriter, financial advisor or private lender and disclose, prior to authorizing the issuance of bonds with a term of greater than 13 months, good faith estimates of the following information in a meeting open to the public: (a) the true interest cost of the bonds, (b) the sum of all fees and charges paid to third parties with respect to the bonds, (c) the amount of proceeds of the bonds expected to be received net of the fees and charges paid to third parties and any reserves or capitalized interest paid or funded with proceeds of the bonds, and (d) the sum total of all debt service payments on the bonds calculated to the final maturity of the bonds plus the fees and charges paid to third parties not paid with the proceeds of the bonds; and

WHEREAS, the LACMTA is duly authorized and empowered, pursuant to each and every requirement of law, to authorize the Financing and to authorize the execution and delivery of one or more New Money Supplemental Trust Agreements, Continuing Disclosure Certificates, Notices of Intention to Sell Bonds, Notices Inviting Bids, the preparation of one or more Preliminary Official Statements and the preparation, execution and delivery of one or more Official Statements (as hereinafter defined) for the purposes, in the manner and upon the terms provided; and

WHEREAS, terms used in this Resolution and not otherwise defined herein shall have the meanings assigned to them in the Trust Agreement;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, AS FOLLOWS:

Section 1. Findings. The LACMTA hereby finds and determines that:

(a) The issuance of one or more series of its New Money Bonds under the Trust Agreement to finance, refinance (through the refunding and repayment of all or a portion of the outstanding Proposition C Revolving Obligations), or reimburse itself for prior expenditures with respect to, additional portions of the Rail, Bus and Highway Transit System, and to pay certain costs of issuance related to the issuance of the New Money Bonds, is in the public interest.

(b) Under the provisions of Ordinance No. 49, all of the Pledged Taxes are revenues of the LACMTA available for rail, bus and highway transit purposes and are available to be and are, by the terms of the resolutions and the Trust Agreement under which the Prior Senior Bonds were issued, pledged, along with the Pledged Revenues, to secure the Prior Senior Bonds and are pledged to secure the New Money Bonds, and, by this Resolution, such pledge is reaffirmed.

(c) The provisions contained in the Trust Agreement, as previously amended and supplemented, and as to be supplemented as set forth in the New Money Supplemental Trust Agreement, are reasonable and proper for the security of the holders of the New Money Bonds.

Section 2. Issuance of New Money Bonds. The Board hereby authorizes the issuance by the LACMTA of one or more series of New Money Bonds, from time to time and in one or more transactions, in an aggregate principal amount not to exceed $450 million, for the purposes of (a) financing, refinancing (through the refunding and repayment of all or a portion of the outstanding Proposition C Revolving Obligations), or reimbursing itself for prior expenditures with respect to, additional portions of the Rail, Bus and Highway Transit System, and (b) paying certain costs of issuance related to the issuance of the New Money Bonds; *provided, however*, that the True Interest Cost (as defined below) of each series of the New Money Bonds shall not exceed 4.0%, as such shall be calculated by the LACMTA's municipal advisor as of the date of delivery of each series of the New Money Bonds. The LACMTA hereby specifies that the New Money Bonds shall mature not later than July 1, 2046.

The New Money Bonds shall be issued in a manner by which the interest thereon is excludable from gross income under the Internal Revenue Code of 1986, as amended. The Chief Executive Officer of the LACMTA, the Chief Financial Officer of the LACMTA, the Treasurer of the LACMTA, any Deputy Executive Officer, Finance of the LACMTA, any Assistant Treasurer of the LACMTA (or such other titles as the LACMTA may from time to time assign for such respective positions), and any such officer serving in an acting or interim capacity, and any written designee of any of them (each, a "Designated Officer"), acting in accordance with this Section 2, are each hereby severally authorized to determine the actual aggregate principal amount of each series of New Money Bonds to be issued (not in excess of the maximum amount set forth above), and to direct the execution and authentication of the New Money Bonds in such amount. Such direction shall be conclusive as to the principal amounts hereby authorized. The New Money Bonds shall be in fully registered form and shall be issued as Book-Entry Bonds as provided in each New Money Supplemental Trust Agreement. Payment of the principal of, interest on and premium, if any, on the New Money Bonds shall be made at the place or places and in the manner provided in each New Money Supplemental Trust Agreement.

As used herein, the term "True Interest Cost" shall be the interest rate (compounded semiannually) necessary to discount the debt service payments from their respective payment dates to the dated date of the applicable series of New Money Bonds and to the principal amount and original issue premium, if any, less underwriters discount and original issue discount, if any, of the applicable series of New Money Bonds. For the purpose of calculating the True Interest Cost, the principal amount of the applicable series of New Money Bonds scheduled for mandatory sinking fund redemption as part of a term bond shall be treated as a serial maturity for such year. The calculation of the True Interest Cost shall include such other reasonable assumptions and methods as determined by the LACMTA's municipal advisor.

Section 3. Terms of New Money Bonds. The New Money Bonds shall be issued as current interest bonds and shall be available in denominations of $5,000 and integral multiples thereof. The New Money Bonds, when issued, shall be in the aggregate principal amounts and shall be dated as shall be provided in the New Money Supplemental Trust Agreement. The New Money Bonds may be issued as serial bonds or as term bonds or as both serial bonds and term bonds, all as set forth in the New Money Supplemental Trust Agreement. Interest on the New Money Bonds shall be paid at the rates and on the dates set forth in the New Money Supplemental Trust Agreement; *provided, however*, that, no New Money Bond shall bear interest at a rate in excess of 5.0% per annum. The New Money Bonds may be subject to redemption at the option of the LACMTA on such terms and conditions as shall be set forth in the New Money Supplemental Trust Agreement, or not be subject to redemption. The New Money Bonds issued as term bonds also shall be subject to mandatory sinking fund redemption as and to the extent set forth in the New Money Supplemental Trust Agreement.

Execution and delivery of the New Money Supplemental Trust Agreement, which document will contain the maturities, principal amounts, interest rates and the payment obligations of the LACMTA within parameters set forth in this Resolution, shall constitute conclusive evidence of the LACMTA's approval of such maturities, principal amounts, interest rates and payment obligations.

Section 4. Special Obligations. The New Money Bonds shall be special obligations of the LACMTA secured by and payable from the Pledged Revenues and from the funds and accounts held by the Trustee under the Trust Agreement.

Section 5. Form of New Money Bonds. The New Money Bonds and the Trustee's Certificate of Authentication to appear thereon shall be in substantially the form set forth in Exhibit A to the New Money Supplemental Trust Agreement on file with the Secretary of the Board and made available to the Board, with such necessary or appropriate variations, omissions and insertions as permitted or required by the Trust Agreement or the New Money Supplemental Trust Agreement or as appropriate to adequately reflect the terms of such New Money Bonds and the obligation represented thereby.

Section 6. Execution of New Money Bonds. Each of the New Money Bonds shall be executed on behalf of the LACMTA by any Designated Officer and any such execution may be by manual or facsimile signature, and each bond shall be authenticated by the endorsement of the Trustee or an agent of the Trustee. Any facsimile signature of such Designated Officer(s) shall have the same force and effect as if such officer(s) had manually signed each of such New Money Bonds.

Section 7. Approval of Documents; Authorization for Execution. The forms, terms and provisions of the New Money Supplemental Trust Agreement, the Notice of Intention to Sell Bonds, the Notice Inviting Bids, and the Continuing Disclosure Certificate on file with the Secretary of the Board and made available to the Board within the parameters set forth in this Resolution are in all respects approved, and each of the Designated Officers is hereby severally authorized, empowered and directed to execute, acknowledge and deliver in the name of and on behalf of the LACMTA one or more New Money Supplemental Trust Agreements, one or more Notices of Intention to Sell Bonds, one or more Notices Inviting Bids, and one or more Continuing Disclosure Certificates, including counterparts thereof. The New Money Supplemental Trust Agreement(s), the Notice(s) of Intention to Sell Bonds, the Notice(s) Inviting Bids, and the Continuing Disclosure Certificate(s), as executed and delivered, shall be in substantially the forms now on file with the Secretary of the Board and made available to the Board and hereby approved, or with such changes therein as shall be approved by the Designated Officer executing the same; the execution thereof shall constitute conclusive evidence of the Board's approval of any and all changes or revisions therein from the form of the New Money Supplemental Trust Agreement, the Notice of Intention to Sell Bonds, the Notice Inviting Bids, and the Continuing Disclosure Certificate now on file with the Secretary of the Board and made available to the Board; and from and after the execution and delivery of each New Money Supplemental Trust Agreement, each Notice of Intention to Sell Bonds, each Notice Inviting Bids, and each Continuing Disclosure Certificate, the officers, agents and employees of the LACMTA are hereby authorized, empowered and directed to do all such acts and things and to execute all such documents as may be necessary to carry out and comply with the provisions of each New Money Supplemental Trust Agreement, each Notice of Intention to Sell Bonds, each Notice Inviting Bids, and each Continuing Disclosure Certificate.

Section 8. Sale of New Money Bonds.

(a) The LACMTA hereby authorizes the sale of the New Money Bonds from time to time in one or more series through one or more competitive sales to one or more Underwriters, as determined by a Designated Officer.

(b) the Designated Officers are each authorized and directed to:

(i) From time to time, choose such times and dates as such Designated Officer shall, in his or her discretion, deem to be necessary or desirable to provide for the sale of the New Money Bonds, to receive proposals from qualified bidders for the purchase of the New Money Bonds (through the receipt of bids through the use of computerized bidding systems) upon the terms and in the manner set forth in each Notice Inviting Bids.

(ii) Execute one or more Notices Inviting Bids, from time to time, in such form as the Designated Officer executing the same shall approve, and call for bids for the sale of the New Money Bonds from qualified bidders in accordance with each such Notice Inviting Bids.

(iii) Cause each Notice of Intention to Sell Bonds to be published from time to time (after completion, modification or correction thereof reflecting the terms of each series of the New Money Bonds, as approved by said Designated Officer, such approval to be conclusively evidenced by such publication) in *The Bond Buyer* (or such other publication as may be selected by a Designated Officer and approved by Bond Counsel), a financial publication generally circulated throughout the State of California or reasonably expected to be disseminated among prospective bidders for the New Money Bonds, at least five days prior to the sale of each series of the New Money Bonds in accordance with Section 53692 of the Government Code of the State of California and any such action previously taken is hereby confirmed, ratified and approved.

(iv) Cause each Notice Inviting Bids to be published, if determined by Bond Counsel and/or a Designated Officer to be necessary or desirable (after completion, modification or correction thereof reflecting the terms of each series of the New Money Bonds, as approved by said Designated Officer, such approval to be conclusively evidenced by such publication) in such publication(s) as selected by a Designated Officer and approved by Bond Counsel and any such action previously taken is hereby confirmed, ratified and approved.

(v) Distribute each Notice Inviting Bids (including via electronic methods) to such municipal broker-dealers, banking and financial institutions and other persons as such Designated Officer deems necessary or desirable, and any such action previously taken is hereby confirmed, ratified and approved.

(vi) On behalf of the LACMTA, accept the best bid for the New Money Bonds received from qualified bidders pursuant to and subject to the terms and conditions set forth in this Resolution and the Notice(s) Inviting Bids herein

approved and to award the New Money Bonds, from time to time, to such best bidder(s).

(c) Take any other action such Designated Officer determines is necessary or desirable to cause any such sale to comply with the LACMTA's Debt Policy and applicable law.

Section 9. Preliminary Official Statement and Official Statement. One or more Preliminary Official Statements shall be used by the LACMTA in connection with the sale and issuance of the New Money Bonds. The form of the Preliminary Official Statement on file with the Secretary of the Board and made available to the Board is hereby approved. The Preliminary Official Statement shall be substantially in the form of the Preliminary Official Statement on file with the Secretary of the Board and made available to the Board with such changes as a Designated Officer approves (such approval to be conclusively evidenced by the execution and delivery of the certificate referenced in the following sentence). The Preliminary Official Statement shall be circulated (via printed format and/or through electronic means) for use in selling the New Money Bonds at such time or times as a Designated Officer shall deem such Preliminary Official Statement to be final within the meaning of Rule 15c2-12 promulgated under the Securities Exchange Act of 1934, as amended, said determination to be conclusively evidenced by a certificate signed by said Designated Officer to said effect. The Preliminary Official Statement shall contain a description of the finances and operations of the LACMTA, a description of the Proposition C Tax and a description of historical receipts of sales tax revenues substantially in the form of the Preliminary Official Statement on file with the Secretary of the Board and made available to the Board with such changes as any Designated Officer determines are appropriate or necessary. The Preliminary Official Statement shall also contain a description of the applicable New Money Bonds and the terms and conditions of the Trust Agreement and the New Money Supplemental Trust Agreement together with such information and description as a Designated Officer determines is appropriate or necessary.

Upon the sale of the New Money Bonds, one or more of the Designated Officers shall provide for the preparation, publication, execution and delivery of one or more final Official Statements in substantially the form of the Preliminary Official Statement deemed final by a Designated Officer with such changes as any Designated Officer approves, such approval to be conclusively evidenced by the execution of such final Official Statement. Any Designated Officer is hereby authorized and directed to execute and deliver one or more final Official Statements in the name and on behalf of the LACMTA. One or more supplements to the final Official Statement(s) or revised final Official Statement(s) may be prepared and delivered reflecting updated and revised information as any Designated Officer deems appropriate or necessary. Each final Official Statement shall be circulated (via printed format and/or through electronic means) for use in selling the New Money Bonds at such time or times as a Designated Officer deems appropriate after consultation with LACMTA's municipal advisor, LACMTA's Disclosure Counsel and LACMTA's Bond Counsel and such other advisors as a Designated Officer believes to be useful.

Section 10. Trustee, Paying Agent and Registrar. U.S. Bank National Association is hereby appointed as Trustee, Paying Agent and Registrar for the New Money Bonds. Such appointments shall be effective upon the issuance of the New Money Bonds and shall remain in

effect until the LACMTA, by supplemental agreement, resolution or other action, shall name a substitute or successor thereto.

Section 11. Authorized Authority Representative. The Board hereby designates each of the Chief Financial Officer of the LACMTA, the Treasurer of the LACMTA, any Deputy Executive Officer, Finance of the LACMTA, any Assistant Treasurer of the LACMTA, and any such officer serving in an acting or interim capacity, as an "Authorized Authority Representative" for all purposes under the Trust Agreement, the New Money Supplemental Trust Agreement, the Subordinate Trust Agreement, and any amendments or supplements to the Trust Agreement, the New Money Supplemental Trust Agreement, or the Subordinate Trust Agreement and as an "Authorized Representative" under the Second Amended and Restated Revolving Credit Agreement and any related documents. Such appointment shall remain in effect until modified by resolution. The prior designation of officers, including the Chairperson of the Board and the Chief Executive Officer of the LACMTA, as Authorized Authority Representatives under the Trust Agreement and Subordinate Trust Agreement and any amendments or supplements thereto shall continue.

Section 12. Additional Authorization. The Designated Officers, for and on behalf of the LACMTA, be and they hereby are authorized and directed to do any and all things necessary to effect the issuance of the New Money Bonds, and the execution and delivery of each New Money Supplemental Trust Agreement, each Notice of Intention to Sell Bonds, each Notice Inviting Bids, and each Continuing Disclosure Certificate, and to carry out the terms thereof. The Designated Officers and all other officers, agents and employees of the LACMTA are further authorized and directed, for and on behalf of the LACMTA, to execute all papers, documents, certificates and other instruments and take all other actions that may be required in order to carry out the authority conferred by this Resolution or the provisions of the Trust Agreement, each New Money Supplemental Trust Agreement, each Notice of Intention to Sell Bonds, each Notice Inviting Bids, and each Continuing Disclosure Certificate or to evidence said authority and its exercise. The foregoing authorization includes, but is in no way limited to, the direction (from time to time) by a Designated Officer of the investment of the proceeds of the New Money Bonds and of the Pledged Revenues and other amounts held under the Trust Agreement, if any, including the execution and delivery of investment agreements or purchase agreements related thereto, the execution by a Designated Officer and the delivery of one or more tax certificates as required by each New Money Supplemental Trust Agreement for the purpose of complying with the rebate requirements and arbitrage restrictions of the Internal Revenue Code of 1986, as amended; the execution and delivery of documents required by The Depository Trust Company in connection with the Book-Entry Bonds. All actions heretofore taken by the officers, agents and employees of the LACMTA in furtherance of this Resolution are hereby confirmed, ratified and approved.

Any Designated Officer, on behalf of the LACMTA, is further authorized and directed to cause written notice(s) to be provided to the California Debt and Investment Advisory Commission ("CDIAC") of the proposed sale of the New Money Bonds, said notice(s) to be provided in accordance with Section 8855 et seq. of the California Government Code, to file the notice(s) of final sale with CDIAC, to file the rebates and notices required under section 148(f) and 149(e) of the Internal Revenue Code of 1986, as amended, if necessary, and to file such additional notices and reports as are deemed necessary or desirable by such Designated Officer in connection with the New Money Bonds, and any such notices are hereby ratified, confirmed and approved.

Section 13. Continuing Authority of Designated Officers. The authority of any individual serving as a Designated Officer under this Resolution by a written designation signed by the Chief Executive Officer, the Chief Financial Officer, the Treasurer, any Deputy Executive Officer, Finance, or any Assistant Treasurer (or such other titles as the LACMTA may from time to time assign for such respective positions), shall remain valid notwithstanding the fact that the individual officer of the LACMTA signing such designation ceases to be an officer of the LACMTA, unless such designation specifically provides otherwise.

Section 14. Investments. From and after the delivery of the New Money Bonds, each Designated Officer is hereby authorized to invest the proceeds of the New Money Bonds in accordance with the Trust Agreement and the New Money Supplemental Trust Agreement and the LACMTA's Investment Policy and is further authorized to enter into or to instruct the Trustee to enter into one or more investment agreements, float contracts, swaps or other hedging products (hereinafter collectively referred to as the "Investment Agreement") providing for the investment of moneys in any of the funds and accounts created under the Trust Agreement and the New Money Supplemental Trust Agreement, on such terms as the Designated Officer shall deem appropriate. In accordance with Section 5922 of the California Government Code, the LACMTA hereby finds and determines that the Investment Agreement is designed to reduce the amount or duration of payment, rate, spread or similar risk or result in a lower cost of borrowing when used in combination with the New Money Bonds or enhance the relationship between risk and return with respect to investments.

Section 15. Good Faith Estimates. In accordance with Section 5852.1 of the California Government Code, good faith estimates of the following are set forth in Exhibit A attached hereto: (a) the true interest cost of the New Money Bonds, (b) the sum of all fees and charges paid to third parties with respect to the New Money Bonds, (c) the amount of proceeds of the New Money Bonds expected to be received net of the fees and charges paid to third parties and any reserves or capitalized interest paid or funded with proceeds of the New Money Bonds, and (d) the sum total of all debt service payments on the New Money Bonds calculated to the final maturity of the New Money Bonds plus the fees and charges paid to third parties not paid with the proceeds of the New Money Bonds.

Section 16. Further Actions. From and after the delivery of the New Money Bonds and, the Designated Officers and each of them are hereby authorized and directed to amend, supplement or otherwise modify each document authorized or authorized to be amended by this Resolution at any time and from time to time and in any manner determined to be necessary or desirable by the Designated Officer executing such amendment, supplement, or modification, upon consultation with the LACMTA's municipal advisor and LACMTA's Bond Counsel, the execution of such amendment, supplement or other modification being conclusive evidence of the LACMTA's approval thereof.

Section 17. Costs of Issuance. The LACMTA authorizes funds of the LACMTA, together with the proceeds of the New Money Bonds, to be used to pay costs of issuance of the New Money Bonds, including, but not limited to, costs of attorneys, accountants, municipal advisors, trustees, the costs associated with rating agencies, printing, publication and mailing expenses and any related filing fees.

Section 18. Severability. The provisions of this Resolution are hereby declared to be severable, and, if any section, phrase or provision shall for any reason be declared to be invalid, such declaration shall not affect the validity of the remainder of the sections, phrases and provisions hereof.

Section 19. Electronic Signature. The Board hereby approves the execution and delivery of all agreements, documents, certificates and instruments referred to herein with electronic signatures as may be permitted under the California Uniform Electronic Transactions Act and digital signatures as may be permitted under Section 16.5 of the California Government Code using DocuSign.

