AGENDA
Transit Committee Meeting

Committee Members
Tim Shaw, Chairman
Al Murray, Vice Chairman
Andrew Do
Steve Jones
Miguel Pulido
Tom Tait
Gregory T. Winterbottom

Orange County Transportation Authority Headquarters
550 South Main Street, Board Room – Conf. Room 07
Orange, California
Thursday, February 9, 2017 at 9:00 a.m.

Any person with a disability who requires a modification or accommodation in order to participate in this meeting should contact the OCTA Clerk of the Board, telephone (714) 560-5676, no less than two (2) business days prior to this meeting to enable OCTA to make reasonable arrangements to assure accessibility to this meeting.

Agenda descriptions are intended to give members of the public a general summary of items of business to be transacted or discussed. The posting of the recommended actions does not indicate what action will be taken. The Committee may take any action which it deems to be appropriate on the agenda item and is not limited in any way by the notice of the recommended action.

All documents relative to the items referenced in this agenda are available for public inspection at www.octa.net or through the Clerk of the Board's office at the OCTA Headquarters, 600 South Main Street, Orange, California.

Call to Order

Pledge of Allegiance
Vice Chairman Murray

1. Public Comments

Special Calendar

2. Committee Meeting 2017 Schedule
Committee Chairman Shaw

The Committee Chairman will lead a discussion regarding the 2017 meeting schedule for the Transit Committee. The proposed 2017 dates and times for this Committee is provided in Attachment A.

3. Roles and Responsibilities of the Transit Committee
Darrell Johnson

Roles and responsibilities for the Transit Committee are reviewed periodically for any appropriate changes or additions. These roles and responsibilities are presented for discussion in Attachment A.

Consent Calendar (Items 4 through 7)

All items on the Consent Calendar are to be approved in one motion unless a Committee Member or a member of the public requests separate action or discussion on a specific item.

4. Approval of Minutes

Approval of the Minutes of the Transit Committee meeting of January 12, 2017.

5. Low Carbon Transit Operations Program Recommendations for Fiscal Year 2016-17 Funds
Louis Zhao/Kia Mortazavi

Overview

Funding recommendations are presented for the Low Carbon Transit Operations Program for fiscal year 2016-17 funds that will promote transit ridership growth and reduce greenhouse gas emissions. This program is part of the state Cap-and-Trade Program.

Recommendations

A. Approve the use of fiscal year 2016-17 Low Carbon Transit Operations Program funding, currently estimated to be $1.7 million, for a fare adjustment program and for the purchase and installation of three-position bike racks on buses and spares, both intended to increase bus system ridership.

B. Approve Resolution 2017-002, consistent with the Low Carbon Transit Operations Program Guidelines.

C. Authorize staff to make all necessary amendments to the Federal Transportation Improvement Program, as well as execute any necessary agreements to facilitate the above recommendations.

6. Cooperative Agreement to Accept Grant Funding for the Hydrogen Fuel Cell Electric Bus Project
P. Sue Zuhlke/Beth McCormick

Overview

A grant from the California Air Resources Board has been awarded which provides grant funds for the purchase of ten hydrogen fuel cell electric buses, a fueling station, and facility modifications. Additional funds from the South Coast Air Quality Management District have also been awarded for this project. This cooperative agreement defines the roles and responsibilities of each party for the acceptance of the grant funds.

Recommendations

A. Authorize the Chief Executive Officer to negotiate and execute Cooperative Agreement No. C-7-1538 between the Orange County Transportation Authority and the Center for Transportation and the Environment, in the amount of $13,241,092, to provide for the purchase of ten hydrogen fuel cell electric buses, construction of a liquid hydrogen station, and modification of maintenance facilities.

B. Amend the Orange County Transportation Authority's Fiscal Year 2016-17 Adopted Budget, in the amount of $13,241,092, to accommodate the hydrogen fuel cell electric bus project and available grant funding from the California Air Resources Board and the South Coast Air Quality Management District.

7. Amendment to Agreement for Additional Consulting Services to Develop Specifications for an Account-Based, Open Payment Fare Collection System
Justin Alcober /Andrew Oftelie

Overview

On April 15, 2013, the Orange County Transportation Authority entered into an agreement with Four Nines Technologies to develop technical specifications for the development of an account-based, open payment fare collection system. An amendment is needed to increase the funding for additional consulting services and extend the term through December 31, 2017, to complete the mobile ticketing project.

Recommendation

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-2-2095 between the Orange County Transportation Authority and Four Nines Technologies, in the amount of $50,000, for additional consulting services for the account-based, open payment fare collection system, and extend the contract term of the agreement through December 31, 2017. The amendment will increase the maximum obligation of the agreement to a total contract value of $294,500.

Regular Calendar

8. Transit Division Performance Measurements Report for the Second Quarter of Fiscal Year 2016-17
Beth McCormick

Overview

The Orange County Transportation Authority operates fixed-route bus and demand-response paratransit service throughout Orange County and into neighboring counties. This report summarizes the performance measures for the transit services provided during the second quarter of fiscal year 2016-17. These performance measures gauge the safety, courtesy, reliability, and overall quality of the public transit services provided.

Recommendation

Receive and file as an information item.

9. Central Harbor Boulevard Transit Corridor Study Update
Eric Carlson/Kia Mortazavi

Overview

In August 2015, the Orange County Transportation Authority initiated the Central Harbor Boulevard Transit Corridor Study to analyze and develop options to improve transit service on Harbor Boulevard, between the Fullerton Transportation Center and Westminster Avenue. To date, the project team has developed the study goals, objectives and evaluation criteria, and identified a set of 12 draft conceptual alternatives for review and comment.

Recommendation

Receive and file as an information item.

10. Overview of Options for OC Streetcar Operations and Maintenance
Mary Shavalier/Jim Beil

Overview

The Orange County Transportation Authority is the lead agency for the design, construction, operations and maintenance of the OC Streetcar in the cities of Santa Ana and Garden Grove. As part of the request for a full funding grant agreement to the Federal Transit Administration, an organization plan is required to prepare for future operations and maintenance of the service. Staff has developed key considerations for the evaluation of options for operations and maintenance of the OC Streetcar for Board of Directors' review.

Recommendation

Direct staff to return to the Board of Directors with an evaluation of the OC Streetcar operations and maintenance organization plan based upon the key considerations.

Discussion Items

11. Mobile Ticketing & On-Demand Service
Lloyd Sullivan/Andrew Oftelie

Exploring OCTA partnerships with Transit Network Providers for On-Demand services utilizing OCTA's existing Mobile Ticketing Application.

12. Chief Executive Officer's Report

13. Committee Members' Reports

14. Closed Session

There are no Closed Session items scheduled.

15. Adjournment

The next regularly scheduled meeting of this Committee will be held at **9:00 a.m. on Thursday, March 9, 2017**, at the Orange County Transportation Authority Headquarters, 550 South Main Street, Board Room - Conference Room 07, Orange, California.

ATTACHMENT A

ORANGE COUNTY TRANSPORTATION AUTHORITY

Proposed 2017 Transit Committee Meetings

JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
1	**2**	3	4	5	6	7
8	**9**	10	11	**12**	13	14
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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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1.20.17

OCTA, OCTD, OCLTA, and OCSAFE regular Board meeting
9:00 a.m., OCTA Headquarters
550 South Main Street, Board Room - Conf. Room 07, Orange CA

Transit Committee
9:00 a.m.

OCTA Holidays

2017 OCTA Proposed Committee Meeting Calendar
Transit Committee

Month	2017 Proposed Changes - Comparison with 2016 Calendar
January	No change
February	No change
March	No change
April	No change
May	No change
June	No change
July	No change
August	No change
September	No change
October	No change
November	No change
December	No change

ATTACHMENT A

Proposed Roles and Responsibilities of the Board Committees for 2017 (02.09.17)

Transit Committee

- Develops, reviews, and provides policy recommendations to the Board of Directors on matters related to the operation of bus and commuter rail services, including fixed-route bus services, express route bus service, bus rapid transit service, ACCESS service, other paratransit service, and Metrolink service;

- Reviews and provides recommendations to the Board of Directors on matters pertaining to the planning of bus and passenger rail services;

- Reviews and provides recommendations to the Board of Directors on transit ridership, schedules, and service policies;

- Reviews and provides recommendations to the Board of Directors on bus and passenger rail capital projects, including OCTA revenue vehicles, support equipment, operations facilities, and Metrolink facilities and stations;

- Makes recommendations to the Board of Directors on use and procurement of professional services and contractors to support planning and delivery of OCTA projects, programs, and services;

- Reviews and provides recommendations to the Board of Directors on future transit programs, such as the Senior Mobility Program, Go Local projects, community circulators, and high-speed rail;

- Reviews and provides recommendations to the Board of Directors on matters related to transit technology, such as mobile ticketing applications and other on-demand service delivery models; and

- Reviews and provides recommendations to the Board of Directors on the role of transit services in attainment of air quality goals.

MINUTES

Transit Committee Meeting

Committee Members Present

Al Murray, Chairman
Gregory T. Winterbottom, Vice Chairman
Andrew Do
Steve Jones
Miguel Pulido
Tim Shaw
Michelle Steel

Committee Members Absent

Tom Tait

Staff Present

Ken Phipps, Deputy Chief Executive Officer
Laurena Weinert, Clerk of the Board
Mary K. Burton, Deputy Clerk of the Board
David DeBerry, Acting General Counsel
OCTA Staff and members of the General Public

Call to Order

The January 12, 2017 regular meeting of the Transit Committee was called to order by Committee Chairman Murray at 9:05 a.m.

Pledge of Allegiance

Committee Vice Chairman Winterbottom led in the Pledge of Allegiance.

1. Public Comments

No public comments were received.

Special Calendar

There were no Special Calendar matters.

Consent Calendar (Items 2 through 7)

2. Approval of Minutes

A motion was made by Director Jones, seconded by Director Steel and declared passed by those present, to approve minutes of the December 8, 2016 meeting.

Director Pulido was not present to vote on this item.

3. Proposition 1B California Transit Security Grant Program Authorization for 2015 and 2016

A motion was made by Director Jones, seconded by Director Steel, and declared passed by those present, to:

A. Adopt Orange County Transportation Authority Resolution No. 2017-003 authorizing the Chief Executive Officer, or designee, to file and execute grant-related agreements with the California Governor's Office of Emergency Services as the designated administrative agency of the California Transit Security Grant Program.

B. Approve the candidate project list and authorize staff to amend the Federal Transportation Improvement Program to accommodate grant revenues.

Director Pulido was not present to vote on this item.

4. Cooperative Agreement with the Southern California Regional Rail Authority for the Laguna Niguel to San Juan Capistrano Passing Siding Project

A motion was made by Director Jones, seconded by Director Steel, and declared passed by those present, to authorize the Chief Executive Officer to negotiate and execute Cooperative Agreement No. C-6-1615 between the Orange County Transportation Authority and Southern California Regional Rail Authority, in the amount of $5,507,000, for the construction of rail signals, communications, and wayside positive train control installations and modifications for the Laguna Niguel to San Juan Capistrano Passing Siding project.

Director Pulido was not present to vote on this item.

5. Rail Programs and Facilities Engineering Quarterly Report

A motion was made by Director Jones, seconded by Director Steel, and declared passed by those present, to receive and file as an information item.

Director Pulido was not present to vote on this item.

6. Transit Projects Programming Revisions

A motion was made by Director Jones, seconded by Director Steel, and declared passed by those present, to:

A. Authorize an overall increase in project funding from $34.2 million to $39.756 million for the Laguna Niguel to San Juan Capistrano Passing Siding Project, which include the following funding:

- Use of $3 million in Transit Intercity Rail Capital Program funds.
- Use of $2.556 million in additional Congestion Mitigation and Air Quality Improvement Program funds.

B. Approve Resolution 2017-001, authorizing the Chief Executive Officer to file and execute agreements, certifications and assurances for the Laguna Niguel to San Juan Capistrano passing siding, consistent with the Transit Intercity Rail Capital Program guidelines.

C. Authorize the following changes for Federal Transit Administration funding:

- Use of $1.348 million in additional Federal Transit Administration Section 5337 State of Good Repair funds towards the Southern California Regional Rail Authority rehabilitation budget.
- Reprogram up to $22.786 million of Federal Transit Administration Section 5307 Urbanized Area Formula Program funds from Preventive Maintenance to purchase 40-foot alternative fuel replacement buses in federal fiscal year 2016-17 to offset local transit funds.
- Reprogram up to $6.086 million in Federal Transit Administration Section 5307 Urbanized Area Formula Program funds from Preventive Maintenance to Capital Cost of Contracting in federal fiscal year 2016-17 to cover increases due to annual inflation built into the contract.
- Reprogram up to $0.960 million in Federal Transit Administration Section 5309 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Earmark funds from video surveillance systems at Metrolink Stations to video surveillance systems upgrades at Santa Ana and Garden Grove Bases.

D. Authorize staff to process all necessary amendments to the Federal Transportation Improvement Program, and execute or amend all necessary agreements to facilitate the above actions.

Director Pulido was not present to vote on this item.

7. Agreement for Replacement of Heating and Ventilation Units at Garden Grove Bus Base Maintenance Building Shop

A motion was made by Director Jones, seconded by Director Steel, and declared passed by those present, to:

A. Find K & J Air Conditioning Incorporated, the apparent low bidder, as non-responsive due to the failure to meet the federal requirement for Disadvantaged Business Enterprise participation.

B. Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-6-1399 between the Orange County Transportation Authority and Western Air conditioning Company Incorporated, the lowest responsive, responsible bidder, in the amount of $290,000, for replacement of heating and ventilation units at Garden Grove Bus Base maintenance building shop.

Director Pulido was not present to vote on this item.

Regular Calendar

8. Cooperative Agreement with the City of Santa Ana for the Use of Right-of-Way for the OC Streetcar Project

Jim Beil, Executive Director of Capital Programs, provided an overview of the Orange County Transportation Authority's (OCTA's) role as the lead agency for the design, construction, operations, and maintenance of the OC Streetcar project. He reported that a cooperative agreement with the City of Santa Ana is required to secure the use of public right-of-way for the construction, operations, and maintenance of the OC Streetcar project.

A motion was made by Committee Chairman Murray, seconded by Director Do, and declared passed by those present, to authorize the Chief Executive Officer to negotiate and execute Cooperative Agreement No. C-6-1433 between the Orange County Transportation Authority and the City of Santa Ana for use of public right-of-way for the construction, operations, and maintenance of the OC Streetcar project.

Director Pulido was not present to vote on this item.

9. OC Bus 360 Update and Next Steps

Kurt Brotcke, Director of Strategic Planning, provided an overview and background of the OC Bus 360° that included ridership marketing initiatives, before and after weekday ridership comparisons by routes, and external factors influencing bus ridership. Mr. Brotcke gave a PowerPoint presentation that included:

- Background and Framework,
- Efforts to Date,
- Trends,
- Average Weekday Results, and
- Next Steps.

Mr. Brotcke reported that OCTA has implemented a comprehensive program through the OC Bus 360° program to retain and grow ridership. The State of the Transit Report will be provided in early 2017 and will serve as a starting point for a new Orange County transit vision.

Committee Vice Chairman Winterbottom requested that an article from Transit Center titled, "What Makes Transit Successful? Walkable Neighborhoods and Fast, Frequent Service" be shared with Members of the Board. Staff responded that they would email the link to access this article to all Board Members.

Following the discussion, no action was taken on this receive and file information item.

Discussion Items

10. Chief Executive Officer's Report

Ken Phipps, Deputy Chief Executive Officer (DCEO), reported on the following:

- The Federal Transit Administration (FTA) issued a letter announcing their support for the OC Streetcar project to officially enter the engineering phase,
- Staff presented a budget update to the Finance and Administration Committee which included a discussion on the state budget,
- Funding challenges, and
- The Leadership Development Academy is designed to help grow and support OCTA's senior managers and develop their skills in order to ensure a continuity of leadership at OCTA.

11. Committee Members' Reports

Director Shaw stated that in regards to the Governor's Proposed Transportation Budget for Streets and Roads, the City of La Habra would be interested in applying for some type of funding that could assist with the completion of the OC Loop and possibly assist with fully funding the Lambert Road project.

Director Pulido requested staff send out an announcement in regards to the FTA approving the OC Streetcar project to officially enter the engineering phase. Mr. Phipps, DCEO, responded that staff would send out an announcement.

12. Closed Session

There were no Closed Session items scheduled.

13. Adjournment

The meeting adjourned at 10:10 a.m.

The next regularly scheduled meeting of this Committee will be held at **9:00 a.m. on Thursday, February 9, 2017**, at the Orange County Transportation Authority Headquarters, 550 South Main Street, Board Room - Conference Room 07, Orange, California.

ATTEST

Mary K. Burton
Deputy Clerk of the Board

Al Murray
Committee Chairman

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Low Carbon Transit Operations Program Recommendations for Fiscal Year 2016-17 Funds

Overview

Funding recommendations are presented for the Low Carbon Transit Operations Program for fiscal year 2016-17 funds that will promote transit ridership growth and reduce greenhouse gas emissions. This program is part of the state Cap-and-Trade Program.

Recommendations

A. Approve the use of fiscal year 2016-17 Low Carbon Transit Operations Program funding, currently estimated to be $1.7 million, for a fare adjustment program and for the purchase and installation of three-position bike racks on buses and spares, both intended to increase bus system ridership.

B. Approve Resolution 2017-002, consistent with the Low Carbon Transit Operations Program Guidelines.

C. Authorize staff to make all necessary amendments to the Federal Transportation Improvement Program, as well as execute any necessary agreements to facilitate the above recommendations.

Background

The Low Carbon Transit Operations Program (LCTOP) provides funds to transit agencies on a formula basis to support transit operations or capital projects that reduce greenhouse gas (GHG) emissions and improve mobility, with a priority to provide benefit to disadvantaged communities.

Projects may include new or expanded bus or rail services, expanded intermodal transit facilities, equipment acquisition, including upgrade of transit vehicles to support active transportation and encourage ridership (e.g., bicycle racks on

buses), fueling, maintenance, and other costs to operate transit services or facilities, including fare discount and promotion programs. Fifty percent of the funds must benefit disadvantaged communities, as defined by the state.

For fiscal year (FY) 2016-17, the LCTOP formula program is estimated to provide $49.0 million statewide and will continuously appropriate five percent of the annual auction proceeds in the GHG reduction fund for LCTOP. Final funding levels for FY 2016-17 may not be made public until March 2017. Funds will be distributed based on the State Transit Assistance formula, which is based on population and fare revenues. The Orange County Transportation Authority's (OCTA) share is currently estimated to be approximately $1.7 million, based on the current auction proceeds for FY 2016-17.

The California Department of Transportation (Caltrans) issued updated guidelines for the 2016-17 LCTOP in December 2016, and is requesting transit agencies to submit projects for Caltrans' confirmation of eligibility by March 2017. Based on the Capital Programming Policies, approved by the OCTA Board of Directors (Board) on December 12, 2016, the funds are to be used for transit operations or capital for expansion of bus transit service, fare reduction programs, and other bus and commuter rail transit efforts that increase ridership and reduce GHG emissions.

Discussion

OCTA expects to receive approximately $1.7 million in LCTOP funds for FY 2016-17. Staff recommends using a portion ($0.9 million) of the FY 2016-17 LCTOP funds for a fare adjustment program that would target ridership growth, which may include colleges and universities. This use is consistent with the prior two years of LCTOP funding, which directed the funds to fare discount and ridership promotion programs. Staff will keep the Board apprised as the fare adjustment program is developed.

Staff is also recommending that $0.8 million be used to purchase and install three-position bike racks on the bus fleet (except 60 foot articulated and cutaway buses), plus spares that would also result in ridership growth by increasing the number of bicyclists who could access the bus system. OCTA buses are currently equipped with two-position bike racks and, as a result, buses leave bicyclists at stops when there are two bicycles already in the bike rack.

In FY 2015-16, approximately 240 riders were recorded as being turned away at stops due to a lack of bike rack capacity. This number does not account for potential lost ridership due to insufficient bike rack capacity. Replacing the two-position racks with three-position racks is a project consistent with the LCTOP Guidelines. The larger capacity racks will reduce the likelihood a bicyclist is left behind, make the system more attractive to bicyclists, and ultimately result in increased ridership. OCTA is proposing to use the funds to purchase up to a total of 557 bike racks, which include 484 installed units and 73 spares. The use of three-position bike racks was demonstrated to the Citizens Advisory Committee on August 2, 2016, and OCTA received positive feedback. While the California Highway Patrol has yet to issue approval to use these three-position bike racks, approval is expected. The current order of 157 buses included two-position bike racks. OCTA is unable to remove them from the current order, but will work with the vendor and the Federal Transit Administration to sell the two-position bike racks or use them elsewhere in order to recover the costs.

The above recommendations are consistent with Caltrans' LCTOP Guidelines. Caltrans has requested that the Board approve submittal of the project and execution of the certifications, and assurance and authorized agent forms through a resolution, which is provided in Attachment A. The authorized agent form authorizes the Chief Executive Officer, or his designee, to sign documents on behalf of OCTA.

Next Steps

With Board approval, staff will submit a request for FY 2016-17 LCTOP funds, currently estimated to be $1.7 million, to Caltrans by March 1, 2017. Caltrans will finalize and submit the statewide list of FY 2016-17 projects to the State Controller's Office (SCO) on or before May 1, 2017. Caltrans expects the SCO to begin releasing FY 2016-17 funds to transit agencies for identified projects by June 1, 2017.

Summary

Staff is recommending that OCTA use FY 2016-17 LCTOP funds for a fare adjustment program, and the purchase and installation of three-position bike racks on all buses except 60-foot articulated and cutaway buses, plus spares. The Board is further requested to approve a resolution authorizing submittal of the project and execution of the certifications, and assurance and authorized agent forms.

Attachment

A. Resolution 2017-002 – Authorization for the Execution of the Certifications and Assurances and Authorized Agent Forms for the Low Carbon Transit Operations Program and for the Execution of the Low Carbon Transit Operations Program Project: Fare Adjustment Program and Purchase and Installation of Three-Position Bike Racks on Buses Plus Spares: Fiscal Year 2016-17 Low Carbon Transit Operations Program Funding, $1,652,825

Prepared by:

Louis Zhao
Section Manager, Transit and Local Transportation Programming
(714) 560-5494

Approved by:

Kia Mortazavi
Executive Director, Planning
(714) 560-5741

ATTACHMENT A

RESOLUTION 2017-002

AUTHORIZATION FOR THE EXECUTION OF THE CERTIFICATIONS AND ASSURANCES AND AUTHORIZED AGENT FORMS FOR THE LOW CARBON TRANSIT OPERATIONS PROGRAM AND FOR THE EXECUTION OF THE LOW CARBON TRANSIT OPERATIONS PROGRAM PROJECT:
FARE ADJUSTMENT PROGRAM AND PURCHASE AND INSTALLATION OF THREE-POSITION BIKE RACKS ON BUSES PLUS SPARES: FISCAL YEAR 2016-17 LOW CARBON TRANSIT OPERATIONS PROGRAM FUNDING, $1,652,825

WHEREAS, the Orange County Transportation Authority (OCTA) is an eligible project sponsor and may receive state funding from the Low Carbon Transit Operations Program (LCTOP) now or sometime in the future for transit projects; and

WHEREAS, the statutes related to state-funded transit projects require a local or regional implementing agency to abide by various regulations; and

WHEREAS, SB 862 (Chapter 36, Statutes 2014) named the California Department of Transportation (Caltrans) as the administrative agency for the LCTOP; and

WHEREAS, Caltrans has developed guidelines for the purpose of administering and distributing LCTOP funds to eligible project sponsors (local agencies); and

WHEREAS, OCTA wishes to delegate authorization to execute these documents and any amendments thereto to Darrell Johnson, Chief Executive Officer; and

WHEREAS, OCTA wishes to implement the LCTOP project listed above;

NOW, THEREFORE, BE IT RESOLVED by the OCTA Board of Directors (Board that the fund recipient agrees to comply with all conditions and requirements set forth in the Certification and Assurances and the Authorized Agent documents and applicable statutes, regulations and guidelines for all LCTOP-funded transit projects;

NOW THEREFORE, BE IT FURTHER RESOLVED that Darrell Johnson, Chief Executive Officer, or his designee, be authorized to execute all required documents of the LCTOP and any amendments thereto with Caltrans;

NOW, THEREFORE, BE IT RESOLVED by the OCTA Board that the fund recipient agrees to comply with all conditions and requirements set forth in applicable statutes, regulations, and guidelines for all LCTOP-funded transit projects;

NOW, THEREFORE, BE IT FURTHER RESOLVED by the OCTA Board that it hereby authorizes the submittal of the following project nomination and allocation request to Caltrans in fiscal year (FY) 2016-17 LCTOP funds:

Project Name: Fare Adjustment Program and Purchase and Installation of Three-Position Bike Racks on Buses Plus Spares

Amount of LCTOP funds requested: FY 2016-17 LCTOP funding at $1,652,825

Short Description of Project: The fare elasticity model, known as the Simpson-Curtin Rule, is used by transit agencies nationwide and it demonstrates that a reduction in fares leads to an increase in ridership. The LCTOP funds will be used to support the loss of fare revenue for providing reduced fares for bus service.

OCTA currently has two-position bike racks on the buses and is proposing to replace the two-position racks with three-position racks to increase ridership by making the system more attractive to bicyclists by reducing the current delays experienced by bike riders when an approaching bus is already carrying two bikes. OCTA would purchase 557 bike racks (including spares) and install them on 484 buses in the active fleet.

Contributing Sponsor: City of Laguna Beach

ADOPTED, SIGNED AND APPROVED this xth day of xx, 2017.

AYES:

NOES:

ABSENT:

ATTEST:

Laurena Weinert Clerk of the Board	Michael Hennessey, Chair Orange County Transportation Authority

OCTA Resolution No. 2017-002

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Cooperative Agreement to Accept Grant Funding for the Hydrogen Fuel Cell Electric Bus Project

Overview

A grant from the California Air Resources Board has been awarded which provides grant funds for the purchase of ten hydrogen fuel cell electric buses, a fueling station, and facility modifications. Additional funds from the South Coast Air Quality Management District have also been awarded for this project. This cooperative agreement defines the roles and responsibilities of each party for the acceptance of the grant funds.

Recommendations

A. Authorize the Chief Executive Officer to negotiate and execute Cooperative Agreement No. C-7-1538 between the Orange County Transportation Authority and the Center for Transportation and the Environment, in the amount of $13,241,092, to provide for the purchase of ten hydrogen fuel cell electric buses, construction of a liquid hydrogen station, and modification of maintenance facilities.

B. Amend the Orange County Transportation Authority's Fiscal Year 2016-17 Adopted Budget, in the amount of $13,241,092, to accommodate the hydrogen fuel cell electric bus project and available grant funding from the California Air Resources Board and the South Coast Air Quality Management District.

Discussion

On November 23, 2015, the Orange County Transportation Authority (OCTA) Board of Directors (Board) approved submission of a grant application to the California Air Resources Board (ARB), in partnership with the Center for Transportation and the Environment (CTE), Alameda-Contra Costa Transit District (AC Transit), New Flyer of America (New Flyer), and Linde LLC (Linde),

collectively known as the Fuel Cell Electric Bus Commercialization Consortium. The lead applicant on the grant application was CTE, who will also provide project management and oversight responsibilities for the projects at OCTA and AC Transit.

On July 22, 2016, the ARB notified applicants of the preliminary selection of projects to be funded, pending appropriation of Cap and Trade funds by the California Legislature and adoption of the funding plan by the ARB Board. Funds were appropriated before the end of the 2015-16 legislative session, and on October 20, 2016, the ARB Board adopted the funding plan. CTE has been working with ARB to finalize the grant agreement. Since CTE is the lead applicant, the grant agreement will be between the ARB and CTE. CTE will enter into cooperative agreements with OCTA and AC Transit for the pass through of the grant funds. All ARB grant requirements will flow through to OCTA and AC Transit.

In addition to the ARB grant funds, the South Coast Air Quality Management District (SCAQMD) also awarded CTE $1,000,000 towards the purchase of OCTA's ten hydrogen fuel cell electric buses.

The following are the key provisions in the cooperative agreement:

- OCTA will receive the following grant funds, as reimbursement to expenditures:
  - $4,777,732 for hydrogen station construction, gas detection, commissioning, and one year routine maintenance
  - $710,541 for utility upgrades necessary for the hydrogen station
  - $7,338,000 for ten hydrogen fuel cell electric buses ($6,338,000 from ARB and $1,000,000 from SCAQMD)
  - $414,819 for facility modifications for hydrogen detection and ventilation
- OCTA will provide $10,727,961 local match for the ARB grant, which includes $1,000,000 cash from SCAQMD, $6,000,000 from OCTA toward the purchase of the buses, and $3,727,961 in-kind contribution for staff time and operation and maintenance of the buses. The current 40-foot compressed natural gas bus order with New Flyer was reduced by ten vehicles to accommodate the $6,000,000 cash contribution and ensure that the fleet is not over capitalized.

- OCTA will execute agreements with New Flyer for the hydrogen fuel cell electric buses and with Linde for the construction, commissioning, and maintenance of the hydrogen station, liquid hydrogen fuel, and rental of a liquid hydrogen storage tank.
- OCTA will complete all necessary facility upgrades in the maintenance bays for the detection and ventilation of hydrogen gas.
- OCTA will deploy and maintain the buses and fuel station through the useful life of the equipment.
- OCTA will work with CTE to ensure collection of data and submission of required reports to ARB.
- OCTA will deploy buses in regular transit service within disadvantaged communities as described in the grant application. Bus routes include the 29, 47, 53, 55, and 64. See Attachment A.
- OCTA will comply with all state, federal, and local laws related to the construction of the station, upgrade of the facilities, and deployment of the buses.
- OCTA will maintain project records for a minimum of three years after the term of the grant for inspection and audit by the state.
- CTE will serve as the recipient of grant funds to be passed through to OCTA upon reimbursement of funds from ARB and SCAQMD.
- CTE will assist OCTA with the development of the technical specifications for the hydrogen fuel cell electric buses, liquid hydrogen station, and facilities modifications.
- CTE will perform the engineering for the maintenance facilities upgrade.
- CTE will oversee the bus build in-plant inspections.
- CTE will assist in the development and delivery of a maintenance support plan and training of coach operators, maintenance personnel, and first responders.
- CTE will ensure the installation of data collection equipment and coordinate the data collection and reporting.
- CTE will prepare and submit all reports to the ARB and SCAQMD.

The key milestones for the project are shown in the table below.

Milestone	Completion
Execute agreement with New Flyer and issue notice to proceed on bus build	4/24/2017
Execute agreements with Linde and issue notice to proceed for construction of hydrogen station	4/24/2017
Deliver first article hydrogen fuel cell electric bus	4/12/2018
Delivery of remaining nine buses beginning 10/19/2018	12/13/2018
Complete 40-hour in-service testing and final acceptance	12/28/2018
Complete final design and engineering of hydrogen station	9/18/2017
Break ground on hydrogen station	6/26/2018
Complete hydrogen station construction	11/5/2018
Complete hydrogen station commissioning	12/31/2018
Complete design and engineering of facility upgrades	8/22/2017
Complete facility upgrades	7/25/2018
Complete operations, maintenance, facility maintenance, and first responder training	12/31/2018
Complete vehicle data collection	1/31/2020

In order to meet the ARB deadline for completing the project and requesting reimbursement of funds, sole source agreements with New Flyer and Linde need to be executed by April 28, 2017. Staff will return to the Board within the next couple of months with these agreements for consideration.

Fiscal Impact

The project was not included in the approved fiscal year 2016-17 budget. A budget amendment in the amount of $13,241,092 to account strings 0030-6053-D2157-YHS and 0030-6053-D2157-XHY is necessary to accommodate the grant funding from the California Air Resources Board and the South Coast Air Quality Management District.

Summary

Based on the information provided, staff recommends authorizing the Chief Executive Officer to negotiate and execute Agreement No. C-7-1538 with the Center for Transportation and the Environment, in the amount of $13,241,092, for the pass through of grant funds for the hydrogen fuel cell electric bus project. A budget amendment is also requested to accept the grant funds.

Attachment

A. Disadvantaged Communities and OCTA Routes

Prepared by:

P. Sue Zuhlke
Director, Maintenance and Motorist Services
714-560-5574

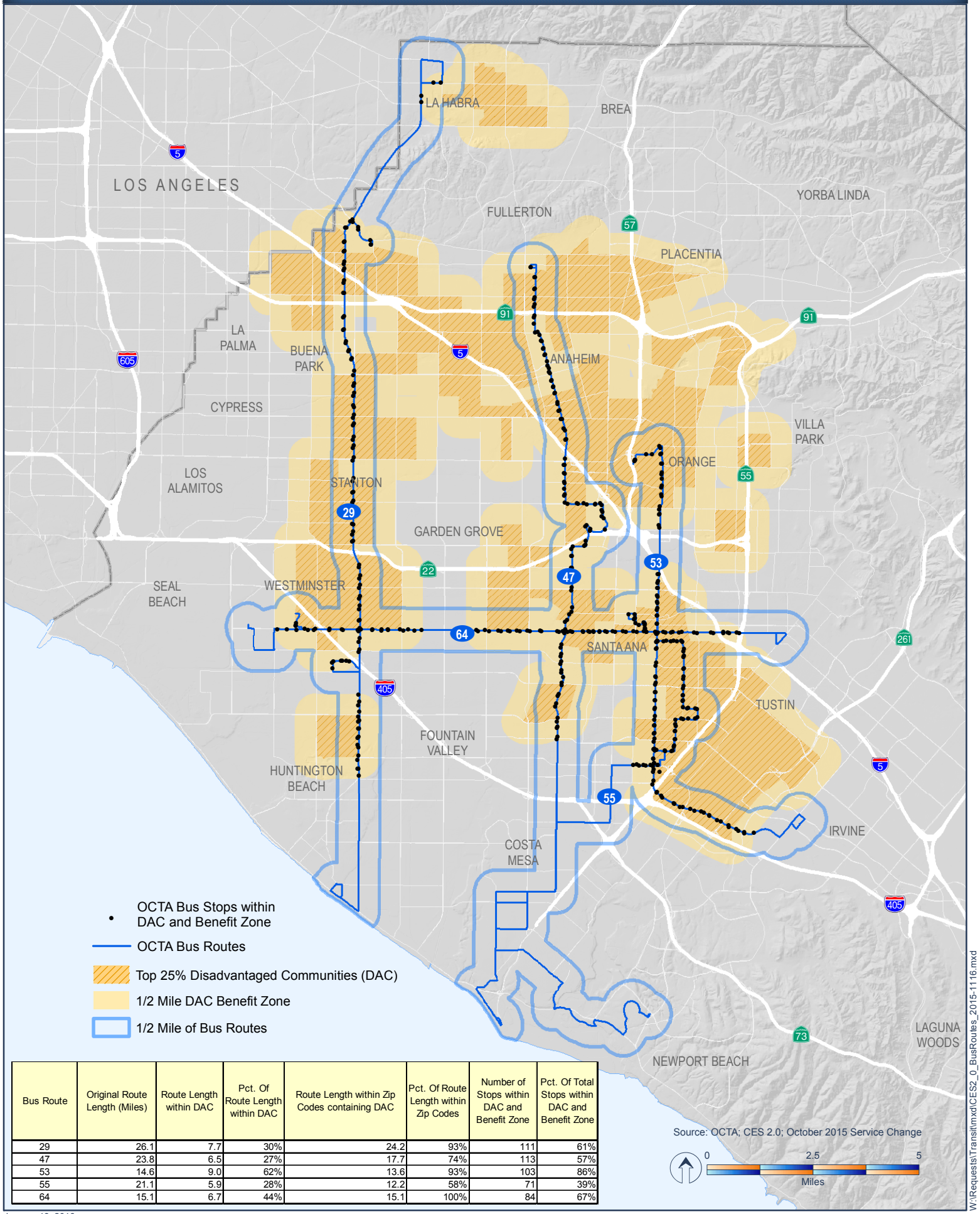
Virginia Abadessa
Director, Contracts Administration and Materials Management
714-560-5623

Approved by:

Beth McCormick
General Manager, Transit
714-560-5964

ATTACHMENT A

Disadvantaged Communities and OCTA Routes



Bus Route	Original Route Length (Miles)	Route Length within DAC	Pct. Of Route Length within DAC	Route Length within Zip Codes containing DAC	Pct. Of Route Length within Zip Codes	Number of Stops within DAC and Benefit Zone	Pct. Of Total Stops within DAC and Benefit Zone
29	26.1	7.7	30%	24.2	93%	111	61%
47	23.8	6.5	27%	17.7	74%	113	57%
53	14.6	9.0	62%	13.6	93%	103	86%
55	21.1	5.9	28%	12.2	58%	71	39%
64	15.1	6.7	44%	15.1	100%	84	67%

Source: OCTA; CES 2.0; October 2015 Service Change

0 2.5 5 Miles

W:\Requests\Transit\mxd\CES2_0_BusRoutes_2015-1116.mxd

January 18, 2016

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Amendment to Agreement for Additional Consulting Services to Develop Specifications for an Account-Based, Open Payment Fare Collection System

Overview

On April 15, 2013, the Orange County Transportation Authority entered into an agreement with Four Nines Technologies to develop technical specifications for the development of an account-based, open payment fare collection system. An amendment is needed to increase the funding for additional consulting services and extend the term through December 31, 2017, to complete the mobile ticketing project.