Section 20. Effective Date. This Resolution shall be effective upon adoption and shall be effective with respect to the New Money Bonds issued on or before December 31, 2021.

CERTIFICATION

The undersigned, duly qualified and acting as Board Secretary of the Los Angeles County Metropolitan Transportation Authority, certifies that the foregoing is a true and correct copy of the Resolution adopted at a legally convened meeting of the Board of Directors of the Los Angeles County Metropolitan Transportation Authority held on March 25, 2021.

[SEAL]

By _____
Interim Board Secretary, Los Angeles County Metropolitan Transportation Authority

Dated: _____, 2021

EXHIBIT A

GOOD FAITH ESTIMATES

The following information was obtained from KNN Public Finance, LLC (the "Municipal Advisor") with respect to the bonds (the "New Money Bonds") approved in the attached Resolution, and is provided in compliance with Section 5852.1 of the California Government Code with respect to the New Money Bonds:

Section 1. True Interest Cost of the New Money Bonds. Based on market interest rates prevailing at the time of preparation of this information, a good faith estimate of the true interest cost of the New Money Bonds, which means the rate necessary to discount the amounts payable on the respective principal and interest payment dates to the purchase price received for the New Money Bonds, is 2.19%.

Section 2. Finance Charge of the New Money Bonds. Based on market interest rates prevailing at the time of preparation of this information, a good faith estimate of the finance charge of the New Money Bonds, which means the sum of all fees and charges paid to third parties (or costs associated with the New Money Bonds), is $1,283,920, as follows:

(a)	Underwriters' Discount	$683,920.00
(b)	Bond Counsel and Disbursements	170,000.00
(c)	Disclosure Counsel and Disbursements	48,500.00
(d)	Municipal Advisor and Disbursements	55,000.00
(e)	Rating Agencies	295,000.00
(f)	Other	31,500.00
Total		$1,283,920.00

Section 3. Amount of Proceeds to be Received. Based on market interest rates prevailing at the time of preparation of this information, a good faith estimate of the amount of proceeds expected to be received by the LACMTA for sale of the New Money Bonds less the finance charge of the New Money Bonds described in Section 2 above and any reserves or capitalized interest paid or funded with proceeds of the New Money Bonds, is $425,000,000.

Section 4. Total Payment Amount. Based on market interest rates prevailing at the time of preparation of this information, a good faith estimate of the total payment amount, which means the sum total of all payments the LACMTA will make to pay debt service on the New Money Bonds plus the finance charge of the New Money Bonds described in Section 2 above not paid with the proceeds of the New Money Bonds, calculated to the final maturity of the New Money Bonds, is $558,704,392.

Attention is directed to the fact that the foregoing information constitutes good faith estimates only. The actual interest cost, finance charges, amount of proceeds and total payment

amount may vary from the estimates above due to variations from these estimates in the timing of New Money Bonds sales, the amount of New Money Bonds sold, the amortization of the New Money Bonds sold and market interest rates at the time of each sale. The date of sale and the amount of New Money Bonds sold will be determined by the LACMTA based on need to provided funds for the Financing and other factors. The actual interest rates at which the New Money Bonds will be sold will depend on the bond market at the time of each sale. The actual amortization of the New Money Bonds will also depend, in part, on market interest rates at the time of sale. Market interest rates are affected by economic and other factors beyond the LACMTA's control. The LACMTA has approved the issuance of the New Money Bonds with a maximum true interest cost of 4.00%.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2021-0085, **File Type:** Informational Report **Agenda Number:** 25.

OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021

SUBJECT: 2020 CUSTOMER EXPERIENCE SURVEY RESULTS

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE 2020 Customer Experience Survey Results.

ISSUE

To improve customer experiences for Metro riders and to help prioritize budget choices, staff developed a comprehensive customer experience survey tool. Staff will present highlights of the survey results for 2020, based on customer ratings of over 40 aspects of service.

BACKGROUND

The 2020 Customer Experience Survey was conducted October 7-23, 2020. Due to the COVID-19 pandemic, the survey was conducted on-line among a random sample of customers who previously completed on-board surveys. Note that staff intend to return to on-board surveys after the pandemic recedes.

Results are based on 1,287 completed surveys. Data is weighted to ensure that the findings reflect the demographic composition of Metro riders as taken from the 2019 On-Board survey to ensure equity and inclusion of all riders.

Customer Experience Surveys are an essential source of insight into the customer experience, and are responsive to Board Motion 38.1 (2018) that requires staff to prepare annual customer experience plans.

DISCUSSION

The 2020 Customer Experience survey is being utilized to prioritize and phase customer experience investments for the FY22 budget, and to identify pain points to be addressed in the 2021 Customer Experience Plan. The cornerstone of the survey findings is something called a Quadrant Chart that identifies target issues for improvement based on customer ratings. There is one Quadrant Chart for bus and one Quadrant Chart for rail. Staff plan to also include Metro Micro in future Customer Experience surveys.

DETERMINATION OF SAFETY IMPACT

The Customer Experience Survey report has no immediate impact on safety, however recommendations that flow from the survey can improve safety for Metro riders.

FINANCIAL IMPACT

Staff will be seeking staffing and budget for future Customer Experience surveys in the FY22 budget process, however there is no immediate financial impact related to this receive and file.

The cost of Customer Experience Plan initiatives that flow from the survey results will be considered relative to other Metro priorities and approved during Metro budget processes.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This report supports strategic plan Goal 2, “Deliver outstanding trip experiences for all users of the transportation system.”

NEXT STEPS

FY22 budget documents will highlight customer experience initiatives recommended in the 2020 Customer Experience Plan and developed in response to 2020 Customer Experience Survey results.

ATTACHMENTS

Attachment A - Customer Experience Survey Results

Prepared by: Aaron Weinstein, EO, Customer Experience, (213) 922-3028

Reviewed by: Nadine Lee, Chief of Staff, (213) 922-7950

Phillip A. Washington
Chief Executive Officer

powered by Legistar™

Would you recommend riding Metro buses to a friend or coworker?

	Valid Percent
Definitely No	5%
2	5%
3	21%
4	21%
Definitely Yes	48%
Total	100%

I want to ride Metro buses more in the future

	Valid Percent
Strongly Disagree	7%
2	8%
3	18%
4	20%
Strongly Agree	47%
Total	100%

Metro buses provides a good value for the money

	Valid Percent
Strongly Disagree	4%
2	5%
3	26%
4	18%
Strongly Agree	46%
Total	100%

When I hear people criticize Metro buses, I want to defend it

	Valid Percent
Strongly Disagree	8%
2	12%
3	27%
4	20%
Strongly Agree	33%
Total	100%

Metro works hard to improve the experience of its bus riders

	Valid Percent
Strongly Disagree	6%
2	9%
3	24%
4	23%
Strongly Agree	38%
Total	100%

Have you ridden a Metro bus at least once in the last three months?

	Valid Percent
Yes	84%
No	16%
Total	100%

How often do you currently ride Metro buses? (Current Riders)

	Valid Percent
5 or more days a week	41%
3-4 days a week	25%
1-2 days a week	16%
At least once a month, but less than 1 day a week	10%
Less than once a month	8%
Total	100%

How long have you been riding Metro buses? (Current Riders)

	Valid Percent
5 or more years	78%
3-4 years	11%
1-2 years	10%
More than 6 months, but less than a year	0%
Less than 6 months	1%
Total	100%

In January 2020, how often did you ride Metro buses? (Has Not Taken Metro During Last Three Months)

	Valid Percent
5 or more days a week	61%
3-4 days a week	18%
1-2 days a week	10%
At least once a month, but less than 1 day a week	6%
Less than once a month	6%
Total	100%

In January 2020, how long had you been riding Metro buses? (Has Not Taken Metro During Last Three Months)

	Valid Percent
5 or more years	46%
3-4 years	25%
1-2 years	18%
More than 6 months, but less than a year	6%
Less than 6 months	4%
Total	100%

On a scale of 1-10, with 1 being poor and 10 being excellent, please rate your satisfaction with the following aspects of METRO BUSES (Mean Average)

How frequently buses run	7.0
Metro bus hours of operation	7.4
Bus speed/travel time	7.5
Bus comes on-time	6.9
Ease of getting from my home to my bus stop	8.4
Ease of getting from bus stop to my destination	8.2

Timeliness of connection to other bus or train (if you transfer)	7.3
Availability of accurate bus arrival time info	7.2
Enough room on the bus	6.7
Comfort of bus seats (if used)	6.9
Cleanliness inside the bus	6.0
Smoothness of bus ride (not too jerky or bumpy)	7.2
Noise level inside the bus	6.8
Age/condition of the bus	7.4
Temperature on the bus	7.7
Bus stop seating	5.7
Cleanliness of bus stop area	5.1
Shade at bus stop	4.7
How well Metro addresses homelessness on buses	5.1
Safe from harassment based on my race or ethnicity	6.7
Safe from sexual harassment	6.8
Presence of security staff on buses	4.6
Buses and bus stops kept free of graffiti	5.8
Enforcement of Metro rules	5.9
Personal security on Metro buses during the day	5.6
Personal security at Metro bus stops during the day	5.3

Personal security on Metro buses at night	4.8
Personal security at Metro bus stops at night	4.5
Helpfulness and courtesy of Metro employees	7.1
Delay advisories (when there are delays)	6.0
Wifi availability and quality on the bus	5.9
Ease of fare payment	7.8
Ease of getting info to plan my trips	7.6
Information on where to go to connect with another bus or train (if you transfer)	7.6
Signs at the bus stop	7.8
Next stop information on the bus	7.6
Availability of bike storage (if applicable)	7.8
Availability of car parking (if applicable)	7.5
Metro.net website	7.7
Transit app	7.7

Thinking about your experiences during your entire journey door to door and all of your interactions with Metro, how satisfied are you with Metro Bus?

	Valid Percent
Very Dissatisfied	2%
2	8%
3	23%
4	34%
Very Satisfied	33%
Total	100%

Do you own or have regular access to a car?

	Valid Percent
Yes	28%
No	72%
Total	100%

Do you own a:

	Valid Percent
Smartphone	73%
Cell Phone	23%
I do not own a smartphone or a cell phone	4%
Total	100%

Does your smartphone have a:

	Valid Percent
Data Plan	87%
No data plan	2%
I am not sure/don't know	10%
Total	100%

Before Metro implemented all door boarding, how did you typically pay your fare?

	Valid Percent
30-Day Pass	31%
TAP Stored Value	30%
Cash	23%
7-Day Pass	7%
Other	5%
Day Pass	4%
Total	100%

Do you have any disabilities?

	Valid Percent
Yes	14%
No	86%
Total	100%

What type of disability do you have? (multiple reponse)

	Valid Percent
Mobility – do not use wheelchair	45%
Mobility – use wheelchair	30%
Mental or cognitive	15%
Other disability	15%
Low vision	4%
Blindness	3%
Deaf/ hard-of-hearing	1%

What is your gender identity?

	Valid Percent
Male	49%
Female	50%
Non-binary	1%
Total	100%

What is your age?

	Valid Percent
Under 18	5%
18-24	21%
25-34	23%
35-44	16%
45-54	17%
55-64	10%
65+	7%
Total	100%

What is your race or ethnic identification?

	Valid Percent
Latinx/Hispanic	67%
Black/African American	17%
White/Caucasian	6%
Asian/Pacific Islander	6%
Native American	1%
Other	3%
Total	100%

What is your household's total annual earnings?

	Valid Percent
Under $10,000	35%
$10,000 - $19,999	27%
$20,000 - $29,999	12%
$30,000 - $39,999	8%
$40,000 - $49,999	6%
$50,000 - $59,999	4%
$60,000 - $69,999	2%
$70,000 - $79,999	2%
$80,000 - $89,999	1%
$90,000 - $99,999	1%
$100,000 - $124,999	1%
$125,000 - $149,999	1%
$150,000 or more	1%
Total	100%

Including yourself, how many people live in your household?

	Valid Percent
1	21%
2	22%
3	15%
4	18%
5	12%
6 or more	12%
Total	100%

Do you personally speak a language other than English at home?

	Valid Percent
Yes	60%
No	40%
Total	100%

What language do you speak at home? (multiple reponse)

	Valid Percent
Spanish	87%
Korean	2%
Chinese	2%
Armenian	2%
Japanese	1%
Vietnamese	1%
Russian	1%
Other (Bengali, French, German, Tagalog, etc.)	9%

How well do you speak English?

	Valid Percent
Very Well	64%
Well	20%
Not well	14%
Not at all	3%
Total	100%

Survey conducted in:	
	Valid Percent
English	82%
Spanish	18%
Total	100%

Would you recommend riding Metro Rail to a friend or coworker?

	Valid Percent
Definitely No	7%
2	9%
3	20%
4	19%
Definitely Yes	45%
Total	100%

I want to ride Metro Rail more in the future

	Valid Percent
Strongly Disagree	5%
2	10%
3	17%
4	19%
Strongly Agree	49%
Total	100%

Metro Rail provides a good value for the money

	Valid Percent
Strongly Disagree	4%
2	6%
3	17%
4	25%
Strongly Agree	48%
Total	100%

When I hear people criticize Metro Rail, I want to defend it

	Valid Percent
Strongly Disagree	12%
2	13%
3	27%
4	19%
Strongly Agree	29%
Total	100%

Metro works hard to improve the experience of its rail riders

	Valid Percent
Strongly Disagree	10%
2	11%
3	27%
4	22%
Strongly Agree	30%
Total	100%

Have you ridden a Metro train at least once in the last three months?

	Valid Percent
Yes	58%
No	42%
Total	100%

How often do you currently ride Metro Rail? (Current Riders)

	Valid Percent
5 or more days a week	36%
3-4 days a week	20%
1-2 days a week	15%
At least once a month, but less than 1 day a week	16%
Less than once a month	13%
Total	100%

How long have you been riding Metro Rail? (Current Riders)

	Valid Percent
5 or more years	64%
3-4 years	27%
1-2 years	9%
More than 6 months, but less than a year	1%
Total	100%

In January 2020, how often did you ride Metro Rail? (Has Not Taken Metro During Last Three Months)

	Valid Percent
5 or more days a week	42%
3-4 days a week	26%
1-2 days a week	19%
At least once a month, but less than 1 day a week	9%
Less than once a month	4%
Total	100%

In January 2020, how long had you been riding Metro Rail? (Has Not Taken Metro During Last Three Months)

	Valid Percent
5 or more years	42%
3-4 years	19%
1-2 years	25%
More than 6 months, but less than 1 year	1%
Less than 6 months	12%
Total	100%

On a scale of 1-10, with 1 being poor and 10 being excellent, please rate your satisfaction with the following aspects of METRO TRAINS (Mean Average)

How frequently trains run	7.5
Metro Rail hours of operation	7.7
Train speed/travel time	7.9
Train comes on-time	7.4
Ease of getting from my home to my station	7.8
Ease of getting from station to my destination	8.1

Timeliness of connection to other bus or train (if you transfer)	6.8
Availability of accurate train arrival time info	7.5
Enough room on the train	7.0
Comfort of train seats (if used)	6.5
Cleanliness inside the train	5.2
Smoothness of train ride (not too jerky or bumpy)	7.7
Noise level inside the train	6.5
Age/condition of the train	7.0
Temperature on the train	7.3
Train station seating	5.6
Cleanliness of train station	5.7
Shade in area where I wait for my train	6.6
Escalators (if applicable)	6.7
Elevators (if applicable)	5.9
How well Metro addresses homelessness on trains	3.8
Safe from harassment based on my race or ethnicity	5.9
Safe from sexual harassment	5.7
Presence of security staff on trains	4.6

Trains and stations kept free of graffiti	6.0
Enforcement of Metro rules	5.2
Personal security on Metro trains during the day	5.5
Personal security at Metro train stations during the day	5.8
Personal security on Metro trains at night	4.6
Personal security at Metro train stations at night	4.4
Helpfulness and courtesy of Metro employees	6.8
Delay advisories (when there are delays)	6.4
Cellular signal availability and quality on the train	6.8
Ease of fare payment	7.9
Ease of getting info to plan my trips	7.4
Information on where to go to connect with another bus or train (if you transfer)	6.9
Station signs	7.4
Next stop information on the train	7.9
Availability of bike parking (if applicable)	6.9
Availability of car parking (if applicable)	6.6
Metro.net website	7.1
Transit app	7.1

Thinking about your experiences during your entire journey door to door and all of your interactions with Metro, how satisfied are you with Metro Rail?

	Valid Percent
Very Dissatisfied	7%
2	5%
3	29%
4	28%
Very Satisfied	30%
Total	100%

Do you own or have regular access to a car?

	Valid Percent
Yes	44%
No	56%
Total	100%

Do you own a:

	Valid Percent
Smartphone	85%
Cell Phone	14%
I do not own a smartphone or a cell phone	1%
Total	100%

Does your smartphone have a:

	Valid Percent
Data Plan	89%
No data plan	3%
I am not sure/don't know	8%
Total	100%

Before Metro implemented all door boarding, how did you typically pay your fare?

	Valid Percent
TAP Stored Value	55%
30-Day Pass	23%
Cash	9%
7-Day Pass	7%
Other	5%
Total	100%

Do you have any disabilities?

	Valid Percent
Yes	8%
No	92%
Total	100%

Disability (multiple reponse)

	Valid Percent
Mental or cognitive	38%
Mobility – do not use wheelchair	34%
Low vision	24%
Other disability	18%
Mobility – use wheelchair	3%

What is your gender identity?

	Valid Percent
Male	49%
Female	46%
Non-binary	4%
Total	100%

What is your age?

	Valid Percent
Under 18	3%
18-24	15%
25-34	31%
35-44	19%
45-54	13%
55-64	14%
65+	6%
Total	100%

What is your ethnicity?

	Valid Percent
Latinx/Hispanic	47%
Black/African American	17%
White/Caucasian	19%
Asian/Pacific Islander	12%
Native American	1%
Other	5%
Total	100%

What is your household's total annual earnings?

	Valid Percent
Under $10,000	25%
$10,000 - $19,999	16%
$20,000 - $29,999	11%
$30,000 - $39,999	9%
$40,000 - $49,999	7%
$50,000 - $59,999	4%
$60,000 - $69,999	5%
$70,000 - $79,999	3%
$80,000 - $89,999	3%
$90,000 - $99,999	2%
$100,000 - $124,999	4%
$125,000 - $149,999	4%
$150,000 or more	8%
Total	100%

Including yourself, how many people live in your household?

	Valid Percent
1	33%
2	25%
3	13%
4	14%
5	7%
6 or more	8%
Total	100%

Do you personally speak a language other than English at home?

	Valid Percent
Yes	51%
No	49%
Total	100%

What language do you speak at home? (multiple reponse)

	Valid Percent
Spanish	68%
Chinese	2%
Korean	2%
Russian	2%
Japanese	2%
Armenian	1%
Vietnamese	1%
Other (Bengali, French, German, Tagalog, etc.)	25%

How well do you speak English?

	Valid Percent
Very Well	75%
Well	18%
Not well	6%
Not at all	1%
Total	100%

Survey conducted in:

	Valid Percent
English	92%
Spanish	8%
Total	100%

Customer Experience Survey Results

Operations, Safety, and Customer Experience Committee

March 18, 2021

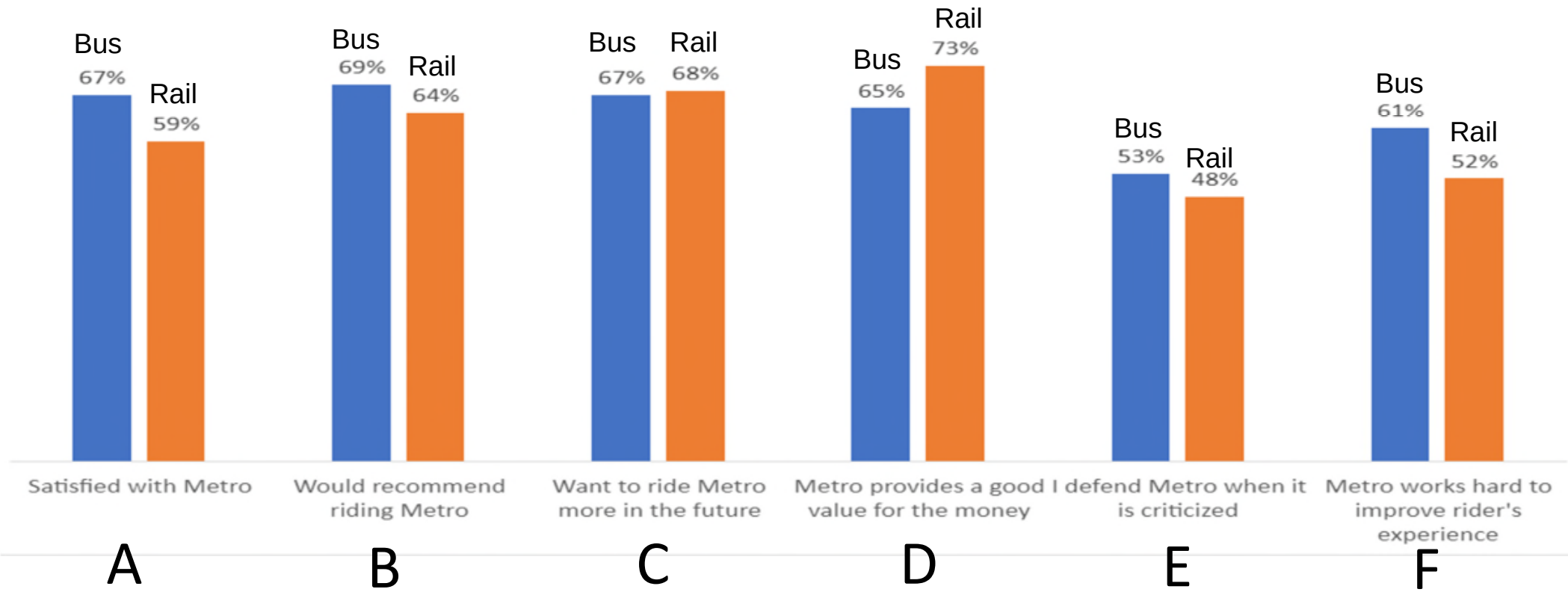
Metro

Methodology

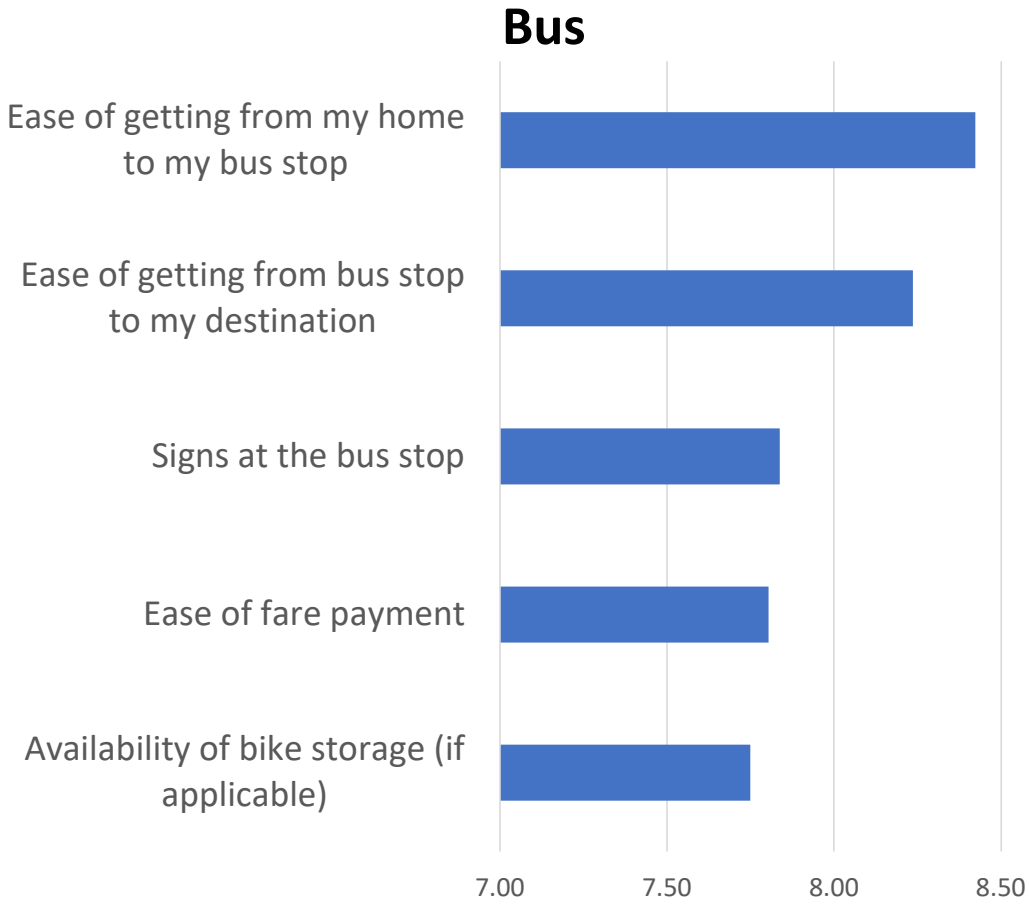
1. Method: online with email invitation
2. Sample: respondents from previous, random sample, on-board surveys
3. Completed surveys: 1,287, October 7-23, 2020
4. Response rate: 21%
5. Questionnaire: rate over 40 aspects of service, respondent characteristics, comments. Multiple languages.
6. Data processing:
    - Filtered to include only riders in 2020, including those who stopped riding due to the COVID pandemic
    - Weighted to reflect 2019 on-board survey results

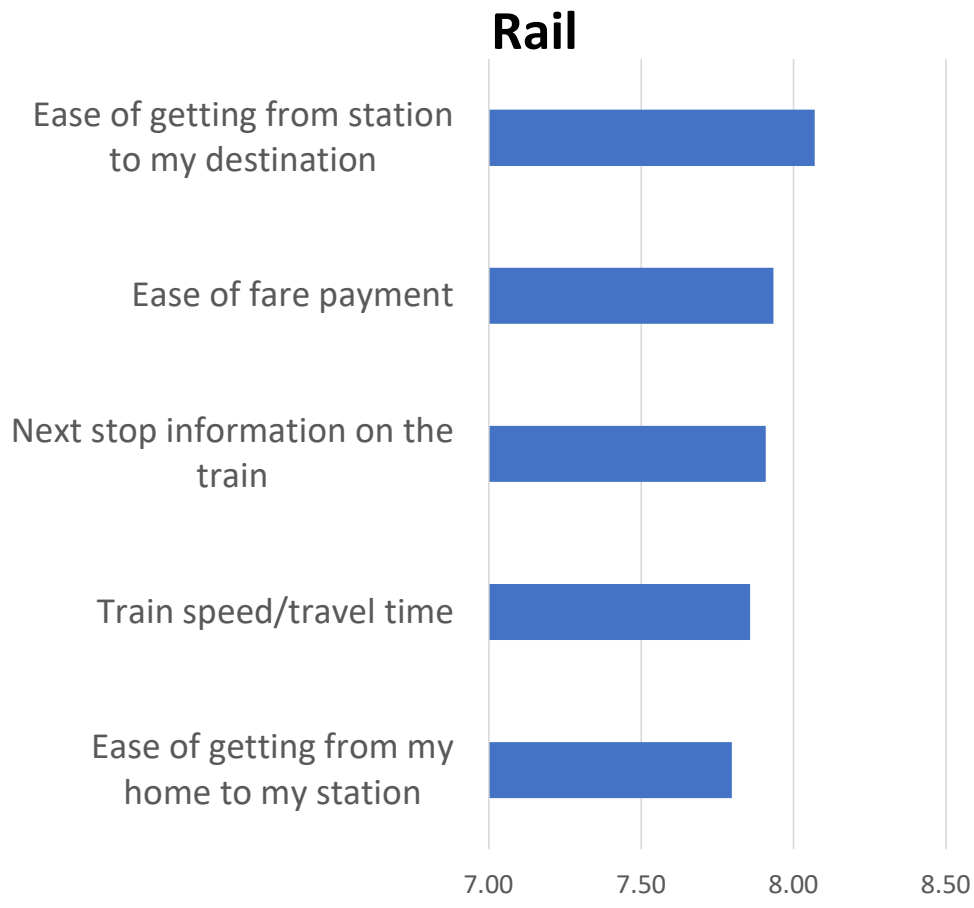
Overall Perceptions of Metro

Note: the percentages are the % of respondents who gave a 4 or 5 rating on a 5 point scale



Top Five Aspects of Customer Experience

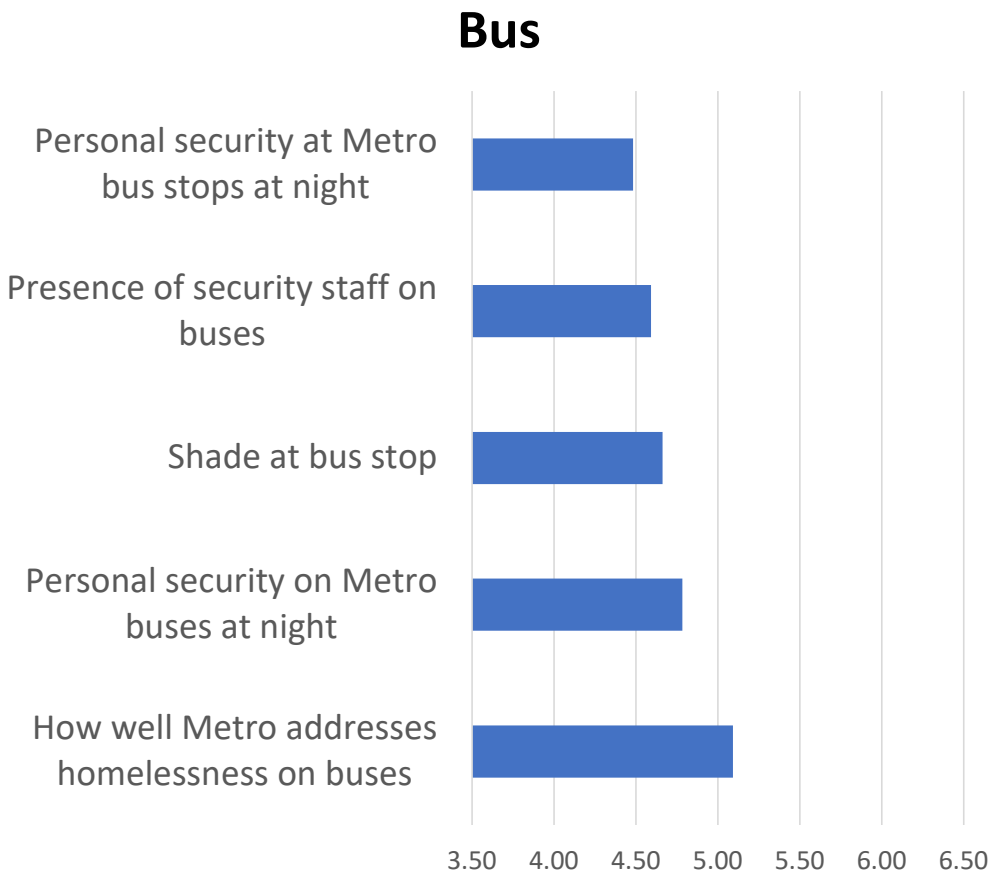


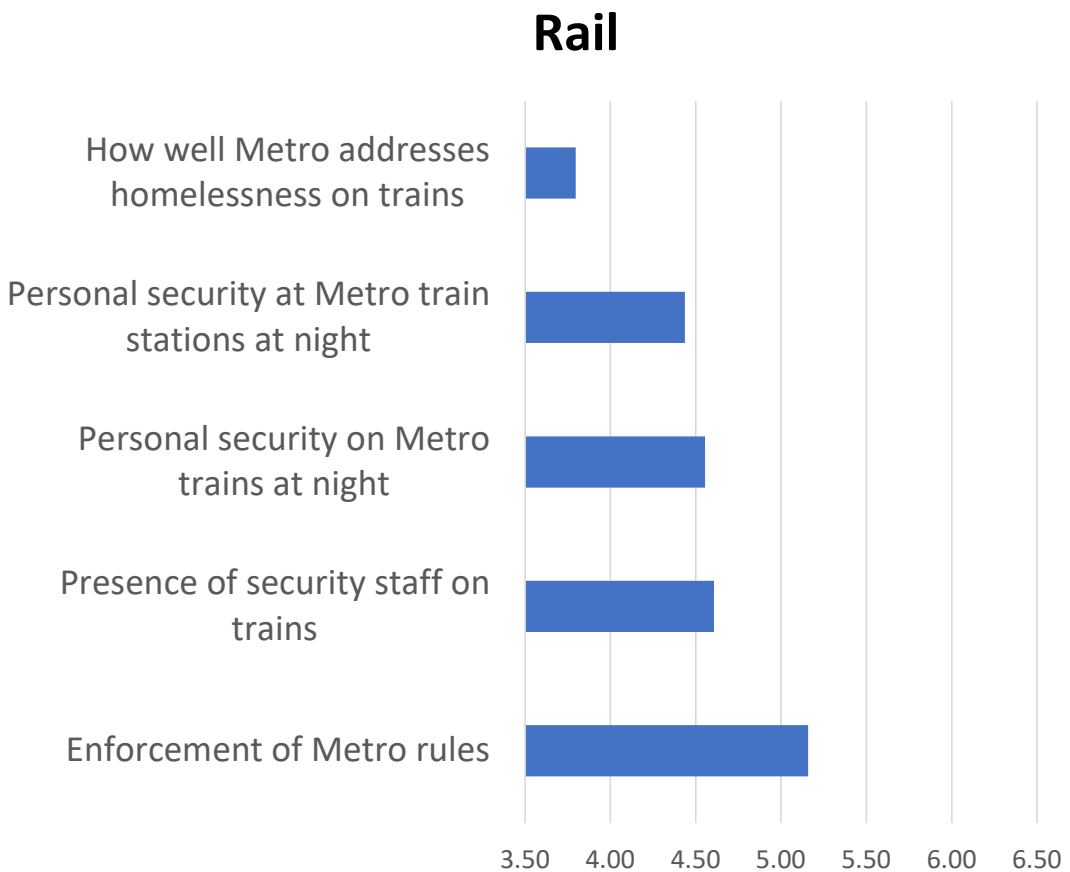


Source: 2020 Customer Experience Survey

Average Scores Shown. Scale: 1=Poor to 10=Excellent

Bottom Five Aspects of Customer Experience

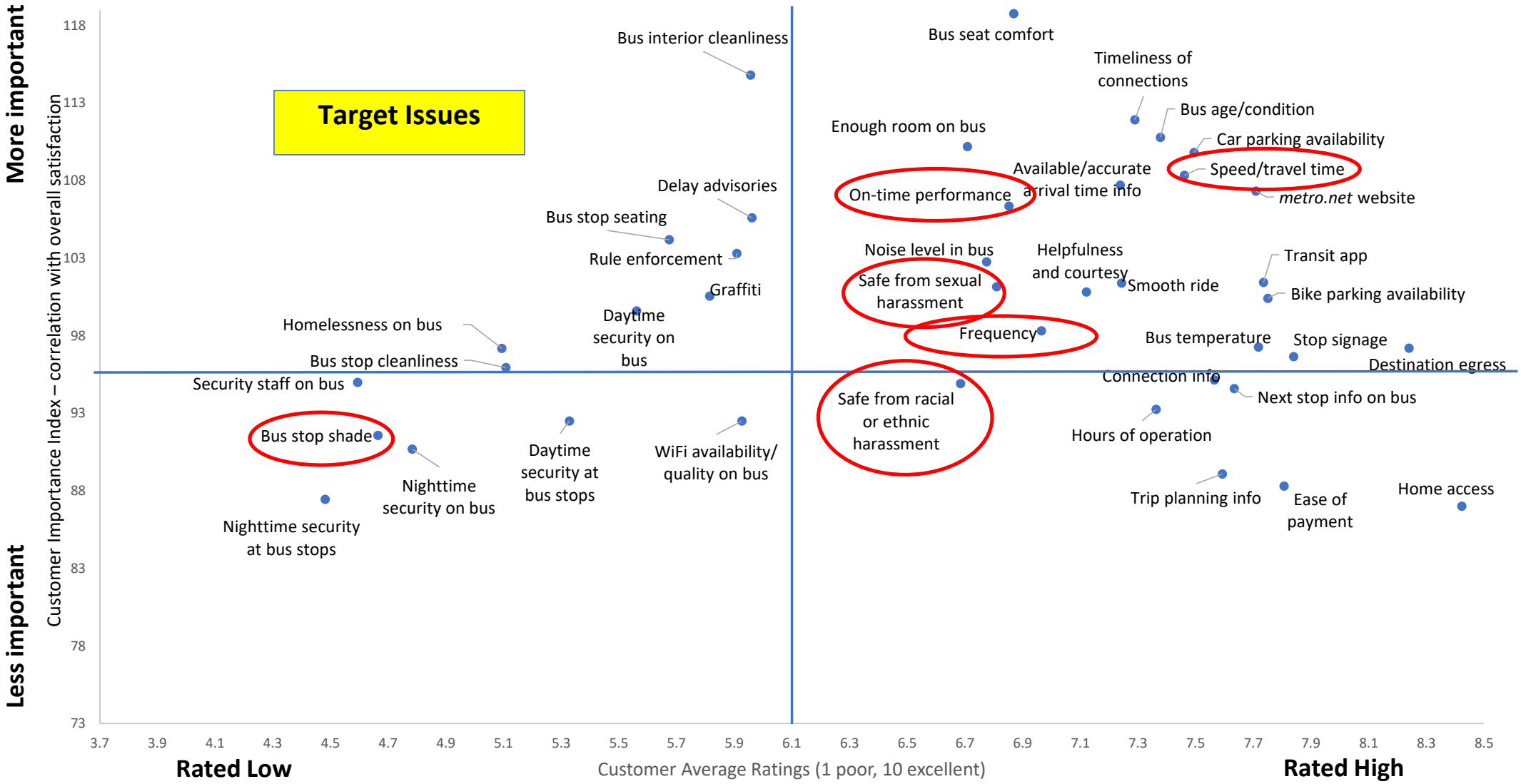




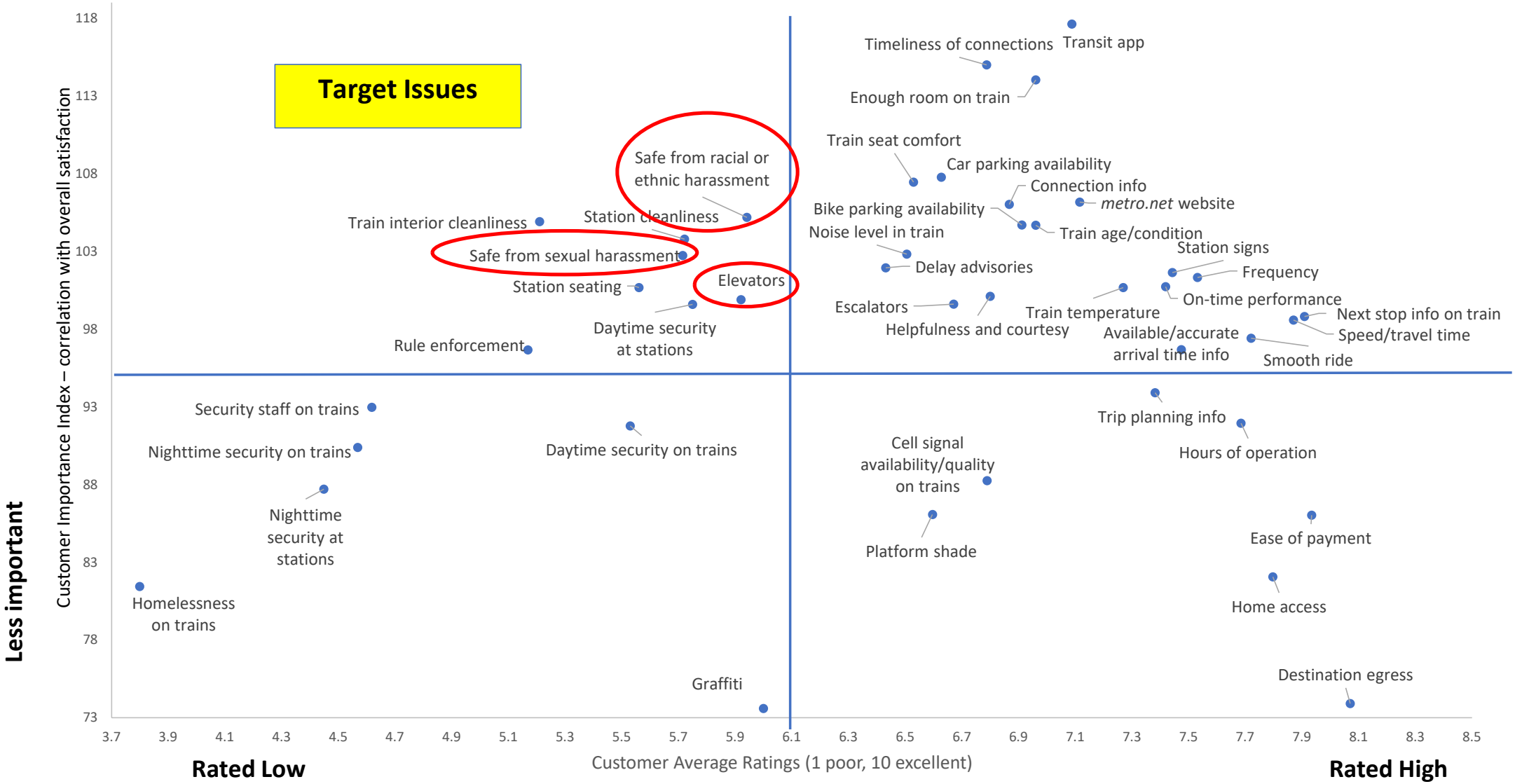
Source: 2020 Customer Experience Survey

Average Scores Shown. Scale: 1=Poor to 10=Excellent

Bus Quadrant Chart – 2020 Customer Experience Survey



Rail Quadrant Chart – 2020 Customer Experience Survey



Customer Experience Survey Results

Operations, Safety, and Customer Experience Committee

March 18, 2021

Metro

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2021-0137, **File Type:** Contract **Agenda Number:** 26.