Recommendation

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-2-2095 between the Orange County Transportation Authority and Four Nines Technologies, in the amount of $50,000, for additional consulting services for the account-based, open payment fare collection system, and extend the contract term of the agreement through December 31, 2017. The amendment will increase the maximum obligation of the agreement to a total contract value of $294,500.

Discussion

The Orange County Transportation Authority (OCTA) recently purchased stand-beside readers for the fixed-route bus fleet to perform electronic validation of the mobile tickets. Electronic readers will automatically and instantaneously collect much of the same data that is currently collected through the existing electronic farebox, such as location of boarding, time of boarding, and fare type. The use of the stand-beside readers ensures that important rider data is not lost as migration occurs from use of the current mag-stripe fare media to mobile ticketing, and other fare instruments that could be introduced in the future using this technology.

A successful integration between the mobile ticketing application and the electronic readers will be key to ensure proper functionality and reporting of electronic validation of mobile tickets. The design review and project support provided by Four Nines Technologies as part of the agreement has been instrumental in the development of the mobile ticketing application.

Procurement Approach

This procurement was originally handled in accordance with OCTA's Board of Directors (Board)-approved policies and procedures for professional services. The original agreement was awarded on April 15, 2013, in the amount of $215,000. This agreement was amended previously as shown in Attachment A.

It has become necessary to amend the existing agreement for additional services to assist and provide project support in the implementation of the electronic readers. The increase in the maximum obligation of the agreement is based on Four Nines Technologies' hourly rates and anticipated usage for services during the electronic readers' project lifecycle. The proposed Amendment No. 4 to Agreement No. C-2-2095, in the amount of $50,000, will bring the total contract value to $294,500.

Fiscal Impact

Funds for additional consulting services were approved in OCTA's Fiscal Year 2016-17 Budget, Finance and Administration Division, Information Systems Department, Account 1288-7519-D1111-THK.

Summary

Staff requests Board approval for the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement C-2-2095 with Four Nines Technologies, in the amount of $50,000, for additional consulting services and project support for the design and installation of electronic readers, and extend the term of the agreement through December 31, 2017.

Attachment

A. Four Nines Technologies, Agreement No. C-2-2095 Fact Sheet

Prepared by:

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Project Manager
Information Systems
(714) 560-5486

Approved by:

Andrew Oftelie
Executive Director
Finance and Administration
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Virginia Abadessa
Director, Contracts Administration and
Materials Management
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ATTACHMENT A

Four Nines Technologies
Agreement No. C-2-2095 Fact Sheet

1. April 15, 2013, Agreement No. C-2-2095, $215,000, approved by Contracts Administration and Materials Management (CAMM) Department.

    - Develop technical specifications for the development of an account-based, open payment fare collection system.
    - Agreement term effective through March 31, 2014.

2. March 4, 2014, Amendment No. 1 to Agreement No. C-2-2095, $29,500, approved by CAMM Department.

    - Additional consulting services included technical support in conducting a pilot project for the mobile ticketing application.
    - Agreement term was extended to March 31, 2015.

3. February 3, 2015, Amendment No. 2 to Agreement No. C-2-2095, $0, approved by CAMM Department.

    - Additional consulting services to include design review and project support of system-wide mobile ticketing.
    - Agreement term extension to December 31, 2016.

4. November 7, 2016, Amendment No. 3 to Agreement No. C-2-2095, $0, approved by CAMM Department

    - Agreement term extension to March 31, 2017.

5. February 27, 2017, Amendment No. 4 to Agreement No. C-2-2095, $50,000, pending approval by the Board of Directors.

    - Additional consulting services to include design review and project support for the electronic readers fleet-wide installation
    - Agreement term extension to December 31, 2017.

Total committed to Four Nines Technologies, Agreement No. C-2-2094, $294,500.

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Transit Division Performance Measurements Report for the Second Quarter of Fiscal Year 2016-17

Overview

The Orange County Transportation Authority operates fixed-route bus and demand-response paratransit service throughout Orange County and into neighboring counties. This report summarizes the performance measures for the transit services provided during the second quarter of fiscal year 2016-17. These performance measures gauge the safety, courtesy, reliability, and overall quality of the public transit services provided.

Recommendation

Receive and file as an information item.

Background

The Orange County Transportation Authority (OCTA) operates a countywide network of local, community, rail connector, and express bus routes serving over 5,000 bus stops. Fixed-route service operates in a 798 square mile area, serving more than three million residents in 34 cities and unincorporated areas, with connections to transit service in Los Angeles, Riverside, San Bernardino, and San Diego counties. Fixed-route bus service operated by OCTA is referred to as directly-operated fixed-route service (DOFR), while routes operated under contract are referred to as contracted fixed-route service (CFR). OCTA also operates a federally-mandated paratransit service (ACCESS), which is a shared-ride program available for people unable to use the regular fixed-route bus service because of functional limitations. Performance measures for both the fixed-route and ACCESS program are summarized and reported quarterly.

Discussion

This report summarizes the performance measurements for the second quarter of fiscal year 2016-17. The report looks at performance standards for transit system safety, courtesy, and reliability in the areas of preventable vehicle accidents, customer complaints, on-time performance, and miles between road calls (MBRC). Along with these metrics, industry-standard measurements are tracked to assess OCTA transit operations; these measurements are ridership, productivity, farebox recovery ratio, subsidy per boarding, and cost per revenue vehicle hour. In an effort to maintain transparency with the public, these reports are shared on the Transit dashboard found on the OCTA website and are reported to the Board of Directors on a quarterly basis.

Safety – Maintaining a good safety record is one of the most important standards measured, and all three modes of service (DOFR, CFR, ACCESS) continue to exhibit strong performance in this area, exceeding accident frequency standards.

Customer Service – One of OCTA's goals is to ensure all transit services meet performance standards, and that customers receive high-quality service. Despite a significant change in the service plan effective in October, DOFR, CFR, and ACCESS services exceeded the standard in the second quarter. This represents an overall system improvement in customer service.

Reliability – For on-time performance (OTP), overall, the system was within one percent of the standard, with DOFR exceeding the standard, CFR performing within four percent of the standard, and ACCESS performing within one percent of the standard. Efforts continue through the third quarter to improve OTP. Vehicle reliability is measured by MBRC. In the second quarter, ACCESS and DOFR exceeded the standard. During the quarter, new buses continued to replace older equipment, contributing to improvements in vehicle reliability; DOFR improved by 23 percent and CFR improved by 19 percent. OCTA staff continue to work closely with CFR in this area.

Ridership and Productivity – For the second quarter, ridership and productivity for total fixed-route service continued to come in under budget assumptions, and ACCESS ridership and productivity exceeded budget assumptions. In an effort to address declining fixed-route ridership and improve system productivity, the OC Bus 360° Plan was developed and implemented over two services changes, in June and October 2016. The plan reallocated service from lower-demand areas to those with higher-demand, improving frequency and travel times to more customers. Over the next two quarters, OCTA staff will continue to monitor

the impact these changes have had on route performance and identify other strategies for implementation to address system wide performance.

Farebox Recovery Ratio – A minimum farebox recovery ratio (FRR) of 20 percent for all service is required by the California Transportation Development Act (TDA) in order for transit agencies to receive their full share of state sales tax available for public transit purposes. The recent passage of Senate Bill 508 allows transit agencies to now include local funds when calculating their TDA FRR. These local funds consist of property tax revenue, advertising revenue, and Measure M fare stabilization. While OCTA's traditional passenger FRR, now referred to as National Transit Database FRR, came in under 20 percent for the last 12 months, after incorporating the local funds, the TDA FRR held steady compared to the first quarter at 28.5 percent.

Subsidy per Boarding – When considered route by route, this measure may be used to compare the performance of routes within the system relative to the cost effectiveness of each route. The type of route influences the subsidy per boarding, for example, longer distance routes with fewer stops (i.e., express routes) likely have a higher subsidy per boarding when compared to local routes that have frequent stops allowing passengers to board and alight more often, which turns seats over to multiple riders compared to a longer distance route. On a single route, subsidy per boarding may vary during the service day, with lower subsidies per boarding during peak travel times and higher subsidies per boarding at other times. This measure is helpful when considering opportunities to improve overall system performance. The attached report includes two sets of charts, one sorted by subsidy per boarding and one sorted by boardings; other route level data is also provided. When considering adjustments to the overall service plan, this information is critical to the development of the plan.

Operating Cost per Revenue Vehicle Hour – This is one of the industry standards used to measure the cost efficiency of transit service. In the second quarter, all three modes of service operated at a lower cost than prior year actuals for this measure.

Summary

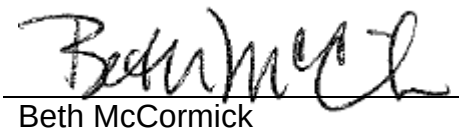
The second quarter of fiscal year 2016-17 showed good performance in all areas of the ACCESS program. For fixed-route services, safety and customer service performance standards were achieved, and while service and vehicle reliability have shown improvement, the contract operator is still working toward attaining the established standards. Steps taken to address reliability show an improvement compared to the first quarter performance. In addition, the OC Bus 360° Plan made significant service changes in October 2016 with the

goal of addressing the system-wide ridership decline and improving system productivity. Staff will continue to monitor key indicators and work to identify other strategies to improve overall system performance.

Attachment

A. Transit Division Performance Measurements, Fiscal Year 2016-17 Second Quarter Report

Approved by:



Beth McCormick
General Manager, Transit Division
714-560-5694

ATTACHMENT A

Transit Division Performance Measurements

OCTA

Fiscal Year 2016-17

Second Quarter Report

About This Report

The Orange County Transportation Authority (OCTA) operates a countywide network of local, community, rail connector, and express bus routes serving over 5,000 bus stops. OCTA also operates federally-mandated paratransit service (ACCESS), a shared-ride program available for people unable to use the regular fixed-route bus service because of functional limitations. Fixed-route bus service operated by OCTA is referred to as directly-operated fixed-route (DOFR) service, while routes operated under contract are referred to as contracted fixed-route (CFR) service. The ACCESS program is a contract-operated demand-response service mandated by the Americans with Disabilities Act that is complementary to the fixed-route service and predominately accounts for the overall paratransit services operated by OCTA. These three services make up the bus transit system and are evaluated by the performance measurements summarized in this report.

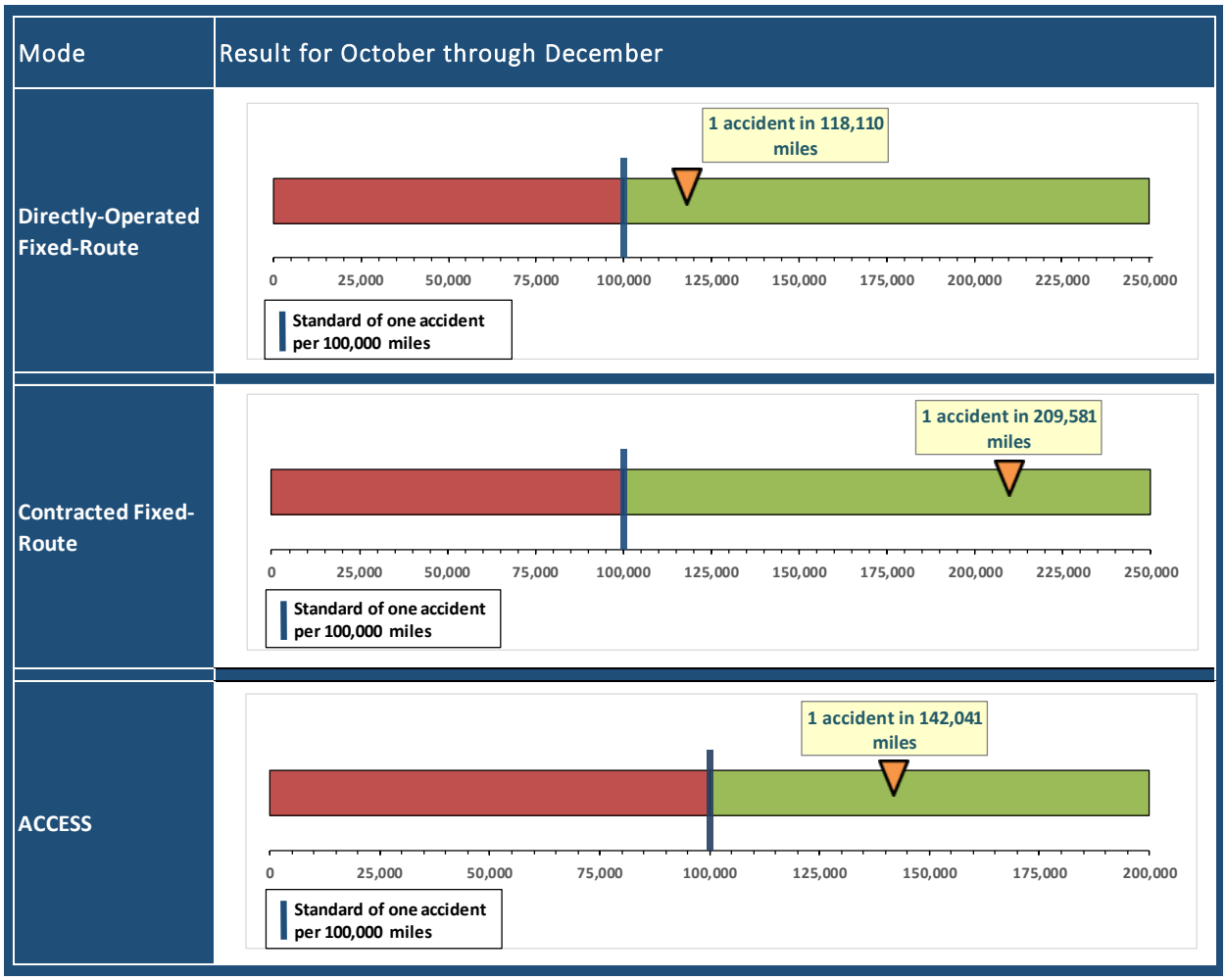
This report tracks transit system safety, courtesy, and reliability in the areas of preventable vehicle accidents, customer complaints, on-time performance (OTP), and miles between road calls (MBRC). Along with these metrics, industry standard measurements are tracked to assess OCTA transit operations; these measurements are ridership, productivity, farebox recovery ratio (FRR), and cost per revenue vehicle hour (RVH). Graphs accompany the details of each indicator showing the standards or goals and the values for the current reporting period. The following sections provide performance information for DOFR, CFR, and ACCESS services.

Safety: Preventable Vehicle Accidents

Preventable vehicle accidents are counts of incidents concerning physical contact between vehicles used for public transit and other vehicles, objects, or pedestrians, where a coach operator failed to do everything reasonable to prevent the accident. The safety standard for DOFR, CFR, and ACCESS services is no more than one vehicle accident per 100,000 miles.

All three modes of service exceeded the safety standard in the second quarter.

Safety is a top priority in the delivery of public transit services. Efforts to include education, campaigns, oversight, and process improvements, are carried out daily to ensure the focus on safety is maintained.

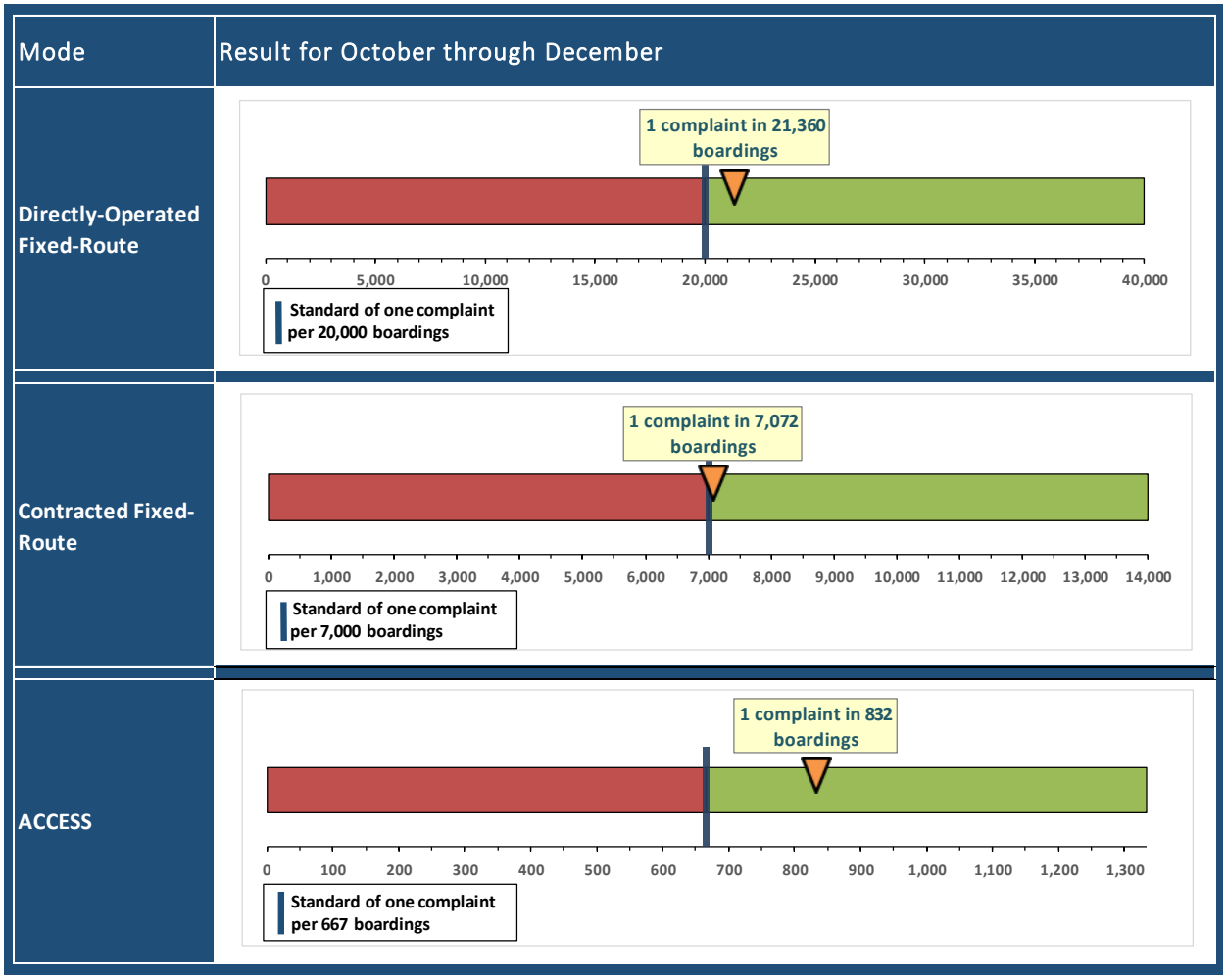


Courtesy: Customer Complaints

Customer complaints are counts of incidents when a rider reports dissatisfaction with the service. The standard adopted by OCTA for DOFR service is no more than one customer complaint per 20,000 boardings; the contractual standard for CFR service is no more than one complaint per 7,000 boardings; and the contractual standard for ACCESS is no more than one complaint per 667 boardings.

All three modes of service exceeded the courtesy standard in the second quarter.

For CFR service, the contractor reviews customer comments with OCTA staff weekly to identify areas for improvement and review progress on an action plan developed to address complaints received. In addition, route-level analysis is conducted, to better understand where specific improvements can be made, including the use of ride-alongs and spot checks at time points. As a result of these efforts, the number of customer complaints for CFR service has met the standard in the second quarter.

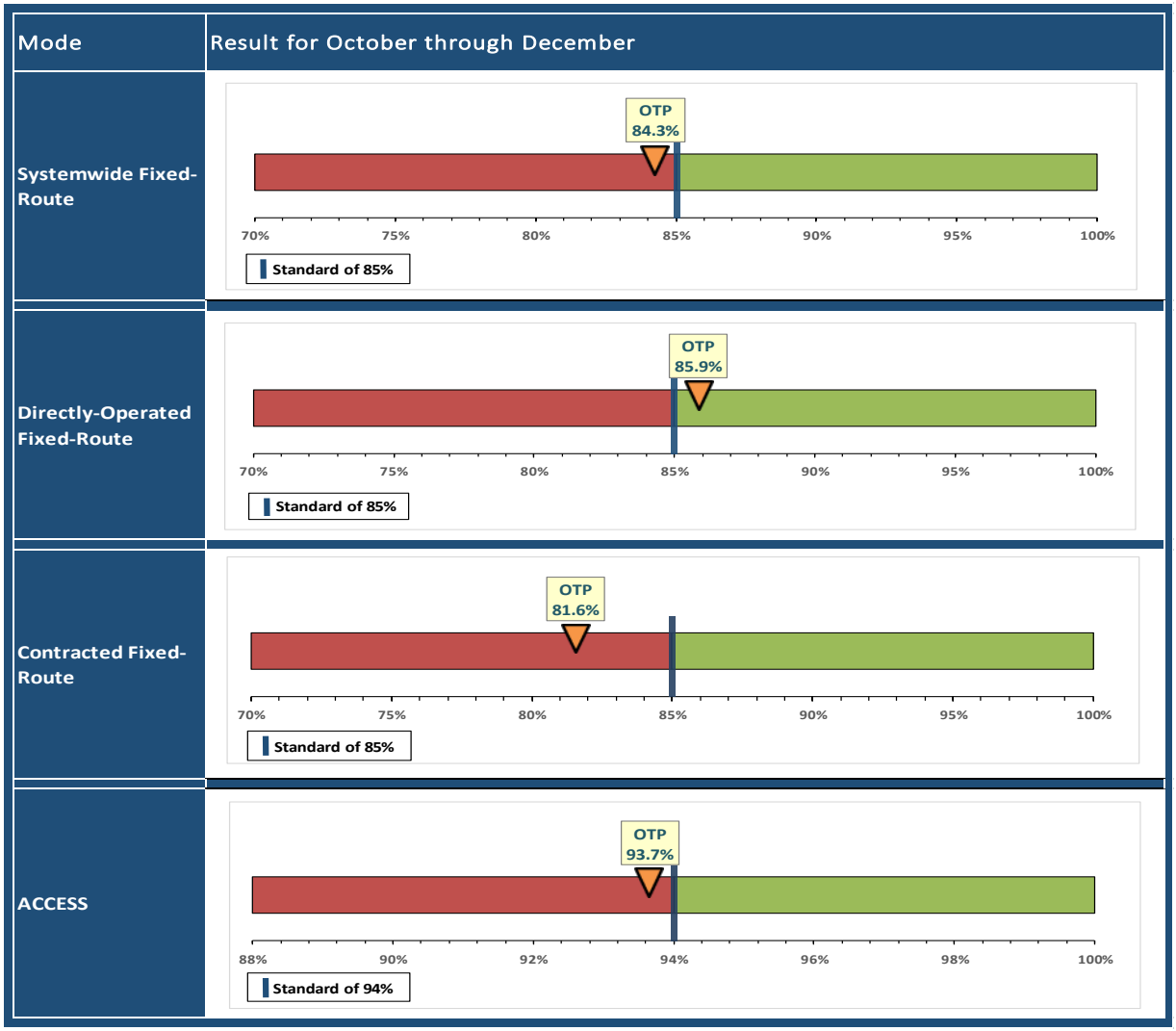


Reliability: On-Time Performance

OTP is a measure of performance evaluating a revenue vehicle's adherence to a planned schedule. For fixed-route service, a trip is considered on-time if it departs the time-point no more than five minutes late. OCTA's system standard for OTP is 85 percent. For ACCESS service, OTP is a measure of performance evaluating a revenue vehicle's adherence to a scheduled pick-up time for transportation on a demand-response trip. A trip is considered on-time as long as the vehicle arrives within a 30-minute window. The ACCESS OTP standard is 94 percent.

DOFR service exceeded the standard; ACCESS service was within one percent of the standard, and CFR service was within four percent of the standard.

For CFR service, the contractor has developed an On Time Performance Improvement Plan, which includes an incentive program for coach operators to give feedback on their routes, road supervisors assigned to closely monitor low performance routes, and data analysis to pinpoint focus areas for improvement. OTP for CFR improved to 83 percent in December 2016. Systemwide, fixed-route service was within one percent of the standard.

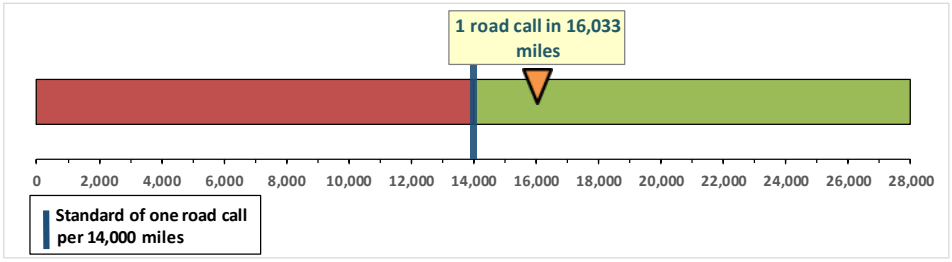
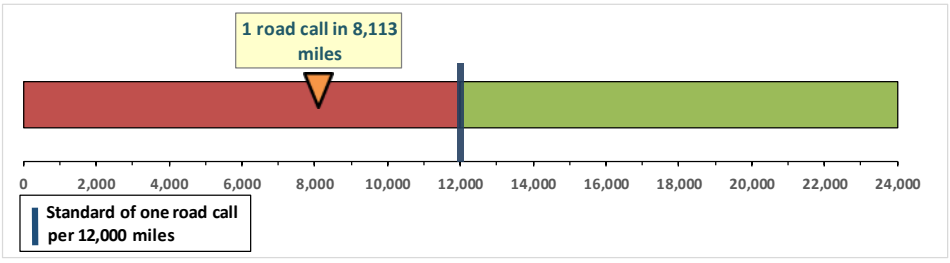
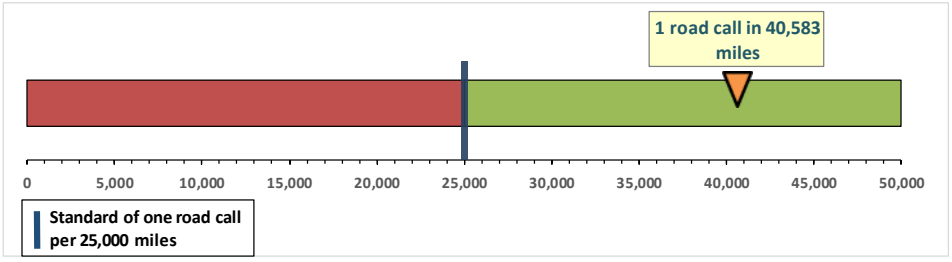


Reliability: Miles Between Road Calls

MBRC is a vehicle reliability performance indicator that measures the average distance in miles that a transit vehicle travels before failure of a vital component forces removal of the vehicle from service. Valid mechanical road calls usually cause a delay in service. The standard adopted by OCTA for DOFR service is 14,000 MBRC; the contractual standard for CFR service is 12,000 MBRC; and the contractual standard for ACCESS is 25,000 MBRC.

In the second quarter, DOFR service met the standard with 16,033 MBRC, which represents a 23 percent improvement over the previous quarter. This increase was influenced in part by the continued replacement of older vehicles in the vehicle fleet. CFR service completed the quarter with 8,113 MBRC, a 19 percent increase from the first quarter. ACCESS service exceeded the standard with 40,583 MBRC.

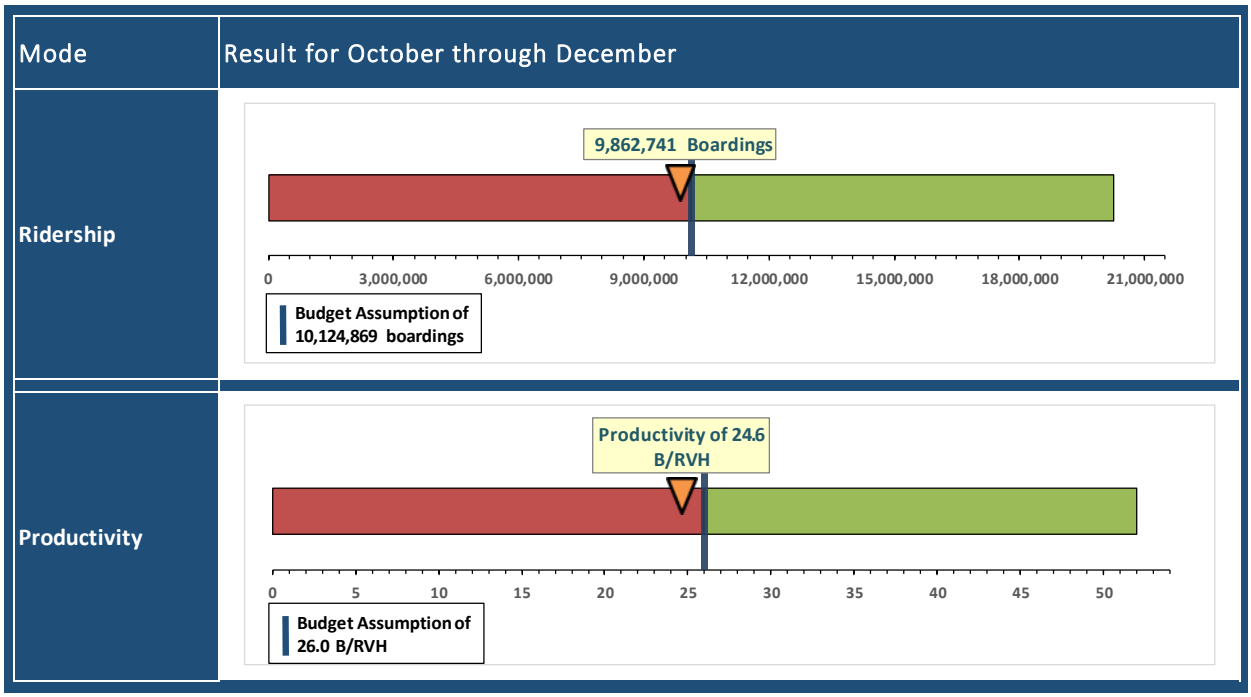
Overall, the majority of the fixed-route road calls were related to engine failures, electrical issues, and charging system failures. Generally, engine and transmission failures are indicative of the age of the fleet. The liquefied natural gas (LNG) vehicles are currently in the process of being replaced and new vehicle deliveries are scheduled to be completed by July 2017. The average age of these LNG vehicles is 15 years.

Mode	Result for October through December
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

Ridership and Productivity – Fixed-Route

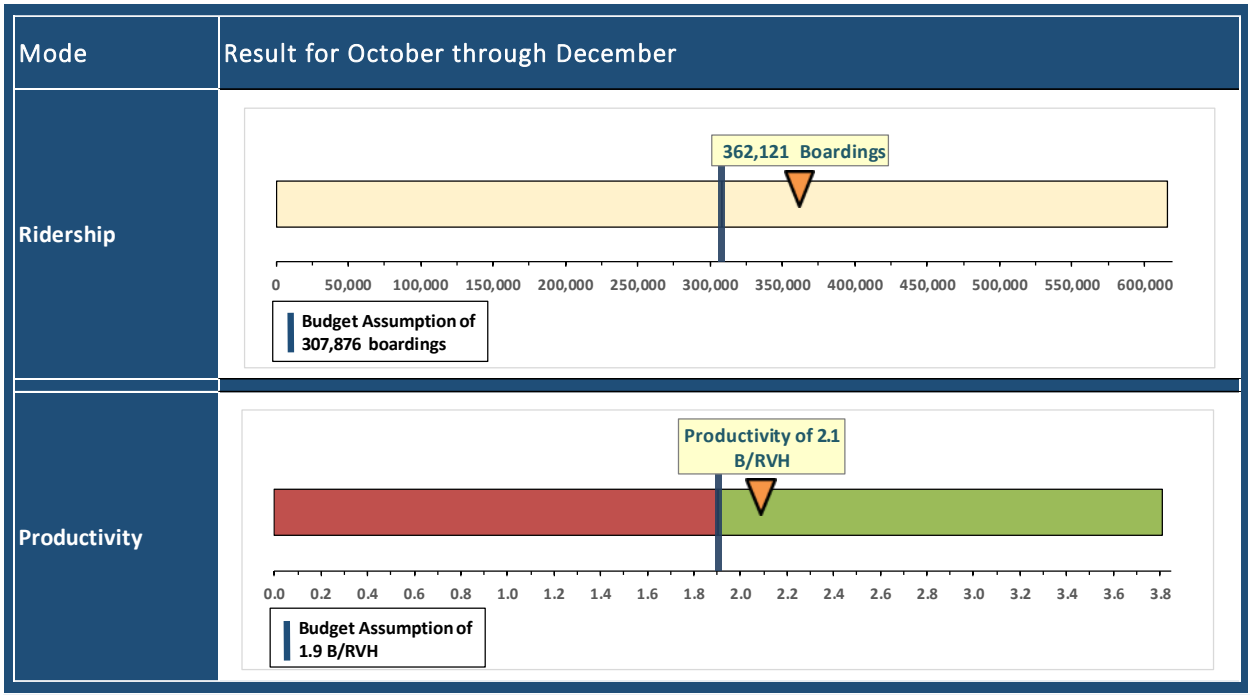
Ridership (or boardings) is the number of rides taken by passengers using public transit and is influenced by the weather, economy, and seasonal variations in demand. Productivity is an industry measure that counts the average number of boardings for each RVH that is provided. This metric is calculated by taking the boardings (B), and dividing it by the number of RVH (B/RVH).

For the second quarter, ridership and productivity for total fixed-route service came in under the goal. Productivity was within one percent of the budget assumption. In an effort to meet community needs and increase ridership, the OC Bus 360° Plan was implemented in June 2016. The plan reallocates resources from low demand areas to those with higher demand, offering faster travel times to more customers.



Ridership and Productivity – ACCESS

For the second quarter, ridership and productivity for ACCESS service exceeded the goal.

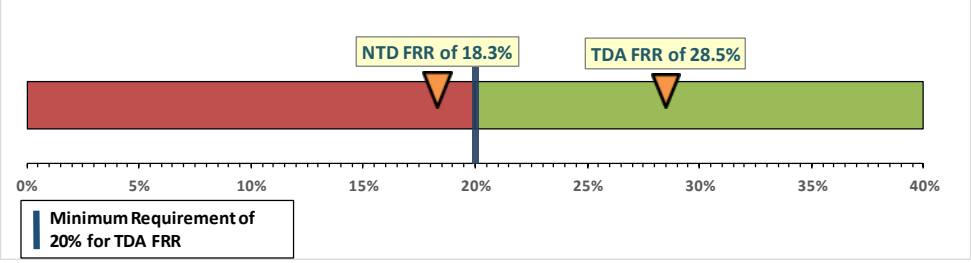


Farebox Recovery Ratio

FRR is a measure of the proportion of operating costs recovered by passenger fares, calculated by dividing the farebox revenue by total operating expenses. As part of the budget development process, a goal is established for each of the modes, as shown in the charts below. A minimum FRR of 20 percent for all service is required by the Transportation Development Act in order for transit agencies to receive their full share of the state sales tax available for public transit purposes.

In an effort to minimize seasonal fluctuations, data shown below reflects actuals over the last 12 months, from December 2015 through November 2016.

FRR, based on the National Transit Database definition in which only passenger fares are included under revenue, did not meet the 20 percent goal. However, as a result of the passage of Senate Bill No. 508 (SB 508), OCTA was able to adjust the FRR to include local funds. SB 508 states, "If fare revenues are insufficient to meet the applicable ratio of fare revenues to operating cost required by this article, an operator may satisfy that requirement by supplementing its fare revenues with local funds. As used in this section, "local funds" means any nonfederal or non-state grant funds or other revenue generated by, earned by, or distributed to an operator." After incorporating property tax revenue, advertising revenue, and Measure M fare stabilization, the adjusted FRR was 28.5 percent.

Mode	Result for December 2015 through November 2016
Systemwide	

Note:
- National Transit Database(NTD) FRR consists of only passenger fares
- Transportation Development Act (TDA) FRR includes passenger fares, property tax revenue, advertising revenue and Measure M fare stabilization

Subsidy per Boarding

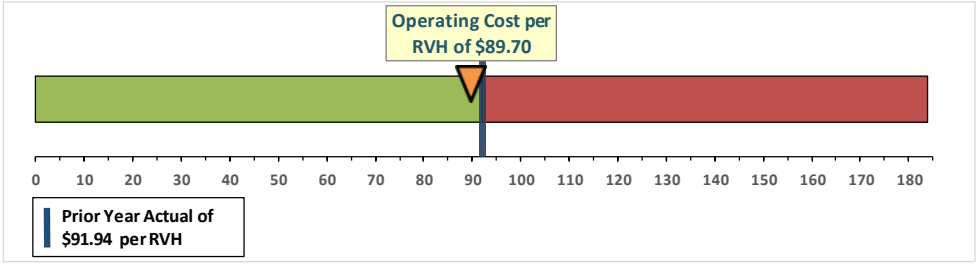
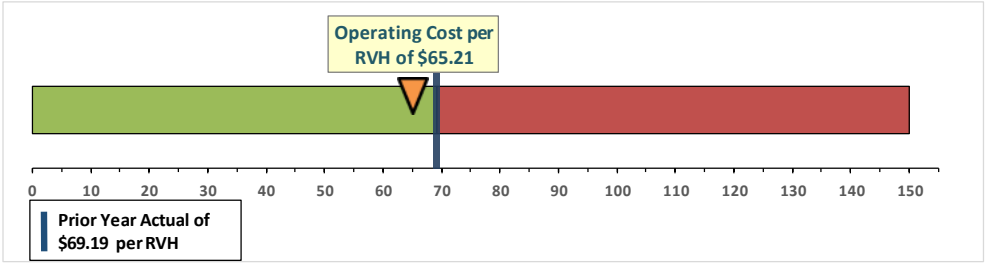
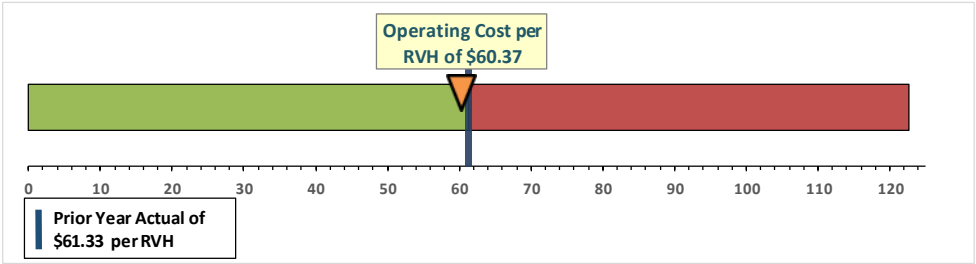
When considered route by route, this measure may be used to compare the performance of the routes within the system relative to the cost effectiveness of each route. The type of route influences the subsidy per boarding, for example, longer distance routes with fewer stops (i.e., express routes) likely have a higher subsidy per boarding when compared to local routes that have frequent stops allowing passengers to board and alight more often, which turns seats over to multiple riders compared to a longer distance route. On a single route, subsidy per boarding may vary during the service day, with lower subsidies per boarding during peak travel times and higher subsidies per boarding at other times. This measure is helpful when considering opportunities to improve overall system performance. The attached report includes two sets of charts, one sorted by subsidy per boarding and one sorted by boardings; other route

level data is also provided. When considering adjustments to the overall service plan, this information is critical to the development of the plan.

Operating Cost per Revenue Vehicle Hour

Cost per RVH is one of the industry standards used to measure the cost efficiency of transit service. It is derived by dividing operating expenses by RVH. In order to provide a more comparable illustration, all metrics below are calculated based on direct operating cost, which excludes capital, general administrative, and other overhead costs.

Similar to the FRR, statistics below depict actuals over the last 12 months. All three services exceed the goal.

Mode	Result for December 2015 through November 2016
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

Performance Evaluation by Route

Continuing efforts are underway to better understand and address ridership trends. The OC Bus 360° Plan, approved by the Board of Directors in March 2016, identifies several strategies to stimulate fixed-route ridership, including targeted marketing, a discounted summer youth pass, development of a mobile ticketing application, re-branding the fixed-route fleet, and improved travel time through the use of express-type service on local routes. In addition, route adjustments were implemented in both June and October 2016 as part of the OC Bus 360° service plan. These adjustments were developed after considering route-level performance. For the remainder of this fiscal year, staff will monitor the impact that these adjustments have had on route performance. In addition, staff will consider other strategies for future implementation to further improve service performance. Performance evaluation is important because it provides:

- A better understanding of where resources are being applied;
- A measure of how well services are being delivered;
- A measure of how well these services are used; and
- An objective basis for decisions regarding future service changes and service deployment.

The tables on the following pages summarize route-level performance through the second three months of fiscal year 2016-17. The first two tables present the route-level performance sorted by routes with the highest net subsidy per boarding to routes with a lower net subsidy per boarding, and the remaining two tables present the same information sorted by routes that have the highest boardings to routes with a lower level of boardings.

A route guide listing all of the routes and their points of origins and destinations is provided on the last page of this report. Route types are grouped by route numbers as follows:

- Routes 1 to 99: Local routes
- Routes 100 to 199: Community routes
- Routes 200 to 299: Intra-county express routes
- Routes 400 to 499: Stationlink routes
- Routes 500 to 599: Bravo! routes
- Routes 600 to 699: Seasonal routes (these are not included on the following charts)
- Routes 700 to 799: Inter-county express routes

OCTA Operating Statistics By Route for Local and Community Services (Sort by Subsidy per Boarding)

Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
021	N	10.1%	$ 11.79	$ 6.42	$ 3.02	$ 2.34	$ 1.06	36,587	$ 105.45	$ 64.79	$ 7.73	10.04	3,645	2	-	-
085	S	12.1%	10.22	5.72	2.69	1.81	1.16	70,994	97.65	62.83	7.26	10.21	6,955	3	-	-
001	S	10.3%	9.82	5.83	2.77	1.22	0.99	317,045	133.63	90.48	8.14	13.93	22,765	9	-	-
076	C	12.6%	8.92	4.89	2.32	1.70	1.04	50,337	126.23	84.56	11.00	15.29	3,292	2	-	-
178	C	12.7%	8.79	4.72	2.17	1.89	1.01	67,935	97.91	62.93	7.70	12.39	5,482	3	-	-
177	S	14.6%	8.60	4.68	2.15	1.77	1.16	48,384	96.87	62.71	7.51	12.12	3,993	2	-	-
167	C	14.2%	8.42	4.45	2.04	1.93	1.07	88,919	96.51	62.63	7.68	12.77	6,965	4	-	-
150	C	15.0%	8.32	4.44	1.91	1.97	1.12	87,078	131.33	87.80	12.97	17.57	4,955	4	-	-
087	S	14.4%	8.11	4.31	2.03	1.77	1.07	48,423	98.55	63.25	6.31	13.30	3,640	2	-	-
153	N	13.7%	8.06	4.73	2.17	1.16	1.09	73,934	95.30	62.36	7.46	11.93	6,199	2	-	-
082	S	17.5%	7.63	3.74	1.76	2.12	1.17	60,562	104.41	64.44	7.03	15.64	3,872	3	-	-
086	C	14.9%	7.46	3.97	1.87	1.63	1.02	79,007	96.40	62.61	7.48	14.06	5,620	3	-	-
079	C	13.4%	7.22	3.98	1.87	1.37	0.91	187,037	96.84	62.68	8.18	14.34	13,045	6	-	-
083	C	15.1%	7.12	3.83	1.82	1.47	1.01	349,711	134.72	91.15	7.47	20.25	17,270	12	-	-
072	C	16.2%	6.49	3.59	1.71	1.19	1.03	179,555	127.27	85.05	10.27	20.12	8,926	5	-	-
070	C	25.2%	6.40	2.16	1.02	3.22	1.07	186,312	104.12	64.71	8.49	24.51	7,600	14	-	-
059	C	19.0%	6.36	3.08	1.45	1.84	1.06	280,018	99.66	63.35	8.19	17.86	15,677	12	-	-
560	C	17.0%	6.30	3.30	1.57	1.43	1.00	390,090	135.21	90.75	11.45	23.04	16,928	13	-	-
091	S	20.0%	6.12	3.30	1.55	1.27	1.21	202,918	98.51	63.18	6.82	16.25	12,485	6	-	-
090	S	19.5%	6.06	3.19	1.50	1.37	1.14	156,978	102.11	64.03	6.89	17.51	8,966	5	-	-
071	N	18.3%	5.98	3.22	1.52	1.24	1.06	310,788	97.35	62.85	7.94	16.78	18,522	9	-	-
024	N	18.9%	5.89	3.22	1.51	1.15	1.10	74,251	96.11	62.52	7.79	16.46	4,511	2	-	-
143	N	18.1%	5.87	3.43	1.58	0.86	1.10	99,668	95.68	62.41	8.36	15.65	6,368	2	-	-
129	N	18.5%	5.74	3.44	1.58	0.72	1.14	118,389	97.24	62.79	7.96	15.79	7,496	2	-	-
026	N	20.5%	5.57	2.79	1.31	1.47	1.06	204,015	97.21	62.71	8.97	18.84	10,830	7	-	-
050	N	17.4%	5.55	2.99	1.42	1.14	0.93	615,901	133.91	89.93	11.58	25.10	24,537	4	-	8
056	N	17.5%	5.51	3.05	1.45	1.01	0.95	212,305	126.82	85.03	11.57	23.27	9,124	5	-	-
054	N	18.2%	5.47	3.09	1.47	0.90	1.01	617,071	136.64	91.65	11.49	24.51	25,173	13	-	-
037	N	19.4%	5.32	2.79	1.33	1.20	0.99	464,616	128.56	85.85	10.22	25.14	18,484	13	-	-
055	C	20.2%	5.28	2.94	1.40	0.94	1.10	685,642	129.66	87.03	11.44	23.83	28,772	15	-	-
030	N	20.1%	5.14	2.74	1.29	1.10	1.01	310,742	96.58	62.67	7.41	19.14	16,236	8	-	-
089	S	22.2%	4.50	2.60	1.22	0.68	1.09	189,293	97.13	62.77	7.68	19.76	9,579	3	-	-
543	N	22.1%	4.39	2.39	1.13	0.87	1.00	592,729	132.37	88.92	11.55	29.28	20,241	12	-	-
070	C	18.6%	4.36	2.96	1.40	0.00	1.00	328,896	130.19	88.84	10.20	24.28	13,545	-	-	-
025	N	23.8%	4.36	2.34	1.10	0.91	1.08	234,405	97.69	62.91	7.75	21.60	10,851	5	-	-
029	N	22.3%	4.24	2.39	1.14	0.71	1.01	1,026,219	131.47	88.32	11.26	28.97	35,419	14	-	2
033	N	23.3%	4.15	2.82	1.33	1.23	0.97	209,804	96.29	62.57	7.71	24.06	8,720	6	-	-
035	N	22.4%	4.15	2.82	1.33	0.00	0.97	429,465	100.49	63.62	8.89	22.25	18,977	9	-	-
047	C	24.6%	3.96	2.23	1.06	0.67	1.07	1,152,912	131.03	87.99	11.30	30.04	38,376	18	-	-
057	C	26.0%	3.83	2.00	0.95	0.87	1.04	1,419,809	133.67	89.80	12.08	33.46	42,429	3	-	17
046	N	26.8%	3.82	1.92	0.90	1.00	1.03	342,550	96.88	62.69	8.33	25.17	13,609	8	-	-
057X	C	27.7%	3.68	1.87	0.89	0.93	1.05	279,832	119.12	79.72	10.84	31.32	8,935	1	-	3
053	C	26.5%	3.44	1.88	0.89	0.67	1.00	1,089,629	128.78	86.20	14.12	34.09	31,962	17	-	-
043	N	26.7%	3.34	1.93	0.92	0.50	1.04	1,122,535	126.27	84.62	12.51	32.53	34,507	13	-	-
038	N	28.0%	3.28	1.72	0.81	0.76	0.98	622,518	98.06	63.00	7.91	27.95	22,276	11	-	-
060	C	25.1%	3.15	1.94	0.92	0.30	0.96	1,016,533	129.73	87.16	11.42	34.00	29,897	7	-	-
066	C	29.4%	3.11	1.68	0.80	0.63	1.03	1,084,011	128.59	86.23	12.06	36.70	29,541	16	-	-
042	N	29.9%	2.86	1.50	0.71	0.65	0.94	857,766	97.50	62.82	8.73	30.90	27,760	13	-	-
064	C	30.0%	2.60	1.51	0.72	0.37	0.95	1,146,624	128.74	86.32	12.86	40.47	28,334	10	-	-

(1) Total bus count (531) is based on PM weekday equipment requirements.

(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.

(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.

(4) C under Zone is Central County, N is North County and S is South County.

OCTA Operating Statistics By Route for Express Service (Sort by Subsidy per Boarding)
Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
794	C	17.4%	$ 35.76	$ 12.28	$ 8.99	$ 14.50	$ 4.48	17,740	$ 173.19	$ 109.71	$ 6.39	6.73	2,637	6	-	-
701	C	8.1%	35.18	16.68	7.29	11.22	2.11	11,457	224.75	153.40	9.54	8.62	1,329	3	-	-
721	N	6.1%	32.65	17.08	7.46	8.11	1.59	15,846	197.23	135.02	6.94	7.55	2,100	3	-	-
211	C	5.5%	31.79	10.24	7.49	14.05	1.04	15,250	120.79	73.90	6.68	6.43	2,370	5	-	-
216	S	5.3%	30.91	10.90	7.98	12.04	1.05	2,373	158.43	94.07	7.03	7.95	298	-	1	-
212	S	5.4%	28.58	10.23	7.49	10.86	1.02	5,263	144.26	82.88	7.38	7.70	684	-	2	-
206	C	6.6%	26.76	8.64	6.33	11.79	1.05	10,906	150.28	85.23	7.55	9.38	1,163	3	-	-
213	N	8.6%	19.55	6.24	4.56	8.75	1.01	19,588	130.58	74.83	7.43	11.06	1,772	4	-	-

(1) Total bus count (531) is based on PM weekday equipment requirements.
(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.
(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.
(4) C under Zone is Central County, N is North County and S is South County.

OCTA Operating Statistics By Route for Stationlink Service (Sort by Subsidy per Boarding)
Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
430	N	2.5%	$ 56.94	$ 21.06	$ 16.30	$ 19.58	$ 0.95	2,919	$ 133.54	$ 74.69	$ 15.21	3.48	838	-	2	-
490	S	3.9%	37.58	13.33	10.32	13.92	0.95	4,104	136.62	75.63	12.62	5.55	739	-	2	-
463	C	5.5%	35.53	9.20	7.12	19.21	0.96	11,156	135.12	76.03	13.21	7.82	1,426	5	-	-
411	N	4.8%	30.04	10.62	8.22	11.20	0.96	2,552	117.58	71.00	13.04	5.94	430	-	1	-
480	C	8.4%	17.71	5.42	4.20	8.08	0.88	10,602	132.37	74.81	11.37	12.60	841	2	-	-
472	C	12.8%	14.52	3.64	2.82	8.05	0.95	15,972	127.65	73.66	10.32	17.22	928	3	-	-
473	C	13.7%	11.97	3.22	2.49	6.26	0.91	20,542	133.75	74.71	12.49	20.21	1,016	3	-	-
454	N	13.8%	10.92	3.13	2.42	5.37	0.88	23,939	141.43	76.58	18.68	21.99	1,088	3	-	-
453	N	15.8%	9.54	2.80	2.17	4.57	0.93	18,755	137.59	75.88	20.62	23.29	805	2	-	-
462	C	17.6%	8.56	2.52	1.95	4.09	0.96	20,947	119.39	71.37	18.13	22.03	951	2	-	-

(1) Total bus count (531) is based on PM weekday equipment requirements.
(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.
(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.
(4) C under Zone is Central County, N is North County and S is South County.

OCTA Operating Statistics By Route for Local and Community Services (Sort by Boardings)

Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
057	C	26.0%	$ 3.83	$ 2.00	$ 0.95	$ 0.87	$ 1.04	1,419,809	$ 133.67	$ 89.80	$ 12.08	33.46	42,429	3	-	17
047	C	24.6%	3.96	2.23	1.06	0.67	1.07	1,152,912	131.03	87.99	11.30	30.04	38,376	18	-	-
064	C	30.0%	2.60	1.51	0.72	0.37	0.95	1,146,624	128.74	86.32	12.86	40.47	28,334	10	-	-
043	N	26.7%	3.34	1.93	0.92	0.50	1.04	1,122,535	126.27	84.62	12.51	32.53	34,507	13	-	-
053	C	26.5%	3.44	1.88	0.89	0.67	1.00	1,089,629	128.78	86.20	14.12	34.09	31,962	17	-	-
066	C	29.4%	3.11	1.68	0.80	0.63	1.03	1,084,011	128.59	86.23	12.06	36.70	29,541	16	-	-
029	N	22.3%	4.24	2.39	1.14	0.71	1.01	1,026,219	131.47	88.32	11.26	28.97	35,419	14	-	2
060	C	25.1%	3.15	1.94	0.92	0.30	0.96	1,016,533	129.73	87.16	11.42	34.00	29,897	7	-	-
042	N	29.9%	2.86	1.50	0.71	0.65	0.94	857,766	97.50	62.82	8.73	30.90	27,760	13	-	-
055	C	20.2%	5.28	2.94	1.40	0.94	1.10	685,642	129.66	87.03	11.44	23.83	28,772	15	-	-
038	N	28.0%	3.28	1.72	0.81	0.76	0.98	622,518	98.06	63.00	7.91	27.95	22,276	11	-	-
054	N	18.2%	5.47	3.09	1.47	0.90	1.01	617,071	136.64	91.65	11.49	24.51	25,173	13	-	-
050	N	17.4%	5.55	2.99	1.42	1.14	0.93	615,901	133.91	89.93	11.58	25.10	24,537	4	-	8
543	N	22.1%	4.39	2.39	1.13	0.87	1.00	592,729	132.37	88.92	11.55	29.28	20,241	12	-	-
037	N	19.4%	5.32	2.79	1.33	1.20	0.99	464,616	128.56	85.85	10.22	25.14	18,484	13	-	-
035	N	22.4%	4.15	2.82	1.33	0.00	0.97	429,465	100.49	63.62	8.89	22.25	18,977	9	-	-
560	C	17.0%	6.30	3.30	1.57	1.43	1.00	390,090	135.21	90.75	11.45	23.04	16,928	13	-	-
083	C	15.1%	7.12	3.83	1.82	1.47	1.01	349,711	134.72	91.15	7.47	20.25	17,270	12	-	-
046	N	26.8%	3.82	1.92	0.90	1.00	1.03	342,550	96.88	62.69	8.33	25.17	13,609	8	-	-
070	C	18.6%	4.36	2.96	1.40	0.00	1.00	328,896	130.19	88.84	10.20	24.28	13,545	-	-	-
001	S	10.3%	9.82	5.83	2.77	1.22	0.99	317,045	133.63	90.48	8.14	13.93	22,765	9	-	-
071	N	18.3%	5.98	3.22	1.52	1.24	1.06	310,788	97.35	62.85	7.94	16.78	18,522	9	-	-
030	N	20.1%	5.14	2.74	1.29	1.10	1.01	310,742	96.58	62.67	7.41	19.14	16,236	8	-	-
059	C	19.0%	6.36	3.08	1.45	1.84	1.06	280,018	99.66	63.35	8.19	17.86	15,677	12	-	-
057X	C	27.7%	3.68	1.87	0.89	0.93	1.05	279,832	119.12	79.72	10.84	31.32	8,935	1	-	3
025	N	23.8%	4.36	2.34	1.10	0.91	1.08	234,405	97.69	62.91	7.75	21.60	10,851	5	-	-
056	N	17.5%	5.51	3.05	1.45	1.01	0.95	212,305	126.82	85.03	11.57	23.27	9,124	5	-	-
033	N	23.3%	4.15	2.82	1.33	1.23	0.97	209,804	96.29	62.57	7.71	24.06	8,720	6	-	-
026	N	20.5%	5.57	2.79	1.31	1.47	1.06	204,015	97.21	62.71	8.97	18.84	10,830	7	-	-
091	S	20.0%	6.12	3.30	1.55	1.27	1.21	202,918	98.51	63.18	6.82	16.25	12,485	6	-	-
089	S	22.2%	4.50	2.60	1.22	0.68	1.09	189,293	97.13	62.77	7.68	19.76	9,579	3	-	-
079	C	13.4%	7.22	3.98	1.87	1.37	0.91	187,037	96.84	62.68	8.18	14.34	13,045	6	-	-
070	C	25.2%	6.40	2.16	1.02	3.22	1.07	186,312	104.12	64.71	8.49	24.51	7,600	14	-	-
072	C	16.2%	6.49	3.59	1.71	1.19	1.03	179,555	127.27	85.05	10.27	20.12	8,926	5	-	-
090	S	19.5%	6.06	3.19	1.50	1.37	1.14	156,978	102.11	64.03	6.89	17.51	8,966	5	-	-
129	N	18.5%	5.74	3.44	1.58	0.72	1.14	118,389	97.24	62.79	7.96	15.79	7,496	2	-	-
143	N	18.1%	5.87	3.43	1.58	0.86	1.10	99,668	95.68	62.41	8.36	15.65	6,368	2	-	-
167	C	14.2%	8.42	4.45	2.04	1.93	1.07	88,919	96.51	62.63	7.68	12.77	6,965	4	-	-
150	C	15.0%	8.32	4.44	1.91	1.97	1.12	87,078	131.33	87.80	12.97	17.57	4,955	4	-	-
086	C	14.9%	7.46	3.97	1.87	1.63	1.02	79,007	96.40	62.61	7.48	14.06	5,620	3	-	-
024	N	18.9%	5.89	3.22	1.51	1.15	1.10	74,251	96.11	62.52	7.79	16.46	4,511	2	-	-
153	N	13.7%	8.06	4.73	2.17	1.16	1.09	73,934	95.30	62.36	7.46	11.93	6,199	2	-	-
085	S	12.1%	10.22	5.72	2.69	1.81	1.16	70,994	97.65	62.83	7.26	10.21	6,955	3	-	-
178	C	12.7%	8.79	4.72	2.17	1.89	1.01	67,935	97.91	62.93	7.70	12.39	5,482	3	-	-
082	S	17.5%	7.63	3.74	1.76	2.12	1.17	60,562	104.41	64.44	7.03	15.64	3,872	3	-	-
076	C	12.6%	8.92	4.89	2.32	1.70	1.04	50,337	126.23	84.56	11.00	15.29	3,292	2	-	-
087	S	14.4%	8.11	4.31	2.03	1.77	1.07	48,423	98.55	63.25	6.31	13.30	3,640	2	-	-
177	S	14.6%	8.60	4.68	2.15	1.77	1.16	48,384	96.87	62.71	7.51	12.12	3,993	2	-	-
021	N	10.1%	11.79	6.42	3.02	2.34	1.06	36,587	105.45	64.79	7.73	10.04	3,645	2	-	-

(1) Total bus count (531) is based on PM weekday equipment requirements.

(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.

(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.

(4) C under Zone is Central County, N is North County and S is South County.

OCTA Operating Statistics By Route for Express Service (Sort by Boardings)
Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
213	N	8.6%	$ 19.55	$ 6.24	$ 4.56	$ 8.75	$ 1.01	19,588	$ 130.58	$ 74.83	$ 7.43	11.06	1,772	4	-	-
794	C	17.4%	35.76	12.28	8.99	14.50	4.48	17,740	173.19	109.71	6.39	6.73	2,637	6	-	-
721	N	6.1%	32.65	17.08	7.46	8.11	1.59	15,846	197.23	135.02	6.94	7.55	2,100	3	-	-
211	C	5.5%	31.79	10.24	7.49	14.05	1.04	15,250	120.79	73.90	6.68	6.43	2,370	5	-	-
701	C	8.1%	35.18	16.68	7.29	11.22	2.11	11,457	224.75	153.40	9.54	8.62	1,329	3	-	-
206	C	6.6%	26.76	8.64	6.33	11.79	1.05	10,906	150.28	85.23	7.55	9.38	1,163	3	-	-
212	S	5.4%	28.58	10.23	7.49	10.86	1.02	5,263	144.26	82.88	7.38	7.70	684	-	2	-
216	S	5.3%	30.91	10.90	7.98	12.04	1.05	2,373	158.43	94.07	7.03	7.95	298	-	1	-

(1) Total bus count (531) is based on PM weekday equipment requirements.
(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.
(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.
(4) C under Zone is Central County, N is North County and S is South County.

OCTA Operating Statistics By Route for Stationlink Service (Sort by Boardings)
Fiscal Year 2016-17 Through Q2

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
454	N	13.8%	$ 10.92	$ 3.13	$ 2.42	$ 5.37	$ 0.88	23,939	$ 141.43	$ 76.58	$ 18.68	21.99	1,088	3	-	-
462	C	17.6%	8.56	2.52	1.95	4.09	0.96	20,947	119.39	71.37	18.13	22.03	951	2	-	-
473	C	13.7%	11.97	3.22	2.49	6.26	0.91	20,542	133.75	74.71	12.49	20.21	1,016	3	-	-
453	N	15.8%	9.54	2.80	2.17	4.57	0.93	18,755	137.59	75.88	20.62	23.29	805	2	-	-
472	C	12.8%	14.52	3.64	2.82	8.05	0.95	15,972	127.65	73.66	10.32	17.22	928	3	-	-
463	C	5.5%	35.53	9.20	7.12	19.21	0.96	11,156	135.12	76.03	13.21	7.82	1,426	5	-	-
480	C	8.4%	17.71	5.42	4.20	8.08	0.88	10,602	132.37	74.81	11.37	12.60	841	2	-	-
490	S	3.9%	37.58	13.33	10.32	13.92	0.95	4,104	136.62	75.63	12.62	5.55	739	-	2	-
430	N	2.5%	56.94	21.06	16.30	19.58	0.95	2,919	133.54	74.69	15.21	3.48	838	-	2	-
411	N	4.8%	30.04	10.62	8.22	11.20	0.96	2,552	117.58	71.00	13.04	5.94	430	-	1	-

(1) Total bus count (531) is based on PM weekday equipment requirements.
(2) Bus count for route 57X is estimate based on total route 57 equipment requirement.
(3) Routes 20,175,187,188,191,193,464,757,758 removed due to elimination of the routes during October service change. This accounts for roughly 112K boardings and 15K RVH in FY 2017.
(4) C under Zone is Central County, N is North County and S is South County.

Special Services: The Little Saigon Shuttle

In addition to the regular services, OCTA has provided special services to accommodate the need of the community. In the second quarter, OCTA has partnered with the City of Westminster to offer new Project V shuttle service.

The Little Saigon Shuttle in Westminster was implemented on October 31, 2016. The service consists of approximately sixteen daily revenue vehicle hours, which connect passengers to more than four hundred restaurants and three thousand five hundred businesses. In an effort to promote the Little Saigon Shuttle, OCTA launched a Little Saigon Event on October 29 to introduce the new service to the community.

Special Services: The MV Shuttle

On October 10, 2016, the City of Mission Viejo, partnering with OCTA, and its Project V Community-Based Transit grant program, began transporting passengers as part of a citywide program to meet the needs of the community. The City of Mission Viejo was one of a handful of Orange County cities to offer this kind of transit shuttle for residents.

The MV Shuttle provides transportation from the Norman P. Murray Community and Senior Center to the Laguna Niguel/Mission Viejo train station using La Paz and Felipe roads, Marguerite Parkway, Medical Center Road and Crown Valley Parkway. The route also includes service to Mission Hospital, The Shops at Mission Viejo, Saddleback College and Capistrano Valley High School (at start and dismissal times).

The service includes two shuttles running between the Norman P. Murray Community and Senior Center and Metrolink station around every 45 minutes. Service will run Monday through Friday from 6 a.m. to 6:30 p.m. and will be free for the first 90 days to encourage folks to ride.

Special Services: The Tamale Festival Shuttle

The La Habra shuttle, funded through Project V, offered free service to La Habra's Tamale Festival on November 27, 2016. Free admission was offered to all the attendees. The festival featured: tamale vendors, food vendors, two stages of entertainment, DJ/Emcee Jimmy Reyes, kids area, pictures with Santa, tamale making demonstrations hosted by Northgate Market, a tree lighting ceremony, dance performances, contests, and more! There were musical performances by: Power House, Samantha Elizondo, Soto Band, and the Grammy Winning Mariachi Divas.

Route Reference Table

Route	Route Description	Main Street	Route Category
1	Long Beach - San Clemente	via Pacific Coast Hwy	LOCAL
20*	La Habra - Brea	via Imperial Hwy	LOCAL
21	Buena Park - Huntington Beach	via Valley View St/ Bolsa Chica Rd	LOCAL
24	Buena Park - Mall of Orange	via Malvern Ave/ Chapman Ave/ Tustin Ave	LOCAL
25	Fullerton - Huntington Beach	via Knott Ave/ Goldenwest St	LOCAL
26	Buena Park - Yorba Linda	via Commonwealth Ave/ Yorba Linda Blvd	LOCAL
29	La Habra - Huntington Beach	via Beach Blvd	LOCAL
30	Cerritos - Anaheim	via Orangethorpe Ave	LOCAL
33	Fullerton - Huntington Beach	via Magnolia St	LOCAL
35	Fullerton - Huntington Beach	via Brookhurst St	LOCAL
37	La Habra - Fountain Valley	via Euclid St	LOCAL
38	Lakewood - Anaheim Hills	via Del Amo Blvd/ La Palma Ave	LOCAL
42	Orange - Seal Beach	via Seal Beach Blvd/ Los Alamitos Blvd/ Lincoln Ave	LOCAL
43	Fullerton - Costa Mesa	via Harbor Blvd	LOCAL
46	Long Beach - Orange	via Ball Road/ Taft Ave	LOCAL
47	Fullerton - Newport Beach	via Anaheim Blvd/ Fairview St	LOCAL
50	Long Beach - Orange	via Katella Ave	LOCAL
53	Orange - Irvine	via Main St	LOCAL
54	Garden Grove - Orange	via Chapman Ave	LOCAL
55	Santa Ana - Newport Beach	via Standard Ave/ Bristol St/ Fairview St/ 17th St	LOCAL
56	Garden Grove - Orange	via Garden Grove Blvd	LOCAL
57	Brea - Newport Beach	via State College Blvd/ Bristol St	LOCAL
59	Anaheim - Irvine	via Kraemer Blvd/ Glassell St/ Grand Ave/ Von Karman Ave	LOCAL
60	Long Beach - Tustin	via Westminster Ave/ 17th St	LOCAL
64	Huntington Beach - Tustin	via Bolsa Ave/ 1st St	LOCAL
66	Huntington Beach - Irvine	via McFadden Ave/ Walnut Ave	LOCAL
70	Sunset Beach - Tustin	via Edinger Ave	LOCAL
71	Yorba Linda - Newport Beach	via Tustin Ave/ Red Hill Ave/ Newport Blvd	LOCAL
72	Sunset Beach - Tustin	via Warner Ave	LOCAL
76	Huntington Beach - Newport Beach	via Talbert Ave/ MacArthur Blvd	LOCAL
79	Tustin - Newport Beach	via Irvine Blvd/ Culver Dr/ University Ave	LOCAL
82	Mission Viejo - Rancho Santa Margarita	via Portola Pkwy/ Santa Margarita Pkwy/ Antonio Pkwy/ Crown Valley Pkwy	LOCAL
83	Anaheim - Laguna Hills	via 5 Fwy/ Main St	LOCAL
85	Mission Viejo - Dana Point	via Marguerite Pkwy/ Crown Valley Pkwy	LOCAL
86	Costa Mesa - Mission Viejo	via Alton Pkwy/ Jeronimo Rd	LOCAL
87	Rancho Santa Margarita - Laguna Niguel	via Alicia Pkwy	LOCAL
89	Lake Forest - Laguna Beach	via El Toro Rd/ Laguna Canyon Rd	LOCAL
90	Tustin - Dana Point	via Irvine Center Dr/ Moulton Pkwy/ Golden Lantern St	LOCAL
91	Mission Viejo - Laguna Hills	via Paseo de Valencia/ Camino Capistrano/ Del Obispo St	LOCAL
129	La Habra - Anaheim	via La Habra Blvd/ Brea Blvd/ Birch St/ Kraemer Blvd	COMMUNITY
143	La Habra - Brea	via Whittier Blvd/ Harbor Blvd/ Brea Blvd/ Birch St	COMMUNITY
150	Santa Ana to Costa Mesa	via Fairview St/ Flower St	COMMUNITY
153	Brea - Orange	via Placentia Ave	COMMUNITY
167	Anaheim - Irvine	via Tustin Ave/ Hewes St/ Bryan Ave	COMMUNITY
175*	Irvine	via Yale Ave/ Campus Dr	COMMUNITY
177	Foothill Ranch - Laguna Hills	via Lake Forest Dr/ Muirlands Blvd/ Los Alisos Blvd	COMMUNITY
178	Huntington Beach - Irvine	via Adams Ave/ Birch St/ Campus Dr	COMMUNITY
187*	Laguna Hills - Dana Point	via El Toro Rd/ Aliso Creek Rd/ Niguel Rd	COMMUNITY
188*	Laguna Hills - Irvine	via Moulton Pkwy/ Irvine Center Dr/ Alton Pkwy/ Ridge Route	COMMUNITY
191*	Mission Viejo - San Clemente	via Rancho Viejo Rd/ Camino Capistrano/ El Camino Real	COMMUNITY
193*	Contracted Community	via Camino de los Mares/ Camino Vera Cruz/ Avenida Pico	COMMUNITY
206	Santa Ana - Lake Forest	via 5 Fwy	EXPRESS BUS
211	Irvine - Seal Beach	via 405 Fwy	EXPRESS BUS
212	Irvine - San Juan Capistrano	via 405 Fwy	EXPRESS BUS
213	Brea - Fullerton - Placenta - Irvine	via 55 Fwy	EXPRESS BUS
216	Costa Mesa - San Juan Capistrano	via 405 Fwy	EXPRESS BUS
411	Anaheim Canyon Metrolink Station	via Coronado St/ La Palma Ave	STATIONLINK
430	Anaheim Amtrak Station - Anaheim	via Katella Ave/ Harbor Blvd/ Ball Rd	STATIONLINK
453	Orange Metrolink Station - Orange	via Chapman Ave/ Main St/ La Veta Ave	STATIONLINK
454	Orange Metrolink Station - The Block	via Chapman Ave/ Metropolitan Dr	STATIONLINK
462	Santa Ana Depot - Civic Center	via Santa Ana Blvd/ Civic Center Dr	STATIONLINK
463	Santa Ana Depot to Imperial Promenade	via Grand Ave	STATIONLINK
464*	Santa Ana Depot - Costa Mesa	via 5 Fwy/ 55 Fwy/ Sunflower Ave	STATIONLINK
472	Tustin Metrolink Station to Irvine	via Edinger Ave/ Red Hill Ave/ Campus Dr/ Jamboree Rd	STATIONLINK
473	Tustin Metrolink Station to UCI	via Edinger Ave/ Harvard Ave	STATIONLINK
480	Irvine Metrolink Station - Irvine Spectrum	via Alton Pkwy/ Bake Pkwy/ Lake Forest Dr	STATIONLINK
490	Laguna Niguel Train Station	via Crown Valley Pkwy/ Moulton Pkwy/ Aliso Viejo	STATIONLINK
543	Fullerton - Costa Mesa	via Harbor Blvd	BRAVO
560	Santa Ana to Long Beach	via 17th St/ Wesminster Blvd	BRAVO
701	Los Angeles - Huntington Beach Express	via 405 Fwy/ 605 Fwy/ 105 Fwy/ 110 Fwy	EXPRESS BUS
721	Los Angeles - Fullerton Express	via 110 Fwy/ 91 Fwy	EXPRESS BUS
757*	Pomona - Santa Ana Express	via 57 Fwy	EXPRESS BUS
758*	Chino - Irvine Spectrum Express	via 57 Fwy/ 5 Fwy	EXPRESS BUS
794	Riverside / Corona to South Coast Metro Ex	via 91 Fwy/ 55 Fwy	EXPRESS BUS