REVISED
OPERATIONS, SAFETY AND CUSTOMER EXPERIENCE COMMITTEE
MARCH 18, 2021

SUBJECT: TRANSIT LAW ENFORCEMENT SERVICES

ACTION: APPROVE CONTRACT MODIFICATIONS

RECOMMENDATION

A. AMEND the combined contract value for the three multi-agency law enforcement contracts for services through December 31, 2021 by an increase of $36,000,000 from $645,675,758 to $681,675,758. The Board delegates to the CEO, or his designee, the discretion to allocate the $36M among the three law enforcement contracts, as deemed appropriate.

B. ENGAGE the Public Safety Advisory Committee (PSAC) for the remaining six months of the multi-agency law enforcement contract.

ISSUE

In order to maintain a consistent and reliable law enforcement presence and to ensure a safe and secure transit system for Metro patrons and employees, the multi-agency law enforcement services contracts need to be modified.

Additional contract authority is being requested to cover significant costs incurred since the beginning of the contract period to (1) augment outreach services to the unhoused population, address crime trends, sexual harassment; and (2) enhanced deployments to cover special events, employee, and customer complaints, or other unforeseen circumstances. An additional $36M is being requested for services through December 31, 2021.

BACKGROUND

On February 23, 2017, the Metro Board of Directors approved the award of three individual five-year, firm-fixed unit rate contracts to the City of Long Beach, City of Los Angeles and County of Los Angeles for multi-agency law enforcement services to support bus and rail operations throughout the entire Metro transit system. The total five-year contract amount for multi-agency law enforcement services is $645,675,758.

In order to effectively and efficiently meet Metro's changing safety and security requirements and to better address ridership safety and security concerns, Metro evaluates and adjusts policing strategies and realigns deployment methodologies. Since contract inception, Metro has requested all three law enforcement agencies to deploy additional resources to meet these changing needs. These deployment adjustments, have, among other things, resulted in fewer copper thefts, making it possible to reopen the New Blue Line on schedule; a decreased crime rate; and improved supportive services for the unhoused population through an increased number of homeless contacts, referrals to social services and housing placements.

The following additional resources and cost adjustments have been incurred to date:

City of Long Beach

In December 2018, Metro requested the City of Long Beach to provide two (2) full-time Metro Quality of Life officers for homeless outreach along the A (Blue) Line, one (1) detective and one (1) vehicle.

City of Los Angeles

In July 2018, Metro authorized the City of Los Angeles to implement the following contract adjustments:

- Augment the "Billing and Inspection Unit";
- Increase Crime Analyst Personnel;
- Reclassify the Sick/IOD/Subpoena Control Coordinator from Police Officer III to Management Analyst;
- Convert HOPE Detail from overtime positions to full-time positions;
- Convert Bomb/K9 Unit from as needed to full-time positions; and
- Enhance "Watch 3" staffing (overtime coverage) to facilitate station closures;
- Increase the training budget for additional law enforcement personnel;
- Increase "Reserve Overtime" for new positions;
- Include "Premium Holiday Pay" in accordance with the respective labor agreements;
- Include provisions for community outreach activities; and
- Increase budget for office supplies.

Since October 2017, the City of Los Angeles has deployed resources to support 184 additional activities such as the following: Metro Real Estate Agreements with Council District 1, Westlake/MacArthur Station Park Community Market, Metrolink Union Station Platforms, A (Blue) Line Closure, New Blue Copper Theft Mitigation, and Metro Rail Operation's calendar of special events, among other enhance deployments.

Metro staff also anticipates staffing level increases will be required to support the Offloading and Flexible Dispatching operations, and the opening of the new Crenshaw/LAX Line. Once the opening date of the new Crenshaw/LAX Line is established, Metro staff will return to the Board of Directors to request approval for additional contract modification authority.

County of Los Angeles

Since contract inception, the County of Los Angeles has augmented budgeted personnel to support 59 additional activities such as: Metro's Red-Light Photo Enforcement (RLPE) program, Metro Real Estate Agreements with East San Gabriel Valley Coalition (ESGVCH), Annual Homeless Winter Shelter Program, and Metro Rail Operation's special events and enhance deployments.

Metro staff anticipates staffing level increases will be required to support the opening of the new Crenshaw/LAX Line. Once the opening date of the new Crenshaw/LAX Line is established, Metro staff will return to the Board of Directors to request approval for additional contract modification authority.

DISCUSSION

Through the multi-agency law enforcement services contracts, Metro is able to provide a consistent and reliable law enforcement presence, improve response times, increase law enforcement staffing over each 24-hour operating period, support bus and rail operations throughout the entire Metro transit system and provide additional law enforcement services on an as-needed basis for special events and/or other exigent circumstances.

By approving this amendment and funding the multi-agency law enforcement contract through December 31, 2021, it provides the Public Safety Advisory Committee (PSAC) the opportunity to provide recommendations on the remaining six months of the contract, including the approach for the opening of Crenshaw/LAX Line, and the future contract to help reimagine public safety on Metro's system. In doing so, it allows Metro to launch pilot programs, gather lessons learned, identify costs, and seek customer feedback. This will complement initiatives underway such as our ambassador program that will assist with connecting persons experiencing homelessness with social services, a pilot Flexible Dispatch Program, and environmental safety enhancements like Call Point. In addition, staff will be launching a Public Safety Survey to better understand the safety needs of our diverse ridership. The survey, in collaboration with PSAC, is expected to be launched in the Summer with results being available in the Fall.

Staff will incorporate PSAC recommendations for the Board's consideration in the November/December 2021 board cycle.

DETERMINATION OF SAFETY IMPACT

The authorization of the contract modifications to each of the law enforcement contracts, will ensure continued safety and security of patrons and employees, improvement of Metro's ability to safeguard critical transportation infrastructures, and outreach to the unsheltered.

FINANCIAL IMPACT

The funding increase of $36M will be added to the total contract value of the three five-year multi-agency law enforcement contracts.

Impact to Budget

The source of funds for this effort will be local operating funds including fares, sales tax Proposition A, C, TDA, and Measure R. Using these funding sources maximizes the allowable project funding designations given approved funding use provisions and guidelines.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The recommendation supports strategic plan goal 2.1 of committing to improving security. To achieve this goal, Metro will rely on a multi-layered, integrated security program that comprises of technology, people, and partnerships.

ALTERNATIVES CONSIDERED

Should the Board of Directors not approve the recommendation outlined in this report, it may consider approving a $111,201,973 amendment to fund the three law enforcement agencies through the end of their contract term of June 30, 2022. This alternative is not recommended as it does not provide PSAC the opportunity to provide recommendations on how to reimagine public safety.

NEXT STEPS

Upon Board approval, staff will execute contract modifications to each of the law enforcement contracts to continue to provide law enforcement services.

ATTACHMENTS

Attachment A - Procurement Summary
Attachment B - Contract Modification/Change Order Log
Attachment C - DEOD Summary

Prepared by: Ronald Dickerson, Deputy Executive Officer, System Security & Law Enforcement, (213) 922-4948

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Nalini Ahuja, Chief Financial Officer, (213) 922-3088

Phillip A. Washington
Chief Executive Officer

PROCUREMENT SUMMARY

TRANSIT LAW ENFORCEMENT SERVICES/PS5862100LAPD24750/ PS5863200LASD24750 and PS95866000LBPD24750

1.	**Contract Number**: (1) PS5862100LAPD24750, (2) PS5863200LASD24750 and (3) PS95866000LBPD24750			
2.	**Contractor**: (1) City of Long Beach (2) City of Los Angeles (3) County of Los Angeles			
3.	**Mod. Work Description**: Increase contract authority			
4.	**Contract Work Description**: Transit Law Enforcement Services			
5.	**The following data is current as of**: December 1, 2020			
6.	**Contract Completion Status**		**Financial Status**	
	Contract Awarded:	LAPD: 2/23/17 LBPD: 2/23/17 LASD: 2/23/17	**Contract Award Amount:**	LAPD: $369,330,499 LASD: $246,270,631 LBPD: $ 30,074,628
	Notice to Proceed (NTP):	N/A	**Total of Modifications Approved:**	LAPD: $0 LASD: $0 LBPD: $0
	Original Complete Date:	6/30/22	**Pending Modifications (including this action):**	LAPD: $21,526,518 LASD: $11,325,520 LBPD: $ 3,147,962
	Current Est. Complete Date:	6/30/22	**Current Contract Value (with this action):**	LAPD: $390,857,017 LASD: $257,596,151 LBPD: $33,222,590
7.	**Contract Administrator**: Aielyn Dumaua		**Telephone Number**: (213) 922-7320	
8.	**Project Manager**: Aston Greene		**Telephone Number**: (213) 922-2599	

A. Procurement Background

This Board Action is to approve modifications to Contract No. PS95866000LBPD24750 with the City of Long Beach, Contract No. PS5862100LAPD24750 with the City of Los Angeles, and Contract No. PS5863200LASD24750 with the County of Los Angeles to continue to provide law enforcement services to support bus and rail operations throughout the entire Metro transit system.

These modifications are being requested to cover significant costs incurred since the beginning of the contract period to (1) augment outreach services to the unhoused population, address crime trends, sexual harassment; and (2) enhance deployments to cover special events, employee, and customer complaints, or other unforeseen circumstances, necessitating the deployment of additional contractor resources above and beyond the original budgeted personnel. Contract modifications will be

processed in accordance with Metro's Acquisition Policy and the contract type is a firm fixed unit rate.

On February 23, 2017, the Board approved the award of contracts to the City of Long Beach, City of Los Angeles and County of Los Angeles to provide transit law enforcement services for a period of five years.

Refer to Attachment B – Contract Modification/Change Order Log for modifications issued to date.

B. Price Analysis

The recommended price has been determined to be fair and reasonable based on price analysis. Labor rates are subject to each law enforcement agencies' collective respective bargaining agreement.

Contractor	Modification Amount	Metro ICE	Negotiated Amount
City of Long Beach	$ 3,147,962	$ 3,147,962	$ 3,147,962
City of Los Angeles	$ 21,526,518	$ 21,526,518	$ 21,526,518
County of Los Angeles	$ 11,325,520	$ 11,325,520	$ 11,325,520

ATTACHMENT B

CONTRACT MODIFICATION/CHANGE ORDER LOG

TRANSIT LAW ENFORCEMENT SERVICES/PS95866000LBPD24750

Mod. No.	Description	Status (approved or pending)	Date	$ Amount
1	Revised Contract No. to PS95866000LBPD24750	Approved	1/8/18	$ 0
2	Revised Exhibit B – Memorandum of Cost	Approved	10/1/19	$ 0
3	Increase in contract authority	**Pending**	**Pending**	**$ 3,147,962**
	Modification Total:			**$ 3,147,962**
	Original Contract:			**$30,074,628**
	Total:			**$33,222,590**

TRANSIT LAW ENFORCEMENT SERVICES/PS5862100LAPD24750

Mod. No.	Description	Status (approved or pending)	Date	$ Amount
1	Revised provisions of GC14-Termination	Approved	7/1/18	$ 0
2	Increase in contract authority	**Pending**	**Pending**	**$ 21,526,518**
	Modification Total:			**$ 21,526,518**
	Original Contract:			**$369,330,499**
	Total:			**$390,857,017**

TRANSIT LAW ENFORCEMENT SERVICES/PS5863200LASD24750

Mod. No.	Description	Status (approved or pending)	Date	$ Amount
1	Revised Exhibit A - Statement of work and updated Exhibit B – SH-AD 575	Approved	7/1/20	$ 0
2	Increase in contract authority	**Pending**	**Pending**	**$ 11,325,520**
	Modification Total:			**$ 11,325,520**
	Original Contract:			**$246,270,631**
	Total:			**$257,596,151**

DEOD SUMMARY

TRANSIT LAW ENFORCEMENT SERVICES/PS5862100LAPD24750/ PS5863200LASD24750 and PS95866000LBPD24750

A. Small Business Participation

The Diversity and Economic Opportunity Department (DEOD) did not recommend a Disadvantaged Business Enterprise (DBE) goal for this solicitation due to a lack of subcontracting opportunities. As confirmed by the Project Manager, these services are performed with the law enforcement departments own workforces.

B. Living Wage and Service Contract Worker Retention Policy Applicability

A review of the current service contract indicates that the Living Wage and Service Contract Worker Retention Policy (LW/SCWRP) was not applicable at the time of award. Therefore, the LW/SCWRP is not applicable to this modification.

C. Prevailing Wage Applicability

Prevailing wage is not applicable to this modification.

D. Project Labor Agreement/Construction Careers Policy

Project Labor Agreement/Construction Careers Policy is not applicable to this Contract. Project Labor Agreement/Construction Careers Policy is applicable only to construction contracts that have a construction contract value in excess of $2.5 million.

Law Enforcement Services Contract Modification Authority

Operations, Safety and Customer Experience Committee

Thursday, March 18, 2021

Contract Amendment Request

- Amend the combined contract value for the three multi-agency law enforcement contracts for services through **December 31, 2021** by an increase of **$36,000,000** from $645,675,758 to $681,675,758.

- The Public Safety Advisory Committee (PSAC) will be engaged for the remaining six months of the multi-agency law enforcement contract. Staff will implement PSAC preliminary recommendations during the remaining six months of the contract. Thus, serving as a public safety model leading into the proposed future law enforcement services contract in FY22 and beyond.

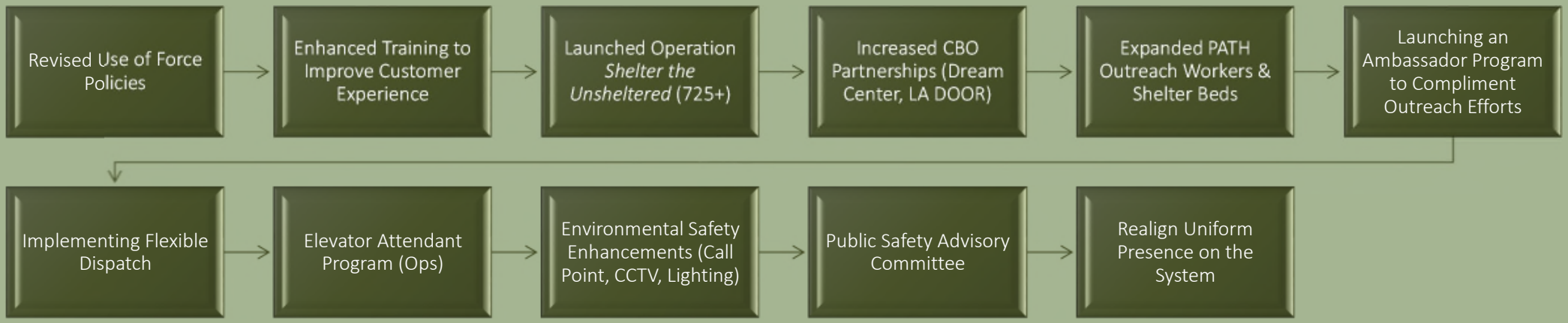
- In addition, staff will be launching a Public Safety Survey to better understand the safety needs of our diverse ridership.

Contract Achievements

- In collaboration with Metro's Transit Security and PATH, we launched Operation *Shelter the Unsheltered* in April 2020, which has helped to connect over 740 individuals to shelters
- Expanded the HOPE, MET, and Quality of Life homeless outreach teams
- Improved contract compliance, and reduced data reporting from 60 days to 30 days
- Improved Metro's Sexual Harassment Program by having law enforcement respond to incidents as priority calls with tracked response time
- Launched law enforcement audits to improve accountability and presence on the system

Future Public Safety Model

Metro is striving to be a national leader in reimaging public safety by launching experimental programs, seeking community input, being agile, and making data driven decisions to increase rider safety.



Through these efforts, our goal is to create a multi-disciplined model to serve the needs of our diverse customers.

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

File #: 2021-0072, **File Type:** Contract **Agenda Number:** 40.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: SEPULVEDA TRANSIT CORRIDOR PROJECT

ACTION: APPROVE RECOMMENDATIONS

RECOMMENDATION

A. AUTHORIZE the Chief Executive Officer (CEO) to award the following two (2) Contracts, subject to resolution of protests, if any.

   a. Contract No. PS66773MRT to LA SkyRail Express, a special purpose corporation to be formed between John Laing Investments Limited and BYD Transit Solutions LLC, for pre-development services for a proposed Monorail technology transit solution concept ("TSC") in an amount not to exceed $63,605,132.

   b. Contract No. PS66773HRT to Sepulveda Transit Corridor Partners -Bechtel, a special purpose vehicle to be formed between Bechtel Development Company, Inc., Meridiam Sepulveda, LLC and American Triple I Partners, LLC, for pre-development services for a proposed Heavy Rail technology transit solution concept ("TSC") in an amount not to exceed $69,882,427.

B. APPROVE Contract Modification Authority in the amount of 25% for each of the two contract award values, respectively, and authorize the CEO to execute individual Contract Modifications within the Board-approved Contract Modification Authority.

ISSUE

On October 31, 2019, Metro issued Request for Proposals (RFP) No. PS66773 seeking up to two qualified contractors to perform pre-development work for the Sepulveda Transit Corridor Project on a firm fixed price basis, with the potential opportunity for one of the contractors to enter into an Implementation Agreement for project delivery after completion of the pre-development work. Metro will determine which developer (if any) will have the opportunity to potentially proceed with implementation.

The Statement of Work, as included in the RFP, is broken out into five phases. Metro may choose not to issue a Notice to Proceed for any phase, in its sole discretion. In addition, if a Contractor's Transit

Solution Concept (TSC), as refined through the PDA process, is not selected by the Board as the locally preferred alternative (LPA) established for construction, the Contract will expire at the end of Phase 3. Metro's decision to request a proposal for implementation from the remaining Contractor, if any, and to proceed with negotiation of such agreement will be made at Metro's sole discretion upon Board approval.

Staff has completed the procurement process and is recommending for award (1) a contract to LA SkyRail Express for a proposed Monorail technology TSC and (2) a contract to Sepulveda Transit Corridor Partners - Bechtel for a proposed Heavy Rail technology TSC.