TRANSIT DIVISION PERFORMANCE MEASUREMENTS REPORT

For the Second Quarter of

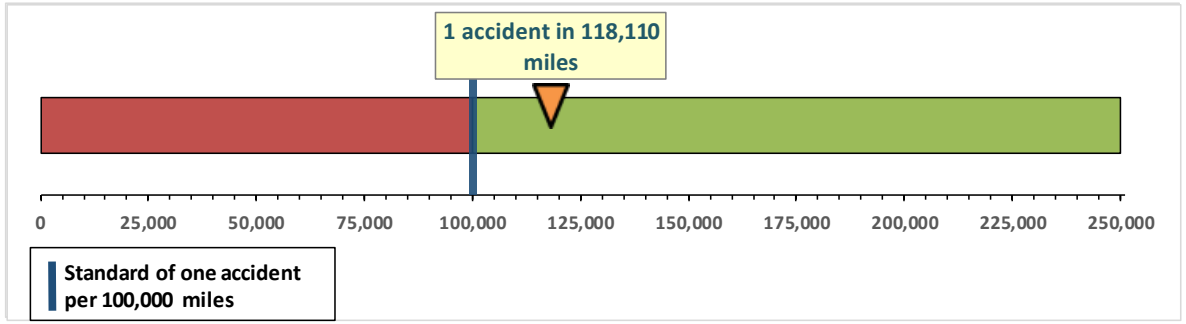
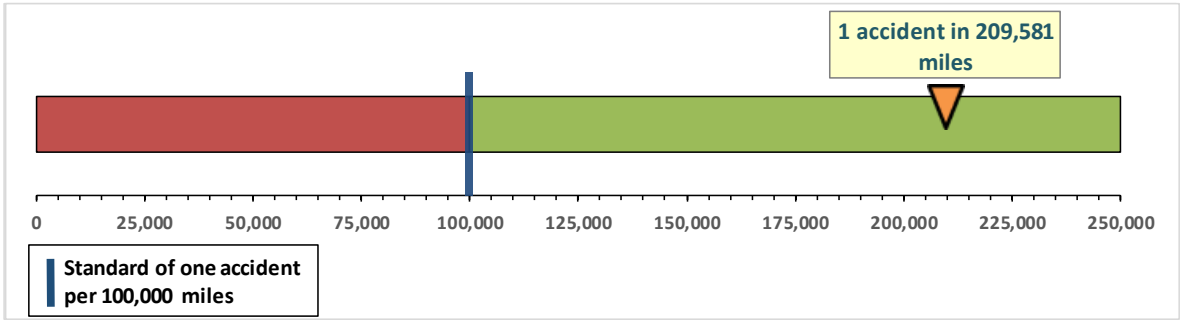
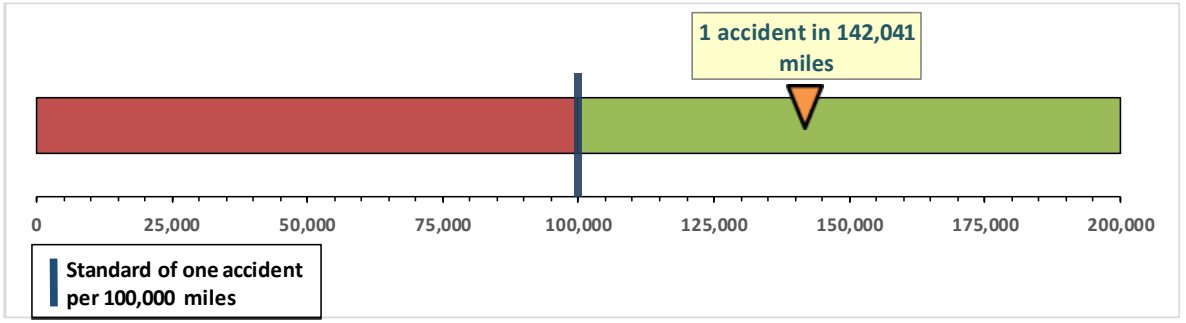
Fiscal Year 2016-17

OCTA

Performance Measurements

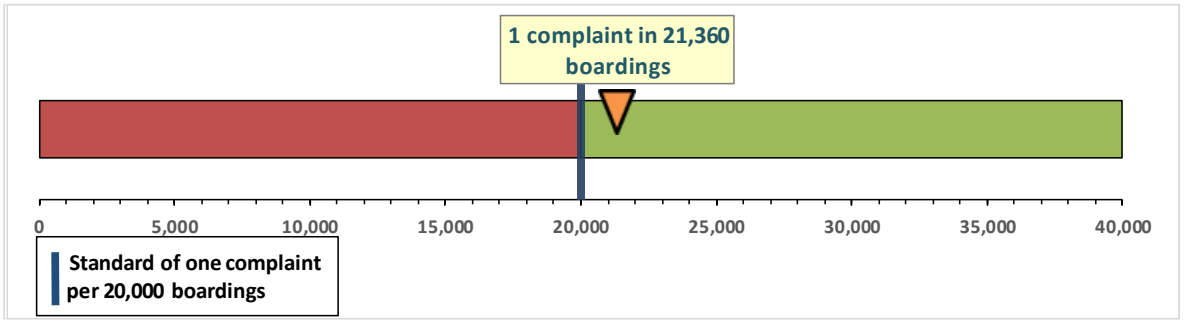
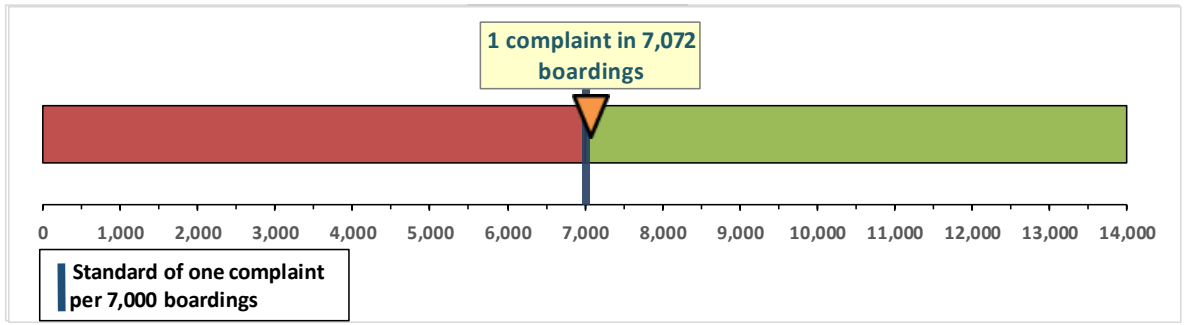
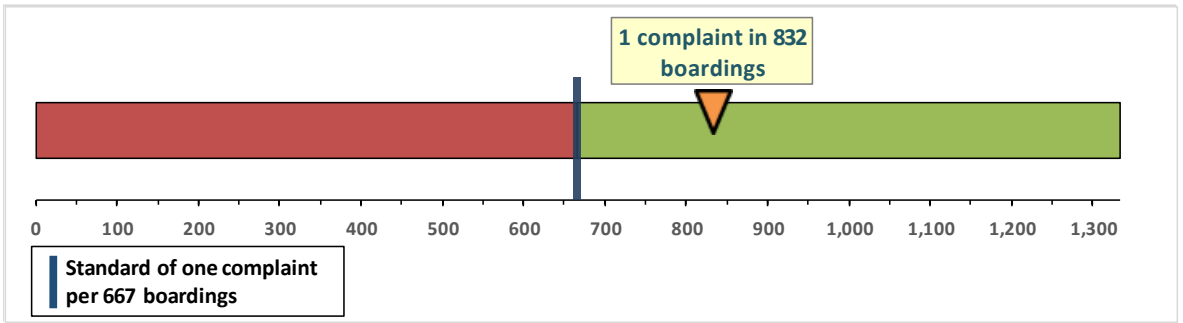
- Safety – Preventable Vehicle Accidents
- Courtesy – Customer Complaints
- Reliability – On-Time Performance (OTP) and Miles Between Road Calls (MBRC)
- Ridership and Productivity
- Farebox Recovery Ratio (FRR)
- Operating Cost per Revenue Vehicle Hour (RVH)
- Performance by Route

Safety

Mode	Result for October through December
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

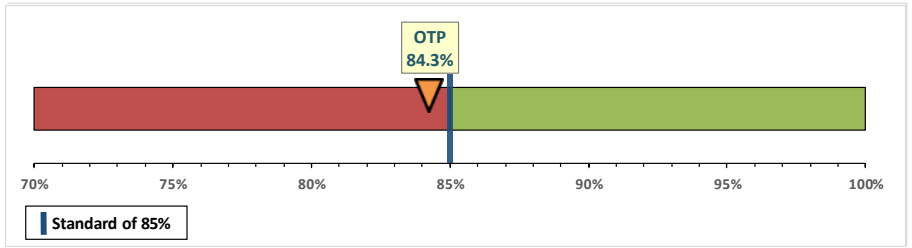
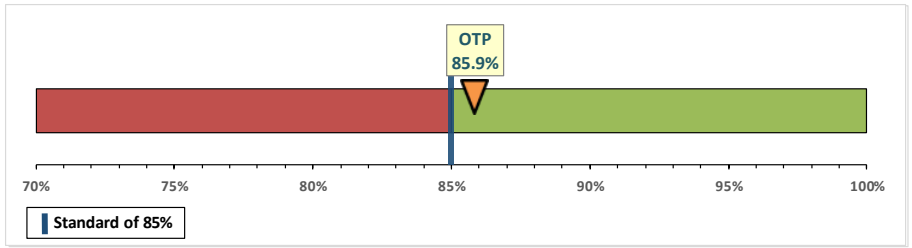
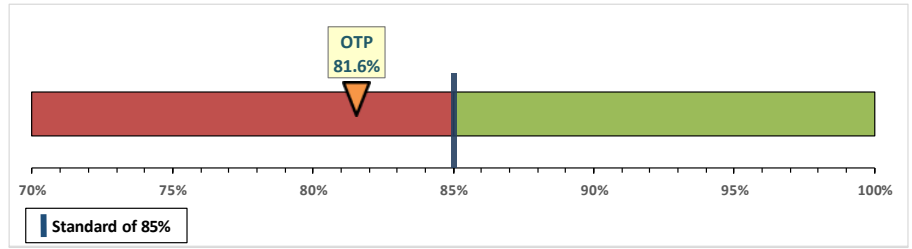
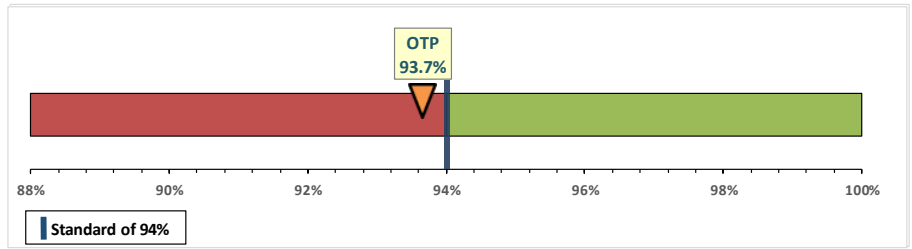
- All three modes of service exceeded the safety standard

Courtesy

Mode	Result for October through December
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

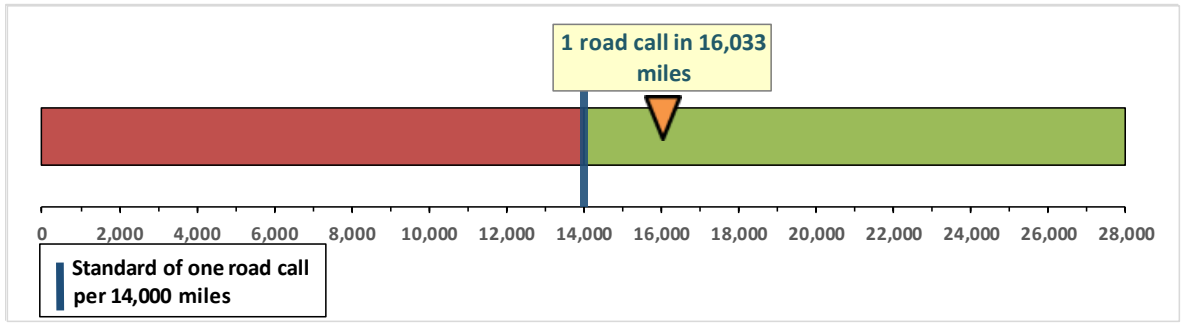
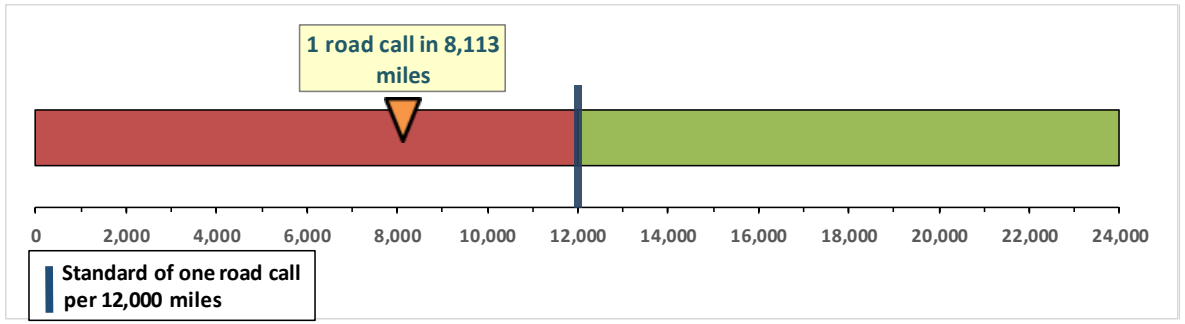
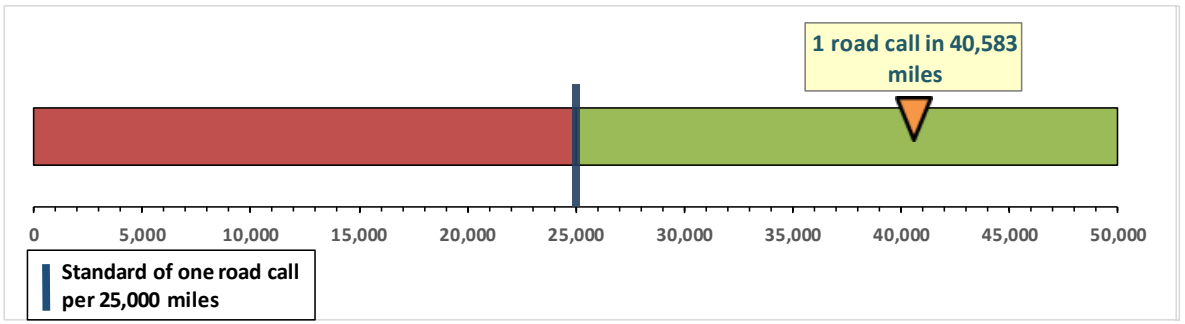
- All three modes of service exceeded the courtesy standard

Reliability-OTP

Mode	Result for October through December
Systemwide Fixed-Route	
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

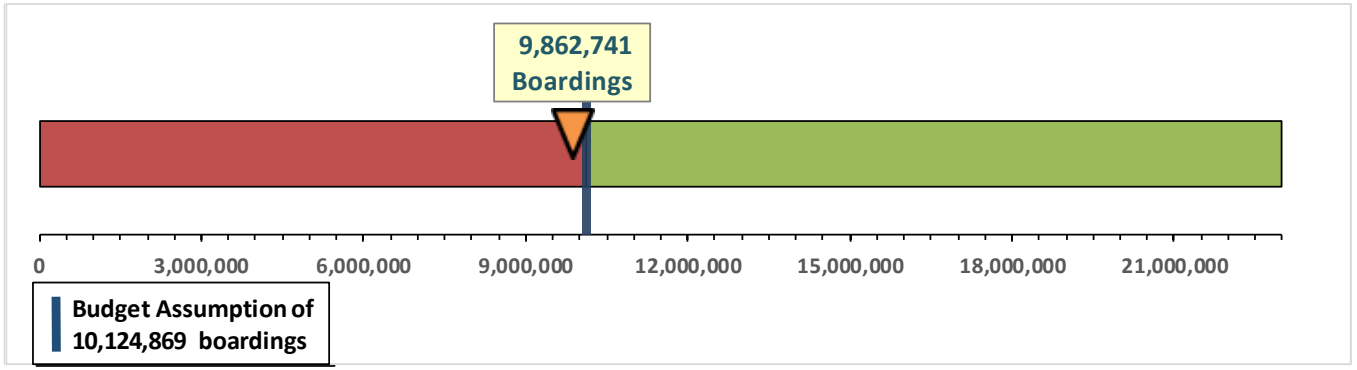
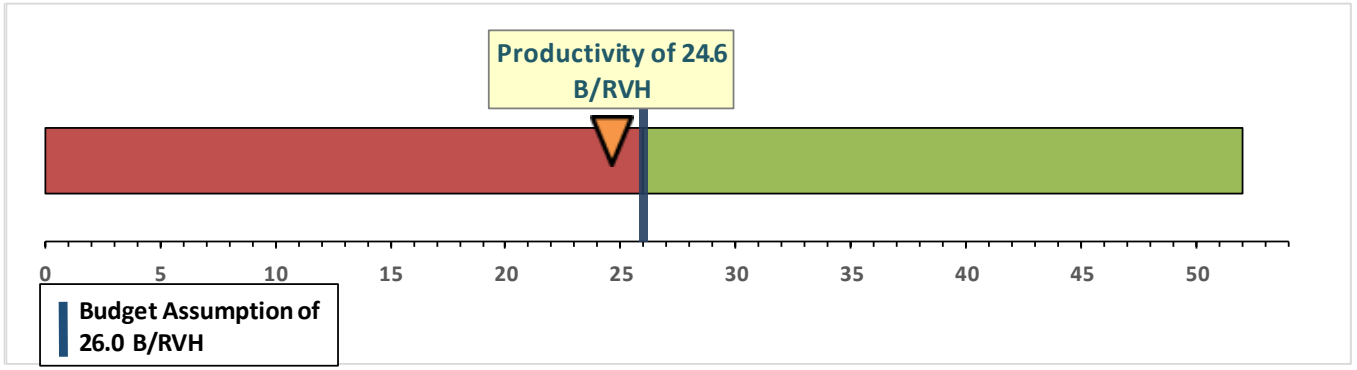
- DOFR service exceeded the standard
- CFR service was within 4 percent of the standard
- ACCESS service was within 1 percent of the standard
- System wide Fixed-Route service was within 1 percent of the standard
- Focus to improve OTP by both CFR and DOFR during quarter; some improvements also realized with October service change

Reliability-MBRC

Mode	Result for October through December
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

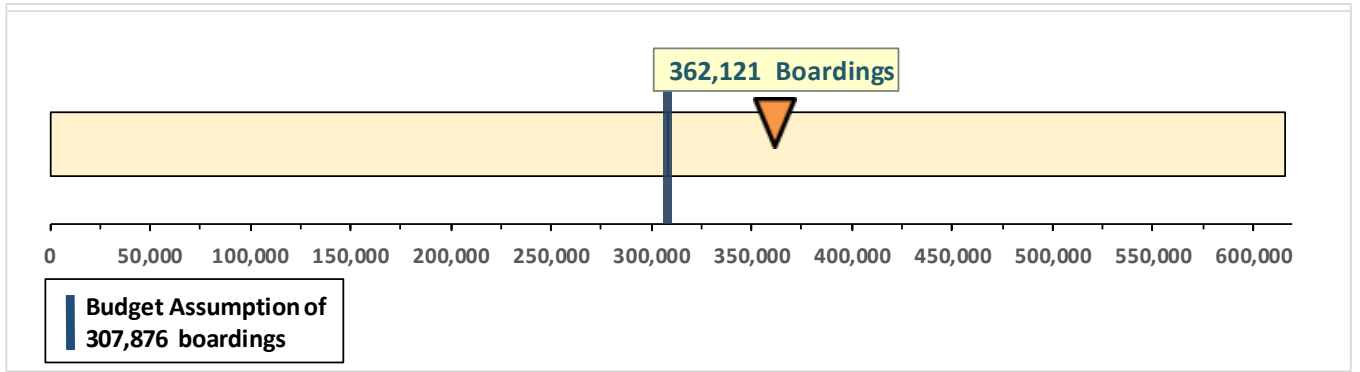
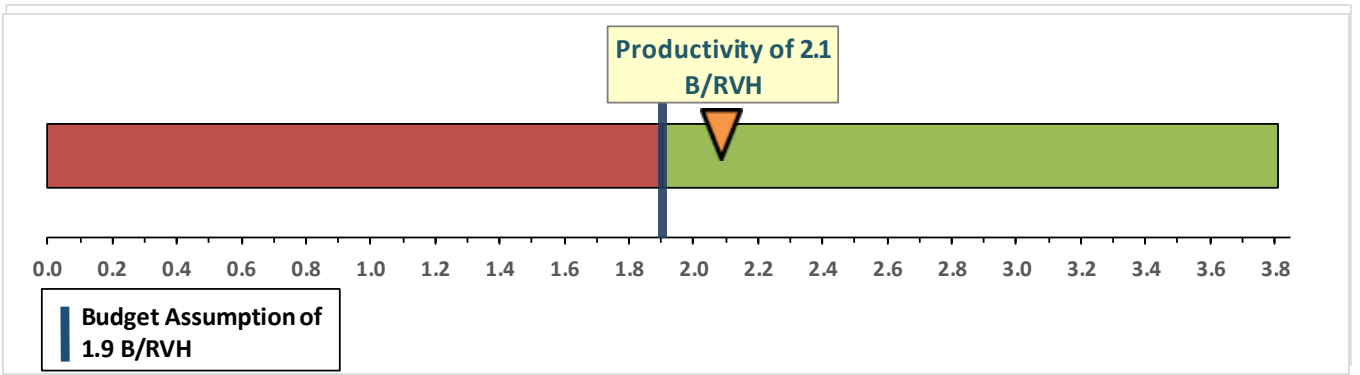
- DOFR and ACCESS services exceeded the MBRC standard
- DOFR service improved by 23 percent, and CFR service improved by 19 percent
- Midlife engine replacement completed; older buses will be completely replaced with new buses during fourth quarter

Fixed-Route-Ridership and Productivity

Mode	Result for October through December
Ridership	
Productivity	

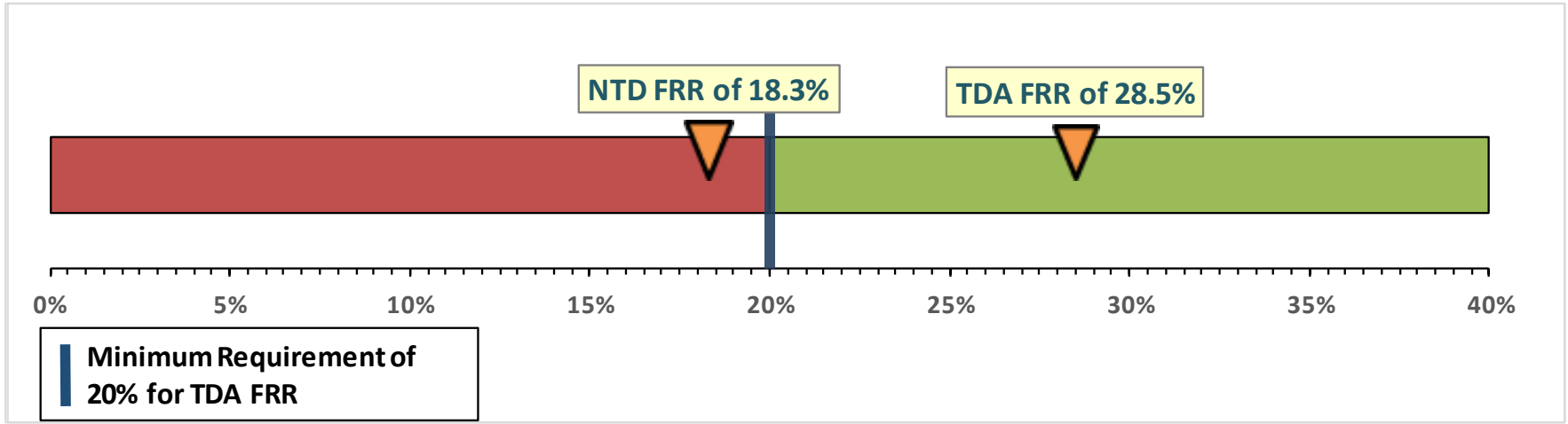
- FR service was below the budget assumption for ridership and productivity
- FR boardings was 4% closer to the budget assumption in the second quarter than the first quarter

ACCESS-Ridership and Productivity

Mode	Result for October through December
Ridership	
Productivity	

- ACCESS service exceeded budget assumptions for ridership and productivity

Farebox Recovery Ratio

Mode	Result for December 2015 through November 2016
Systemwide	

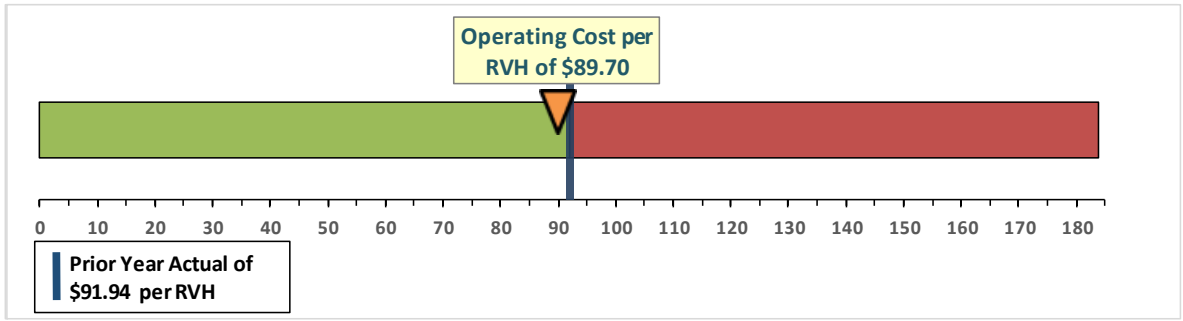
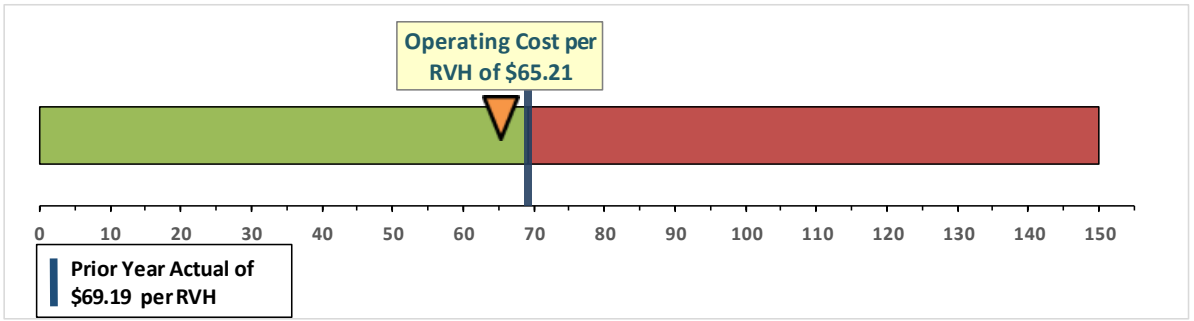
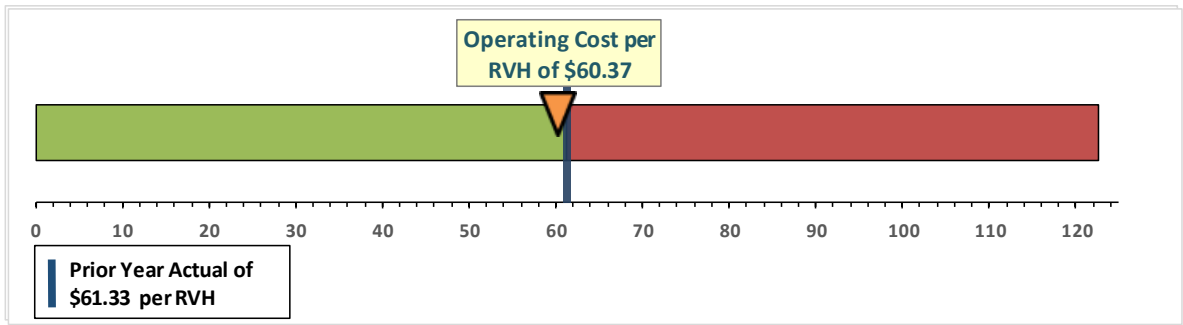
Note:

- National Transit Database(NTD) FRR consists of only passenger fares

- Transportation Development Act (TDA) FRR includes passenger fares, property tax revenue, advertising revenue and Measure M fare stabilization

- Both NTD FRR and TDA FRR have an improvement from previous rolling 12 months

Cost per RVH

Mode	Result for December 2015 through November 2016
Directly-Operated Fixed-Route	
Contracted Fixed-Route	
ACCESS	

- All three modes of service operated at a lower cost than the prior year actual target

Performance by Local Routes

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
021	N	10.1%	$ 11.79	$ 6.42	$ 3.02	$ 2.34	$ 1.06	36,587	$ 105.45	$ 64.79	$ 7.73	10.04	3,645	2	-	-
085	S	12.1%	10.22	5.72	2.69	1.81	1.16	70,994	97.65	62.83	7.26	10.21	6,955	3	-	-
001	S	10.3%	9.82	5.83	2.77	1.22	0.99	317,045	133.63	90.48	8.14	13.93	22,765	9	-	-
076	C	12.6%	8.92	4.89	2.32	1.70	1.04	50,337	126.23	84.56	11.00	15.29	3,292	2	-	-
087	S	14.4%	8.11	4.31	2.03	1.77	1.07	48,423	98.55	63.25	6.31	13.30	3,640	2	-	-
082	S	17.5%	7.63	3.74	1.76	2.12	1.17	60,562	104.41	64.44	7.03	15.64	3,872	3	-	-
086	C	14.9%	7.46	3.97	1.87	1.63	1.02	79,007	96.40	62.61	7.48	14.06	5,620	3	-	-
079	C	13.4%	7.22	3.98	1.87	1.37	0.91	187,037	96.84	62.68	8.18	14.34	13,045	6	-	-
083	C	15.1%	7.12	3.83	1.82	1.47	1.01	349,711	134.72	91.15	7.47	20.25	17,270	12	-	-
072	C	16.2%	6.49	3.59	1.71	1.19	1.03	179,555	127.27	85.05	10.27	20.12	8,926	5	-	-
070	C	25.2%	6.40	2.16	1.02	3.22	1.07	186,312	104.12	64.71	8.49	24.51	7,600	14	-	-
059	C	19.0%	6.36	3.08	1.45	1.84	1.06	280,018	99.66	63.35	8.19	17.86	15,677	12	-	-
560	C	17.0%	6.30	3.30	1.57	1.43	1.00	390,090	135.21	90.75	11.45	23.04	16,928	13	-	-
091	S	20.0%	6.12	3.30	1.55	1.27	1.21	202,918	98.51	63.18	6.82	16.25	12,485	6	-	-
090	S	19.5%	6.06	3.19	1.50	1.37	1.14	156,978	102.11	64.03	6.89	17.51	8,966	5	-	-
071	N	18.3%	5.98	3.22	1.52	1.24	1.06	310,788	97.35	62.85	7.94	16.78	18,522	9	-	-
024	N	18.9%	5.89	3.22	1.51	1.15	1.10	74,251	96.11	62.52	7.79	16.46	4,511	2	-	-
026	N	20.5%	5.57	2.79	1.31	1.47	1.06	204,015	97.21	62.71	8.97	18.84	10,830	7	-	-
050	N	17.4%	5.55	2.99	1.42	1.14	0.93	615,901	133.91	89.93	11.58	25.10	24,537	4	-	8
056	N	17.5%	5.51	3.05	1.45	1.01	0.95	212,305	126.82	85.03	11.57	23.27	9,124	5	-	-
054	N	18.2%	5.47	3.09	1.47	0.90	1.01	617,071	136.64	91.65	11.49	24.51	25,173	13	-	-
037	N	19.4%	5.32	2.79	1.33	1.20	0.99	464,616	128.56	85.85	10.22	25.14	18,484	13	-	-
055	C	20.2%	5.28	2.94	1.40	0.94	1.10	685,642	129.66	87.03	11.44	23.83	28,772	15	-	-
030	N	20.1%	5.14	2.74	1.29	1.10	1.01	310,742	96.58	62.67	7.41	19.14	16,236	8	-	-
089	S	22.2%	4.50	2.60	1.22	0.68	1.09	189,293	97.13	62.77	7.68	19.76	9,579	3	-	-
543	N	22.1%	4.39	2.39	1.13	0.87	1.00	592,729	132.37	88.92	11.55	29.28	20,241	12	-	-
070	C	18.6%	4.36	2.96	1.40	0.00	1.00	328,896	130.19	88.84	10.20	24.28	13,545	-	-	-
025	N	23.8%	4.36	2.34	1.10	0.91	1.08	234,405	97.69	62.91	7.75	21.60	10,851	5	-	-
029	N	22.3%	4.24	2.39	1.14	0.71	1.01	1,026,219	131.47	88.32	11.26	28.97	35,419	14	-	2
033	N	23.3%	4.15	2.82	1.33	1.23	0.97	209,804	96.29	62.57	7.71	24.06	8,720	6	-	-
035	N	22.4%	4.15	2.82	1.33	0.00	0.97	429,465	100.49	63.62	8.89	22.25	18,977	9	-	-
047	C	24.6%	3.96	2.23	1.06	0.67	1.07	1,152,912	131.03	87.99	11.30	30.04	38,376	18	-	-
057	C	26.0%	3.83	2.00	0.95	0.87	1.04	1,419,809	133.67	89.80	12.08	33.46	42,429	3	-	17
046	N	26.8%	3.82	1.92	0.90	1.00	1.03	342,550	96.88	62.69	8.33	25.17	13,609	8	-	-
057X	C	27.7%	3.68	1.87	0.89	0.93	1.05	279,832	119.12	79.72	10.84	31.32	8,935	1	-	3
053	C	26.5%	3.44	1.88	0.89	0.67	1.00	1,089,629	128.78	86.20	14.12	34.09	31,962	17	-	-
043	N	26.7%	3.34	1.93	0.92	0.50	1.04	1,122,535	126.27	84.62	12.51	32.53	34,507	13	-	-
038	N	28.0%	3.28	1.72	0.81	0.76	0.98	622,518	98.06	63.00	7.91	27.95	22,276	11	-	-
060	C	25.1%	3.15	1.94	0.92	0.30	0.96	1,016,533	129.73	87.16	11.42	34.00	29,897	7	-	-
066	C	29.4%	3.11	1.68	0.80	0.63	1.03	1,084,011	128.59	86.23	12.06	36.70	29,541	16	-	-
042	N	29.9%	2.86	1.50	0.71	0.65	0.94	857,766	97.50	62.82	8.73	30.90	27,760	13	-	-
064	C	30.0%	2.60	1.51	0.72	0.37	0.95	1,146,624	128.74	86.32	12.86	40.47	28,334	10	-	-

C under Zone is Central County, N is North County and S is South County.

Performance by Community Routes

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
178	C	12.7%	$ 8.79	$ 4.72	$ 2.17	$ 1.89	$ 1.01	67,935	$ 97.91	$ 62.93	$ 7.70	12.39	5,482	3	-	-
177	S	14.6%	8.60	4.68	2.15	1.77	1.16	48,384	96.87	62.71	7.51	12.12	3,993	2	-	-
167	C	14.2%	8.42	4.45	2.04	1.93	1.07	88,919	96.51	62.63	7.68	12.77	6,965	4	-	-
150	C	15.0%	8.32	4.44	1.91	1.97	1.12	87,078	131.33	87.80	12.97	17.57	4,955	4	-	-
153	N	13.7%	8.06	4.73	2.17	1.16	1.09	73,934	95.30	62.36	7.46	11.93	6,199	2	-	-
143	N	18.1%	5.87	3.43	1.58	0.86	1.10	99,668	95.68	62.41	8.36	15.65	6,368	2	-	-
129	N	18.5%	5.74	3.44	1.58	0.72	1.14	118,389	97.24	62.79	7.96	15.79	7,496	2	-	-

C under Zone is Central County, N is North County and S is South County.

Performance by Express & Stationlink Routes

Route	Zone	Farebox	Subsidy per Boarding	Direct Subsidy	Indirect Subsidy	"Capital Subsidy" Per Boarding	Revenue per Boarding	Boardings	CostVSH	Direct CostVSH	CostVSM	BoardVSH	VSH	40 FT	32 FT	60 FT
430	N	2.5%	$ 56.94	$ 21.06	$ 16.30	$ 19.58	$ 0.95	2,919	$ 133.54	$ 74.69	$ 15.21	3.48	838	-	2	-
490	S	3.9%	37.58	13.33	10.32	13.92	0.95	4,104	136.62	75.63	12.62	5.55	739	-	2	-
794	C	17.4%	35.76	12.28	8.99	14.50	4.48	17,740	173.19	109.71	6.39	6.73	2,637	6	-	-
463	C	5.5%	35.53	9.20	7.12	19.21	0.96	11,156	135.12	76.03	13.21	7.82	1,426	5	-	-
701	C	8.1%	35.18	16.68	7.29	11.22	2.11	11,457	224.75	153.40	9.54	8.62	1,329	3	-	-
721	N	6.1%	32.65	17.08	7.46	8.11	1.59	15,846	197.23	135.02	6.94	7.55	2,100	3	-	-
211	C	5.5%	31.79	10.24	7.49	14.05	1.04	15,250	120.79	73.90	6.68	6.43	2,370	5	-	-
216	S	5.3%	30.91	10.90	7.98	12.04	1.05	2,373	158.43	94.07	7.03	7.95	298	-	1	-
411	N	4.8%	30.04	10.62	8.22	11.20	0.96	2,552	117.58	71.00	13.04	5.94	430	-	1	-
212	S	5.4%	28.58	10.23	7.49	10.86	1.02	5,263	144.26	82.88	7.38	7.70	684	-	2	-
206	C	6.6%	26.76	8.64	6.33	11.79	1.05	10,906	150.28	85.23	7.55	9.38	1,163	3	-	-
213	N	8.6%	19.55	6.24	4.56	8.75	1.01	19,588	130.58	74.83	7.43	11.06	1,772	4	-	-
480	C	8.4%	17.71	5.42	4.20	8.08	0.88	10,602	132.37	74.81	11.37	12.60	841	2	-	-
472	C	12.8%	14.52	3.64	2.82	8.05	0.95	15,972	127.65	73.66	10.32	17.22	928	3	-	-
473	C	13.7%	11.97	3.22	2.49	6.26	0.91	20,542	133.75	74.71	12.49	20.21	1,016	3	-	-
454	N	13.8%	10.92	3.13	2.42	5.37	0.88	23,939	141.43	76.58	18.68	21.99	1,088	3	-	-
453	N	15.8%	9.54	2.80	2.17	4.57	0.93	18,755	137.59	75.88	20.62	23.29	805	2	-	-
462	C	17.6%	8.56	2.52	1.95	4.09	0.96	20,947	119.39	71.37	18.13	22.03	951	2	-	-

C under Zone is Central County, N is North County and S is South County.

Next Steps

- Work with CFR operator to improve performance in reliability
- Continue to deploy new vehicles and retire aging fleet
- Continue to monitor performance in the third quarter, including the impact of the OC Bus 360° Plan
- Continue to pursue other strategies to improve overall system performance

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Central Harbor Boulevard Transit Corridor Study Update

Overview

In August 2015, the Orange County Transportation Authority initiated the Central Harbor Boulevard Transit Corridor Study to analyze and develop options to improve transit service on Harbor Boulevard, between the Fullerton Transportation Center and Westminster Avenue. To date, the project team has developed the study goals, objectives and evaluation criteria, and identified a set of 12 draft conceptual alternatives for review and comment.

Recommendation

Receive and file as an information item.

Background

The Central Harbor Boulevard Transit Corridor Study (Harbor Study) is an initial planning study and is intended to serve as a screening process to evaluate a broad range of conceptual transit alternatives that include a variety of alignment, mode, and feature options. The study's approach is focused on working with the corridor cities, stakeholders, and the public to identify the alternatives that perform the best and receive the widest community support. The top performing alternatives could then potentially be recommended for further evaluation in a more detailed study.

The study area includes an eight-mile stretch of Harbor Boulevard, between the Fullerton Transportation Center and Westminster Avenue (the future terminus of the OC Streetcar); and a 2.5-mile stretch of Katella Avenue, between Harbor Boulevard and the Anaheim Regional Transportation Intermodal Center (ARTIC).

The Orange County Transportation Authority (OCTA) initiated the study in August 2015, and has worked closely with technical staff from each of the corridor cities (Anaheim, Fullerton, Garden Grove, and Santa Ana) throughout the process. To date, the team has analyzed the study corridors, identified mobility needs and study objectives, defined evaluation criteria, and developed 12 draft conceptual transit alternatives for review and comment.

The original study scope focused on the Harbor Boulevard corridor and was tasked to develop and evaluate up to nine alternatives. In October 2016, the OCTA Board of Directors (Board) and the City of Anaheim agreed to conclude city-led planning efforts to develop the Anaheim Rapid Connection Streetcar Project, and instead evaluate transit connections between the Anaheim Resort and the ARTIC as part of the Harbor Study. At that time, the study scope was amended to add three additional alternatives that focused on connections between Harbor Boulevard and the ARTIC. Over the past few months, the project team has performed the analysis of this corridor and identified three additional alternatives.

In January 2017, the City of Anaheim adopted a resolution expressing opposition to a streetcar on Harbor Boulevard or Katella Avenue. OCTA responded with a letter acknowledging that the Harbor Study would consider this input, along with the input received from other cities, stakeholders, and members of the public, (Attachment A). All input received during the review and comment period will be used in conjunction with planning considerations to refine the draft alternatives prior to the evaluation process. The aim of this staff report is to initiate a public review of the draft alternatives and the evaluation criteria. Following the presentation to the Transit Committee and the Board, the project team will offer updates to each of the city councils, meet with the stakeholder working group, hold two public workshops, and provide an online engagement tool to solicit feedback.

Discussion

The project team completed an extensive analysis of the study area and identified a number of mobility problems and key themes. An initial round of outreach was conducted to engage and inform the general public and stakeholders, and to solicit early input on the mobility needs. A summary of the full analysis is included in the Purpose and Need Statement (Attachment B) and the Open House Round 1 Summary Report (Attachment C). Additionally, based on input from the cities of Anaheim and Fullerton, Anaheim Boulevard/Lemon Street was identified as a viable, alternative alignment for conceptual transit improvements.

The following are key themes from the Purpose and Need Statement:

- Highest Transit Usage – The study area includes the cities with the highest transit usage rates in the county.
- Heavy Commute Focus – Approximately 78 percent of OCTA bus trips are commute trips to/from work or school.
- High Traffic Volumes and Right-of-Way Constraints - Traffic conditions limit the speed and reliability of transit service. Roadway widths on Harbor Boulevard vary between four and eight lanes.
- Population and Employment Densities – 20 percent higher than the county's average.
- Major Employment and Resort Destination – 27 million annual visitors and associated employees in Anaheim Resort.
- Inconsistent User Experience – Inconsistency in the level of stop amenities and branding in the study area.

In addition, early stakeholder input has emphasized:

- Improving the connectivity of transit services locally and regionally.
- Maintaining or improving bicycle access in the corridor.
- Providing efficient linkages to key destinations.
- Ensuring service is expanded to serve work hours and sporting events.
- Signal synchronization between jurisdictions to improve traffic flow for all vehicles.

Based on the mobility problems identified and early input received, a set of draft evaluation criteria were developed to allow for a comprehensive evaluation of alternatives. The evaluation criteria incorporate standard transit performance metrics, as well as Federal Transportation Administration New Starts performance measures. Attachment D includes a description of the draft evaluation criteria.

As part of the alternatives development, four main alignment options (Harbor Boulevard north and south of Katella Avenue, Anaheim Boulevard/ Lemon Street, and Katella Avenue) were identified. A variety of mode and feature options were then considered for each alignment option. A description of all of the draft alternatives is included in the PowerPoint presentation that accompanies this staff report.

Summary

OCTA initiated the Harbor Study to analyze and develop options to improve transit service on Harbor Boulevard, between the Fullerton Transportation Center and Westminster Boulevard, and to evaluate transit connections on Katella Avenue, between Harbor Boulevard and the ARTIC. The project team has developed 12 draft alternatives and evaluation criteria for review and comment. Following this update, staff will solicit input through a stakeholder meeting, city council briefings, and two public workshops through March and April 2017. Staff anticipates returning to the Board with the final alternatives and evaluation results in July 2017.

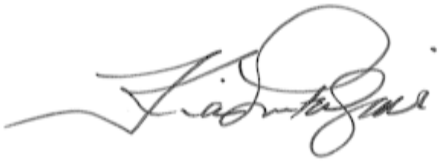
Attachments

A. Letter to Mr. Paul Emery, City Manager, City of Anaheim - Dated January 27, 2017 - RE: City Resolution Related to a Streetcar System in Anaheim
B. Orange County Transportation Authority - Central Harbor Boulevard Transit Corridor Study - Purpose and Need Statement - Final
C. Orange County Transportation Authority - Central Harbor Boulevard Transit Corridor Study - Open House Round 1 Summary Report - Final
D. Central Harbor Boulevard Transit Corridor Study - Draft Evaluation Criteria

Prepared by:

Eric Carlson
Senior Transportation Analyst
Transit and Non-Motorized Planning
(714) 560-5381

Approved by:



Kia Mortazavi
Executive Director, Planning
(714) 560-5741

ATTACHMENT A

OCTA

AFFILIATED AGENCIES

Orange County Transit District

Local Transportation Authority

Service Authority for Freeway Emergencies

Consolidated Transporation Service Agency

Congestion Management Agency

Service Authority for Abandoned Vehicles

January 27, 2017

Mr. Paul Emery
City Manager
City of Anaheim
200 South Anaheim Boulevard
Anaheim, CA 92805

RE: **City Resolution Related to a Streetcar System in Anaheim**

Dear Mr. Emery:

This correspondence is in response to the recent City of Anaheim (City) Council resolution related to a streetcar system within the City. As you know, the Central Harbor Boulevard Transit Corridor Study is developing and analyzing strategies for improving transit service in this important corridor that serves Orange County residents, employees, and visitors.

A key Orange County Transportation Authority (OCTA) responsibility includes evaluation of all options and strategies for improving transit in core service corridors throughout Orange County as required and recommended by the Federal Transit Administration, environmental laws and regulations, data-driven planning practices, and public input. The study was initiated in 2015, consistent with these requirements and recommendations, and has been developed in close coordination with representatives from each of the corridor cities (Anaheim, Fullerton, Garden Grove, and Santa Ana) and stakeholders. As such, OCTA is committed to a rigorous planning process that includes public and local agencies' input, detailed technical assessments, and, of course, future policy direction from the OCTA Board of Directors (Board) on next steps.

To date, the project team has developed 12 draft conceptual alternatives for improving transit service in the Harbor Boulevard corridor. These conceptual alternatives include a variety of alignments (Anaheim Boulevard/Lemon Street, Harbor Boulevard, and Katella Avenue), modes (enhanced bus, bus rapid transit, and streetcar), and features (vehicle type, stop amenities, shared or dedicated lanes, etc.). Each alternative has been developed with input from the corridor cities, OCTA, and the public, and will ultimately be evaluated based on how well it meets a defined set of performance criteria.

OCTA acknowledges the City's resolution, which identifies related concerns with traffic impacts, affordable fares, operations, and safety. This input will be considered by the Board during the refinement of the draft alternatives for the study. Comments received from each of the corridor cities, stakeholders, and the public will be weighed and evaluated in order to refine the draft alternatives. The draft alternatives will be available for review and comment in the next few months, and the project team will be seeking input from all study participants regarding the transit options being proposed.

We look forward to continuing to work with the City to identify transit alternatives for the Harbor Boulevard corridor that best meet the needs identified through the study process.

Sincerely,

Darrell Johnson
Chief Executive Officer

DJ:kb
Attachment

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ANAHEIM EXPRESSING OPPOSITION TO A STREET CAR SYSTEM IN ANAHEIM

WHEREAS, for nearly a decade, the City of Anaheim (City) and the Orange County Transportation Authority (OCTA) have worked collaboratively on the proposed Anaheim Rapid Connection (ARC) Project which is intended to provide residents, employees, and visitors an east-west transit connection between the Anaheim Regional Transportation Intermodal Center (ARTIC) and Anaheim's major neighborhoods, employment and activity centers in the Platinum Triangle and The Anaheim Resort; and

WHEREAS, on May 12, 2008 OCTA authorized funding Anaheim's Go Local application with an investment of $5,900,000 from Measure M (Project S) and a $100,000 local match from Anaheim to study and potentially develop a convenient "last mile" connection between the Study Area's activity centers and Metrolink, Amtrak, local fixed-route bus, Stationlink bus, and future California High Speed Rail (CHSR) at ARTIC; and

WHEREAS, the City has successfully received federal, Measure M and Measure M2 transportation funding from the OCTA Board and entered into cooperative agreements with the OCTA to study transit connections from Metrolink stations in Anaheim to major job, housing and activity centers; and

WHEREAS, the City has also contributed local funding to this analysis, including Anaheim Tourism Improvement District (ATID) restricted transportation funds; and

WHEREAS, on September 27, 2016, the City Council approved and authorized an Amendment to a Cooperative Agreement with OCTA for the ARC Fixed Guideway Project, requiring the City conclude all planning efforts for the ARC project and submit all work completed to date to OCTA; affirmed OCTA as the lead agency for any potential future phases of the ARC project; and

WHEREAS, in furtherance of this previous action, City staff has concluded all planning efforts for the street car project; and

WHEREAS, in light of the OCTA managing these significant transportation projects in corridors along and near the ARC corridor, the OCTA Board has determined there is a need for a more regional perspective for planning transit extensions to current or planned systems. As such, the OCTA Board has reevaluated the roles identified in the cooperative agreement with the City of Anaheim for the ARC Project; and

WHEREAS, it is the City Council's belief that a Street Car project is not a viable transit solution in Anaheim; and

WHEREAS, the proposed Street Car project, budgeted for more than $300 million, would

have been one of the most expensive projects of its kind, on a per mile basis in the United States; and

WHEREAS, the ARTIC train facility has had significantly lower ridership numbers than projected; and

WHEREAS, having a fixed guide rail transit project connected to ARTIC would seem to be an unwise investment of taxpayer dollars; and

WHEREAS, a fixed guide rail system within the resort area would be ill conceived as it would severely disrupt street traffic lanes needed for car and buses; and

WHEREAS, municipalities such as Providence, Rhode Island and Arlington, Virginia have rejected previously approved rail transit programs due to the high costs associated with such transit solutions; and

WHEREAS, the City Council is hereby expressing concern that the proposed Street Car project is expensive and a drain on community resources; does not allow for flexibility; makes congestion worse and does not support ridership numbers; and

WHEREAS, Anaheim has a large population of transit-dependent people who rely on the OCTA bus system and the City of Anaheim has a need for more routes and frequency of service with lower fares for these residents; and

WHEREAS, the City Council does support more dynamic, fluid and accessible transportation system that does not create unintended consequences, such as an increase in traffic and supports alternatives which are a better fit for the unique needs of The Anaheim Resort and Platinum Triangle.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ANAHEIM AS FOLLOWS:

Section 1. The City Council of the City of Anaheim wishes to express its opposition to the Anaheim Rapid Connection (ARC) Street Car project as being a non-viable transit solution in the City of Anaheim.

Section 2. The City Council of the City of Anaheim also opposes any street car plans along Harbor Blvd. However, it supports the Orange County Transportation Authority's study of other transit modes to recommend the best options to alleviate traffic congestion and improve mobility for transit dependent riders in Anaheim and Orange County.

Section 3. The City Council of the City of Anaheim encourages the Orange County Transportation Authority to plan and develop a flexible transit solution that increases frequency of bus routes and provides this solution for a lower fare, so that more riders can use this system.

THE FOREGOING RESOLUTION is approved and adopted by the City Council of the City of Anaheim this _____day of _____, 2017 by the following roll call vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

CITY OF ANAHEIM

BY _____
MAYOR OF THE CITY OF ANAHEIM

ATTEST:

_____
CITY CLERK OF THE CITY OF ANAHEIM
119091

ATTACHMENT B

Orange County Transportation Authority

Central Harbor Boulevard Transit Corridor Study

Purpose and Need Statement – Final

OCTA

FULLERTON

ANAHEIM

GARDEN GROVE

SANTA ANA

Purpose and Need Statement

Final

January 27, 2017

Task # 2.5

Document Control

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Submitted By:	Tyler Bonstead	01/24/17

In Association with:

Kittelson & Associates, Inc.
HNTB Corporation
Cityworks Design
Green Grass Communications
VMA Communications, Inc.

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ABBREVIATIONS / ACRONYMS

ARC.....Anaheim Rapid Connection
ART .....Anaheim Resort Transportation
ARTIC.....Anaheim Regional Transportation Intermodal Center
CSUF .....California State University, Fullerton
FCC .....Fullerton College Connector
FFS.....Free-Flow Speed
FTA .....Federal Transit Administration
FTC.....Fullerton Transportation Center
LOS .....Level of Service
mph .....miles per hour
OCCOG .....Orange County Council of Governments
OC CSI.....Orange County Complete Streets Initiative
OCP.....Orange County Projections
OCTA .....Orange County Transportation Authority
SARTC .....Santa Ana Regional Transportation Center
SCAG.....Southern California Association of Governments
V/C.....Vehicle Volume to Capacity

REFERENCES

Alternative Evaluation Methodology Report – March 2016
Katella Avenue Technical Addendum – January 2017
Mobility Problem Definition Report – April 2016
Prior Studies and Data Collection Report – April 2016
Study Corridor Definition Report – April 2016
Travel Demand Methodology Report – March 2016
Travel Market Assessment Report – March 2016

1. INTRODUCTION

1.1. STUDY OVERVIEW

Harbor Boulevard is Orange County's busiest north-south transit corridor. The entire corridor extends over 20 miles in length between the cities of La Habra and Costa Mesa, and intersects nearly 30 major east-west corridors. Its value as a north-south transit spine with connections to east-west arterials, including Katella Avenue, is evident on a daily basis. Average weekday boardings on buses from the Orange County Transportation Authority (OCTA) total more than 12,000 on this corridor. OCTA buses operating on the parallel Anaheim Boulevard/Lemon Street corridor collect an additional 9,000 average weekday boardings between the cities of Fullerton and Newport Beach. Additionally, OCTA buses operating along Katella Avenue between the cities of Long Beach and Orange average 4,000 boardings per weekday. The three routes combined account for a significant share of OCTA's total average daily boardings.

This transit corridor study focuses on an eight-mile segment of Harbor Boulevard from the Fullerton Transportation Center (FTC) in Downtown Fullerton, south through the cites of Anaheim and Garden Grove to Westminster Avenue, on the border of Garden Grove and the city of Santa Ana. This segment of the corridor accounts for approximately 60 percent of total route boardings. Additionally, this study also considers connections along a parallel five-mile segment of Lemon Street-La Palma Avenue-Anaheim Boulevard from Downtown Fullerton to Katella Avenue in Anaheim. An additional 2.2-mile segment of Katella Avenue, from Harbor Boulevard to the Anaheim Regional Transportation Intermodal Center (ARTIC) in Anaheim's Platinum Triangle district has also been identified for consideration in this study. The study area is shown on Figure 1.1.

Each corridor includes a connection to future fixed-guideway improvements and regional rail centers currently being studied or under development. These include:

- **The OC Streetcar Project:** A 4.2-mile streetcar system that will operate between the Santa Ana Regional Transportation Center (SARTC)—a hub for local and regional rail, bus, and airport taxi/shuttle service—and the intersection of Harbor Boulevard/ Westminster Avenue. The project is currently in design and is expected to begin operations in 2020.
- **ARTIC**: Opened in December 2014, the station provides rail, bus, taxi, and other services for commuters and travelers throughout Orange County. The first phase of ARTIC serves Metrolink, Amtrak, and connections to other local and regional transit providers, including OCTA and Anaheim Resort Transportation (ART). Phase two will provide additional passenger facilities and support services to accommodate future potential California High-Speed Rail service.
- **FTC:** The Fullerton Transportation Center is the busiest train station in Orange County, providing connections to Amtrak, Metrolink, and local transit providers like OCTA. The station is featured in the *Fullerton College Connector Study* (2015), which the City of

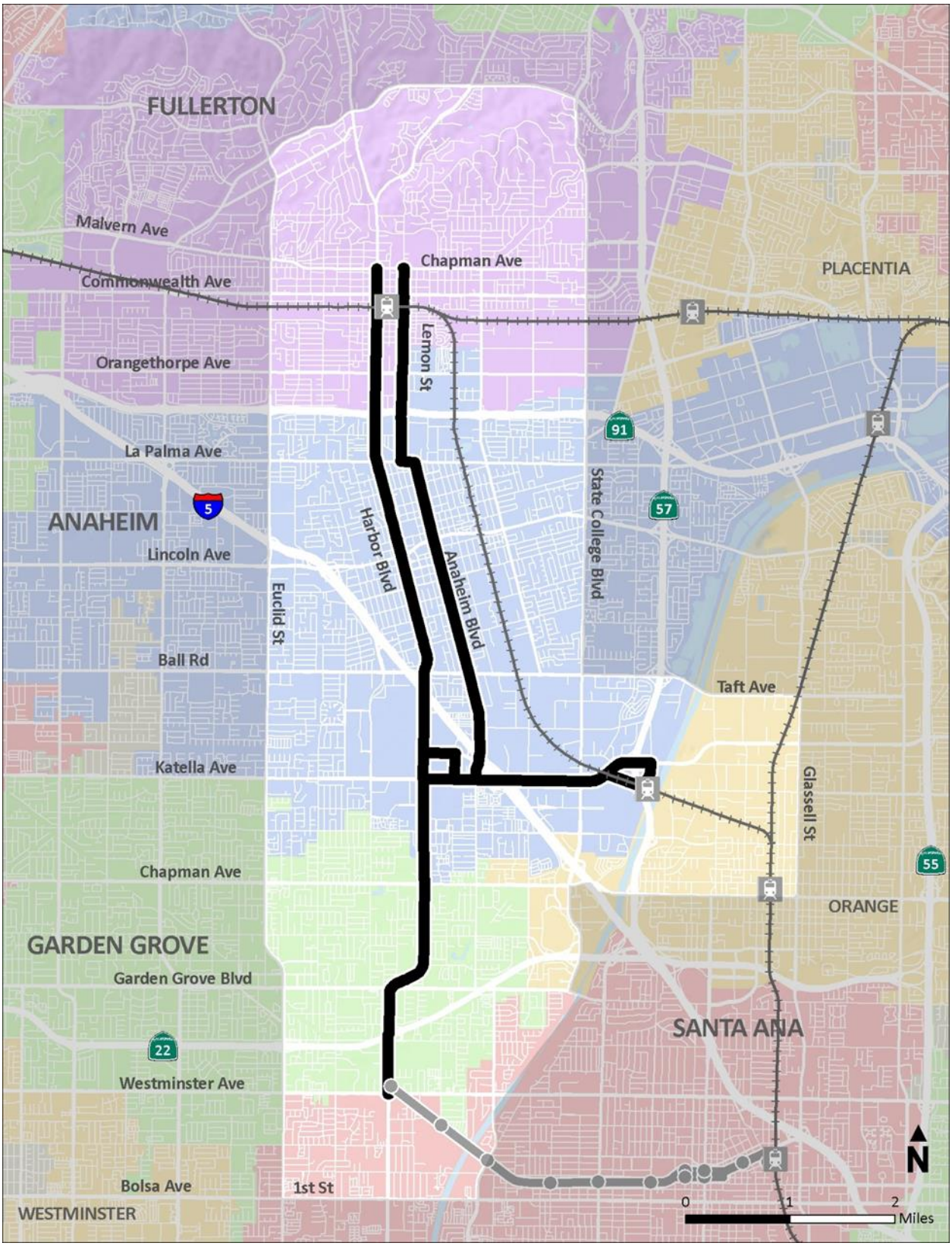
Fullerton developed to evaluate strategies for enhancing transit connections between local college campuses (Fullerton College and California State University, Fullerton) and the FTC.

OCTA, while working in close coordination with the cities of Anaheim, Fullerton, Garden Grove, and Santa Ana, has formed a project development team with staff representatives from each city. The objectives of the transit corridor team include:

1. To analyze and develop strategies for improving transit along these important corridors;
2. To establish goals, objectives and evaluation criteria for evaluating various transit improvements;
3. To develop up to 12 conceptual transit alternatives and evaluate each alternative against the evaluation criteria;
4. To prepare a final report with the results of the evaluation and possible recommendations about the next steps.

Subsequent phases of this study will describe and rank the 12 alternatives to determine which alternatives perform best. These alternatives can then be recommended for advancement into a subsequent study phase which would likely include detailed environmental analysis and additional public engagement.

Figure 1.1. Central Harbor Boulevard Transit Corridor Study Area



Source: STV, 2017

1.2. STUDY CORRIDOR TRANSIT THEMES

There are several important themes that have arisen from the study analysis which must be considered in the development of conceptual transit alternatives:

- **Important North-South Transit Spine:** Approximately 12 percent of OCTA's daily bus boardings occur along the two north-south corridors, helping riders connect to jobs, school, and other destinations and frequently to make transfers to east-west corridors.
- **High Frequency Service:** Harbor Boulevard provides the highest frequency bus service in the OCTA system, operating Route 43 and Bravo! Route 543, and providing a bus every 7.5 minutes during peak service hours at major bus stops.
- **Resorts, Tourism and Jobs:** The Harbor corridor is a jobs dense corridor with The Anaheim Resort® anchoring a regional jobs center and a national tourism destination. The Disneyland Resort® is the county's largest employer with an estimated 28,000 employees.
- **Residential and Employment Densities:** There study area averages more than twice as many jobs and residents than the rest of Orange County.
- **Future Planned Projects:** Each corridor city has plans to increase development and expand activity along the corridors. Frequent and convenient transit service is vital for these corridors to meet development demands and help offset higher traffic volumes and congestion.
- **Measure M1/M2:** Measure M is a half-cent sales tax first approved by county voters in 1990 (M1) and later renewed in 2006 (M2). The measure set aside nearly $1 billion for transit projects which focus on extending the influence of the regional rail stations.
- **Transit Rider Demographics and Needs:** Survey data indicates that home-to-work commute trips represent the greatest share of trips taken (78%), followed by other (10 percent) and School commutes (9 percent). The most desired improvements among existing riders are greater frequency of service and extended operating hours.
- **Current Trends and the Challenge of Growing Transit Ridership:** Retaining transit ridership is a key challenge for transit agencies. OCTA has experienced declining transit ridership in recent years and is focusing planning efforts around allocating service to the most productive corridors and evaluating ways to increase the competitiveness and quality of transit service across all routes.
- **OC Bus 360 & 2016 Bus Service Plan:** OCTA is planning on making frequency improvements to many of the east-west routes in the study area. These include Routes 26 (Commonwealth Avenue), 30 (Orangethorpe Avenue), 50 (Katella Avenue), and 54 (Chapman Avenue). The frequency improvements are expected to increase transit ridership in this area.
- **Connections to Regional Rail:** Enhanced connections to regional rail stations is another opportunity present in this study corridor. Enhanced service at each station has the potential to support future development in downtown Fullerton, the Anaheim Platinum Triangle development district, and downtown to Santa Ana. Establishing these connections requires enhancements to north-south, and east-west feeder service.

Each theme listed above provides important information about where the current travel demand is, how current transit services are operating, how commuter behavior is changing, what attributes of service are highly valued by existing riders, and where the residential and employment densities that will require more transit service going forward are located.

Given current and planned transit service in the corridor, the OCTA Central Harbor Boulevard Transit Corridor Study will develop options to leverage these investments and facilitate connections to the OC Streetcar, The Anaheim Resort, and ARTIC. This study will also consider alternative alignments and transit technologies along Harbor Boulevard, Lemon Street/Anaheim Boulevard, and Katella Avenue, and will include the necessary information so that corridor cities and OCTA may take the project further through additional public engagement, alternative selection, and environmental review (not part of this study). The study team will also incorporate input from staff representatives from corridor cities and internal OCTA stakeholders.

1.3. REPORT PURPOSE AND STRUCTURE

This report summarizes and synthesizes the data gathered throughout Phase 2 of this study (Purpose and Need), defines the key transportation mobility issues in the study area, and confirms the project's purpose and need. This report is thus organized into the following sections:

2. The Existing Transportation Network
3. Planned Transportation Facilities/Projects in the Study Area
4. Study Area Demographics and Land Use Patterns
5. Travel Market Assessment
6. Transit and Roadway Performance
7. Mobility Problems
8. Goals and Objectives

2. TRANSPORTATION NETWORK

This section describes the existing transportation network and services in the study area. More detailed information on this can be found in the *Study Corridor Definition Report* (April 2016).

2.1. FREEWAYS & ARTERIALS

The study area is served by four major freeways: the Santa Ana Freeway (Interstate 5), the Riverside Freeway (California State Route 91), the Garden Grove Freeway (California State Route 22), and the Orange Freeway (California State Route 57). Arterial roads are typically laid out in a grid pattern with major streets approximately one mile apart.

This convergence of four major freeways in an area with a high concentration of jobs and activity centers results in high volumes of traffic during peak commuting hours on Harbor Boulevard, Lemon Street/Anaheim Boulevard, Katella Avenue, and all other major arterials. This not only affects drivers but, as seen in the *Mobility Problem Definition Report* (April 2016), has adverse consequences on transit operations throughout certain hours of the day.

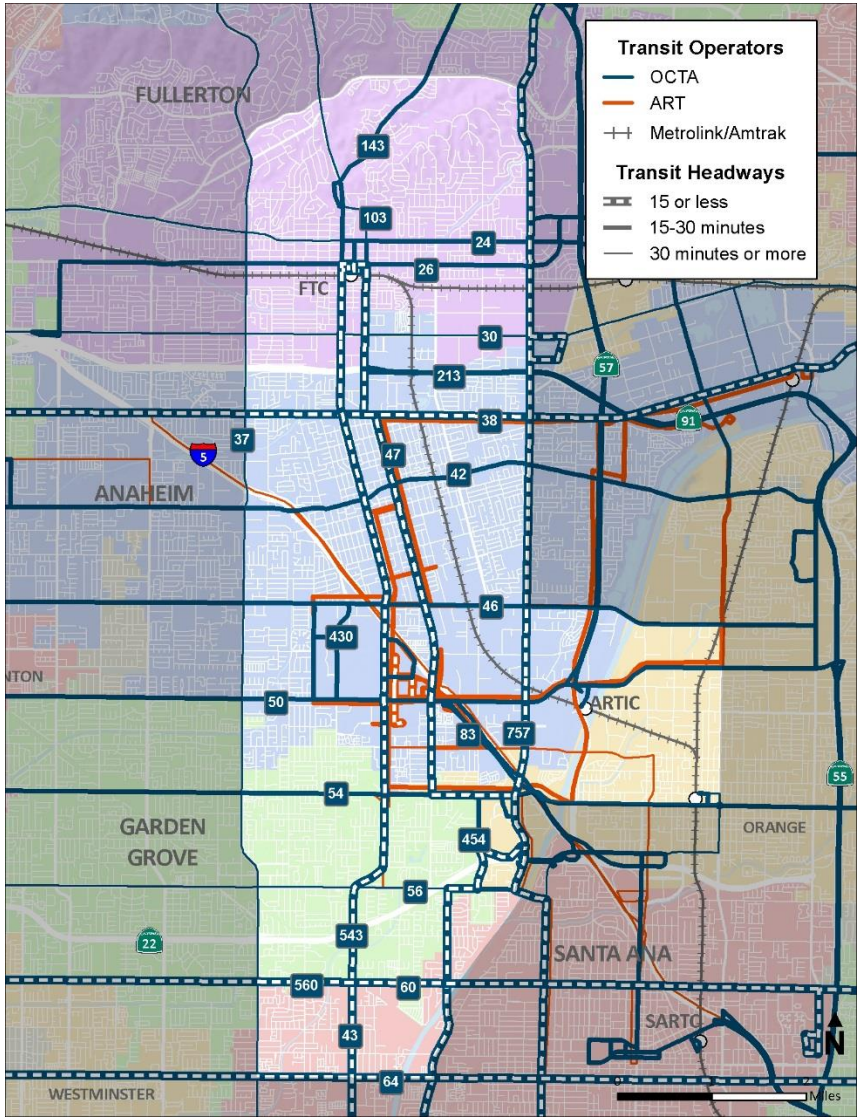
2.2. TRANSIT NETWORK

There are multiple operators providing a variety of transit options in the study area. They are described in the following section and shown in Figure 2.1 and Figure 2.2.

The following concepts help to describe the nature and quality of Transit in the study area.

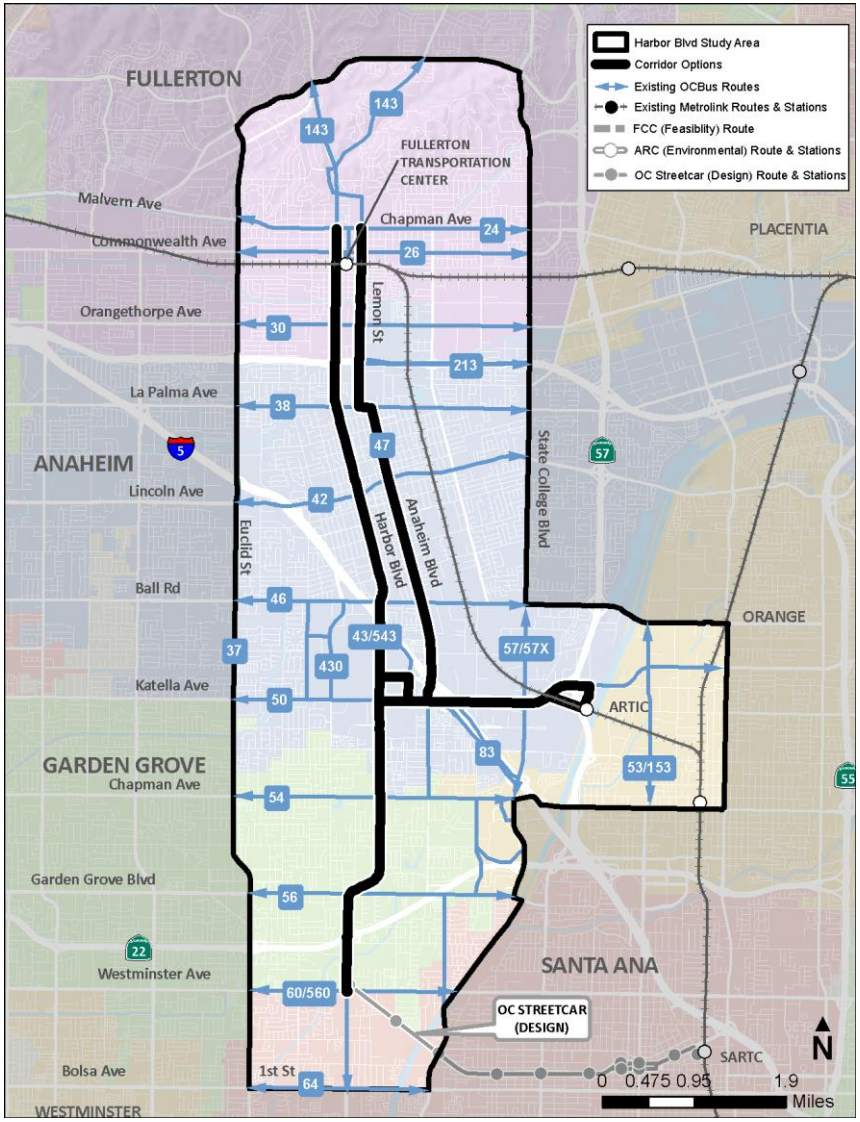
- **Service Coverage:** This relates to the destinations covered by the bus route and the number of stops along the corridor.
- **Frequency and Span of Service:** This refers to the time interval with which bus service is provided and the daily hours of operation for each route. Generally, transit service that is provided on an interval of every 15 minutes or less is considered "frequent" while wider time intervals are considered "infrequent."
- **Mixed Flow Traffic or Designated Transit Lanes:** All transit services in Orange County (except Amtrak and Metrolink commuter rail) operate in mixed flow traffic with other automobiles. Time schedules and on-time performance are at least partially dependent on traffic conditions.
- **Bus Stop/Shelter Amenities:** The provision and quality of bus stop amenities is currently determined by the local jurisdiction in which the stops are located. Along the Harbor corridor the provision of amenities is inconsistent and varies greatly from jurisdiction to jurisdiction.
- **Connectivity to the Network:** How do the services in the corridor connect to the overall transit network and to other modes.