BACKGROUND

Metro is planning for the construction of a fixed-guideway transit service running between the San Fernando Valley ("Valley") and Los Angeles International Airport ("LAX"), through the Westside of Los Angeles ("Westside"). The section of Interstate 405 ("I-405") between these high-demand areas remains one of the most congested urban freeway corridors in the United States. Prior to the current pandemic (COVID-19), more than 400,000 people moved through this area every weekday. Much of this crowding is a result of the geography of the area and the limited number of roads and public transport options running north-south through the Santa Monica Mountains.

To address the need for additional transportation capacity, the initial phase of the Project will connect the San Fernando Valley to West Los Angeles ("Valley to Westside" or the "Project"), and ultimately extend a final project phase south to LAX ("Westside-LAX Extension"). Each project phase is included in Metro's Measure M Expenditure Plan, which specifies delivery of the Valley to Westside project phase by 2033-35 and delivery of the Westside to LAX project phase by 2057-59.

The Project is part of the Measure M expenditure plan, with approximately $5.7 billion for new transit service to connect the San Fernando Valley and the Westside, scheduled to open by 2033-35. Approximately $3.8 billion is allocated to extend that service from the Westside to LAX with a 2057-59 opening date.

At the December 2019 meeting (Legistar File 2019-0759), the Board received the findings of the Sepulveda Transit Corridor Feasibility Study. The study included the identification and valuation of high-capacity rail transit concepts and alternatives that would provide high quality service to a large travel market between the San Fernando Valley and the Westside, including the LAX area.

DISCUSSION

Pre-Development Agreement Approach

A pre-development agreement (PDA) is a form of early contractor involvement where a private project developer participates in early project definition and design, in partnership with the project owner. PDA contractors will provide technical work products including cost estimates, constructability

reviews, technical analyses, etc. that support the ongoing development of the project as it progresses through the environmental review and approval processes.

In July 2019, the Board approved a finding that the use of a PDA approach pursuant to Public Utilities Code Section 130242 will achieve certain private sector efficiencies in the integration of the planning, design and construction of the Project (file 2019-0490).

Previously in 2012, the Metro Board directed Metro staff to "…proceed with all actions necessary to assist in the preparation of a Pre-Development Agreement (PDA) to develop the [Sepulveda Transit Project]" in a motion made by Directors Richard Katz and Mel Wilson, approved at the December 13, 2012 Board meeting. The Board's approval for solicitation of a PDA also followed receipt by Metro in 2016, of three Unsolicited Proposals (UP) for delivery of the Sepulveda Transit Corridor, each of which offered different approaches to achieve innovative, accelerated delivery of the project. Two of the three also proposed the use of a PDA to advance preliminary definition and design of the project, followed by project delivery through a potential public-private partnership (P3), which would include the design, construction, finance, and potentially project operations and/or maintenance.

The PDA project development period includes clear phases and milestones, which occur in parallel with, but separate from, the process of developing the environmental documents to satisfy the requirements of NEPA and CEQA. In each phase, a PDA contractor advances the design of its TSC, at Metro's direction, considering public and stakeholder feedback received by Metro through the environmental process.

In particular, PDA Phases 1 through 3 are focused on building upon the concepts submitted in the PDA Proposals by refining and advancing the design of each proposed concept based on technical analysis (e.g. factors such as site investigations, field reviews/surveys, performance assessment), stakeholder meetings, and public feedback. This may also involve studying other concepts to make connections to important destinations (which may include, but not limited to UCLA), which may be explored further during the PDA and environmental processes based on technical feasibility and stakeholder feedback.

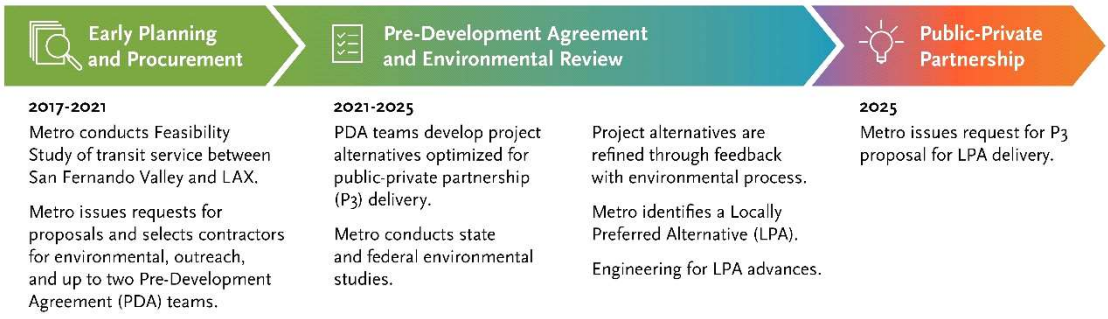
The conclusion of each PDA phase allows Metro the opportunity to decline to continue its relationship with a PDA contractor. Each Contract would also allow Metro the ability to add work relating to the Westside-LAX Extension to the scope of work under the Contract, in coordination with the environmental process.

After the Board establishes a Locally Preferred Alternative (LPA) for the Project, which is anticipated to occur at the end of PDA Phase 3, Metro may elect to continue pre-development work with a Contractor if its TSC is selected by the Board as the LPA, and the other Contract will expire.

Thereafter, during PDA Phase 4, the selected Contractor will advance the engineering of the selected mode, configuration, and alignment to a level of detail necessary to submit an Implementation Proposal.

Once certain conditions have been met as specified in the Contract, as part of PDA Phase 5, Metro may offer the remaining Contractor the opportunity to submit a firm fixed price proposal (or other pricing model, as determined by Metro to ensure the desired cost certainty) for Project

implementation. Metro would review the Project Implementation Proposal and make a recommendation to the Board whether to proceed with a modification to the Contract (called an "Implementation Agreement") with that Contractor. This Implementation Agreement would potentially include Project financing, operations, and maintenance, as well as final design and construction. This process is summarized in the figure below.



Staff intends to provide quarterly updates to the Board, including status of schedule, budget, and key stakeholder/third party issues. These updates will be coordinated with Planning and Communications Departments.

PDA Solicitation Approach

Metro issued a Request for Proposal (RFP) No. PS66773 for the performance of pre-development work for the Project on October 31, 2019.

In order to participate in this solicitation, prospective Proposers were required to meet certain criteria prior to submitting a proposal, as demonstrated through an Initial Qualifications Submittal. This submittal included information about the prospective Proposer and its equity members, previous experience of the proposed lead construction contractor and lead engineering firm, and the previous experience of proposed equity member(s). A total of five teams were determined to be qualified to submit proposals.

Metro's objective for the PDA was to generate unique and creative concepts to address the mobility challenge in the study area, which could be developed into a feasible project and successfully delivered/implemented within Metro's desired timeframe and budget. To maximize potential competition and innovation, Metro did not specify a required mode, alignment, or configuration for the Project. Firms were encouraged to propose solutions that best met the required project parameters, as stated in the RFP, that were likely to be technically and financially feasible.

Metro staff developed a PDA Solicitation approach to evaluate the technical and financial feasibility of potential PDA team(s) across a range of qualities, including, but not limited to: 1) quality of transit concept, 2) quality of project development approach, 3) project development experience, and 4) project delivery/implementation experience, as well as 5) price components and 6) diversity/inclusion.

This approach was intended to balance the quality of each team's proposed TSC (mode, alignment, configuration, station locations, etc.) with its approach to developing the conceptual TSC proposal into a technically and financially feasible project, and the qualifications and experience that support each team's ability to successfully deliver both the PDA work and the potential project implementation. As part of this, teams were encouraged to identify key project development or delivery challenges associated with its TSC, as well as strategies for mitigating or addressing these risks.

As part of the RFP, Metro established Disadvantaged Business Enterprise (DBE) contract goals for this project in the following percentages:

Phase	DBE Contract Goal in percentage of Payment Amount
1	30%
2	25%
3	23.50%
4	24.94%

Proposals were received by August 26, 2020 from the following four teams:

- LA SkyRail Express (Monorail mode)
- Sepulveda Transit Corridor Partners - Bechtel (Heavy Rail mode)
- Sepulveda Transit Corridor Partners - Fengate (Light Rail mode)
- Tutor Perini, Parsons & Plenary (Heavy Rail mode)

Proposal Evaluation Approach

Following a responsiveness review, a Proposal Evaluation Team (PET), supported by a range of Subject Matter Experts (SME) through fact-based analysis, reviewed each technical and financial proposal submitted, and scored each proposal according to the Evaluation Criteria described in the RFP. Oral presentations/interviews were conducted with all four proposing teams. The PET members scored the proposals in accordance with the evaluation procedure outlined in the RFP, the final scores were calculated and the highest-ranked proposal for each proposed transit mode was determined.

The following firms were determined to be the two highest ranked proposers:

- LA SkyRail Express team (Monorail); and
- Sepulveda Transit Corridor Partners - Bechtel (Heavy Rail)

Attachment B provides further details regarding the procurement process including:

1. The number of questions received from Proposers,
2. The Amendments to the RFP issued by Metro,
3. The evaluation process,
4. A summary of the qualifications of the recommended teams,

5. The evaluation scores, and
6. A price analysis

Consistency with Metro's Equity Platform Framework

To help address disparities in access to opportunity across Los Angeles County, the Metro Board adopted the Equity Platform policy framework in February 2018 and a working definition of Equity Focus Communities (EFC) in June 2019. The Sepulveda Transit Corridor is consistent with the Metro Equity Platform in that the alternatives help address accessibility for residential and employment centers, support for transit-oriented communities' policies, support for first/last-mile connections, and investment in disadvantaged communities. In addition, ridership estimates suggest that a large share of the ridership demand would include low-income riders. Going forward, the Project will use the working definition of EFC along with other metrics as appropriate to guide analyses and to conduct robust community engagement.

Community Outreach

The Board awarded a separate outreach contract (Contract No. PS68039000) to Arellano Associates LLC at its December 2020 Board meeting. The outreach contractor will support the facilitation and implementation of a Community Participation Program (Program) for the Project, inclusive of the environmental study, the work of the PDA developers as it contributes to the outreach associated with the environmental study, related advanced conceptual engineering (ACE) and associated transit-oriented communities (TOC), first/last mile planning and design of the Project. Using Metro's Equity Platform as a guide, the Program will prioritize genuine public and community engagement to a wide array of diverse stakeholders, using tactics and strategies appropriate to the Project's stakeholders, including those who reside within the Study Area and those who travel through it.

DETERMINATION OF SAFETY IMPACT

These actions will not have any impact on the safety of Metro customers and/or employees because this project is in the planning process phase and no capital or operational impacts result from this Board action.

FINANCIAL IMPACT

This Project is funded on a fiscal year basis under Project number 460305 Sepulveda Transit Corridor, cost center 8510, under various accounts including Professional/Technical Services and $9.1M is included in the FY21 Adopted Budget. This amount is consistent with the CEO's Call to Action Financial Recovery Plan. This is a multi-year project requiring expenditure authorizations in fiscal year increments until a Board Authorized Life of Project Budget is adopted. As required in the RFP, each PDA Team submitted its Price Proposal broken down by PDA Phase. Metro will only be responsible for costs for work accepted as part of the completion of a PDA Phase. Because Metro intends to issue a notice to proceed for PDA Phase 4 with only one of the two Contractors (if any), Metro will only be responsible, at a maximum, for Phase 4 and Phase 5 costs submitted by one of the two teams. The table below provides the PDA Price by Phase for each recommended Proposer.

		PDA Price by Phase	
		LASRE	**STCP - Becht**
Phase 1	Alternatives Refinement	$6,445,812	$6,500,000
Phase 2	Conceptual Engineering & Analysis	$20,869,629	$22,494,822
Phase 3	Conceptual Engineering to Support LPA Selection	$9,784,655	$9,452,860
Phase 4	Final Technical Concept	$26,505,036	$31,434,745
Phase 5	Project Implementation Proposal	$0	$0
	Total	**$63,605,132**	**$69,882,427**

It is the responsibility of the Cost Center Manager, Project Manager and Chief Program Management Officer to budget for this project in the future fiscal years and within the cumulative contract limits.

Impact to Budget

The Sepulveda Transit Corridor Project is included in Metro's current Long Range Transportation Plan (LRTP), as approved by the Metro Board in 2020, which is consistent with the Measure M expenditure plan approved by LA County voters in 2016. Funding for the Project in the Expenditure Plan is broken down into three phases with approximately $9.7 billion in total funding (2015 dollars). Phase 1, with $260 million in funding, includes implementation of Metro ExpressLanes on the I-405 between the 10 and 101 Freeways with an opening date of Fiscal Year (FY) 2026. Phase 2, with approximately $5.7 billion in funding, includes a fixed-guideway transit service between the San Fernando Valley and the Westwood area of Los Angeles, with an opening year of FY 2033. Phase 3, with approximately $3.8 billion in funding, involves extending the Phase 2 project southward to LAX, with an opening year of FY 2057.

These funds are earmarked for the Sepulveda Transit Corridor project and are not eligible for Metro bus and rail capital and operating expenditures.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The Sepulveda Transit Corridor Project will support the first goal of the Vision 2028 Metro Strategic Plan by providing high-quality mobility options that enable people to spend less time traveling. Travel times are forecast to be less than 30 minutes for Valley-Westside (from the Ventura County Metrolink Line in the north to the Expo Line in the south), and less than 40 minutes for Valley-Westside-LAX (from Metrolink to the Crenshaw/LAX Line). This performance is highly competitive with travel by car on the I-405 freeway.

The project will also support the goals of the strategic plan by enhancing communities and lives through mobility and access to opportunity by adding a new high-quality mobility option, closing a gap in the rail network that provides outstanding trip experiences and enhances communities and lives

through mobility and access to opportunity.

ALTERNATIVES CONSIDERED

The Board could choose not to approve any or all of the recommendations. However, certain private sector efficiencies in the integration of project design with long-term operational performance and cost of ownership may not be achieved. Also, the opportunity to potentially identify strategies to improve performance, reduce costs, and accelerate project delivery utilizing this recommended method will not be available.

Metro staff explored delivering the Project utilizing Design/Bid/Build and Design/Build contracting, as well as a traditional hard-bid P3 (without early contractor involvement); however, these approaches would not benefit from contractor insights into project definition and design stages that could support more efficient achievement of Metro's project goals. Therefore, it is not recommended that either option be utilized.

NEXT STEPS

Upon Board approval, staff will execute Contract Nos. PS66773MRT with LA SkyRail Express and PS66773HRT with Sepulveda Transit Corridor Partners - Bechtel and initiate the pre-development work.

ATTACHMENTS

Attachment A - Sepulveda Project Final Feasibility Report Link <http://media.metro.net/projects_studies/sfv-405/images/Feasibility%20Report.pdf>
Attachment B - Procurement Summary
Attachment C - DEOD Summary

Prepared by:

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Debra Avila, Chief Vendor / Contract Management Officer, (213) 418-3051

Phillip A. Washington
Chief Executive Officer

PROCUREMENT SUMMARY

SEPULVEDA TRANSIT CORRIDOR PROJECT
PRE-DEVELOPMENT SERVICES
PS66773MRT / PS66773HRT

1.	**Contract Numbers**: **PS66773MRT** **PS66773HRT**	
2.	**Recommended Vendor**: LA SkyRail Express (Monorail technology) Sepulveda Transit Corridor Partners -Bechtel (Heavy Rail technology)	
3.	**Type of Procurement (check one):** ☐ **IFB** ☒ **RFP** ☐ **RFP–A&E** ☐ **Non-Competitive** ☐ **Modification** ☐ **Task Order**	
4.	**Procurement Dates**:	
	A. Issued: October 31, 2019	
	B. Advertised/Publicized: October 31, 2019	
	C. Pre-Proposal Conference: January 8, 2020	
	D. Proposals Due: August 26, 2020	
	E. Pre-Qualification Completed: February 16, 2021	
	F. Conflict of Interest Form Submitted to Ethics: September 9, 2019	
	G. Protest Period End Date: March 1, 2021	
5.	**Solicitations Picked up/Downloaded**: 583	**Bids/Proposals Received**: 4
6.	**Contract Administrator**: Manchi Yi	**Telephone Number**: (213) 418-3332
7.	**Project Manager**: Kavita Mehta	**Telephone Number**: (213) 435-5047

A. Procurement Background

This Board Action is to approve Contract No. PS66773MRT to LA SkyRail Express (Monorail technology) and Contract No. PS66773HRT to Sepulveda Transit Corridor Partners – Bechtel (Heavy Rail technology) to furnish all goods and services required for the performance of pre-development work for the Sepulveda Transit Corridor Project (Project). Board approval of contract awards are subject to resolution of any properly submitted protest.

In July 2019, the Board approved a finding that the use of a pre-development agreement (PDA) approach pursuant to Public Utilities Code (PUC) Section 130242 will achieve certain private sector efficiencies in the integration of the planning, design and construction of the Project (file 2019-0490). The Board also approved the solicitation of PDA contracts and award of up to two contracts for different fixed guideway transit technology, pursuant to PUC 130242(e) with the recommended development team or teams chosen by utilizing a competitive process that employs objective selection criteria (in addition to price).

In August 2019, an industry outreach forum was held in the LA Union Station Ticket Concourse, which was attended by 202 attendees. At the event, Metro staff made

available to the general public information about the innovative contracting approach, and how firms could prepare to participate in this unique endeavor. Metro executive staff presented information and answered questions about the Project, the anticipated PDA, and the planned procurement.

On October 31, 2019, Request for Proposal (RFP) No. PS66773 was issued for the performance of pre-development work for the Project in accordance with Metro's Acquisition Policy and the contract type is firm fixed price. In the spirit of expanding competition, Metro had not determined the technology, nor the specific configuration or alignment, for the Project; therefore, firms were encouraged to propose innovative solutions that best met the project challenges. In accordance with the RFP and as previously approved by the Board, Metro may award up to two contracts as the result of the solicitation, with each of the selected developers performing certain pre-development work under the contract relating to the transit solution concept (TSC) it proposed, and with Metro determining which developer (if any) will have the opportunity to perform further pre-development work and potentially modify the Contract to proceed with implementation. Metro's decision to request a proposal for implementation from the remaining developer and to proceed with negotiation of such agreement will be made at Metro's sole discretion.

The RFP was issued with the following Disadvantage Business Enterprise (DBE) goals and is subject to Metro's DBE Contracting Outreach and Mentoring Plan (COMP).

- 30% of the PDA Phase 1 Payment Amount
- 25% of the PDA Phase 2 Payment Amount
- 23.50% of the PDA Phase 3 Payment Amount
- 24.94% of the PDA Phase 4 Payment Amount

The RFP required an Initial Qualifications (IQ) submittal from interested teams to demonstrate their previous experience and technical qualifications of three specific team members, including: 1) the proposed lead construction contractor, 2) the lead engineering firm, and 3) previous experience of the proposed equity member(s). Metro would review the IQ submittals received by the deadline stated in the RFP, and deem them acceptable, incomplete or unacceptable. If the submittal was deemed acceptable, the proposing team would be added to the list of eligible Proposers and would be eligible to submit a proposal for the performance of the PDA work on a firm fixed price basis, with the potential opportunity to enter into an Implementation Agreement after completion of the PDA work.

Six prospective teams submitted an IQ by December 11, 2019. The IQ submissions of the following five teams, listed below in alphabetical order, were determined to be acceptable, and were deemed eligible Proposers:

- ACS Infrastructure Development
- LA SkyRail Express

- Sepulveda Transit Corridor Partners - Bechtel
- Sepulveda Transit Corridor Partners - Fengate
- Tutor Perini, Parsons & Plenary

On January 8, 2020, a pre-proposal conference and DBE networking event was held with 268 people in attendance. Following the pre-proposal conference, eligible Proposers were provided table space to conduct networking sessions and outreach with DBEs to discuss contracting opportunities.

In January and February 2020, two rounds of one-on-one meetings were conducted with eligible Proposers and Metro staff. While the one-on-one meetings were not mandatory, they were intended to provide eligible Proposers with a better understanding of the RFP and to allow discussions regarding the Proposers' approach to the PDA work. At the request of the eligible Proposers, Metro agreed to two additional rounds of one-on-one meetings that were subsequently held in March and June 2020.