Figure 2.1. Transit Lines through Study Area



Source: STV, 2017; OCTA, 2015

Figure 2.2. OCTA Routes through Study Area



Source: STV, 2017; OCTA, 2015

2.2.1. Orange County Transportation Authority

Harbor Boulevard

OCTA operates two bus routes on Harbor Boulevard: Route 43 (Local) and Bravo! 543 (Limited Stop). These two routes provide a high level of coverage and frequency when both routes are in service.[1] Table 2.1 below summarizes the characteristics of service provided. While Route 43 provides a high level of coverage with stops located an average of 0.25-miles apart, it has a lower frequency of every 20 minutes. Bravo! 543 runs more frequently (12 minutes during peak hours and 18 minutes during non-peak weekday service) and provides a faster travel time since its stops are spaced approximately 0.75-miles apart.

Table 2.1 Bus Service on the Harbor Boulevard Corridor

Route	Route Limits	Distance (miles)	Stop Spacing	Frequency (minutes)*	Hours of Operation	Run Time (minutes)
43 (SB)	North Court to Newport Blvd/19th St	18.0	0.25	20, 30, 60	3:50 am - 1:29 am	90
Bravo! 543 (SB)	FTC to MacArthur Blvd	13.0	0.75	12-20, 60	5:02 am - 7:50 pm	48
43 (NB)	19th St/Newport Blvd to North Court	18.0	0.25	20, 30, 60	4 am - 1:30 am	90
Bravo! 543 (NB)	MacArthur Blvd to FTC	13.0	0.75	12-20, 60	5:46 am - 8:00 pm	50

*Service frequency on Bravo! 543 is 12 minutes during peak hours while service frequency on Route 43 is 20 minutes during peak hours.

Anaheim Boulevard/Lemon Street

OCTA operates Route 47 (Local) between the FTC and the city of Newport Beach. This route travels north to south along Lemon Street and Anaheim Boulevard/Haster Street to Chapman Avenue. Past Chapman Avenue, Route 47 travels primarily along Fairview Street. Route 47 is 22 miles in length and has stop locations spaced about 0.3-miles apart. Stop spacing provides good coverage on this route but results in a long run time of 100 minutes. The frequency of service is 14 minutes during peak hours and up to 40 minutes during the non-peak. Service operates from 4 AM to 11:30 PM. Table 2.2 summarizes the characteristics of service provided.

[1] Bravo! 543 operates between approximately 5 AM and 8 PM on weekdays. Route 43 operates between approximately 4 AM and 1:30 AM on weekdays.

Table 2.2. Bus Service on the Lemon Street/Anaheim Boulevard Corridor

Route	Route Limits	Distance (Miles)	Stop Spacing	Frequency (Minutes)*	Hours of Operation	Run Time (mins.)
47 (SB)	FTC to Oceanfront/Palm St	22.0	0.3	14, 20-40	4:34 am - 11:27 pm	100
47 (NB)	Oceanfront/Palm St to FTC	22.0	0.3	20, 30-60	3:55 am- 11:37 pm	98

*Service frequency is 14 minutes during peak hours.

Katella Avenue

OCTA operates Route 50 (local) between the cities of Long Beach and Orange. This route primarily travels east to west along Katella Avenue, through the cities of Long Beach, Los Alamitos, Cypress, Stanton, Garden Grove, Anaheim (including ARTIC), and Orange. Route 50 is approximately 20 miles in length and has stop locations spaced at various intervals ranging from under 0.2 miles to approximately 0.35 miles. Stop spacing and skipped stops on this route result in a total run time of approximately 90 to 100 minutes. The frequency of service is 15 minutes during peak hours and up to 30-60 minutes during off-peak hours. Service operates from approximately 4 AM to 1:30 AM during weekdays. Table 2.3 summarizes the characteristics of service provided.

Table 2.3. Bus Service on the Katella Avenue Corridor

Route	Route Limits	Distance (Miles)	Stop Spacing	Frequency (Minutes)*	Hours of Operation	Run Time (mins.)
50 (WB)	The Village at Orange to 7th St/Channel Dr	20	0.2-0.35	15, 30, 60	4:34 am - 11:27 pm	90- 100
50 (EB)	7th St/Channel Dr to The Village at Orange	20	0.2-0.35	15, 30, 60	3:55 am- 11:37 pm	90-100

*Service frequency is 15 minutes during peak hours.

OCTA also operates a limited-stop shuttle on weekdays between ARTIC and Walnut Street/Calle de las Estrellas outside of the Disneyland Hotel on the western edge of the Disneyland Resort.

Other Corridors

There is an extensive network of other OCTA bus lines in the study area, including local, express, and station connector services. Table 2.4 lists the routes that run through the study area. As noted in the overview, Harbor Boulevard intersects more than two dozen major east-west corridors.

Table 2.4. OCTA Transit Lines through Study Area

Route Type	Routes
Local/Fixed Routes	24: Fullerton – Orange via Chapman Avenue 26: Buena Park – Huntington Beach via Commonwealth Avenue 30: Cerritos – Anaheim via Orangethorpe Avenue 37: La Habra – Fountain Valley via Euclid Street 38: Lakewood – Anaheim Hills via La Palma Avenue 42: Seal Beach – Orange via Lincoln Avenue 43: Fullerton – Costa Mesa via Harbor Boulevard 46: Los Alamitos – Orange via Ball Road 47: Fullerton – Newport Beach via Anaheim Boulevard 50: Long Beach – Orange via Katella Avenue 54: Garden Grove – Orange via Chapman Avenue 56: Garden Grove – Orange via Garden Grove Boulevard 57/57X: Brea – Newport Beach via Bristol Street 60: Long Beach – Tustin via Westminster Avenue 64: Huntington Beach – Tustin via 1st Street 83: Anaheim – Laguna Hills Express via Manchester Avenue 543: Fullerton – Santa Ana via Harbor Boulevard 560: Santa Ana – Long Beach via Westminster Ave
Community Routes	103: La Habra Express via Harbor Boulevard 143: La Habra – Brea Mall via Harbor Boulevard
Intracounty Express	213: Brea – Irvine via Brea Boulevard
Stationlink	430: Anaheim Resort – ARTIC via Katella Avenue 454: Garden Grove – Orange Transportation Center via Chapman Avenue
Intercounty Express	757: Diamond Bar – Santa Ana via SR-57

2.2.2. Anaheim Resort Transportation

Anaheim Resort Transportation provides transit services in the city of Anaheim, including The Anaheim Resort, the Platinum Triangle, and CtrCity Anaheim. ART also provides services to limited locations in other cities, including Garden Grove, Orange, Buena Park, Santa Ana, and Costa Mesa. There are 21 fixed route lines which originate from the Disneyland Resort Transportation Center. These routes travel to multiple destinations, retail districts, lodging establishments, and activity centers nearby. ART routes are described in Table 2.5.

Table 2.5. ART Routes Through Study Area

Route	Destination
Harbor Boulevard Lines 1-2	Garden Grove Entertainment District, via Harbor Boulevard
Grand Plaza Lines 3/4/5	Anaheim Convention Center via Harbor Boulevard
Hotel Circle Clementine Lines 6/7/8	Anaheim Hotel Circle via Harbor Boulevard, Katella Avenue, and Manchester Avenue
Katella Line 9	Harbor Boulevard and westbound on Katella Avenue to Walnut Street
Downtown Packing District Line 10	Downtown Anaheim Packing District via Harbor Boulevard, Anaheim Boulevard, and Ball Road
Ball Road Line 11	Harbor Boulevard and Ball Road to Walnut Street

Route	Destination
Manchester Ave Line 12	Harbor Boulevard, Katella Avenue, Haster Street, Orangewood Avenue, Manchester Way, and Disney Way
ARTIC Sports Complex Lines 14/15	Anaheim Convention Center, Angel Stadium of Anaheim, Honda Center, State College Boulevard, Outlets at Orange, and ARTIC
Orange Line 16	Garden Grove Entertainment District and The Outlets at Orange via Harbor Boulevard, Garden Grove Boulevard, The City Drive, and Chapman Avenue
Buena Park Line 18	Activity centers in Buena Park via Harbor Boulevard, Disney Way, Manchester Avenue, La Palma Avenue, and Beach Boulevard
Canyon Line 17/21	Anaheim Canyon Metrolink Station via Harbor Boulevard, Ball Road, SR-57, and La Palma Avenue
Santa Ana Line 19	Activity centers in Santa Ana via Harbor Boulevard, Orangewood Avenue, and Main Street
Toy Story Line 20	Toy Story Transportation Center via Harbor Boulevard
Costa Mesa/ South Coast Plaza Line 22	Costa Mesa South Coast Plaza, via Harbor Boulevard, Chapman Avenue, Anaheim Way, SR-55, and Bristol Street

2.2.3. Metrolink and Amtrak

Three multi-modal transportation hubs are located either in or near the study area: the Fullerton Transportation Center, the Anaheim Regional Transportation Intermodal Center, and the Santa Ana Regional Transportation Center. Metrolink commuter rail services and Amtrak regional/national rail services are accessed from each of these hubs. The FTC is located off Harbor Boulevard and provides a direct connection to/from the college campuses located in Fullerton and to/from the jobs-dense Harbor corridor. ARTIC is located south of Angel Stadium of Anaheim off Douglass Road. This study considers enhancements to connections between this station, which has been identified as a future potential California High Speed Rail station, and The Anaheim Resort, Angel Stadium of Anaheim, the Honda Center, and Anaheim's Platinum Triangle district. SARTC is located at East Santa Ana Boulevard and Penn Way in Santa Ana and provides access to downtown Santa Ana and the Santa Ana Civic Center. Metrolink and Amtrak lines are listed below in Table 2.6. When completed, the OC Streetcar project will connect SARTC to Harbor Boulevard.

Table 2.6. Commuter and Regional Rail Lines Through and Near Study Area

Route	Destination
Metrolink 91	Los Angeles to Riverside with stop at FTC
Metrolink Orange County Line	Los Angeles to Oceanside with stops at FTC, ARTIC, and SARTC
Metrolink Inland Empire Line	San Bernardino to Oceanside with stop at SARTC
Amtrak Southwest Chief	Los Angeles to Chicago with stop at FTC
Amtrak Pacific Surfliner	San Luis Obispo to Los Angeles to San Diego with stops at FTC, ARTIC, SARTC

2.2.4. Los Angeles County Metropolitan Transportation Authority

Additionally, the Los Angeles County Metropolitan Transportation Authority operates Local and Express Bus Route 460 between downtown Los Angeles and the Anaheim Resort via local streets through southeastern Los Angeles County/northwestern Orange County and the I-5 Freeway. Within the study area, Route 460 stops at the Disneyland Resort and at Manchester Avenue/Harbor Boulevard.

2.3. ACTIVE TRANSPORTATION

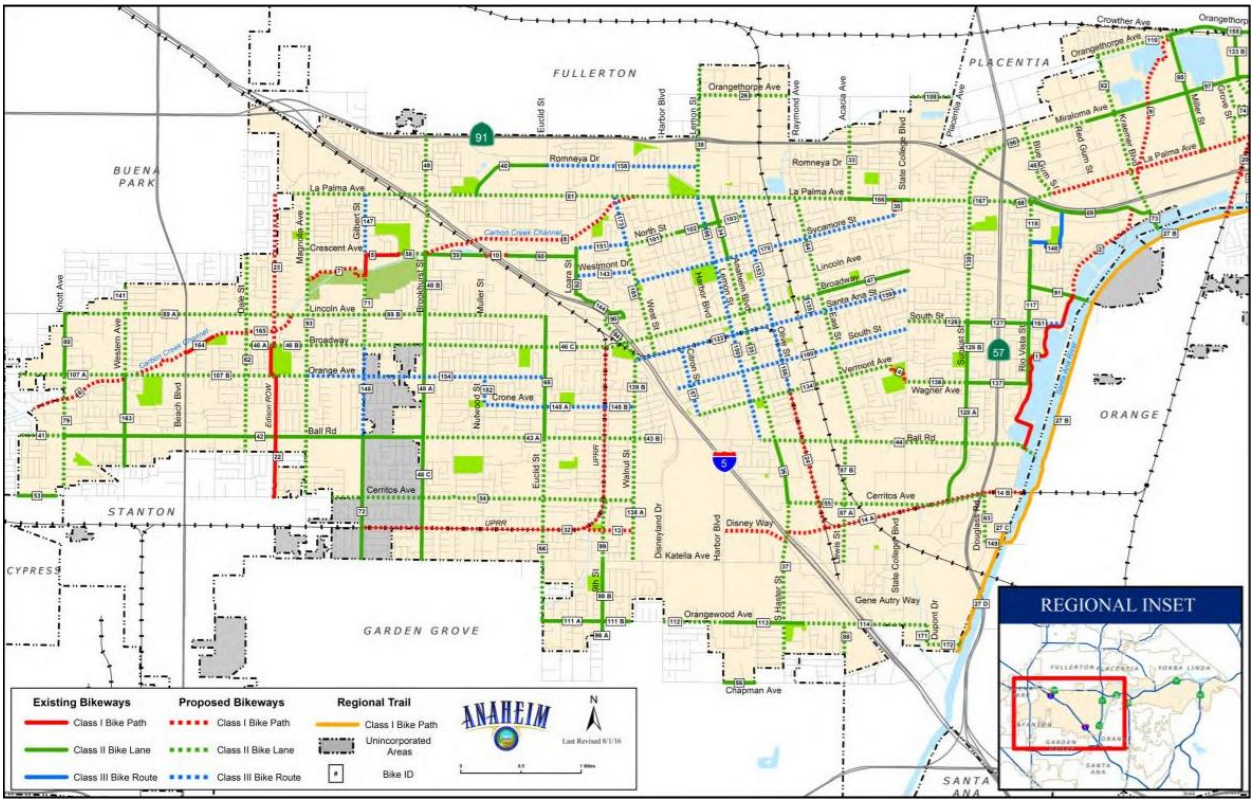
2.3.1. Bicycle Transportation

Bicycle facilities are currently limited within the study area and nearly non-existent along Harbor Boulevard. Most of the existing bike lanes and paths are located in Fullerton, along with a few east-west bike lanes through Garden Grove, and south of Westminster Avenue in Santa Ana. The sparse bikeway network and few connections to transit modes reflects the auto-centric nature of the corridor when originally developed. However, several cities are proposing extensive additions to fill the gaps in the existing bikeway network. Anaheim, for example, is proposing several Class II and III bikeways along east-west streets that connect CtrCity and the Colony Historic District. On the southern end of the study corridor, Garden Grove and Santa Ana are proposing several Class II and III facilities along Orangewood Avenue, Chapman Avenue, Lampson Avenue, and Westminster Avenue. These additions would create a strong regional network throughout the study area. Due to existing and projected traffic/transit volumes, however, this study does not currently recommend enhanced bicycle amenities along Harbor Boulevard. See *Study Corridor Definition Report* (April 2016) and the next section for more information on the region's proposed bikeway system.

Anaheim Bicycle Master Plan

Since the release of the *Study Corridor Definition Report* (April 2016), the city of Anaheim, as mentioned above, has released plans to improve bicycle infrastructure throughout the study area. In August 2016, the city of Anaheim released their Bicycle Master Plan to guide its implementation of citywide bicycle facilities. The Plan supersedes the 2004 Anaheim Bicycle Master Plan and is intended to improve bicycling safety, comfort, and accessibility. The Plan identifies a network of existing and proposed bicycle facilities that will improve multi-modal connectivity and increase bicycle mode share, especially for short trips through a system of on-street bike lanes and routes and off-street bike paths to connect residents, visitors, and workers to their destinations. The Plan has meets California State requirements for a Bicycle Transportation Plan and includes amendments to the Anaheim General Plan. The Plan does not propose to remove any vehicle travel lanes in favor of bicycle lanes, but does propose enhanced bicycle facilities (Class II and III) on Lemon Street, La Palma Avenue, Anaheim Boulevard/Haster Street, and Disney Way (a Class I Bike Path is proposed along Disney Way, between Harbor Boulevard and Haster Street). Enhancements to other intersecting east-west routes through the study area are also proposed along segments of Romneya Drive, North Street, Sycamore Street, Broadway, Santa Ana Street, South Street, Vermont Avenue, Ball Road, Cerritos Avenue, and Orangewood Drive. The existing and proposed bikeway network is shown in Figure 2.3 below.

Figure 2.3. Existing/Proposed Bikeway Network (Anaheim West)

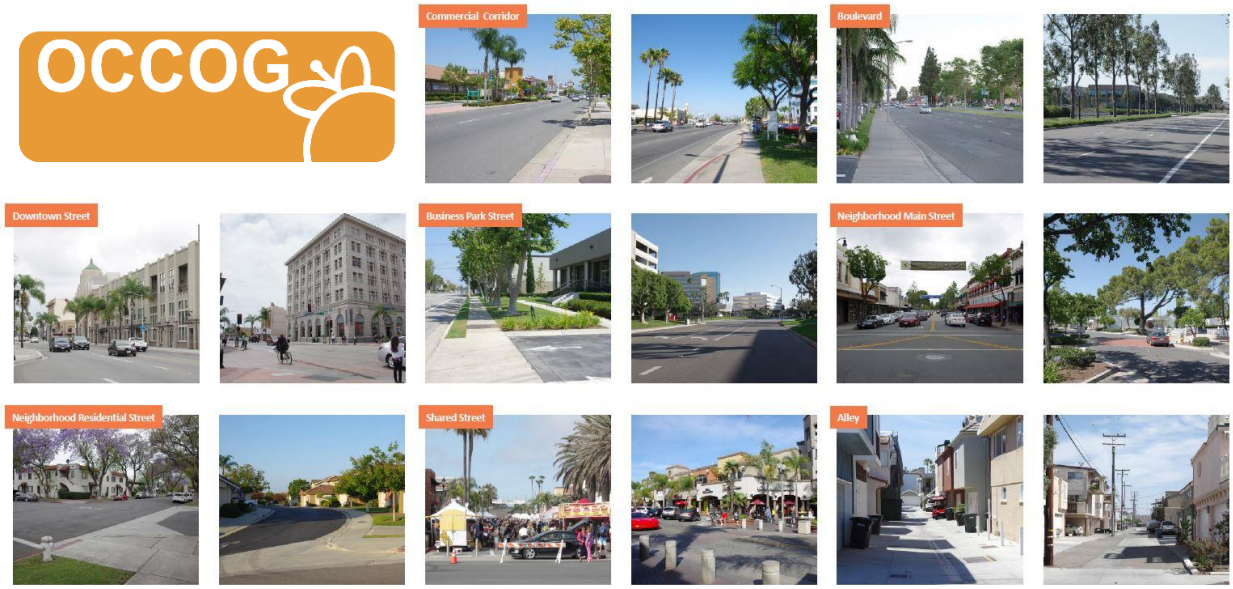


Source: City of Anaheim, 2016

2.3.2. Complete Streets

In April 2016, the Orange County Council of Governments (OCCOG) completed the draft Orange County Complete Streets Initiative Plan (OC CSI). The plan establishes criteria to create a transportation network that serves all users by enhancing mobility choices and offering a variety of improvements that improve safety, health, environmental, financial, and social issues. With respect to the study corridors, the OC CSI offers a variety of treatments to the different street typologies found within the study area. See the next page for examples.

Figure 2.4. Select Street Types Found in Orange County



Source: Orange County Council of Governments, 2016

Harbor Boulevard, for example, is a major arterial and serves as a commercial corridor first and foremost, but also as a neighborhood main street, neighborhood residential street, and a wide boulevard. The Lemon Street/Anaheim Boulevard corridor serves primarily as a downtown street, business park street, and commercial corridor/boulevard. Katella Avenue is a commercial corridor and boulevard.

3. PLANNED PROJECTS & STUDIES

This section introduces the major planned projects and studies in the area that seek to improve mobility in this region. More detailed information on these and other projects in the area can be found in the *Prior Studies & Data Collection Report* (April 2016).

3.1. OC STREETCAR (IN DESIGN)

The Santa Ana-Garden Grove Fixed Guideway Project (also known as the "OC Streetcar"), is a $289 million, Measure M2-initiated, streetcar project scheduled to begin operation in 2020. The approximately 4-mile route will travel from SARTC to a new multimodal hub in Garden Grove on the northeast corner of Harbor Boulevard and Westminster Avenue. The project's primary purpose is to provide "last mile" connections to Metrolink and Amtrak service at SARTC. The streetcar will travel along a combination of local streets and a dedicated right-of-way. The project is currently in the engineering and design phase and has achieved several milestones to date. The Revised Environmental Assessment/Final Environmental Impact Report was certified by Santa Ana in January 2015, and the Federal Transit Administration (FTA) approved a Finding of No Significant Impact in March 2015. In May 2015, the FTA approved the project for entry into project development.

3.2. FULLERTON COLLEGE CONNECTOR (FEASIBILITY STUDY)

The Fullerton College Connector Feasibility Study evaluated the opportunities, challenges, and costs associated with implementing an "urban circulator" system between Downtown Fullerton/FTC and numerous educational institutions (most notably Fullerton College and CSUF) located northeast of Downtown Fullerton. The study developed numerous alternatives for enhanced transit service primarily along Commonwealth Avenue and/or Chapman Avenue. Transit technologies considered in the study consisted of light rail, modern streetcars, heritage/historic streetcars, and rubber-tire or hybrid buses using a mixture of mixed-flow traffic and dedicated rights-of-way. Of the six alternatives studied, total capital costs for implementation range from $140-$173.8 million.

3.3. CENTRAL COUNTY CORRIDOR MAJOR INVESTMENT STUDY (PLANNING DOCUMENT)

The 2010 Central County Corridor Major Investment Study helped establish a long-term transportation vision by studying the need for strategic investments that address current and future mobility problems in central Orange County through 2035. The study resulted in a consensus on a multimodal strategy that includes improvements to arterials, freeways, bus, and rail transit. Proposed specific improvements range from arterial and intersection optimization/widening, additional high-occupancy vehicle lanes and interchanges to local freeways, enhanced connections to Metrolink/Amtrak passenger rail, investment in community-based shuttles (e.g., ART), the development of high-capacity fixed-guideways in Anaheim (ARC) and Santa Ana/Garden Grove (OC Streetcar), and substantial improvements to

local bus service in conjunction with the implementation of six Bus Rapid Transit routes (including Harbor Boulevard and Katella Avenue). The study also suggested an intersection improvement feasibility study for the intersection of Harbor Boulevard and Ball Road.

3.4. ANAHEIM RAPID CONNECTION

Anaheim's "ARC" project evaluated a fixed guideway connection along a 3.2-mile corridor between The Anaheim Resort and ARTIC. The project was intended to serve the major job and activity centers in The Anaheim Resort (i.e., the Anaheim Convention Center, the Disneyland Resort, and Anaheim GardenWalk) and provide a connection to the regional rail station. On October 24, 2016, the OCTA Board of Directors and the City of Anaheim agreed to discontinue planning efforts for the ARC, and instead evaluate transit connections between The Anaheim Resort and ARTIC as part of the Central Harbor Boulevard Transit Corridor Study.

Implications

The projects listed above indicate a willingness from local municipalities and OCTA to make significant investments in transportation improvements on or near Harbor Boulevard. With numerous projects being planned and developed in Downtown Fullerton, CtrCity (Downtown) Anaheim, The Anaheim Resort, Grove District-Anaheim Resort, and at the intersection of Harbor Boulevard and Westminster Avenue, enhanced transit options are essential to improving quality of life for residents, workers, and visitors.

In Santa Ana and Garden Grove, the OC Streetcar will enhance connections to SARTC, Downtown Santa Ana's Civic Center, and the proposed developments on Harbor Boulevard and Westminster Avenue. In Anaheim, the Central Harbor Boulevard Transit Corridor Study will examine methods to provide a direct connection between ARTIC and The Anaheim Resort. In Fullerton, the FCC seeks to enhance connections between CSUF and Downtown Fullerton.

4. DEMOGRAPHICS & LAND USE

4.1. LAND USE

Table 4.1. Land Uses within Study Area

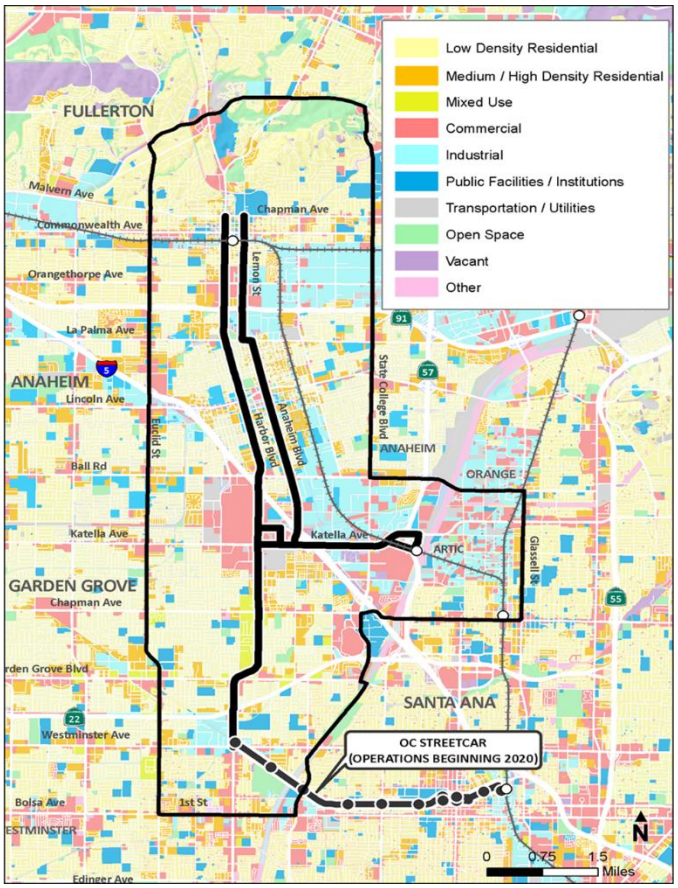
Region	Low-Density Residential	High-Density Residential	Commercial	Industrial	Public Facilities / Institutions	Transportation / Utilities	Mixed Use	Open Space / Recreation	Vacant[2]	Other
Study Area	36.4%	12.4%	19.1%	12.3%	8.2%	3.5%	0.4%	4.8%	1.1%	1.8%
Orange County	21.9%	5.9%	7.8%	4.1%	4.2%	2.9%	0.2%	10.1%	37.4%	5.5%

Source: STV, 2016; SCAG, 2008; City of Anaheim, 2015; City of Fullerton, 2015; City of Garden Grove, 2015

As seen in Table 4.1 above and Figure 4.1 to the right, approximately half of the land uses within the study area are residential, with approximately 36 percent low-density residential, and approximately 12 percent mid-to-high density residential. Commercial land uses comprise a large portion of the study area, at approximately 19 percent and are concentrated around The Anaheim Resort, downtown Fullerton, and along the Santa Ana River between the SR-22 freeway and Ball Road. Industrial uses make up approximately 12 percent of the study area, and are mostly located along freight and passenger rail lines.

Within the study area, there are large concentrations of commercial land uses around The Anaheim Resort and Platinum Triangle in Anaheim. Industrial land uses are dispersed near or off railway lines to the east of the Lemon/Anaheim corridor.

Figure 4.1. Land Uses within Study Area



Source: STV, 2016; SCAG, 2008; City of Anaheim, 2015; City of Fullerton, 2015; City of Garden Grove, 2015

[2] Vacant land categories include natural undeveloped areas of the county such as Cleveland National Forest.

4.2. Present Population and Employment

There are about 50 percent more residents than jobs within the study area. Residents are distributed fairly evenly across the area, with the exception of the area around The Anaheim Resort and the industrial and commercial centers east of the I-5 freeway between Chapman Avenue in the south and Ball Road in the north. This is in line with the heavier presence of industrial and commercial land along rail corridors in that area. Residential density in the study area is high at more than double the density of Orange County overall. Figure 4.5 through Figure 4.8 show jobs/job density, residents/residential density per sub-area (Figure 4.4).

Jobs within the study area are concentrated around Fullerton College and the rail-adjacent industrial areas east of the FTC, The Anaheim Resort, the Anaheim Convention Center, Anaheim's Platinum Triangle, the Outlets at Orange, the Grove District in Garden Grove, and downtown Santa Ana, which will also be served by the OC Streetcar beginning in 2020. Job density is significantly higher than that of Orange County at nearly three times as dense.

Table 4.2 below lists the population and employment densities for the study area and Orange County overall. Figure 4.2 and Figure 4.3 graphically represent the population and job distribution.

Table 4.2. Population and Employment Densities within Study Area (2015)

Region	Population Density (residents/sq. mile)	Employment Density (jobs/sq. mile)
Study Area	8,872	5,757
Orange County	3,945	2,032

Source: OCP, 2015

4.3. Future Population and Employment

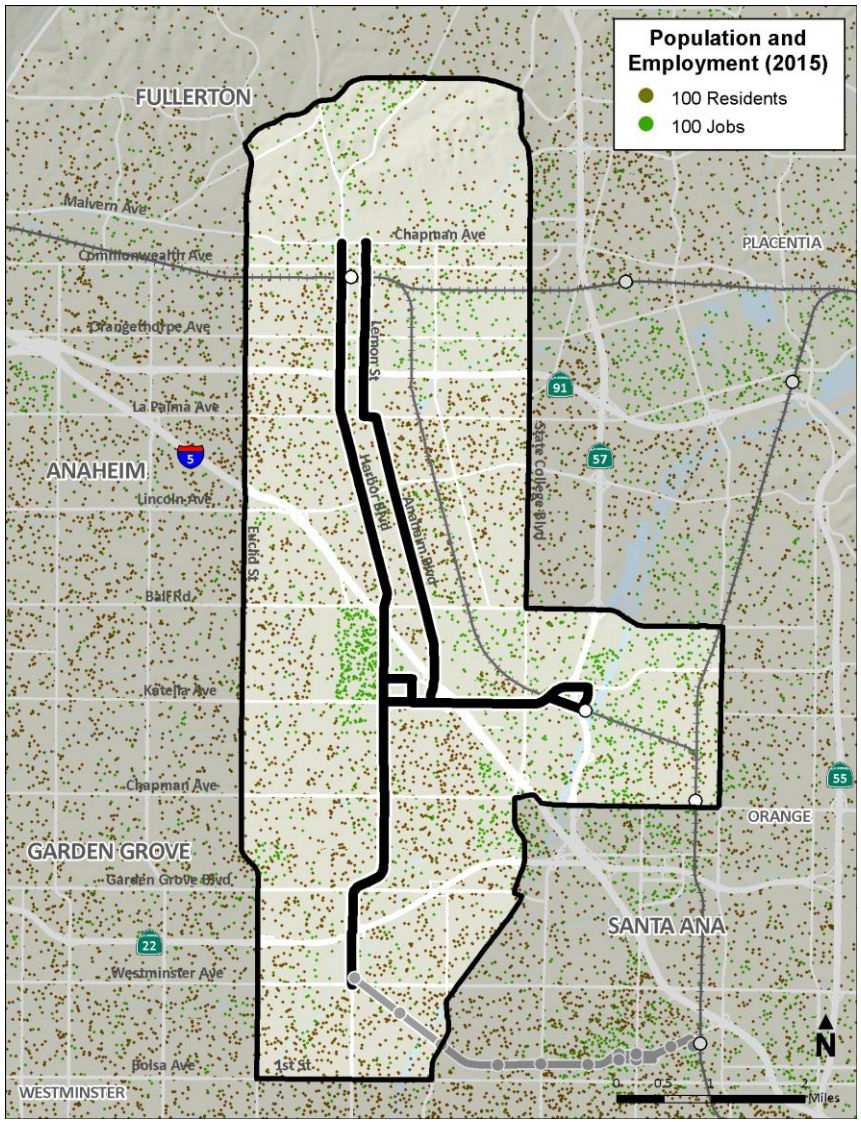
High rates of residential and employment growth are projected for the overall study area. Between 2015 and 2035, population is expected to increase by over 15 percent and employment by over 25 percent, with most of the growth concentrated in Anaheim and Fullerton. Compared to Orange County as a whole, the study area is projected to have higher rates of growth for both residents and jobs. Table 4.3 shows the projected population and employment change for the study area and the entire county from 2015 to 2035. See Figure 4.2 and Figure 4.3 for a side-by-side comparison of present and future spatial distribution of both jobs and population.

Table 4.3. Population and Employment Change within Study Area (2015 to 2035)

Region	Population Density (residents/sq. mile)	Employment Density (jobs/sq. Mile)	% Change in Population	% Change in Employment
Study Area	10,313	7,244	16	26
Orange County	4,297	2,430	9	15

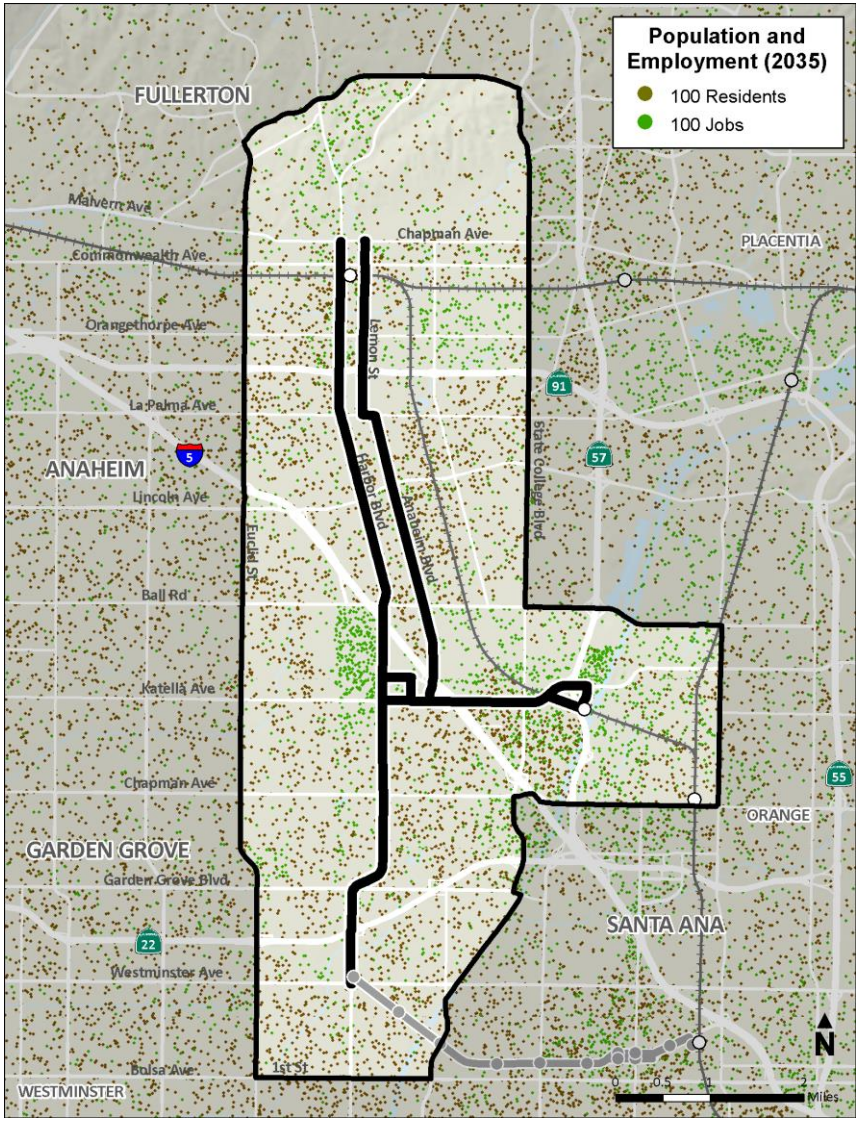
Source: STV, 2015; OCP, 2015

Figure 4.2. 2015 Population and Employment within Study Area



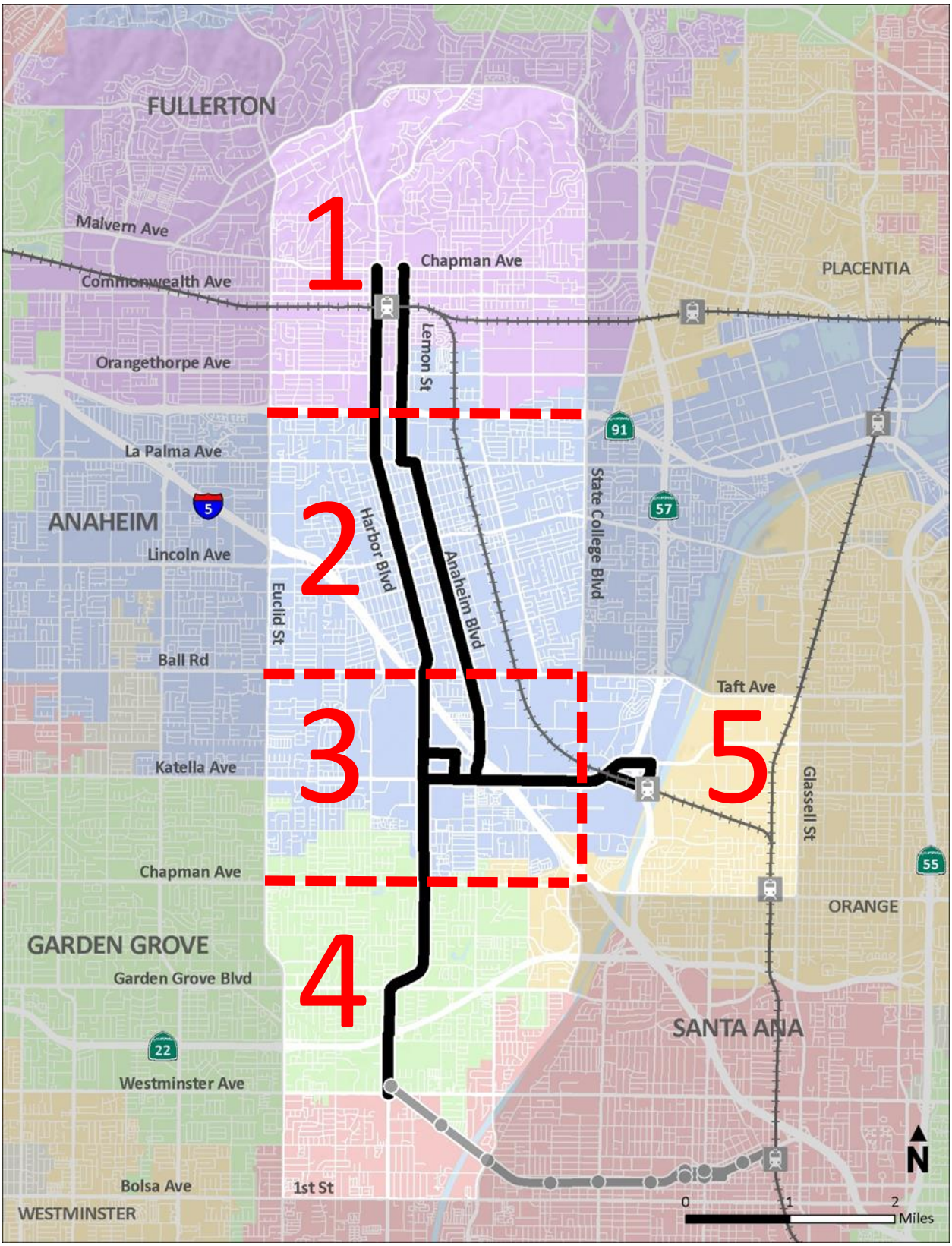
Source: STV, 2015; OCP, 2015

Figure 4.3. 2035 Population and Employment within Study Area



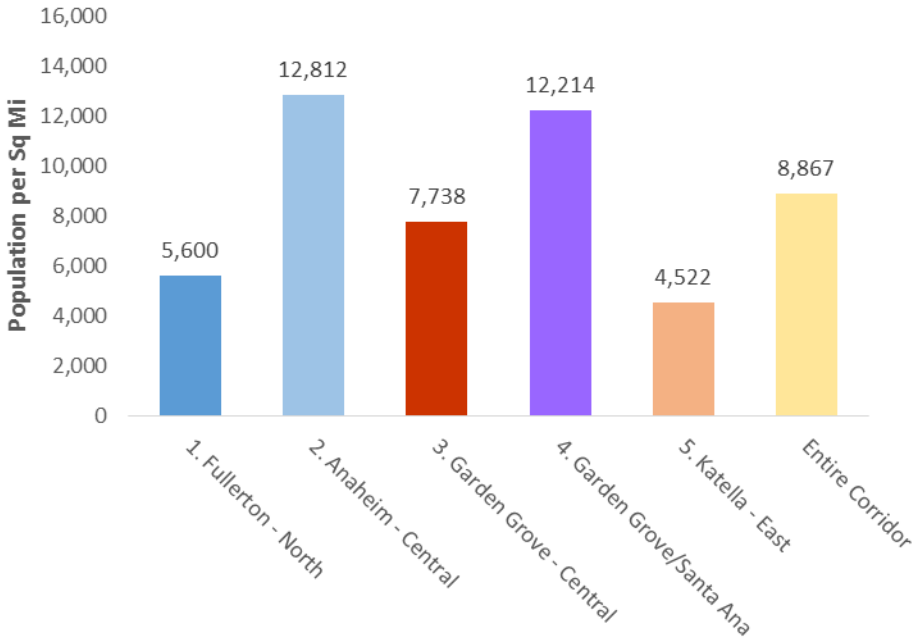
Source: STV, 2015; OCP, 2015

Figure 4.4. Project Sub-Areas



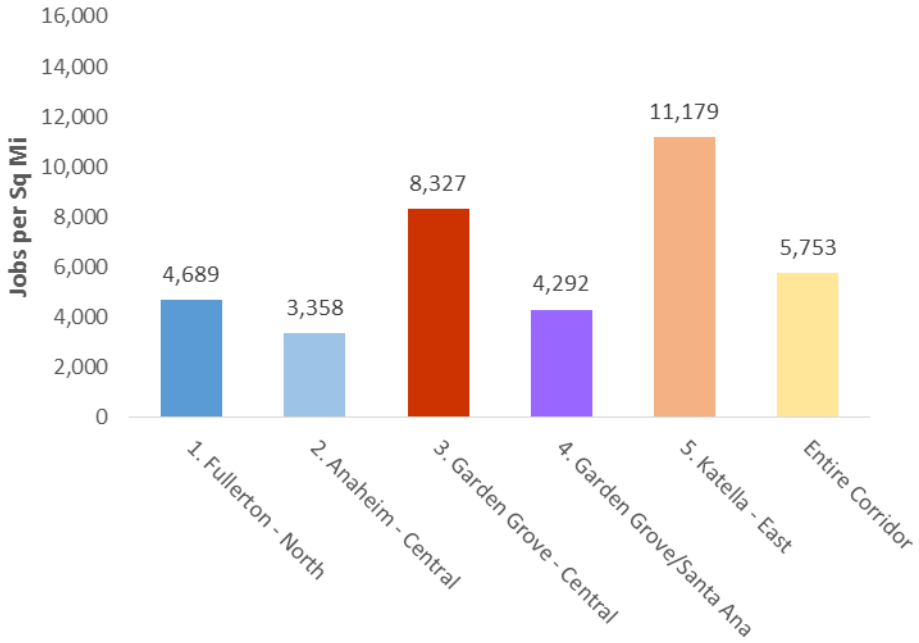
Source: STV, 2017

Figure 4.5. Population per Project Sub-Area per Square Mile[3]



Source: STV, 2016; U.S. Census Bureau, 2013

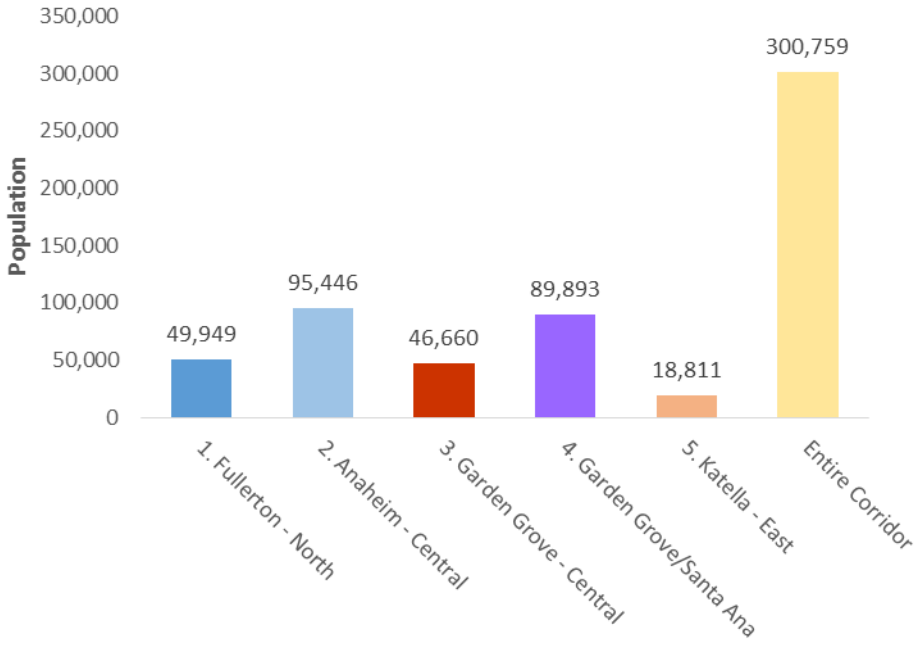
Figure 4.6. Jobs per Project Sub-Area per Square Mile



Source: STV, 2016; U.S. Census Bureau, 2013

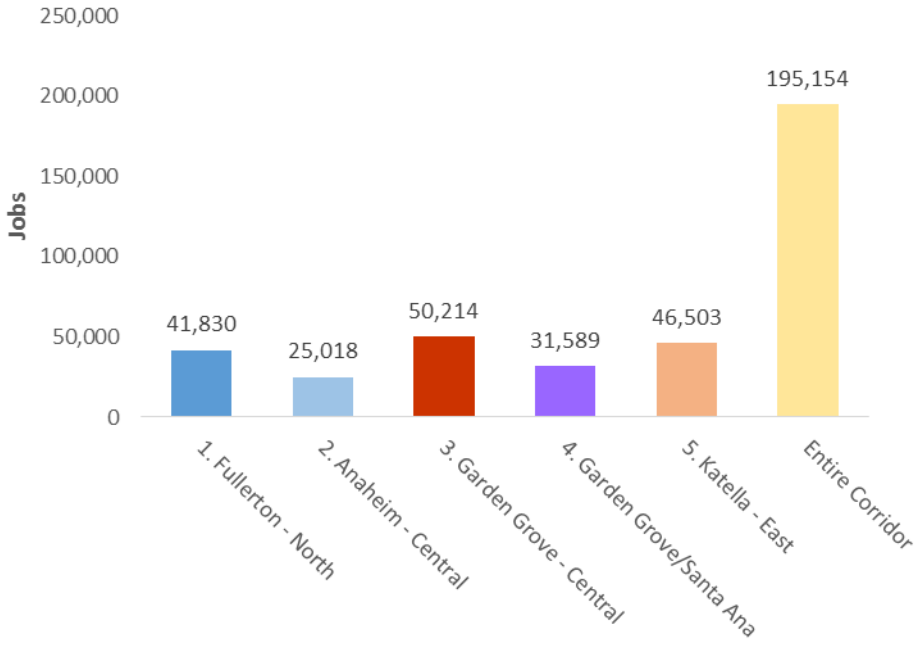
[3] Numbers in these charts may differ slightly from other parts of this report due to discrepancies between shape of study area boundaries and Traffic Analysis Zones and Census Tracts used for analysis.

Figure 4.7. Total Population per Project Sub-Area



Source: STV, 2016; U.S. Census Bureau, 2013

Figure 4.8. Total Jobs per Project Sub-Area



Source: STV, 2016; U.S. Census Bureau, 2013

4.4. STATION AREA DENSITIES AND TRANSIT RIDERSHIP

There is a strong positive relationship between residential and employment densities and transit ridership: the greater the densities in the station areas, the greater the potential for attracting transit riders. Transit professionals have attempted to articulate a precise range of densities within a 0.5-mile radius of transit stations at which investments in enhanced bus service, Bus Rapid Transit, Streetcar, Light Rail or Heavy Rail (subway) systems could expect higher returns on investment. However, since there are many other variables that affect transit ridership and these variables differ across every region, there is not one standard range of densities that has become accepted as the standard for determining the appropriate level of transit investment. Transit professionals have widely acknowledged the importance of both residential and employment densities within 0.5-mile radius (walking distance) of station areas, and a recent study of 58 transit systems in the U.S. found that employment densities within 0.25-mile radius of station areas provided the best predictor of ridership. A key objective of this study will be to ensure that proposed station/stop locations serve the densest residential and employment areas, as well as the key destinations and transfer points.

Additionally, projects applying for funding from the FTA's New Starts program are required to evaluate both the population density within 0.5-miles of proposed stations and the total employment within 0.5 miles of the proposed transit project. This is important to acknowledge since OCTA projects may compete through this process against other projects around the country.

4.5. TRANSIT RIDER DEMOGRAPHICS

OCTA has conducted a number of surveys in recent years to help provide more information about what types of trips are being taken, how the quality of service is perceived by riders, and to discern the reasons why former riders stopped riding transit. These surveys have provided valuable information about transit usage in Orange County.

The most extensive survey was the On Board Survey (2013) which collected nearly 100,000 on-board surveys over a two year period. The survey respondents reported the following:

- **Age (18-64)**: Eighty-seven percent **(87%)** of respondents fell within this age range.
- **Low income households**: Seventy percent **(70%)** estimated their household income as less than $30,000.
- **No Auto Available**: Forty-one percent **(41%)** reported being from a zero-car households and eighty-two percent **(82%)** reported that there was no auto available for their personal commute.
- **Walk to/from bus**: Ninety percent reported that they accessed their transit commute by walking **(90%)**, while 4.6 percent were brought by auto and 4.5 percent arrived by bike.

- **Home to Work Commute**: The predominate trip purpose reported was for work commute **(78%)**; the next most common responses were *Other* (10%) and *School/College* (9%).

The OCTA Bus Customer Survey (2014) asked respondents to rank their *Most Desired Improvements* and *Customer Service Needs*. The following improvements and needs were ranked the highest.

Top 5 Most Desired Improvements:

- Frequency of Service (58%)
- Overcrowding inside buses (27%)
- More weekend Service (24%)
- More evening service (23%)
- Security & safety at bus stops (23%)

Top 5 Customer Service Needs:

- Frequency of buses / Wait time at bus stops
- On-time performance of bus
- Cost of riding bus
- Info provided at bus stops
- Travel time of trip

In 2013, OCTA surveyed riders exclusively along the Harbor Boulevard corridors. The agency surveyed 1,000 passengers who were riding either Route 43 or Bravo! Route 543. Riders surveyed reported the great majority of trips (74%) as commute trips between home and work or between home and school. Over one-third of the trips required a transfer to complete the trip. Fifty-eight percent (58%) of riders surveyed reported household income below $30,000 and thirty-three percent (33%) indicated belonging to a zero-car household.

A couple of important implications can be made about Harbor Boulevard corridor ridership:

- **Core ridership** includes a large share of transit dependent riders who live and/or work within or near the study area; and who rely on bus service for all their daily travel needs, and often require transfers to reach their final destinations.

- Only a **small percentage of trips (7%) are made for recreation** despite the key activity centers located along the corridor. ART serves as a primary transit option for trips to/from The Anaheim Resort and serves many tourists and visitors traveling to other activity centers and destinations. Better access to information materials, and enhanced branding, fare media, and stop/shelter amenities could help make OCTA services more attractive to tourists visiting the corridor or connecting to/from ARTIC.

5. TRAVEL MARKET ASSESSMENT

5.1. EXISTING COMMUTE FLOW

Connections to Jobs

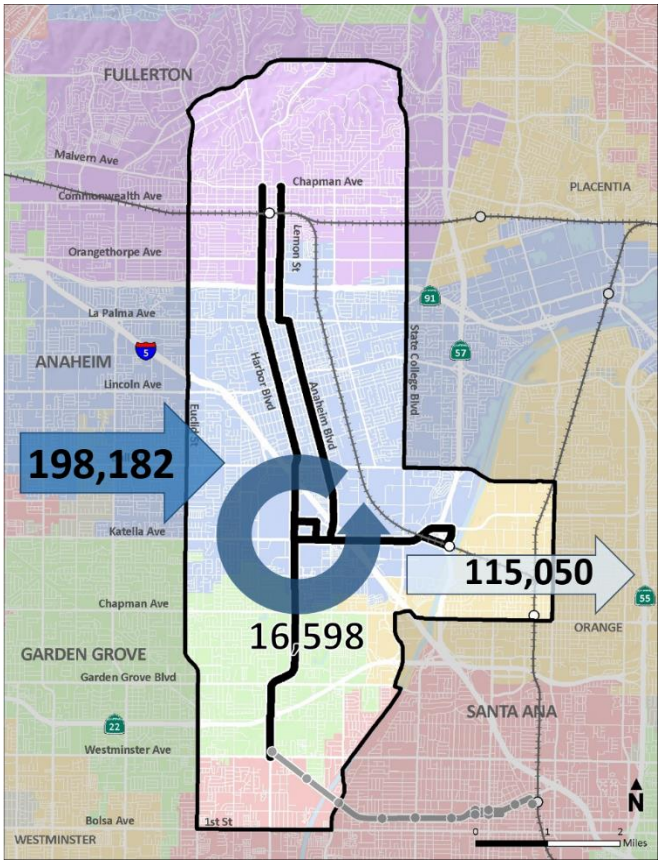


Figure 5.1. Study Area Commute Patterns
Source: LEHD, U.S. Census 2013: Kittelson & Associates, 2015

The study corridors are also some of the busiest and densest transit corridors in all of Orange County. Harbor Boulevard averages over 12,000 daily boardings, the Lemon Street/Anaheim Boulevard corridor averages an additional 9,000 daily boardings, while Katella Avenue averages over 4,000 daily boardings. The great majority of trips on these routes are commute-related: home-to-work and home-to-school trips. Thus, people who both reside and work/study within the study area are especially in a position to benefit from transit improvements along Harbor Boulevard, Lemon Street/Anaheim Boulevard, and Katella Avenue.

Study area commute patterns, as shown on Figure 5.1, suggest that the study area is skewed towards jobs as opposed to housing. In 2013, according to the U.S. Census Bureau's Longtitudinal Employment-Household Dynamics (LEHD) program, approximately 198,182 people commuted into the study area each day, while over 115,000 commuted to areas outside of the study area for work. About 16,598 both lived and worked in the study area.

Connections to Activity Centers

The study corridors provide connections to many local and regional activity centers and three major transportation hubs in Fullerton, Anaheim, and Santa Ana. Along Harbor Boulevard, for example, a significant number of transfers occur at the FTC, La Palma Avenue, Lincoln Avenue, Katella Avenue, and Westminster Avenue. La Palma Avenue and Lincoln Avenue in the northern half of the study area, in particular, along with Westminster Avenue in the southern edge,

Figure 5.2. Study Area Activity Centers
Source: STV, 2015

experience high volumes of transfers on the eastern edge of the study corridor at State College Boulevard (for La Palma and Lincoln Avenue) and Fairview Street at Westminster Avenue.

Therefore, improvements to the frequency and quality of transit service in the study corridor, as designated to take place under OCTA's Final 2016 Service Plan (approved February, 2016), would provide benefits to passengers transferring to/from east-west corridors. According to the Plan, frequencies along several key east-west routes would be elevated to 15 minutes or less, or similar Bravo! (12 minutes during peak hours). Frequencies along local routes 26 (Commonwealth Avenue), 50 (Katella Avenue), 54 (Chapman Avenue [South]) will be upgraded to 15 minutes during peak hours. OCTA's second Bravo! line (Route 560) travels along Westminster Avenue with a peak-hour frequency of 12 minutes. Changes outlined in the Plan went into effect in the summer and fall of 2016. For more information on changes to service, see OCTA's *Final 2016 Service Plan.*

Table 5.1 below compares travel time by mode from each transportation hub to a major activity center. Typically, transit commutes from a transit hub are two to four times longer than in a personal automobile. For these relatively short trips, cars have a clear advantage over the existing bus service. People coming from major activity centers outside of the area for work or recreation would likely find transit to be a less than convenient mode choice if time is the greatest concern.

Table 5.1. Comparison of Travel Time by Mode for Various Destinations, by City[4]

	Origin	Destination	Routes	Distance (miles)	Travel Time with Transit (minutes)	Travel Time with Auto (minutes)
Fullerton	FTC	Cal State Fullerton	Route 26	2.8	21	7
Fullerton	FTC	St. Jude Medical Center	Route 153	1.9	9	8
Anaheim	ARTIC	The Anaheim Resort	Route 14	3.9	30	13
Garden Grove	ARTIC	Downtown Garden Grove	Route 50 To Route 37	5.9	48	12
Santa Ana	SARTC	The Anaheim Resort	Route 19	7	40	15

Source: STV, 2016

5.2. TRAVEL MARKET CHARACTERISTICS

Commute Mode Share

The vast majority of workers in the area commute by driving alone along the corridor. Carpooling and bus transit appear to be the other major means of transportation to work (comprising less than twenty percent overall) while walking and working from home the only other modes above one percent. Commute mode choice percentages are shown by corridor city in Table 5.2 below.

Table 5.2. Means of Transportation to Work by Corridor Sub-Area[5]

Corridor Area	Drive Alone	Carpool	Transit	Bike	Walk	Other Means	Worked at Home
Fullerton	75.9%	12.1%	4.0%	1.2%	3.2%	0.4%	3.2%
Anaheim	70.1%	15.9%	6.5%	1.3%	2.5%	1.0%	2.7%
Garden Grove	73.8%	12.8%	7.0%	1.4%	2.4%	1.0%	1.6%
Santa Ana	75.6%	13.3%	5.1%	1.0%	2.2%	1.2%	1.7%
Total	73.0%	14.5%	5.4%	1.2%	2.5%	1.0%	2.4%
Orange County	78.0%	10.1%	2.8%	1.0%	2.0%	1.1%	5.0%

Source: Kittelson & Associates, 2015; US Census Bureau, ACS 5-Year Estimates, 2009-2013.

[4] Trips were calculated with Google Maps route planner using 10 AM departure times

[5] For residents living along the corridor, the most recent 5-year estimates from the American Community Survey (ACS) were used based on the 5-year period of 2009 to 2013. In order to help provide more local context for the travel market, the corridor has been broken down into four sub-segments. These sub-segments are:

- Fullerton-North: From Commonwealth Avenue to the City of Fullerton/City of Anaheim border;
- Anaheim-Central: From the City of Fullerton/City of Anaheim border to Katella Avenue;
- Garden Grove-Central: From Katella Avenue to Westminster Boulevard; and,
- Santa Ana-South: From Westminster Boulevard to 1st Street.

6. TRANSIT AND ROADWAY PERFORMANCE

This section examines existing and future traffic conditions, how they impact transit performance, and how future traffic conditions may affect transit performance.

6.1. EXISTING TRAFFIC CONDITIONS

A major constraint for transit service along the Harbor Boulevard and Lemon Street/Anaheim Boulevard study corridor is traffic congestion. Roadway congestion is often reported using level of service (LOS) which assigns a letter grade based on the amount of delay and comfort a driver is expected to experience.

Table 6.1. Level of Service Classifications

A	LOS A represents free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver.
B	LOS B has stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.
C	LOS C has stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.
D	LOS D represents high-density, but stable flow. Users experience severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.
E	LOS E represents operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.
F	LOS F is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.

Source: Highway Capacity Manual, 2000

Table 6.1 above provides the criteria used to assign a LOS letter grade and describes the conditions a driver is likely to experience under these conditions. Table 6.3 on the following page shows peak hour traffic volumes, vehicle volume to capacity (V/C) ratios (i.e., number of vehicles on a roadway divided by the roadway's carrying capacity), and LOS for segments along the study corridors during peak morning travel hours.

According to the Highway Capacity Manual, "Free-Flow Speed" (FFS) on an urban street is the speed that a vehicle travels under low volume conditions when all the signals on the urban street are green for the entire trip. Thus, all delay at signalized intersections, even under low flow conditions, is excluded from the computation of urban street FFS. Table 6.3 shows LOS for northbound and southbound trips on both corridors during the morning rush hour. Northbound

LOS is shown on the half segments on the right and southbound LOS is shown on the half segments on the left.

None of the segments shown in Table 6.3 and Table 6.3, and in Figure 6.1 and Figure 6.2 operate at free-flowing condition which is to be expected in an urbanized area. There are numerous sections where "D" and "E" conditions are present, with V/C ratios close to 1.0, indicating the roadway is nearly at capacity. Additionally, southbound traffic during the morning hour is slower compared to northbound traffic, especially within Anaheim near The Anaheim Resort. The projected employment and population increases signifies that LOS on Harbor Boulevard, Lemon Street/Anaheim Boulevard, and Katella Avenue could continue to worsen in the future.

To mitigate this pressure without a substantial shift in travel modes, corridor cities would need to acquire additional private right-of-way to add additional capacity to streets. The high cost and impacts to adjacent land owners make this a difficult proposition in a highly urbanized area such as this. Existing demand and future growth thus require looking for ways to increase person throughput within existing constraints.

Table 6.2 Katella Avenue Study Corridor LOS (AM Peak)

	From	To	Class	Lanes	Volume	Capacity	V/C	LOS
Westbound								
Katella Avenue	West St	Harbor Blvd	2	3	761	2,670	0.29	C
	Harbor Blvd	Haster St[6]	2	3	838	2,670	0.31	C
	Haster St	State College Blvd	2	4	785	3,560	0.22	C
	State College Blvd	SR 57	2	3	1,178	2,670	0.44	C
	SR 57	Main St	2	3	920	2,670	0.34	C
Eastbound								
Katella Avenue	West St	Harbor Blvd	2	3	1,501	2,670	0.56	C
	Harbor Blvd	Haster St	2	3	1,509	2,670	0.57	C
	Haster St	State College Blvd	2	4	1,410	3,560	0.40	C
	State College Blvd	SR 57	2	3	1,234	2,670	0.46	C
	SR 57	Main St	2	3	1,300	2,670	0.49	C

Source: Kittelson & Associates, 2016

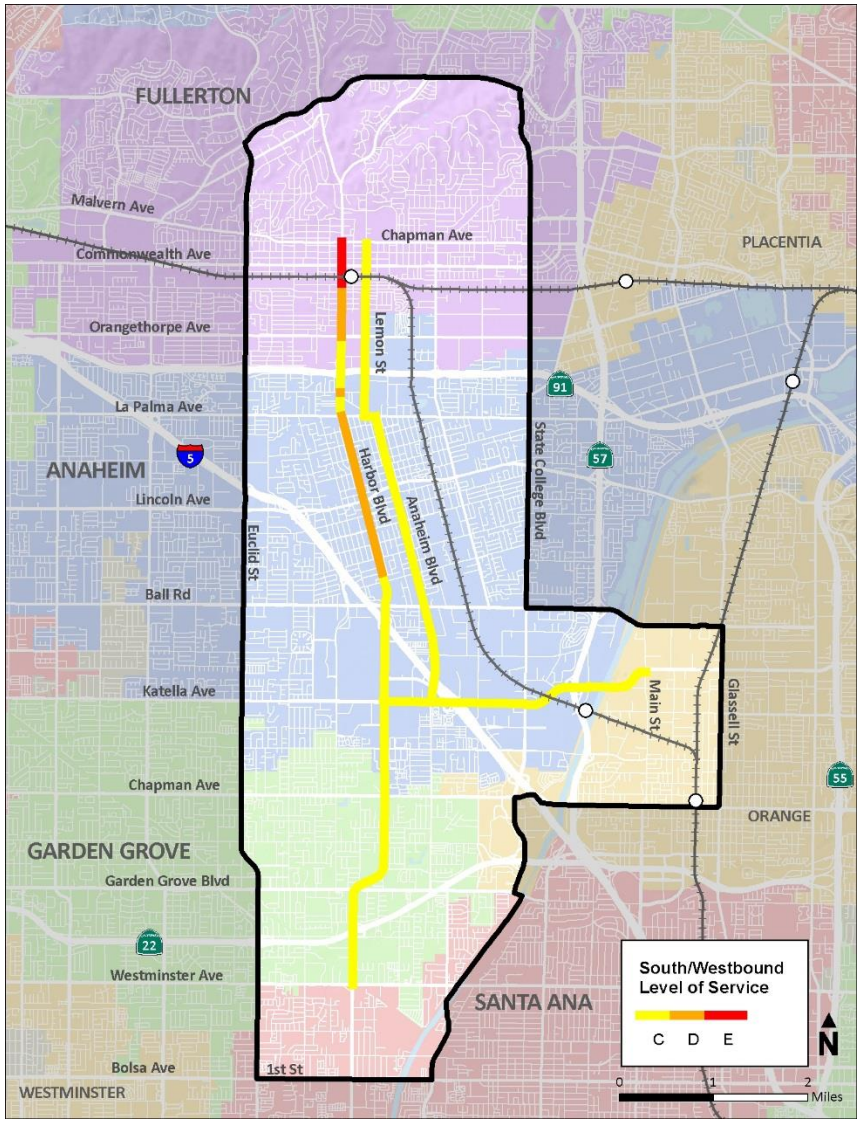
[6] North of Katella Avenue, Haster Street becomes Anaheim Boulevard.

Table 6.3. Harbor & Lemon/Anaheim Boulevard Study Corridors LOS (AM Peak Hours)

	From	To	Class	Lanes	Volume	Capacity	V/C	LOS
Southbound								
Harbor Boulevard	Chapman Avenue	Valencia Avenue	3	2	1,625	1,690	0.96	E
	Valencia Avenue	Orangethorpe Avenue	3	2	1,073	1,690	0.63	D
	Orangethorpe Avenue	Romneya Drive	2	3	1,522	2,670	0.57	C
	Romneya Drive	Victor Avenue	3	2	1,035	1,690	0.61	D
	Victor Avenue	La Palma Avenue	3	3	1,021	2,540	0.40	C
	La Palma Avenue	Sycamore Street	3	2	1,418	1,690	0.84	D
	Sycamore Street	Cypress Street	3	2	1,030	1,690	0.61	D
	Cypress Street	Vermont Avenue	3	2	1,329	1,690	0.79	D
	Vermont Avenue	Ball Road	3	3	1,202	2,540	0.47	C
	Ball Road	Manchester Avenue	2	4	1,861	3,560	0.52	C
	Manchester Avenue	Katella Avenue	2	3	1,046	2,670	0.39	C
	Katella Avenue	Orangewood Avenue	2	3	1,113	2,670	0.42	C
	Orangewood Avenue	Chapman Avenue	2	3	1,013	2,670	0.38	C
	Chapman Avenue	MacArthur Boulevard	2	3	1,056	2,670	0.40	C
Anaheim Boulevard / Lemon Street	Chapman Avenue	Orangethorpe Avenue	2	2	776	1,780	0.44	C
	Orangethorpe Avenue	SR 91	2	3	1,026	1,780	0.58	C
	SR 91 EB Ramps	La Palma Avenue	3	3	546	1,690	0.32	C
	Lemon Street	Anaheim Boulevard	2	2	1,036	1,780	0.58	C
	La Palma Avenue	Sycamore Street	3	2	649	1,690	0.38	C
	Sycamore Street	Broadway	3	2	733	1,690	0.43	C
	Broadway	Ball Rd	3	2	883	1,690	0.52	C
	Ball Rd	Cerritos Avenue	2	3	1,218	2,670	0.46	C
	Cerritos Avenue	Katella Avenue	2	3	615	2,670	0.23	C
Northbound								
Harbor Boulevard	MacArthur Boulevard	Chapman Avenue	2	3	1,194	2,670	0.45	C
	Chapman Avenue	Orangewood Avenue	2	3	1,090	2,670	0.41	C
	Orangewood Avenue	Katella Avenue	2	3	959	2,670	0.36	C
	Katella Avenue	Manchester Avenue	2	3	965	2,670	0.36	C
	Manchester Avenue	Ball Road	2	4	1,539	3,560	0.43	C
	Ball Road	Vermont Avenue	3	3	735	2,540	0.29	C
	Vermont Avenue	Cypress Street	3	2	754	1,690	0.45	C
	Cypress Street	Sycamore Street	3	2	601	1,690	0.36	C
	Sycamore Street	La Palma Avenue	3	2	846	1,690	0.50	C
	La Palma Avenue	Victor Avenue	3	3	1,475	2,540	0.58	C
	Victor Avenue	Romneya Drive	3	2	890	1,690	0.53	C
	Romneya Drive	Orangethorpe Avenue	2	3	954	2,670	0.36	C
	Orangethorpe Avenue	Valencia Avenue	3	2	1,566	1,690	0.93	D
	Valencia Avenue	Chapman Avenue	3	2	1,138	1,690	0.67	D
Anaheim Boulevard / Lemon Street	Katella Avenue	Cerritos Avenue	2	3	677	2,670	0.25	C
	Cerritos Avenue	Ball Rd	2	3	762	2,670	0.29	C
	Ball Rd	Broadway	3	2	488	1,690	0.29	C
	Broadway	Sycamore Street	3	2	537	1,690	0.32	C
	Sycamore Street	La Palma Avenue	3	2	574	1,690	0.34	C
	Anaheim Boulevard	Lemon Street	2	2	1,098	1,780	0.62	D
	La Palma Avenue	SR 91 EB Ramps	3	2	580	1,690	0.34	C
	SR 91	Orangethorpe Avenue	2	2	1,003	1,780	0.56	C
	Orangethorpe Avenue	Chapman Avenue	2	2	787	1780	0.44	C

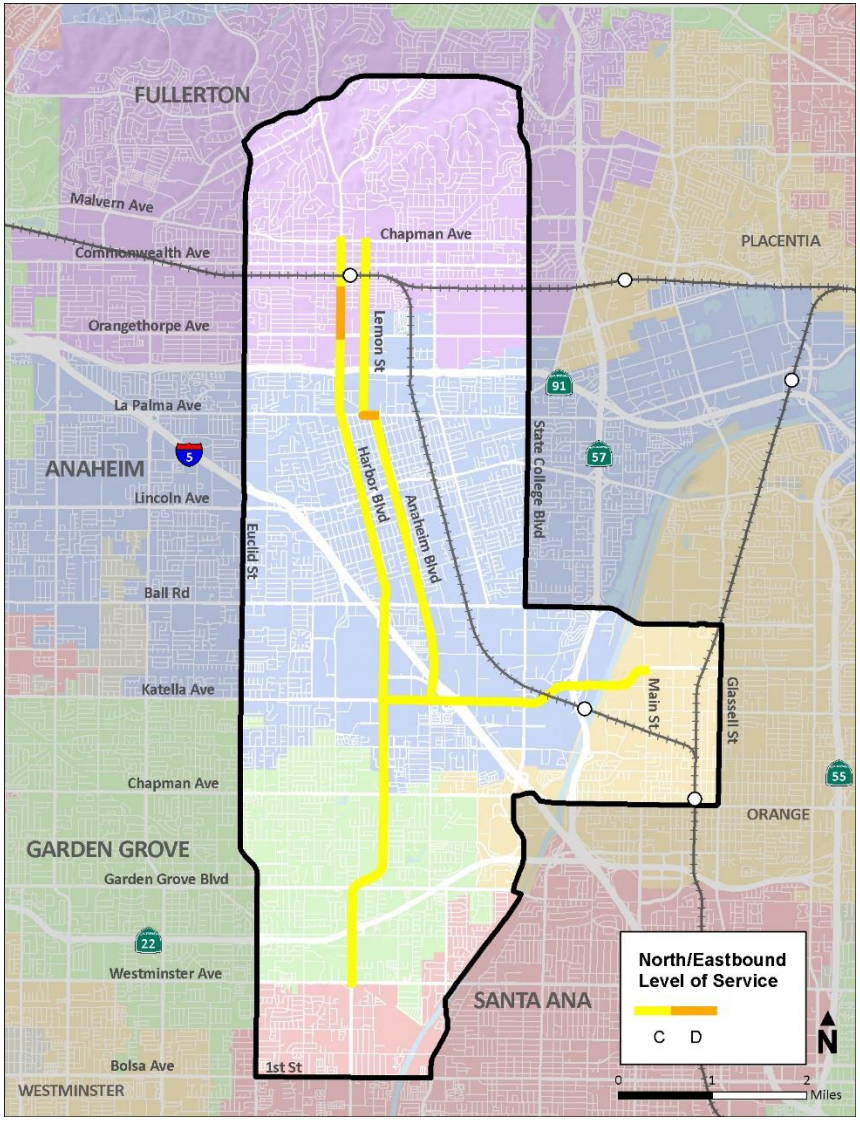
Source: Kittelson & Associates, 2016

Figure 6.1. South/Westbound Peak AM LOS



Source: STV, 2016; Kittelson & Associates, 2016

Figure 6.2. North/Eastbound Peak AM LOS



Source: STV, 2016; Kittelson & Associates, 2016

6.2. TRANSIT PERFORMANCE

Traffic delay on Harbor Boulevard and Lemon Avenue/Anaheim Boulevard not only affects drivers, but also negatively impacts transit operations. Despite the successes of OCTA's Bravo! Limited-stop service (detailed in OCTA's Bravo! Route 543 Survey Report from October 2014), there are indications that service is not performing optimally throughout the study corridor because of traffic conditions. A telling illustration of this is the lack of consistency in average bus travel speed throughout the approximately 8-mile Harbor Boulevard corridor and 5-mile Lemon Street-Anaheim Boulevard corridor. The following figures illustrate this and show what the problem areas for transit operations are during the morning and afternoon commute times.