Sixteen amendments were issued during the solicitation phase of the RFP:

- Amendment No. 1, issued on November 20, 2019, provided revisions related to the Initial Qualifications (IQ) Submittal Requirements and extended the date for prospective Proposers to submit the IQ Submittal;
- Amendment No. 2, issued on January 31, 2020, provided revisions related to the Letter of Invitation for Proposal regarding subcontractors' eligibility to propose on multiple teams, Letter of Invitation Supplement (PDA), Proposal Submittal Requirements and Evaluation and Selection Process and Criteria;
- Amendment No. 3, issued on February 5, 2020, provided revisions related to Letter of Invitation Supplement (PDA) and Form of Contract;
- Amendment No. 4, issued on February 13, 2020, provided revisions related to the Proposal Submittal Requirements;
- Amendment No. 5, issued on February 19, 2020, added submission of clarification request date;
- Amendment No. 6, issued on February 26, 2020, extended the proposal due date;
- Amendment No. 7, issued on February 28, 2020, added submission of clarification request date;
- Amendment No. 8, issued on March 6, 2020, provided revisions related to Letter of Invitation, Instruction to Proposers, Proposal Submittal Requirements, Evaluation and Selection Process and Criteria and Form of Contract;
- Amendment No. 9, issued on March 11, 2020, added a third round of one-on-one meetings with eligible Proposers;
- Amendment No. 10, issued on March 23, 2020, extended the proposal due date;
- Amendment No. 11, issued on May 5, 2020, provided revisions related to Letter of Invitation, Letter of Invitation Supplement (PDA), Proposal Submittal

Requirements, Evaluation and Selection Process and Criteria and Form of Contract;

- Amendment No. 12, issued on May 29, 2020, added a fourth round of one-on-one meetings with eligible Proposers, extended submittal of proposed changes concerning Equity Members, Lead Construction Contractor, or Lead Engineering Firm and extended the proposal due date;
- Amendment No. 13, issued on July 13, 2020, provided revisions related to Letter of Invitation Supplement (PDA), Proposal Submittal Requirements, Evaluation and Selection Process and Criteria and Form of Contract;
- Amendment No. 14, issued on July 24, 2020, extended the proposal due date;
- Amendment No. 15, issued on August 4, 2020, provided revisions related to the List of Reference Documents;
- Amendment No. 16, issued on August 14, 2020, provided revisions related to submission of Proposals.

A total of 583 individuals downloaded the RFP and were included on the plan holders list. There were 360 questions submitted and responses were released prior to the proposal due date.

Of the five eligible Proposers, Metro received the following four proposals (and their technologies) by the due date of August 26, 2020. The firms are listed below in alphabetical order:

- LA SkyRail Express (Monorail technology)
- Sepulveda Transit Corridor Partners - Bechtel (Heavy Rail technology)
- Sepulveda Transit Corridor Partners - Fengate (Light Rail technology)
- Tutor Perini, Parsons & Plenary (Heavy Rail technology)

B. Evaluation of Proposals

A Proposal Evaluation Team (PET) composed of staff from Metro's Program Management, Countywide Planning, and Office of Extraordinary Innovation and outside agency members from California Department of Transportation (Caltrans) and Los Angeles Department of Transportation (LADOT) reviewed each technical and financial proposal submitted. In addition, a team of subject matter experts (SME) from Metro, Jacobs Engineering and their subconsultants, and Ernst & Young and their subconsultants was assembled to provide subject matter expertise based on their background and relevant experience to offer technical and financial analysis to the PET.

The proposals were evaluated based on the responsiveness pass/fail requirements (administrative, technical, financial, price, and approach to diversity and inclusion) of the RFP and the following evaluation criteria and point allocations.

- **Evaluation of Technical Proposal (630 points)**
    - Qualifications and Experience to Support Project Development (110 points)
    - Approach to Completing PDA Work (290 points)
    - Quality of Proposer's Transit Solution Concept (230 points)

- **Evaluation of Financial Proposal (230 points)**
    - Project Finance Experience, Investment Capacity, Project Delivery Plan and Financial Strength (110 points)
    - Quality of TSC Financial Feasibility Plan (120 points)

- **Evaluation of Price Proposal (130 points)**
    - PDA Price (100 points)
    - Implementation Agreement Maximum Profit Margin (30 points)

- **Evaluation of Approach to Diversity and Inclusion (40 points)**

There was a total of 1030 possible points.

Several factors were considered when developing the evaluation criteria and point allocation for this solicitation, giving the greatest importance to the evaluation of the technical proposal. As noted above, to maximize potential competition and innovation, Metro did not specify a required mode/technology, alignment, or configuration for the Project. Firms were encouraged to propose a TSC that best met the required project parameters, as stated in the RFP, that were likely to be technically and financially feasible. Proposers were also asked to identify key technical and financial risks to their specific approach, as well as strategies for mitigating or addressing these delivery challenges. Finally, firms were encouraged to demonstrate how their qualifications and experience would support their approach to successfully developing and delivering the proposed project within Metro's desired timeframe and budget.

All proposals passed the responsive requirements included in the RFP. The PET began its independent evaluation of the proposals on September 1, 2020. Additionally, the SMEs independently reviewed the proposals to provide the PET with technical and financial comments based on their relevant subject matter experience, background and expertise. The SMEs identified factual information from the proposals and related analysis to support identification of strengths, weaknesses, and risks for each proposal in accordance with the evaluation criteria included in the RFP.

Oral presentations/interviews were conducted with all four proposing teams during the week of November 9, 2020.

The PET members finalized their scores in December of 2020. In accordance with the evaluation process outlined in the RFP, the final scores were calculated and the highest-ranked proposal for each proposed transit technology was determined.

From that list, the two highest-ranked Proposers were determined to be LA SkyRail Express team proposing a monorail technology and Sepulveda Transit Corridor Partners - Bechtel team, proposing a heavy rail technology.

Qualifications Summary of Proposing Teams

LA SkyRail Express

LA SkyRail Express (LASRE) is a team comprised of BYD Transit Solutions LLC, John Laing Investments Limited, Skanska USA Civil West California District Inc. and HDR Engineering, Inc. The LASRE team proposed a monorail mode with 100% aerial alignment and unattended train operations. Their one-way trip time estimate from Valley to Westside is 24 minutes. Their financial proposal included a $6.1 billion (capital expenses in 2020$) TSC (Baseline Proposal), with $221 million in anticipated equity investment, and $63 million per year in operating expenses (2035$). In addition to the Baseline Proposal, this proposal presented several other concepts to connect to important destinations (including UCLA) which may be explored further during the PDA and environmental processes based on technical feasibility and stakeholder feedback. LASRE submitted a detailed proposal which highlighted a well-developed technical solution concept design. The proposed project manager (PM) has direct experience on other monorail technology projects including Las Vegas Monorail and Vancouver SkyTrain. Their proposal included early consideration of operations and maintenance requirements to drive design decisions and minimize lifecycle costs. The proposal demonstrated strong financial experience across team members in raising finance. Their proposed equity structure is diversified and anticipated risk. The team demonstrated a clear understanding of the Measure M Expenditure Plan and associated funding constraints.

Sepulveda Transit Corridor Partners – Bechtel

Sepulveda Transit Corridor Partners - Bechtel (Bechtel) is a team comprised of Bechtel Development Company, Bechtel Infrastructure, Meridiam Sepulveda, LLC and American Triple I Partners, LLC. The Bechtel team proposed a heavy rail technology with 38% aerial and 62% tunnel alignment and unattended train operations. Their one-way trip time estimate from Valley to Westside is 19.7 minutes. Their financial proposal included a $10.8 billion (capital expenses in 2020$) TSC, with $634 million in anticipated equity investment, and $118 million per year in operating expenses (2035$). Bechtel's proposal included well thought out stations siting, configuration and connections/transfers and stations were sized for some amount of growth in train consists. The team proposed a single-bore tunnel design to address significant challenges with tunneling and demonstrated a good

understanding of geo-technical issues. The proposal highlighted detailed plans to completing the PDA work, including consideration for third parties, FTA and the environmental process. During the interview, the Bechtel team demonstrated cohesion and coordination and their commitment to the Project. The financial proposal highlighted deep global financing experience across a range of project types and extensive experience with projects of similar size and complexity. The team's financial capacity appeared quite strong and they depicted an appropriate financial structure with a diversity of sources.

Sepulveda Transit Corridor Partners - Fengate

Sepulveda Transit Corridor Partners - Fengate (Fengate) is a team comprised of The Lane Construction Corporation, Webuild S.p.A., Hatch Associates Consultants, Inc., Fengate Capital Management Ltd., Globalvia Inversiones SAU, and Lane Infrastructure, Inc. The Fengate team proposed a light rail technology with 100% tunnel alignment and automatic train operations with a driver present. The team's one-way trip time estimate from Valley to Westside is 21 minutes. Their financial proposal included an $11.5 billion (capital expenses in 2020$) TSC, with $198 million in anticipated equity investment, and $97 million per year in operating expenses (2035$). The technical proposal presented a strong and detailed TSC with well thought out station layouts with the customer experience and transfers in mind. The proposal included innovative ideas such as potential joint development opportunity as the maintenance facility and potential for a one-seat ride with East San Fernando Valley Line. Their risk management process had a high level of detail focused on identifying cost savings, reducing/mitigating risk and supporting P3 deal structuring.

Tutor, Perini, Parsons & Plenary

Tutor, Perini, Parsons & Plenary (TP3) is a team comprised of Tutor Perini Corporation, Parsons Construction, and Plenary Group. The TP3 team proposed a heavy rail technology with 39% aerial and 61% tunnel alignment and unattended train operations. Their one-way trip time estimate from Valley to Westside is 23 minutes. Their financial proposal included a $7.2 billion (capital expenses in 2020$) TSC, with $574 million in anticipated equity investment, and $128 million per year in operating expenses (2035$). While the TP3 team's key personnel showed good experience in the written proposal, the team did not demonstrate cohesion or coordination during the interview. The team proposed good strategies for coordination with the environmental and outreach consultants. However, their proposal lacked detail in the TSC submittals. The technical proposal did not put forward a strong recommendation regarding alignment, vehicle type or maintenance storage facility location. TP3's financial proposal included reference projects that showed experience across transit projects and P3 projects. However, the financial proposal did not include the capital costs for the maintenance storage facility.

The following table summarizes the PET's ranking and scores.

1	Proposer/Mode	Maximum Points	Earned Points	Sub Total Points	Total Points	Rank
2	**LA SkyRail Express/ Monorail**					
3	Evaluation of Technical Proposal (630 points)					
4	• Qualifications and Experience to Support Project Development	110	86.36			
5	• Approach to Completing PDA Work	290	222.50			
6	• Quality of Proposer's Transit Solution Concept	230	175.71			
7	**Total Technical Proposal**			**484.57**		
8	Evaluation of Financial Proposal (230 points)					
9	• Project Finance Experience, Investment Capacity, Project Delivery Plan and Financial Strength	110	90.86			
10	• Quality of TSC Financial Feasibility Plan	120	97.71			
11	**Total Financial Proposal**			**188.57**		
12	Evaluation of Price Proposal (130 points)					
13	• PDA Price	100	100.00			
14	• Implementation Profit Margin	30	26.67			
15	**Total Price Proposal**			**126.67**		
16	Evaluation of Approach to Diversity and Inclusion (40 points)					
17	• Inclusivity and Diversity	40	40.00			
18	**Total Diversity and Inclusion**			**40.00**		
19	**Grand Total**	**1030**			**839.81**	**1**
20	**Sepulveda Transit Corridor Partners – Bechtel /Heavy Rail**					
21	Evaluation of Technical Proposal (630 points)					
22	• Qualifications and Experience to Support Project Development	110	80.33			
23	• Approach to Completing PDA Work	290	204.19			
24	• Quality of Proposer's Transit Solution Concept	230	183.91			

25	**Total Technical Proposal**			**468.43**		
26	Evaluation of Financial Proposal (230 points)					
27	• Project Finance Experience, Investment Capacity, Project Delivery Plan and Financial Strength	110	84.79			
28	• Quality of TSC Financial Feasibility Plan	120	67.71			
29	**Total Financial Proposal**			**152.50**		
30	Evaluation of Price Proposal (130 points)					
31	• PDA Price	100	91.02			
32	• Implementation Profit Margin	30	30.00			
33	**Total Price Proposal**			**121.02**		
34	Evaluation of Approach to Diversity and Inclusion (40 points)					
35	• Inclusivity and Diversity	**40**	30			
36	**Total Diversity and Inclusion**			**30.00**		
37	**Grand Total**	**1030**			**771.95**	**2**
38	**Tutor Perini, Parsons & Plenary /Heavy Rail**					
39	Evaluation of Technical Proposal (630 points)					
40	• Qualifications and Experience to Support Project Development	110	75.50			
41	• Approach to Completing PDA Work	290	206.73			
42	• Quality of Proposer's Transit Solution Concept	230	139.43			
43	**Total Technical Proposal**			**421.66**		
44	Evaluation of Financial Proposal (230 points)					
45	• Project Finance Experience, Investment Capacity, Project Delivery Plan and Financial Strength	110	79.36			
46	• Quality of TSC Financial Feasibility Plan	120	78.00			
47	**Total Financial Proposal**			**157.36**		
48	Evaluation of Price Proposal (130 points)					
49	• PDA Price	100	88.96			
50	• Implementation Profit Margin	30	30.00			

51	**Total Price Proposal**			**118.96**		
52	Evaluation of Approach to Diversity and Inclusion (40 points)					
53	• Inclusivity and Diversity	**40**	20			
54	**Total Diversity and Inclusion**			**20**		
55	**Grand Total**	**1030**			**717.98**	**3**
56	**Sepulveda Transit Corridor Partners – Fengate /Light Rail**					
57	Evaluation of Technical Proposal (630 points)					
58	• Qualifications and Experience to Support Project Development	110	85.93			
59	• Approach to Completing PDA Work	290	223.51			
60	• Quality of Proposer's Transit Solution Concept	230	174.21			
61	**Total Technical Proposal**			**483.65**		
62	Evaluation of Financial Proposal (230 points)					
63	• Project Finance Experience, Investment Capacity, Project Delivery Plan and Financial Strength	110	80.54			
64	• Quality of TSC Financial Feasibility Plan	120	74.57			
65	**Total Financial Proposal**			**155.11**		
66	Evaluation of Price Proposal (130 points)					
67	• PDA Price	100	0.00			
68	• Implementation Profit Margin	30	30.00			
69	**Total Price Proposal**			**30.00**		
70	Evaluation of Approach to Diversity and Inclusion (40 points)					
71	• Inclusivity and Diversity	**40**	35.00			
72	**Total Diversity and Inclusion**			**35.00**		
73	**Grand Total**	**1030**			**703.76**	**4**

Approach to Price Evaluation

When considering pricing for PDA services, Metro's objective for this procurement was to contract with the highest quality PDA partner(s) to develop the project, while ensuring that the cost of the PDA work would remain reasonable and affordable. As

a result, Metro took an approach to the PDA Price Proposal evaluation that sought to balance affordability with the qualifications-based nature of the procurement.

Specifically, staff utilized a *tiered price formula* designed to encourage efficient pricing without putting a hard cap on price, which might unduly limit the level of effort required to support high-quality project development approaches. The tiering provides for an increasingly strong incentive to control price, as price increases. In other words, a proposer may risk an increasingly greater amount of points, the higher their proposed price.

The price formula identified in the RFP was based on two thresholds that were developed using Metro's Independent Cost Estimate: 1) a Price Target ($72,000,000), within the range of Metro's *preferred* pricing, and 2) a Price Limit ($104,000,000), representing the range of Metro's *acceptable* pricing. Pricing was then evaluated as follows:

- If a proposer submitted a price that was ***below or equal to the Price Target***, the score would be calculated by dividing the *lowest proposed price* into the *price being evaluated*, multiplied by 100. This formula results in the *lowest proposed price* receiving all 100 available points, and each price *above* the low price (but *below* Metro's Price Target) receiving a reduction in points proportionate to how far *in excess of the lowest price* it was.
- If a proposer submitted a price that was ***greater than the Price Target, but less than or equal to the Price Limit***, the score would be calculated on a sliding scale that was defined by the *highest* submitted price. The highest submitted price would receive 0 points, and each score *below* the high price would receive a score based on how far *below the highest price* it was.
- If a proposer submitted a price that was ***greater than the Price Limit***, while the overall proposal would be considered responsive, the score would be calculated as zero (without regard to any other proposed prices). Metro also stipulated that it reserved the right to reject any proposal that was priced over the Price Limit, to ensure affordability could ultimately be achieved.

Fengate proposed the highest price of all proposing teams to perform the PDA services, exceeding the price target of $72,000,000, as defined in the RFP. Because no other firm proposed a price above the Price Target, in accordance with the formula defined in the RFP, the team earned a score of 0 for the PDA Price evaluation criteria.

The two highest-ranked Proposers submitted the lowest price proposal in their respective technology.

C. Cost/Price Analysis

The recommended price has been determined to be fair and reasonable based upon an independent cost estimate (ICE), adequate price competition, technical evaluation, fact finding, clarifications and negotiations.

	Proposer Name/Mode	PDA Proposal Amount	Metro ICE	Award Amount
1.	LA SkyRail Express/ Monorail	$63,605,132	$71,321,139 *	$63,605,132
2.	Sepulveda Transit Corridor Partners (Bechtel)/ Heavy Rail	$69,882,427	$71,321,139 *	$69,882,427
3.	Tutor Perini, Parsons & Plenary/ Heavy Rail	$71,500,000		
4.	Sepulveda Transit Corridor Partners (Fengate)/ Light Rail	$103,800,000		

*Each contract.

D. Background on Recommended Contractors

LA SkyRail Express (LASRE) will serve as the Special Purpose Corporation (SPC) to be formed with John Laing Investments Limited and BYD Transit Solutions LLC identified as equity members. The SPC will be formally created prior to contract execution. LASRE has teamed up with Skanska USA Civil West California District Inc. as the lead construction contractor and HDR Engineering, Inc. as the lead engineering firm. Past projects for firms of this team include engineering on Eagle P3 Commuter Rail Line in Denver, construction on Expo Line light rail transit extension project, and financing on Denver Eagle P3, Hurontario Light Rail Transit in Ontario, Canada, and Sydney Light Rail in Australia.

Sepulveda Transit Corridor Partners - Bechtel (Bechtel) will serve as the Special Purpose Vehicle (SPV) to be formed with Bechtel Development Company, American Triple I Partners, LLC and Meridiam Sepulveda, LLC identified as equity members. The SPV will be formally created prior to contract execution. STCP Bechtel has teamed up with Bechtel Infrastructure as the lead construction contractor and lead engineering firm. Past projects for firms of this team include engineering and construction on Dulles Corridor Metrorail Project in Northern Virginia, and financing on Edmonton Valley Line light rail transit project in Alberta, Canada and LaGuardia Airport Central Terminal Redevelopment in New York.

ATTACHMENT C

DEOD SUMMARY

SEPULVEDA TRANSIT CORRIDOR PROJECT
PRE-DEVELOPMENT SERVICES / PS66773MRT/PS66773HRT

A. Small Business Participation

The Diversity & Economic Opportunity Department (DEOD) established DBE goals for each Phase of this Pre-Development Agreement (PDA) services project. A 30% DBE goal was established for Phase 1 – Alternatives Refinement, a 25.00% DBE goal for Phase 2 – Conceptual Engineering and Analysis, a 23.50% DBE goal for Phase 3 – Conceptual Engineering to Support Locally Preferred Alternative Selection, and a 24.94% DBE goal for Phase 4 – Final Technical Concept.

Two (2) firms were selected as Prime Consultants: LA SkyRail Express (LASRE) (Monorail Technology) and Sepulveda Transit Corridor Partners – Bechtel (STCP-BECHTEL) (Heavy Rail Technology). Each firm committed to or exceeded the goals established for each Phase.

PHASE 1: LASRE exceeded the mandatory DBE goal by making a **30.02%** DBE commitment.

Small Business Goal (Phase 1)	**30% DBE**	**Small Business Committment**	**30.02% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	Amheart Solutions	Asian Pacific American	1.82%
2.	D'Leon Consulting Engineers	Hispanic American	3.89%
3.	Destination Enterprises, Inc.	Non-Minority Female	0.94%
4.	Don H. Mahaffey Drilling Co.	Hispanic American Female	0.73%
5.	Earth Mechanics, Inc.	Asian Pacific American	2.01%
6.	FPL and Associates	Asian Pacific American	0.34%
7.	Gallego Consulting Services, Inc.	Hispanic American	0.57%
8.	Innova Technologies, Inc.	Hispanic American	6.82%
9.	JNA Builders, Inc.	Asian Pacific American	0.16%
10.	Lindborg & Mazor LLP	Non-Minority Female	0.50%

11.	LKG-CMC, Inc.	Non-Minority Female	1.09%
12.	Modern Times, Inc.	Hispanic American	2.98%
13.	Mountain Pacific, Inc.	Non-Minority Female	0.89%
14.	N. Saylor Consulting Group, Inc.	Non-Minority Female	0.33%
15.	Sapphos Environmental Inc.	Hispanic American Female	0.33%
16.	Sotomayor & Associates	Hispanic American	1.00%
17.	SXM Strategies, LLC	Asian Pacific American Female	0.35%
18.	T and T Public Relations	Hispanic American Female	1.17%
19.	TEC Management Consultants, Inc.	African American	0.70%
20.	The Wathen Group, LLC	Non-Minority Female	0.09%
21.	V&A, Inc.	Hispanic American	0.39%
22.	Virginkar & Associates	Asian Pacific American Female	2.92%
		Total DBE Commitment	**30.02%**

Phase 1: STCP-BECHTEL exceeded the mandatory DBE goal by making a **30.18%** DBE commitment.

Small Business Goal (Phase 1)	**30% DBE**	**Small Business Commitment**	**30.18% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	360 Total Concept Consulting, Inc.	African American Female	4.61%
2.	A. Esteban & Company, Inc.	Hispanic American	0.35%
3.	A1 Management and Inspection, Inc.	Non-Minority Female	3.09%
4.	A3GEO, Inc.	Non-Minority Female	2.50%
5.	Anil Verma Associates, Inc.	Subcontinent Asian American	0.97%
6.	Auriga Corporation	Subcontinent Asian American	1.19%
7.	BA, Inc.	African American	1.33%
8.	Cheshil Consultants, Inc.	Subcontinent Asian American	1.22%

9.	D'Leon Consulting Engineers Corporation	Hispanic American	1.28%
10.	FMG Architects	Hispanic American Female	1.52%
11.	Here Design Studio, LLC	African American Female	0.86%
12.	Intueor Consulting, Inc.	Subcontinent Asian American	1.80%
13.	Jenkins/Gales & Martinez, Inc.	African American	1.61%
14.	JKH Consulting, LLC	African American Female	0.69%
15.	McLean and Schultz, Inc.	Hispanic American	2.11%
16.	PacRim Engineering	Asian Pacific American	1.00%
17.	Unico Engineering, Inc.	Hispanic American	0.05%
18.	Virginkar & Associates, Inc.	Asian Pacific American Female	1.00%
19.	VN Tunnel and Underground, Inc.	Asian Pacific American	2.59%
20.	Vobecky Enterprises, Inc.	African American Female	0.41%
		Total DBE Commitment	**30.18%**

PHASE 2: LASRE exceeded the mandatory DBE goal by making a **28.26%** DBE commitment.

Small Business Goal (Phase 2)	**25% DBE**	**Small Business Commitment**	**28.26% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	Amheart Solutions	Asian Pacific American	0.61%
2.	Auriga Corporation	Subcontinent Asian American	0.85%
3.	BA, Inc.	African American	0.96%
4.	Coast Surveying	Hispanic American	0.23%
5.	D'Leon Consulting Engineers	Hispanic American	1.25%
6.	Destination Enterprises, Inc.	Non-Minority Female	0.78%
7.	Don H. Mahaffey Drilling Co.	Hispanic American Female	0.51%
8.	Earth Mechanics, Inc.	Asian Pacific American	0.62%

9.	FPL and Associates	Asian Pacific American	0.33%
10.	Gallego Consulting Services, Inc.	Hispanic American	0.44%
11.	Hinman Consulting Engineers, Inc..	Non-Minority Female	2.19%
12.	IDC Consulting Engineers, Inc.	Asian Pacific American Female	1.09%
13.	Innova Technologies, Inc.	Hispanic American	5.20%
14.	Intueor Consulting, Inc.	Subcontinent Asian American	0.54%
15.	JNA Builders, Inc.	Asian Pacific American	0.13%
16.	Lindborg & Mazor LLP	Non-Minority Female	0.38%
17.	LKG-CMC, Inc.	Non-Minority Female	1.25%
18.	Modern Times, Inc.	Hispanic American	0.56%
19.	Morgner Construction Management	Hispanic American Female	0.58%
20.	Mountain Pacific, Inc.	Non-Minority Female	0.42%
21.	N. Saylor Consulting Group, Inc.	Non-Minority Female	0.10%
22.	PBS Engineers, Inc.	Subcontinent Asian American	2.89%
23.	RAW International, Inc.	African American	0.79%
24.	Sapphos Environmental Inc.	Hispanic American Female	0.11%
25.	Sotomayor & Associates	Hispanic American	0.14%
26.	SXM Strategies, LLC	Asian Pacific American Female	0.64%
27.	T and T Public Relations	Hispanic American Female	0.70%
28.	TEC Management Consultants, Inc.	African American	0.53%
29.	The Wathen Group, LLC	Non-Minority Female	0.62%
30.	TransSolutions	Non-Minority Female	0.16%
31.	V&A, Inc.	Hispanic American	1.30%
32.	Virginkar & Associates	Asian Pacific American Female	0.43%
33.	YKD Landscape (Yunsoo Kim Design, Inc.)	Asian Pacific American	0.93%
		Total DBE Commitment	**28.26%**

Phase 2: STCP-BECHTEL exceeded the mandatory DBE goal by making a **25.79%** DBE commitment.

Small Business Goal (Phase 2)	**25% DBE**	**Small Business Commitment**	**25.79% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	360 Total Concept Consulting, Inc.	African American Female	1.30%
2.	A. Esteban & Company, Inc.	Hispanic American	0.20%
3.	A1 Management and Inspection, Inc.	Non-Minority Female	0.49%
4.	A3GEO, Inc.	Non-Minority Female	1.29%
5.	Alliance Engineering Consultants, Inc.	Asian Pacific American	0.37%
6.	Anil Verma Associates, Inc.	Subcontinent Asian American	0.36%
7.	Auriga Corporation	Subcontinent Asian American	1.04%
8.	BA, Inc.	African American	0.36%
9.	Cheshil Consultants, Inc.	Subcontinent Asian American	0.89%
10.	Diaz Yourman & Associates	Hispanic American	0.22%
11.	D'Leon Consulting Engineers Corporation	Hispanic American	1.65%
12.	EW Consulting, Inc.	Non-Minority Female	0.60%
13.	FMG Architects	Hispanic American Female	0.36%
14.	FPL and Associates	Asian Pacific American	1.10%
15.	Here Design Studio, LLC	African American Female	0.88%
16.	Intueor Consulting, Inc.	Subcontinent Asian American	0.82%
17.	Jenkins/Gales & Martinez, Inc.	African American	0.36%
18.	JKH Consulting, LLC	African American Female	0.29%

19.	McLean and Schultz, Inc.	Hispanic American	1.44%
20.	Monument ROW, Inc.	Non-Minority Female	0.62%
21.	PacRim Engineering	Asian Pacific American	1.79%
22.	Unico Engineering, Inc.	Hispanic American	0.84%
23.	V&A, Inc.	Hispanic American	0.65%
24.	Virginkar & Associates, Inc.	Asian Pacific American Female	1.25%
25.	VN Tunnel and Underground, Inc.	Asian Pacific American	2.88%
26.	Wagner Engineering & Survey, Inc.	Non-Minority Female	3.50%
27.	Yunsoo Kim Design	Asian Pacific American	0.24%
		Total DBE Commitment	**25.79%**

PHASE 3: LASRE exceeded the mandatory DBE goal by making a **25.87%** DBE commitment.

Small Business Goal (Phase 3)	**23.50% DBE**	**Small Business Comittment**	**25.87% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	Amheart Solutions	Asian Pacific American	0.79%
2.	Auriga Corporation	Subcontinent Asian American	0.74%
3.	Coast Surveying	Hispanic American	0.28%
4.	D'Leon Consulting Engineers	Hispanic American	0.39%
5.	Destination Enterprises, Inc.	Non-Minority Female	1.28%
6.	Don H. Mahaffey Drilling Co.	Hispanic American Female	0.59%
7.	Earth Mechanics, Inc.	Asian Pacific American	0.22%
8.	FPL and Associates	Asian Pacific American	0.75%
9.	Gallego Consulting Services, Inc.	Hispanic American	0.54%

10.	Hinman Consulting Engineers, Inc..	Non-Minority Female	0.66%
11.	IDC Consulting Engineers, Inc.	Asian Pacific American Female	0.54%
12.	Innova Technologies, Inc.	Hispanic American	5.95%
13.	JNA Builders, Inc.	Asian Pacific American	0.20%
14.	Lindborg & Mazor LLP	Non-Minority Female	0.38%
15.	LKG-CMC, Inc.	Non-Minority Female	0.95%
16.	Modern Times, Inc.	Hispanic American	0.81%
17.	Mountain Pacific, Inc.	Non-Minority Female	0.75%
18.	N. Saylor Consulting Group, Inc.	Non-Minority Female	0.11%
19.	PBS Engineers, Inc.	Subcontinent Asian American	2.33%
20.	Regency Right of Way Consulting, LLC	African American Female	0.32%
21.	Sapphos Environmental Inc.	Hispanic American Female	0.12%
22.	Sotomayor & Associates	Hispanic American	0.22%
23.	SXM Strategies, LLC	Asian Pacific American Female	0.72%
24.	T and T Public Relations	Hispanic American Female	0.74%
25.	TEC Management Consultants, Inc.	African American	0.75%
26.	The Wathen Group, LLC	Non-Minority Female	0.83%
27.	TransSolutions	Non-Minority Female	0.18%
28.	V&A, Inc.	Hispanic American	1.25%
29.	Virginkar & Associates	Asian Pacific American Female	1.49%
30.	YKD Landscape (Yunsoo Kim Design, Inc.)	Asian Pacific American	0.99%
		Total DBE Commitment	**25.87%**

Phase 3: STCP-BECHTEL exceeded the mandatory DBE goal by making a **23.71%** DBE commitment.

Small Business Goal (Phase 3)	23.50% DBE	Small Business Commitment	23.71% DBE

	DBE Subcontractors	Ethnicity	% Committed
1.	360 Total Concept Consulting, Inc.	African American Female	1.64%
2.	A. Esteban & Company, Inc.	Hispanic American	0.88%
3.	A1 Management and Inspection, Inc.	Non-Minority Female	1.67%
4.	A3GEO, Inc.	Non-Minority Female	0.88%
5.	Alliance Engineering Consultants, Inc.	Asian Pacific American	0.43%
6.	Anil Verma Associates, Inc.	Subcontinent Asian American	0.77%
7.	Auriga Corporation	Subcontinent Asian American	1.33%
8.	BA, Inc.	African American	0.63%
9.	Cheshil Consultants, Inc.	Subcontinent Asian American	1.21%
10.	Diaz Yourman & Associates	Hispanic American	1.05%
11.	D'Leon Consulting Engineers Corporation	Hispanic American	2.62%
12.	EW Consulting, Inc.	Non-Minority Female	0.47%
13.	FMG Architects	Hispanic American Female	0.77%
14.	FPL and Associates	Asian Pacific American	0.79%
15.	Here Design Studio, LLC	African American Female	0.08%
16.	Intueor Consulting, Inc.	Subcontinent Asian American	0.69%
17.	Jenkins/Gales & Martinez, Inc.	African American	0.42%
18.	JKH Consulting, LLC	African American Female	0.16%
19.	McLean and Schultz, Inc.	Hispanic American	0.98%

20.	Monument ROW, Inc.	Non-Minority Female	0.28%
21.	PacRim Engineering	Asian Pacific American	1.51%
22.	Unico Engineering, Inc.	Hispanic American	0.52%
23.	V&A, Inc.	Hispanic American	0.63%
24.	Virginkar & Associates, Inc.	Asian Pacific American Female	0.80%
25	VN Tunnel and Underground, Inc.	Asian Pacific American	1.68%
26.	Wagner Engineering & Survey, Inc.	Non-Minority Female	0.56%
27.	Yunsoo Kim Design	Asian Pacific American	0.26%
		Total DBE Commitment	**23.71%**

To be responsive, Proposers were required to commit to meet or exceed the DBE goal for Phase 4 at the time of Proposal submittal. During Phase 3, the Prime Contractor will be required to submit a list of all DBE and non-DBE firms that will perform work in Phase 4.

PHASE 4: LASRE met the mandatory DBE goal by making a **24.94%** DBE commitment.

Small Business Goal (Phase 4)	**24.94% DBE**	**Small Business Committment**	**24.94% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	To Be Determined during Phase 3	TBD	24.94%
		Total DBE Commitment	24.94%

Phase 4: STCP-BECHTEL met the mandatory DBE goal by making a **24.94%** DBE commitment.

Small Business Goal (Phase 4)	**24.94% DBE**	**Small Business Commitment**	**24.94% DBE**

	DBE Subcontractors	**Ethnicity**	**% Committed**
1.	To Be Determined during Phase 3	TBD	24.94%
		Total DBE Commitment	24.94%

B. Contracting Outreach and Mentoring Plan (COMP)

To be responsive, Proposers were required to submit a Contracting Outreach and Mentoring Plan (COMP) including strategies to mentor for protégé development four (4) DBE firms for Mentor-Protégé development in at least two of Phases 1 – 3.

LASRE proposed to mentor the following (4) protégé's: Coast Surveying, Inc., IDC Consulting, Inc., Auriga Corporation, and RAW International. STCP-BECHTEL proposed to mentor the following (4) protégé's: FMG Architects, 360 Total Concept Consulting, A1 Management and Inspection, and A3GEO Inc.

For Phase 4, the Prime Contractor is required to mentor a total of two (2) DBE firms for Protégé development. The Prime Contractor must identify Proteges for Phase 4 during Phase 3. The two DBE firms mentored during Phase 4 shall not be firms that were mentored in Phases 1-3.

C. Living Wage and Service Contract Worker Retention Policy Applicability

The Living Wage and Service Contract Worker Retention Policy is not applicable to this contract.

D. Prevailing Wage Applicability

Prevailing Wage requirements are applicable to this project. DEOD will monitor contractors' compliance with the State of California Department of Industrial Relations (DIR), California Labor Code, and, if federally funded, the U S Department of Labor (DOL) Davis Bacon and Related Acts (DBRA).

E. Project Labor Agreement/Construction Careers Policy

Project Labor Agreement/Construction Careers Policy is not applicable to this Contract. Project Labor Agreement/Construction Careers Policy is applicable only to construction contracts that have a construction contract value in excess of $2.5 million.

Next stop: exploring alternatives to the 405.
SEPULVEDA TRANSIT CORRIDOR PROJECT
RFP No. PS66773 Sepulveda Transit Corridor
Pre-Development Agreement (PDA)
Recommendation for Awards
Metro
March 2021

Recommendation

- **AUTHORIZING the Chief Executive Officer (CEO) to award the following two (2) Contracts, subject to resolution of protests, if any.**
  - Contract No. PS66773MRT to LA SkyRail Express for pre-development services for a proposed Monorail technology transit solution concept in an amount not to exceed $63,605,132.
  - Contract No. PS66773HRT to Sepulveda Transit Corridor Partners -Bechtel for pre-development services for a proposed Heavy Rail technology transit solution concept in an amount not to exceed $69,882,427.
- **APPROVE Contract Modification Authority in the amount of 25% for each of the two contract award values, respectively, and authorize the CEO to execute individual Contract Modifications within the Board-approved Contract Modification Authority.**

Metro

PDA Procurement Review

What staff are recommending today:

- PDA Teams with qualifications and experience aligned with their proposed project design and development approach and project implementation capabilities
- Transit concept as starting point for development (PDA) work that meets/exceeds Project Goals and adheres to specified Project Parameters
- Evaluation considered quality of concept, quality of approach, development experience, delivery experience, price components, diversity/inclusion

Award of PDA Contract(s) will allow environmental process to begin

- Previous Board award of environmental contract and communications contract
- Once environmental process begins, concept designs for range of alternatives will be advanced/refined through public feedback and technical investigation/analysis
- Additional concepts to make connections to important destinations (such as UCLA) may also be explored during the PDA and environmental processes

Metro

Evaluation Criteria

- **Technical – 630 points**
  - Qualifications and experience to support project development (110 points)
  - Approach to completing PDA work (290 points)
  - Quality of Proposer's Transit Solution Concept (TSC) (230 points)
- **Financial – 230 points**
  - Project finance experience, investment capacity, project delivery plan and financial strength (110 points)
  - Quality of TSC Financial Feasibility Plan (120 points)
- **PDA Price – 130 points**
  - PDA price (100 points)
  - Implementation profit margin (30 points)
- **Inclusivity and Diversity – 40 points**
  - Contractor Outreach Mentor Protégé Plan (40 points)

Metro

Final Evaluation Scores

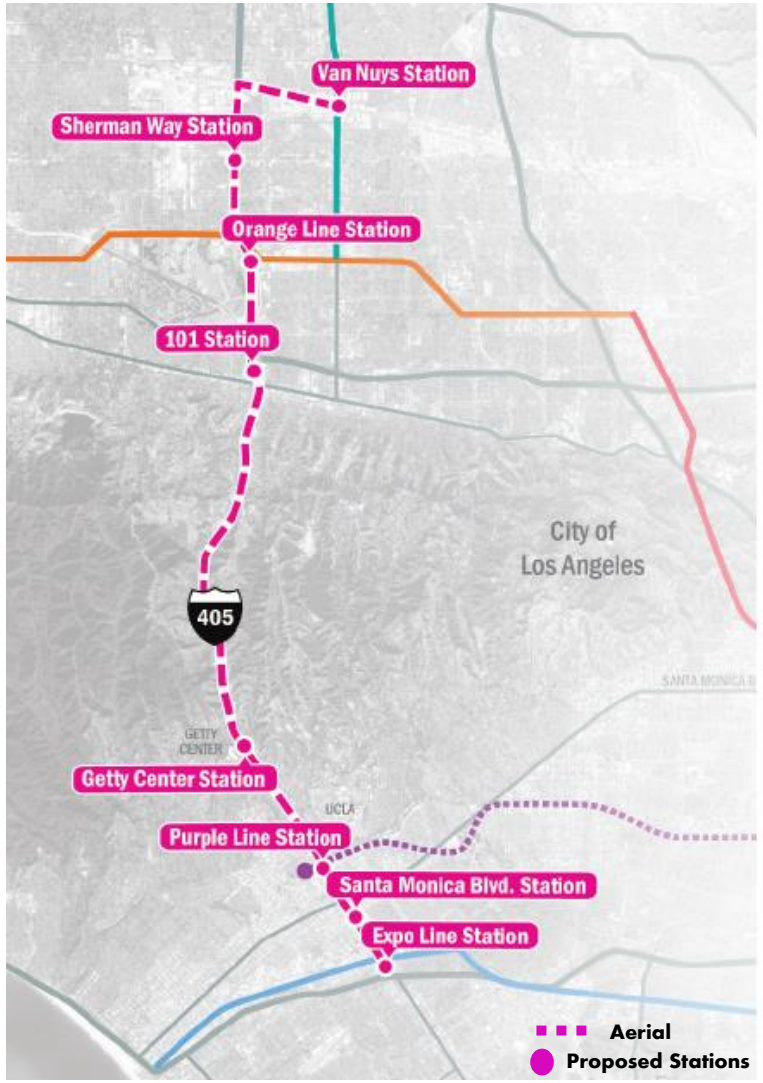
Proposer/Mode	Technical (630 points) Financial (230 points) (860 points)	PDA Price (100 points)	Implementation Profit Margin (30 points)	Inclusion and Diversity (40 points)	Grand Total (1030 points)
LA SkyRail Express / MRT	673.14	100.00	26.67	40.00	839.81
STCP Bechtel / HRT	620.93	91.02	30.00	30.00	771.95
Tutor Perini, Parsons & Plenary / HRT	579.02	88.96	30.00	20.00	717.98
STCP Fengate / LRT	638.76	0.00	30.00	35.00	703.76

Metro

Recommended Proposer – LA SkyRail Express

Proposal Highlights

- Mode: Monorail
- 100% Aerial Alignment (I-405 ROW)
- Automated Operations
- Valley to Westside Trip Time: 24 minutes
- $6.1 billion (2020$) Capital Cost (for Baseline proposal)
- ~$63m/yr Operating Expenses (2035$)
- Team with direct experience with this technology
- Early consideration of O&M requirements to minimize lifecycle costs
- Demonstrated financial experience on P3 projects in the US and abroad



Adapted from Proposer's Map

Metro

Recommended Proposer – Sepulveda Transit Corridor Partners (Bechtel)

Proposal Highlights

- Mode: Heavy Rail
- 62% of Alignment is Underground/Tunnel
- Automated Operations
- Valley to Westside Trip Time: 19.7 minutes
- $10.8 billion (2020$) Capital Cost
- ~$118m/yr Operating Expenses (2035$)
- Detailed stations plans, connections/transfers, and integration with the surroundings
- Good understanding of geo-technical issues; well-defined construction approach
- Demonstrated financial experience across a range of project types of similar complexity

Adapted from Proposer's Map

Metro

PDA Structure: Phases of Work

Phase	PDA Activities	Number of PDA Developers	Duration Months*
Alternatives Definition	Refine alternatives and incorporate stakeholder feedback	Up to 2	9
Conceptual Engineering and Analysis	Conceptual engineering and analysis of environmental impacts, performance, constructability, cost, and risk for DEIR	Up to 2	13
Conceptual Engineering to support LPA	Develop indicative performance and cost reports to finalize DEIR and LPA Selection	Up to 2	9
Final Technical Concept	Refine engineering for FEIR, performance analysis, contract terms and conditions, risk allocation, and pricing	1	11
Proposal for Implementation	Finalize FEIR; Issue Metro Request for presumed fixed-price P3 delivery proposal; Evaluate Proposal and close transaction	1	10

**subject to change*

Metro

PDA Price by Phase

		PDA Price by Phase		Number of PDA Developers
		LASRE	**STCP - Bechtel**	
Phase 1	Alternatives Refinement	$6,445,812	$6,500,000	Up to 2
Phase 2	Conceptual Engineering & Analysis	$20,869,629	$22,494,822	Up to 2
Phase 3	Conceptual Engineering to Support LPA Selection	$9,784,655	$9,452,860	Up to 2
Phase 4	Final Technical Concept	$26,505,036	$31,434,745	1
Phase 5	Project Implementation Proposal	$0	$0	1
	Total	**$63,605,132**	**$69,882,427**	

Metro

Public Feedback and Next Steps

Public interest in project remains high

- 12,000 stakeholders in project database
- Press release and Source post generated media coverage in multiple publications

Comments received since February 2021 are a mix of support and concerns for elements of both proposals

- Feedback consistent with input received during the Feasibility Study
- Stakeholders generally understand PDA contract awards are the starting point of next phase

Next steps

- The range of alternatives for environmental review will be presented to the Board in April 2021
- Prepare for environmental review process and Fall 2021 public scoping period
- PDA Teams continue to further develop their proposed concepts, which are refined through the environmental process

Metro

Thank You

QUESTIONS?

Metro

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2021-0074, **File Type:** Informational Report **Agenda Number:** 43.

EXECUTIVE MANAGEMENT COMMITTEE
MARCH 18, 2021

SUBJECT: FARELESS SYSTEM INITIATIVE UPDATE

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE status report on Fareless System Initiative Update

ISSUE

On August 27, 2020, Metro CEO Phil Washington announced the formation of the Fareless System Initiative (FSI) Task Force to identify challenges and offer recommendations on how best Metro can implement fareless transit for all riders on Metro buses and trains. This report serves as the second update to the Metro Board of Directors on the Fareless System Initiative.

BACKGROUND

Prior to the pandemic induced decline in transit ridership, almost 70% of Metro customers were either very low or extremely low income. Removing the financial barrier posed by transit fares is a significant step in improving the equity of access to Metro's transit system. Additionally, a fareless system will also contribute to the post COVID-19 economic recovery in Los Angeles County, support the reduction of greenhouse gas (GHG) emissions, attract riders back to the system, and lessen both fare related disputes and the costs associated with fare collection and enforcement.

DISCUSSION

The 19-member FSI Task Force has been working with Metro staff throughout the agency, and with local and municipal transit operators, to identify the challenges of implementing a fareless system. As a result of this effort, the Task Force has identified a leading concept for a fareless pilot. The leading concept is a Metro-only 18-month phased pilot that would begin in January 2022 with low-income riders and expand to all K-12 students in August 2022. Throughout the study period, the Task Force has held regular meetings with a Regional Ad Hoc Committee that included representatives from other transit operators throughout the region. Additional Ad Hoc Committee Meetings will be held to coordinate with regional transit operators as the project moves forward.

Over the next two months, the Task Force will continue to conduct outreach, finalize pilot funding

recommendations and the study report document, and refine potential pilot implementation strategies. The draft report document will then be brought to the Board for consideration in April and the final will be brought in May 2021.

Ongoing efforts of the Task Force include:

1. **Communications and Public Outreach**
   During the month of March and April, Metro is sharing updates on the Fareless System Initiative and collecting feedback. Through a series of presentations at each Metro Service Council and a countywide telephone town hall on March 31st, Metro will continue to listen to public input and provide an update to the Board.

2. **Paying for the Pilot** Staff is examining a wide array of possible funding opportunities. These range from securing Federal Department of Transportation assistance under already existing programs; new legislation in support of fareless experiments; examining the possible reprogramming of Federal and State funds now available to Metro; and new sources of revenue through partnerships with public and private entities across Los Angeles County.
This is a major priority for staff at Metro, and a range of possible funding sources is anticipated and will be brought to the Metro Board of Directors for consideration at the Board's April 2021 meeting.

3. **Fareless System Initiative (FSI) Report** The FSI Task Force is incorporating task force analyses done over the past several months into a comprehensive report, so that all interested stakeholders can see the full array of interrelated issues that must be addressed in order to launch such an initiative. In addition, the report document will be a valuable and necessary asset to Metro in seeking funding from partners at various levels of government in the months ahead.

4. **Implementation Preparation** Successfully carrying out a pilot fareless program requires enormous internal and external teamwork and coordination. The FSI Task Force is now beginning to turn beyond research and analysis that has been the focus to date, to the many actions needed to implement the pilot program. Preparation efforts include the start of engagement with Metro's labor unions, who are a critical component for successful implementation of the program. Metro's Labor Relations team is collaborating with the Task Force to set up meetings with each union. Similar to the Task Force's work with the service councils, the overall goal of this engagement is to share information and seek their input and perspective to inform implementation planning.

   One of the noted challenges of implementation will be identifying eligible participants for the program and enabling their fareless access to the system in a streamlined and timely process. Metro must build on the existing LIFE and Reduced Fare (RF) programs by collaborating with social services agencies and community-based-organizations to successfully synchronize efforts and increase participation. Work has already begun between Metro's TAP Office and the City of Los Angeles' Angeleno Connect program to ensure compatible technology between the two programs. Metro will continue to work with other governmental social services agencies and community benefits organizations to build out partnerships and will ensure that

immigrants, undocumented individuals, and persons experiencing homelessness are included.

5. Impediments to Implementing Fareless for K-12 and Community College Students in August 2021

At the February 2021 Board of Director's Meeting, Metro Board Chair Mayor Eric Garcetti, asked staff to look at what the impediments would be to implement fareless for students in Community College and LAUSD the start of the 2021 school year and report back in March what would it take to begin that phase in 2021.

The leading concept of the FSI pilot program includes adding all K-12 students to the pilot in Fall 2022. College students were not included in the initial proposal because as a group their income levels are slightly higher and the FSI project is focused on reaching the families in greatest need first. In addition, this shift of income levels of the included groups would have an effect on the Title VI analysis required by the FTA, which requires Metro to analyze the impact of fare changes on low-income communities. It is important to note that all low-income students (K-12 and college) and their households would qualify for the low-income pilot proposed to begin in January 2022 and continue through June 2023.

Per Metro's Office of Management and Budget (OMB), there were approximately 26 million K-12 boardings in FY19, with 20 million of those being paid with cash at $1.00 per boarding, for a total of $27 million in fare revenue. Based on data from LADOT's free DASH to Class Program and Sacramento's free student program, student ridership has been shown to increase over 100% once fares become free. That could translate to lost fare revenue of $54 million per year ($4.5 million per month). However, in the K-12 U-Pass Program Pilot Program, 40% of students who registered self-reported that they were already using K-12 reduced fare and 54% said they were paying by full fare. This suggests that the actual lost fare revenue could be higher, because students paying full fare are not taken into account in the K-12 fare revenue totals above.

There are currently 1.4 million K-12 students in LA County that are already slated to be included in the FSI Pilot. According to the California Department of Education, approximately 990,000 (69%) are low-income and qualify for free and reduced lunch program and would also qualify for the low-income portion of the FSI Pilot in January 2022. If these students were to participate in the FSI Pilot 5 months earlier in August 2021, the additional cost would be approximately $15.5 million ($4.5 million x 69% x 5 months). If the remaining 31% of students not designated as low-income, who are slated to join the FSI Pilot in August 2022, were moved up to August 2021, the additional cost would be $16.7 million ($4.5 million x 31% x 12 months).

Therefore, if the K-12 student pilot began in August 2021 instead of August 2022, the cost would be an additional $32.2 million in lost fare revenue. There would be an additional cost and effort for distributing TAP cards or stickers to students and administration of the program. In FY19 there were approximately 64,000 students using K-12 Reduced Fare TAP cards. If participation doubles, an additional 64,000 cards could need to be distributed at a cost of $2 per card or $128,000, plus administration.

The highest participation in the Universal College Pass (U-Pass) program is approximately 10%, which could double to 20% if the fares are free. There are approximately 800,000 Community College students in L.A. County.

The average U-Pass ridership is five boardings per week at a cost of $3.75 per week at $0.75 per boarding. According to U-Pass registration data, approximately 75% of participating students at all schools qualify as low-income, and would, therefore be included in the FSI pilot group in January 2022. If Community College students were to participate in the FSI Pilot 5 months earlier in August 2021, the additional cost would be approximately $8.6 million (800,000 students x 75% low-income x 20% participation x $3.75 per week x 19 weeks)

If 20% of the remaining 25% of Community College students who do not qualify for low income were to ride Metro five times per week, the additional cost to FSI would be approximately $18.8 million (800,000 students x 25% non-low-income x 20% participation x $3.75 per week x 98 weeks), plus $80,000 for 40,000 TAP stickers or cards. These costs do not include administration, which is anticipated to be handled by Metro Commute Services, who currently manages the U-Pass Program. Eight of the 20 Community Colleges in LA County are already participating in the U-Pass program and have existing transit pass distribution processes in place on their campuses. The additional twelve schools would need to be added.

It is important to note that the both K-12 districts and schools and Community College districts and schools will have to take on administration of this programs on their individual campuses in order to participate, and that the feasibility of adding twelve Community Colleges and all new K-12 participation prior to August 2021 will also be dependent on the schools' timelines.

Summary of Additional Costs (on top of the initial leading concept costs)

Grades K-12 in August 2021	
Cost of moving up low-income (69%) from January 2022 August 2021	$15,500,000
Cost of moving up non-low-income (31%) from August 2022 to August 2021	$16,700,000
Cost of additional TAP cards or stickers (64,000)	$128,000
Total	**$32,328,000**
Including Community Colleges in August 2021	
Cost of moving up low-income (75% of 800,000) from January 2022 August 2021	$8,600,000
Covering non low-income community college students (25% of 800,000)	$18,800,000
Cost of $2 TAP cards or stickers (20% of 200,000 = 40,000)	$80,000
Total	**$27,480,000**
Total Cost of Launching K-12 and Community Colleges in August 2021	**$59,808,000**

If ridership does not return to pre-COVID levels or does not increase the full 100% due to the

elimination of fares, the cost could be as low as half the amount listed above or $29.9 million.

FINANCIAL IMPACT

There is no financial impact as a result of this receive and file report at this time. Staff has identified anticipated pilot cost and continues to work on identifying pilot funding.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

This recommendation supports the following strategic plan goals identified in Vision 2028. Goal 3 Enhance communities and lives through mobility and access to opportunity; Goal 4 Metro will work with partners to build trust and make decisions that support the goals of the Vision 2028 Plan; and Goal 5 Provide responsive, accountable, and trustworthy governance within the Metro organization.

NEXT STEPS

The FSI Task Force will be conducting Community Outreach through April 15th, finalizing the report document, identifying eligible funding, and refining implementation strategies. The FSI Task Force will return to the Metro Board of Directors in April 2021 with an update and will present the final report to the Board for action in May 2021.

Prepared by: doreen Morrissey, Principal Transportation Planner, (213) 418-3421
Dennis Tucker, Director, (213) 418-3160
Fareless System Initiative Task Force

Reviewed by: Phillip A. Washington, Chief Executive Officer, (213) 922-7555

Phillip A. Washington
Chief Executive Officer

Fareless System Initiative (FSI)

March 25, 2021

Metro

FSI Update

FSI Taskforce is working on a report, due in April 2021, which will include the following:

- Funding options and opportunities
- How Fareless pilot relates to broader Metro initiatives
- Impact of Fareless pilot on overall Metro operations
- Collaboration with municipal operators and cost for them to participate
- Relation of Fareless pilot to existing discount programs already in effect

FSI Update Cont.

- Formula Allocation Procedure (FAP) considerations
- Fareless comments received through customer surveys
- Potential cost savings relating to fare collection/TAP and pass administration

- Draft will be available to Board Members and interested stakeholders in April

- Fareless initiative assumes no cuts in service and continued focus on customer service and State of Good Repair

Fareless Pilot Will Yield Essential Information

- Ridership increases, especially in post-pandemic time
- Equitable help for those most severely affected during the COVID-19 Pandemic and in need of help
- New and creative ways to allow citizens to sign up for pilot

Federal Assistance

- Some Federal help is possible during pilot
- LA Metro can lead the country in Fareless, and a pilot will greatly reinforce our case for sustained Federal assistance
- Congress is now considering significant innovative funding for Fareless experiments
- Federal aid essential after the pilot

Partnerships are Essential

- Staff has and will increase partnerships and communications with municipal transit operators
- Outreach to LAUSD and LACCD is significant
- Other transit systems offering special student fares or no fares receive designated financial support

Questions and Answers

Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
3rd Floor Board Room
Los Angeles, CA

Metro

Board Report

File #: 2021-0109, **File Type:** Informational Report **Agenda Number:** 45.

REGULAR BOARD MEETING
MARCH 25, 2021

SUBJECT: UPDATE CRENSHAW/LAX PROJECT

ACTION: ORAL REPORT

RECOMMENDATION

RECEIVE Oral Report on Crenshaw/LAX Project.

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Crenshaw/LAX Transit Project

Budget/Schedule Presentation – March 25, 2021

Budget / Schedule

BUDGET

	Current	Forecast
TOTAL COST	$2,148M	$2,148M

SCHEDULE

REVENUE OPERATION	Current	Forecast
	May 2021	Winter 2021

- Overall Project Progress is 98% complete (progress from 96% - 98% completion achieved in a 7-month period)
- Contractor is not applying sufficient work force to complete their remaining work
- Metro continues to work with contractor to mitigate the schedule forecast; emphasizing safety and reliability in final acceptance of project elements and systems
- Remaining work is primarily communications system testing, especially in underground sections

Expo Station mezzanine level fare gates

UG3 - Start-up crew inspecting tunnel booster fans

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OK On target Possible problem Significant Impact

*Contractor Substantial Completion

Life-of-Project Budget Status

- Project total commitments are 96.9% and expenses are 93.2% of the LOP Budget of $2,148 million
- Past three months' professional services, including Metro staff, expenses are between $3.5 - $4 million per month
- $26.5 million in unallocated contingency remains
- Budget does not include any potential claim settlement funding

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Project Sequence of Completion

- Installation of Equipment (Contractor)
- Local Field Acceptance Tests – (LFAT) (Contractor)
- Systems Integration Tests – (SIT-1) (Contractor)
- Vehicle Software – (P3010) Metro (Carborne)/Contractor (Wayside)
- Systems integration Tests (SIT-2) - interface with Rail Operations Control (ROC) – Metro
- Training, Simulated Service, Emergency Drills - Metro
- Safety Certification – California Public Utility Commission
- Revenue Service

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Schedule Status

- Contractor did not complete substantial completion by December 2020
- Progress monitoring indicates that this goal may be attained in 2021
- Schedule projections are dependent on number of variables - productivity, contractor resources, amount of re-work, testing success rate and complexity of work
- Contractor needs to make more progress in LFAT testing before a reliable estimate of completion can be made
- Consider strategies such as overlapping activities

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WSCC Contract
Milestone Substantial Completion Forecast

- WSCC needs to make significant performance improvement by taking the following potential mitigation actions:
  - Add crews and resources to prepare/complete required prerequisites before conducting Local Field Acceptance Tests and System Integration Tests,
  - Double testing personnel and increase to two work shifts,
  - Double dedicated management and integration supervision to complement increased work force,
  - Develop a realistic plan to complete testing, and
  - Increase schedule measurement resource for real time tracking of progress.

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Overall Systems Completion Status (as of 3/11/21)

Overall Project Completion Status				
Segment A (8+08.15 - 159+50)				
Systems	Traction Power	OCS /OCR	Train Control	Communication
Installation	100%	100%	100%	88%
LFAT Test	95%	99%	100%	65%
SIT-1 Test	10%	50%	30%	10%
Segment B1 (159+50 - 274+00)				
Systems	Traction Power	OCS /OCR	Train Control	Communication
Installation	100%	100%	100%	90%
LFAT Test	95%	99%	98%	60%
SIT-1 Test	10%	50%	15%	10%
Segment B2 (274+00 - 364+80)				
Systems	Traction Power	OCS /OCR	Train Control	Communication
Installation	100%	100%	100%	90%
LFAT Test	95%	99%	100%	40%
SIT-1 Test	N/A	50%	15%	10%
Segment C (364+80 - 448+34)				
Systems	Traction Power	OCS /OCR	Train Control	Communication
Installation	100%	100%	100%	70%
LFAT Test	95%	99%	100%	45%
SIT-1 Test	10%	50%	25%	0%

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Systems Testing Progress (as of 3/10/21)

Monthly LFATs Outcome						
Month	Total Scheduled	Passed[1]	Passed %[2]	Failed	Ongoing	Canceled/ Rescheduled
Aug	77	32	42%	11	8	26
Sep	85	52	61%	4	12	17
Oct	59	35	59%	3	8	13
Nov	82	43	52%	9	3	27
Dec	90	44	49%	3	14	34
Jan	49	24		1	7	17
Feb	120	60	50%	22	16	22
Target per month		104				

Monthly SITs Outcome						
Month	Total Scheduled	Passed[1]	Passed %[2]	Failed	Ongoing	Canceled
Aug	2	0	0%	2	0	0
Sep	1	0	0%	0	0	1
Oct	5	2	40%	3	0	0
Nov	13	4	31%	8	0	1
Dec	4	1	25%	2	0	1
Jan	15	8		2	0	2
Feb	9	1	11%	5	0	3
Target per month		43				

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Schedule Considerations

- Current field team personnel (Metro, contractor, subcontractors) are experienced and committed to a successful start-up
- Equipment interfaces are very complex, but the technology is service proven
- The most recent tunneling project that Metro opened was a small section of the Eastside Extension, so there are systems project characteristics that are new to Metro projects as technology has advanced since then
- Metro working to remove pieces of scope from WSCC Contract. Most significant is agreement with the City of Los Angeles to perform paving work at Park Mesa Heights

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Remaining Project Key Issues

These issues will determine the final completion dates:

- Significant amount of physical installation work that remains to be completed
- Volume of complex testing that remains to be done
- 330 (90%) LFATs remain as of February 19, 2021
- Subcontractor coordination and integration management
- Labor resources
- Design resources
- Ability to control schedule delays
- Amount of re-work

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Conclusion

- Number of variables impact actual completion dates
- Metro continues to work with contractor to mitigate the schedule forecast
- Metro will continue to emphasize safety and reliability in final acceptance of Project elements and systems
- Remaining work is primarily communications system testing, especially in underground sections

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