Figure 6.3 and Table 6.4. Hourly Breakdown of Average OCTA Route 50 Speeds during AM Peak on the next page show average scheduled travel speeds for OCTA's Route 50 from 6 AM to 9 AM through the following sections of Katella Avenue (as determined by OCTA):

- Brookhurst Avenue to Katella Avenue
- Katella Avenue to ARTIC
- ARTIC to Glassell Street (city of Orange)

Figure 6.4 and Table 6.5 on the next page show average scheduled travel speeds for OCTA's Route 43 from 6 AM to 9 AM through the following sections of Harbor Boulevard (as determined by OCTA):

- Westminster Ave to Katella Ave
- Katella Ave to Lincoln Ave
- Lincoln Ave to Orangethorpe Ave to the FTC

Figure 6.5 and Table 6.6 on the next page show average scheduled travel speeds for OCTA's Bravo! 543 from 6 AM to 9 AM through the following sections of Harbor Boulevard (as determined by OCTA):

- FTC to Lincoln Avenue (Fullerton to Anaheim)
- Lincoln Avenue to Katella Avenue (Anaheim)
- Katella Avenue to Westminster Avenue (Anaheim to Santa Ana)

Finally, Figure 6.6. Average Route 47 Travel Speeds during AM Peak and Table 6.7 and on the following page show average scheduled travel speeds for OCTA's Local Route 47 from 6 AM to 9 AM through the following segments (also determined by OCTA):

- FTC to Orangethorpe Avenue (via Lemon Street in Fullerton)
- Orangethorpe Avenue to Lincoln Avenue
  (Lemon Street to La Palma Avenue to Anaheim Boulevard; Fullerton-Anaheim)
- Lincoln Avenue to Katella Avenue (via Anaheim Boulevard in Anaheim)

Travel Time: Key to Competitive Transit Service

Travel time is of critical importance to transit riders and also has important implications for the productivity and cost-effectiveness of transit service. A 25 percent improvement in travel time, for example, gets riders to their destinations and transfer points sooner, improves the attractiveness of the service, and has the added benefit of increasing the productivity of all the transit vehicles along the route, potentially resulting in a 25 percent reduction in operating cost. On the other hand, increasing travel times hurt the competitiveness of transit service and increase operating costs. For this reason, identifying and evaluating alternatives that produce real travel time reductions is a key objective of this study.

Areas to Evaluate for Travel Time Reductions:

This study will evaluate a number of strategies to identify those that have the potential to provide significant travel time reductions with limited impacts to other modes. Some of these strategies relate to service attributes employed by the transit agency and others relate to traffic coordination and/or transit priority attributes which would need to be coordinated with each jurisdiction in the study area. Strategies to be evaluated include the following:

- **Stop/Station Spacing**: One method for effectively reducing transit travel times is to increase the spacing between transit stops for more streamlined service. OCTA's Bravo! 543 every 0.75-miles on average and averages an operating speed closer to 17mph while the local service (Route 43) stops every 0.25 miles on average and averages an operating speed closer to 12 mph. Transit riders often demonstrate a willingness to walk further distances for faster, more frequent service.

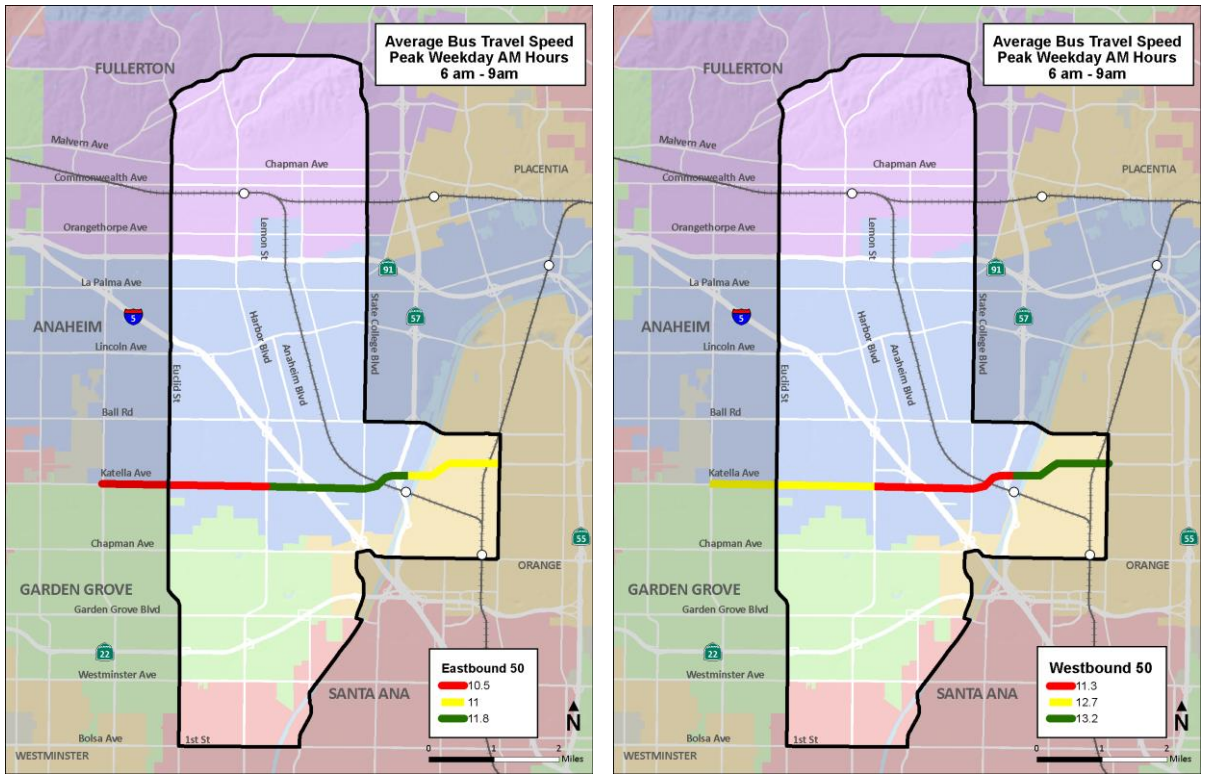
- **Mixed Traffic or Designated Transit lanes**: Designating a traffic lane to transit use during the peak period or all day can provide significant benefits to transit travel time. A high frequency of transit service is needed to make this strategy justified and traffic volume analyses need to be conducted to ensure the impacts to other modes can be minimized.

- **Transit Stop Dwell Time**: There are many strategies for reducing the amount of time it takes to load and off-load passengers: off-board fare collection, multi-door boarding, low-floor vehicles and level platform boarding, improved information, signage, and branding.

- **Address Traffic Choke Points**: Work with corridor cities to remove or alleviate bottlenecks and employ traffic signal timing refinements or "queue jumpers" at strategic intersections.

- **Traffic Signal Priority**: Evaluate the potential benefits and impacts of providing transit signal priority to high occupancy transit vehicles through strategic segments of the corridor.

Figure 6.3. Average OCTA Route 50 Travel Speeds during AM Peak [7]



Source: STV, 2016; OCTA, October 2015

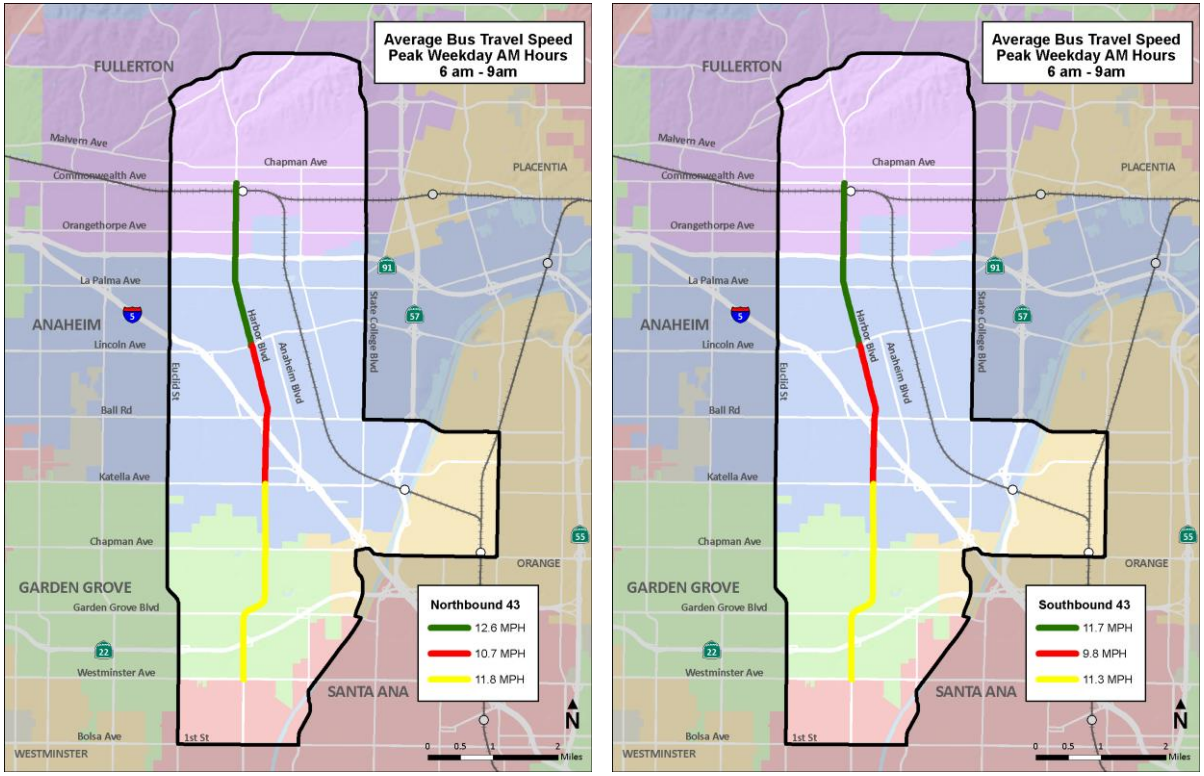
Table 6.4. Hourly Breakdown of Average OCTA Route 50 Speeds during AM Peak

	Monday-Friday: Eastbound				Monday-Friday: Westbound (Reverse Order)			
	Distance (Miles)	6 am	7 am	8 am	Distance	6 am	7 am	8 am
Brookhurst Ave – Harbor Blvd	2.6	11.7	9.2	10.7	2.6	13.2	12.4	13.6
Harbor Blvd - ARTIC	2.6	12.0	11.5	12.0	2.6	10.5	10.7	11.4
ARTIC – Glassell Street	1.7	11.6	9.9	11.6	1.7	10.5	10.1	9.7

Source: STV, 2016; OCTA, 2015

[7] Note: Average travel speeds during peak travel periods for all figures were weighted equally when calculating the overall average for the three hour period.

Figure 6.4 Average OCTA Route 43 Travel Speeds during AM Peak



Source: STV, 2015; OCTA, October 2015

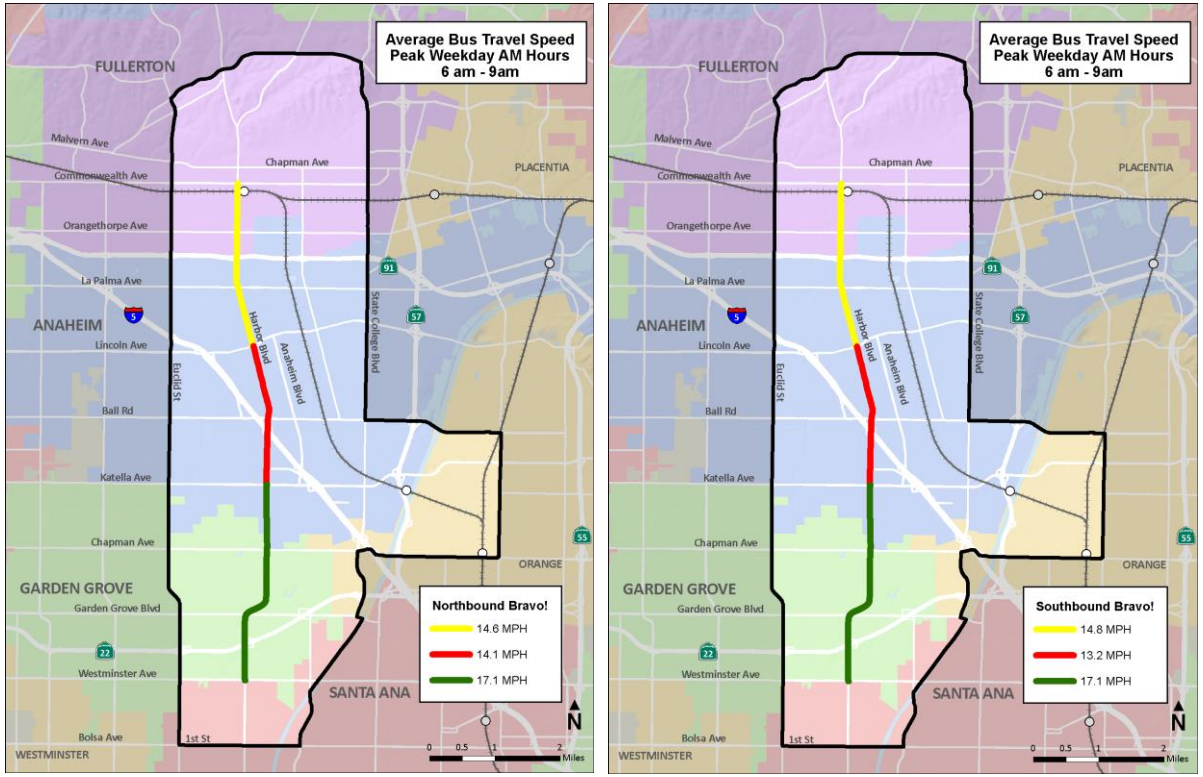
Table 6.5. Hourly Breakdown of Average Route 43 Speeds during AM Peak[8]

	Monday-Friday: Northbound				Monday-Friday: Southbound			
	Distance (Miles)	6 am	7 am	8 am	Distance	6 am	7 am	8 am
Westminster Ave – Katella Ave	3.2	12.1	11.4	12.1	3.2	11.6	11.2	11.2
Katella Ave – Lincoln Ave	2.1	11.4	10.4	10.4	2.2	10.9	9.3	9.3
Lincoln Ave – Orangethorpe Ave/FTC	1.9/0.9	12.4/11.4	12.4/12.7	12.4/14.2	1.8/1.0	14.1/11.6	12.0/10.3	12.0/10.3

Source: STV, 2015; OCTA, 2015

[8] Northernmost segments (FTC-Orangethorpe Ave and Orangethorpe Ave-Lincoln Ave) have been combined to correspond with other figures.

Figure 6.5. Average Bravo! 543 Travel Speeds during AM Peak



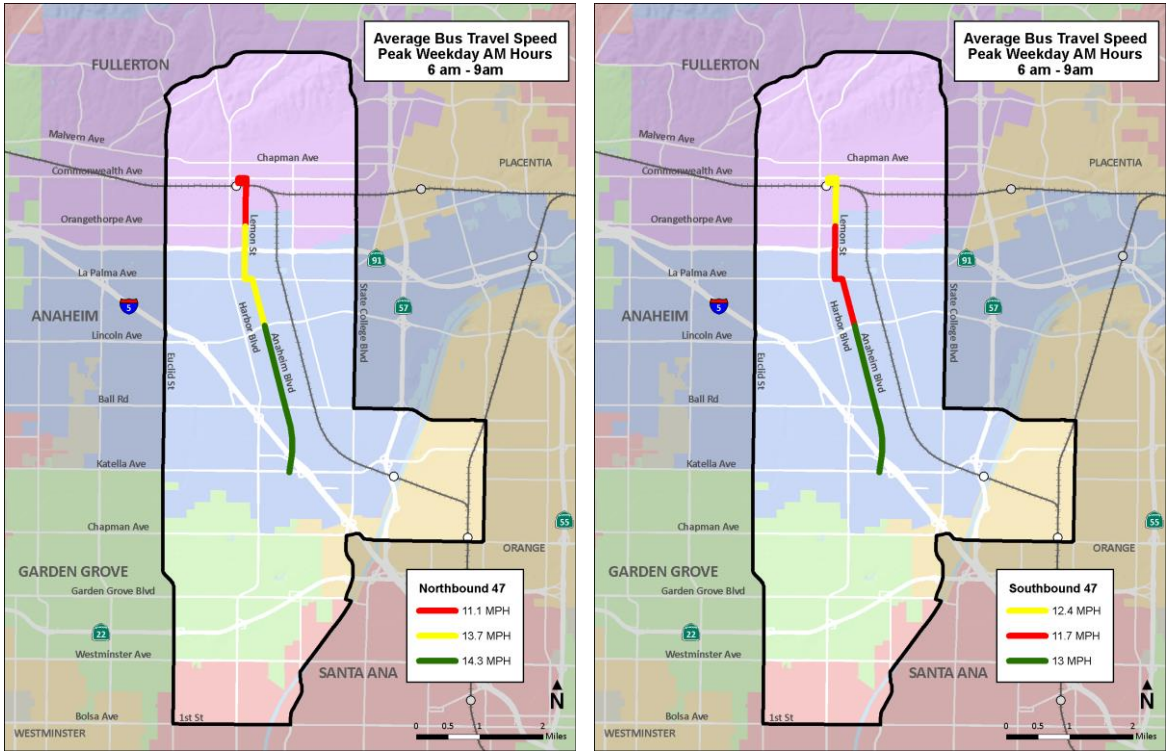
Source: STV, 2015; OCTA, October 2015

Table 6.6. Hourly Breakdown of Average OCTA Bravo! 543 Speeds during AM Peak

	Monday-Friday: Northbound				Monday-Friday: Southbound			
	Distance (Miles)	6 am	7 am	8 am	Distance	6 am	7 am	8 am
Westminster Ave – Katella Ave	3.2	17.6	16.1	17.6	3.2	18.0	16.2	17.0
Katella Ave – Lincoln Ave	2.1	16.0	12.8	13.6	2.2	14.9	12.3	12.5
Lincoln Ave – FTC	3.0	15.0	14.3	14.5	2.7	16.5	14.4	13.7

Source: STV, 2015; OCTA, October 2015

Figure 6.6. Average Route 47 Travel Speeds during AM Peak



Source: STV, 2015; OCTA, October 2015

Table 6.7. Hourly Breakdown of Average OCTA Route 47 Speeds during AM Peak

	Monday-Friday: Northbound				Monday-Friday: Southbound			
	Distance (Miles)	6 am	7 am	8 am	Distance	6 am	7 am	8 am
Katella Ave – Lincoln Ave	3.2	17.6 (mph)	16.1	17.6	3.2	18.0 (mph)	16.2	17.0
Lincoln Ave – Orangethorpe Ave	2.1	16.0	12.8	13.6	2.2	14.9	12.3	12.5
Orangethorpe Ave - FTC	3.0	15.0	14.3	14.5	2.7	16.5	14.4	13.7

Source: OCTA, October 2015

7. MOBILITY PROBLEMS

The Central Harbor Boulevard Study Area faces several obstacles that limit mobility for residents, employees, and visitors. Each of these obstacles fall under six "problem statements":

1. **Transit/Roadway Performance: Current traffic conditions limit the speed and reliability of existing transit service.** LOS in certain segments of the study area will likely continue to deteriorate as population and employment grow. Average travel speeds for transit during peak hours are around 10 mph. Modifications to transit operations can only go so far towards improving transit service without addressing traffic congestion during peak hours.

2. **User Experience: Stop amenities, branding, and information are inconsistent throughout the corridor.** People's perceptions of transit affect their mode choices. Poor perceptions can be addressed by improving transit station access and amenities. The majority of the stops within the study area (with exceptions in The Anaheim Resort) only provide basic amenities.

3. **Mode Choices: For many trips, few mode choices are competitive with the automobile.** OCTA core ridership includes a large number of transit dependent riders which rely on the transit system to meet all of their daily needs. All OCTA riders require frequent, reliable service. Increasing ridership among choice and tourist riders is difficult, as it requires creating a legible, attractive system that may require higher investments.

4. **Connectivity: Connections to/from major activity centers are time consuming and/or inconvenient for many transit users.** Non-Metrolink transit connections between the three transportation hubs (FTC, ARTIC, and SARTC) and major activity centers are not competitive with the automobile. Thus, personal auto usage is the dominant mode choice for commuters and people who live and work within the study area. Poor transit connections, combined with uncompetitive travel times, often make transit an unattractive option for many workers.

5. **Land Use: Some land uses prioritize automobile access over transit and pedestrian options.** The existing land use patterns along Harbor Boulevard vary and are sometimes not ideal for encouraging high transit usage. Additionally, the auto-centric nature of the corridor creates a heavy transportation burden on Title VI communities and carries environmental impacts.

6. **Infrastructure Constraints: Restricted street configuration supports auto use (limiting options for transit, bike, and pedestrian uses).** The ROW is constrained, with much of the corridor built out, and there is little room for roadway expansion. The space within the public ROW today is mainly dedicated to auto travel lanes, with fewer transit, bicycle, and pedestrian treatments.

8. GOALS AND OBJECTIVES

The following goal and objectives have been developed to address the problems listed in the previous page. These goals will inform the development of alternatives. The objectives with an asterisk (*) refer to criteria that match FTA New Starts funding criteria.

1. Enhanced Transit/Roadway Performance

- Increase average overall transit operating speed
- Person Throughput
- Travel Time Reliability / On-Time Performance
- Congestion Relief - New Linked Project Trips*

2. Encourage Transit Compatible Land Uses

- Transit-Compatible Land Uses - Station Area Population / Employment Density*
- Economic Development - Transit Supportive Plans and Policies*
- Environmental Benefits and Impacts - Traffic-Related (Traffic, Air Quality, etc.)*
- Other Environmental Benefits & Impacts (Noise, Historic, etc.)

3. Improve Local and Regional Connectivity

- Activity Center Connectivity
- Zero and One Transfer Rides
- Compliance with Long Range Regional Mobility Goals*
- First/Last Mile Connection – Bike/Ped Amenities & Linkages

4. Optimally Allocate Infrastructure by Mode

- Optimally Allocate Roadway Infrastructure
- Overall Safety / Collision Hot Spots
- Optimize Traffic Operations
- Physical Corridor Constraints (Bridges, Rail Crossings, etc)

5. Enhance User Experience / Improve Mode Choices

- New Riders (System-Wide)
- Mode Share
- Mobility Improvement - Linked Trips on Project*
- Station User experience / Level of Amenities

6. Pursue Projects that are Cost-Effective

- Cost Effectiveness - Capital + Operations & Maintenance Costs / Project Trips
- Incremental Cost per New Transit Trip*
- Farebox Recovery
- Financial Feasibility (Cost, Funding Suitability, etc)

7. Pursue Projects with Broad Support from the Community

- Community Support from Cities, Stakeholders, & Public

9. NEXT STEPS

This report summarizes findings from *Purpose and Need* (Tasks 2.1-2.4). This report and the reports prepared under Task 2 will inform the study as it progresses into the next phase: *Task 3: Alternative Development*.

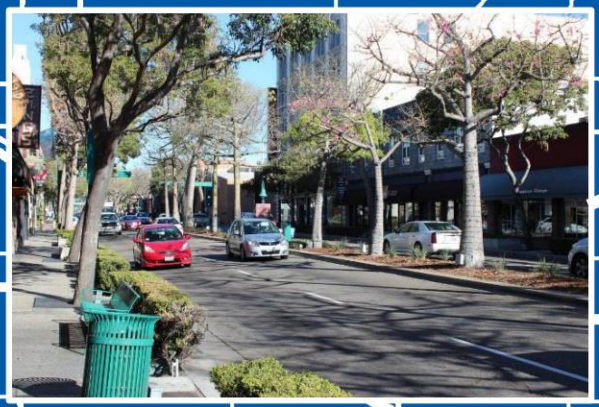
ATTACHMENT C

Orange County Transportation Authority

Central Harbor Boulevard Transit Corridor Study

OCTA

Open House Round 1 Summary Report – Final



FULLERTON

ANAHEIM

GARDEN GROVE

SANTA ANA

Open House Round 1 Summary Report

Final

July 29, 2016

Task # 5.1

Document Control

Version	Responsible	Date
Draft		
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Submitted By:	Tyler Bonstead	07/29/16

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TABLE OF CONTENTS

TABLES

APPENDIX

ABBREVIATIONS / ACRONYMS

OCTA .....Orange County Transportation Authority
FTC.....Fullerton Transportation Center

1. INTRODUCTION

1.1. STUDY BACKGROUND

Harbor Boulevard is Orange County's busiest north/south transit corridor, carrying approximately eight percent of countywide bus ridership through some of the densest areas of the County. Planning and design activities are underway for an east/west fixed-guideway project in the cities of Santa Ana and Garden Grove (the OC Streetcar), which has a planned western terminus at Harbor Boulevard and Westminster Avenue. Another east/west fixed-guideway project is currently under study in the City of Anaheim (Anaheim Rapid Connection) which proposes a western terminus at Harbor Boulevard and Convention Way. Additionally, the City of Fullerton has expressed an interest in enhanced east/west transit service between the Fullerton Transportation Center (FTC) near Harbor Boulevard, Fullerton College, and California State University, Fullerton.

Given the current and planned transit service in the corridor, the Orange County Transportation Authority (OCTA) Central Harbor Boulevard Transit Corridor Study is analyzing and developing options to improve the Central Harbor Boulevard Transit Corridor from Westminster Boulevard, in the City of Santa Ana to Chapman Avenue, in the City of Fullerton. This study will consider alternative alignments and transit technologies along the Harbor Boulevard corridor, and will include the necessary information so that the cities or OCTA may take the project further through additional public engagement, alternative selection, and environmental review (which are not part of this study). The study team will also incorporate input from staff representatives from the corridor cities and internal OCTA stakeholders.

1.2. REPORT PURPOSE AND STRUCTURE

The purpose of this report is to provide a summary of public participation activities and feedback received during the first round of open houses for the OCTA Central Harbor Boulevard Transit Corridor Study (Study). The portion of Harbor Boulevard under consideration is approximately eight miles long, and connects the cities of Santa Ana, Garden Grove, Anaheim and Fullerton. This portion of Harbor Boulevard is unique, home to small businesses and major resort and visitor destinations, multi-family and historic homes, economically and culturally diverse, and bears the distinction of being the busiest bus corridor in the County.

Over the course of the Study, two rounds of two public meetings will be conducted and one meeting will be held in each of the four cities. For this first round, two Open Houses were held to support the development of the Study's Purpose and Need and alternatives by sharing information with the public and soliciting their input. The meetings were held on February 24 in Fullerton and February 25 in Garden Grove, and featured information stations staffed by

project team members and a number of options for stakeholders to provide feedback. Additional open house details, including public participation and feedback are provided in the sections below.

2. NOTIFICATION OF OPEN HOUSE MEETINGS

OCTA is committed to conducting comprehensive public outreach programs that inform and engage stakeholders. Given the diversity of the corridor, a variety of noticing strategies were utilized to reach and engage interested stakeholders including: mailing notices, counter flyer distribution, on-bus noticing, emails blasts, social media, media coverage, and study and community partner resources.

2.1. MAILING OF NOTICES

Full color bilingual (English and Spanish) postcard notices with additional text in Vietnamese and Korean offering language services were developed to publicize the Community Open Houses. Meeting notices (Appendix A) were mailed to approximately 7,600 owner/occupants. Addresses were identified based on proximity to Harbor Boulevard, and the Lemon Avenue/Anaheim Boulevard corridor option.

2.2. COUNTER DISTRIBUTION AND EXTENDED OUTREACH

The full color bilingual (English and Spanish) meeting notices were distributed at the public counters of all four city halls (Santa Ana, Garden Grove, Anaheim and Fullerton). Additional notices were provided to the City of Santa Ana's Com-Link Council and the City of Anaheim's Central and West Neighborhood District meetings. Meeting flyers were also designed and distributed on buses serving the Harbor Boulevard Study Area (Appendix B).

The four partner cities, elected official district offices, and more than 100 key stakeholder organizations were asked for their support to promote the meetings through their respective electronic communication tools, including websites, e-newsletters, social media sites, and membership e-blasts. Sample language was provided for possible e-blasts and/or newsletter articles, as well as Facebook posts (Appendix C).

2.3. E-BLASTS/SOCIAL MEDIA

The electronic version of the flyer (Appendix D) was distributed via OCTA's *On the Move* Blog to more than three thousand email contacts included in OCTA's stakeholder database. The notice was sent out two times: the first notice was shared over two weeks in advance of the start of the Open Houses, the second meeting notice was distributed again on February 25 as a reminder for that evening's meeting in Garden Grove. The second e-blast distribution also

included an additional 1,179 stakeholders identified as Harbor Boulevard bus riders during outreach conducted for OCTA's bus service changes. OCTA's Facebook page was also utilized to build awareness for the project and the open houses, with posts on February 16, 18 and 22 (Appendix E).

2.4. MEDIA AND STAKEHOLDER COVERAGE

OCTA Media Relations drafted and distributed a press release (Appendix F) introducing the project and publicizing the open houses. The release was distributed to the following media outlets:

- Orange County Register
- Fullerton News Tribune
- Anaheim Bulletin
- La Habra Star/Brea Progress
- Patch.com
- Los Angeles Times
- Daily Pilot
- Huntington Beach Independent
- Voice of OC
- Nguoi Viet Daily News
- La Opinión
- Rumores
- Excelsior
- KPCC
- KCRW
- KFI
- KNX

3. OPEN HOUSE MEETINGS

3.1. MEETING FORMAT

OCTA hosted two Open Houses in February 2016 to provide the public with an opportunity to learn about the study, ask questions and provide feedback. The meetings were held from 5:00 to 8:00 p.m. and featured information stations staffed by project team members. Each meeting provided Spanish language support by having a bilingual technical and outreach team member available to engage with stakeholders. A looping PowerPoint presentation (Appendix G) was displayed throughout the meeting.

A virtual meeting was made available following the meetings via the OCTA website and featured the full complement of information boards and looping presentation. Open House location information is shown in Table 3.1.

Table 3.1. Open House Locations

Community	Date	Location/Address
Fullerton	Wednesday, February 24	Fullerton Community Center 340 W. Commonwealth Fullerton, CA
Garden Grove	Thursday, February 25	Garden Grove High School 11271 Stanford Ave. Garden Grove, CA

Project team members staffed the information stations based on their technical expertise. An overview of the stations is featured below in Table 3.2. Copies of materials can be found in Appendix H.

Table 3.2. Open House Information Stations

Station	Description
Registration	Participants were greeted and asked to register using the sign-in sheets for inclusion in the Study's stakeholder database, in order to receive study updates and subsequent public involvement opportunities. All meeting participants were provided with a study fact sheet and a sign was posted offering language support in Spanish.
Study Overview	Looping PowerPoint Presentation
Study Goals and Objectives	Introduced the Study and its purpose and process/timeline to identify possible alternatives to improve transit on and near Harbor Boulevard
Corridor Definition	Provided high-level demographic background and defined the study area. This station also featured a laminated map of the study area for participants to make notes and write on.
Transit Mode and Route Options	Possible route options using Harbor Boulevard, Anaheim Boulevard, and Lemon Ave. and transit technologies were identified. Feedback was encouraged and a flip chart and makers were also made available for participants.
Comments	A "comments station" was also made available to facilitate submittal of public comments. This station featured comment cards, pens, and comment boxes for submittal of comment forms. Laptops and smart tablets were made available to those stakeholders interested in completing the study's online survey.

3.2. SUMMARY OF PUBLIC PARTICIPATION

Approximately 25 stakeholders participated in-person at the two Open Houses. Two stakeholders provided written comments (Appendix I) at the meetings, and stakeholders were encouraged to complete the online survey following the meeting.

Written feedback and conversations with stakeholders yielded the following feedback:

- Improve connectivity of transit services locally and regionally
- Maintain or improve bicycle access in the corridor
- Provide efficient linkages to key destinations
- Make sure service is expanded to serve the hours of Disneyland and sporting events
- Signal synchronization between jurisdictions to improve traffic flow for all vehicles

A significant number of stakeholders opted to gather information via the website and engage via the online survey, which was available in English, Spanish and Vietnamese. The survey garnered 603 unique visits and 413 responses, which equates to a 68.5 percent completion rate. The majority of respondents were commuters, employees and/or residents within the study area, with more than 60 percent using transit on a daily, weekly or monthly basis. Out of these individuals, 69 percent were between the ages of 25 and 54. Highlights of the feedback are shown in Table 3.3.

Table 3.3. Summary of Online Feedback

Topic	Responses		
Biggest challenges for transit in the study area	Transit/roadway performance (27%)	Mode choices (25%)	Connectivity (17%)
Average rating for mode option preferences (Out of 10)	7.07 for streetcar	6.60 for bus rapid transit	6.10 for limited-stop bus
Most important transit characteristics (Able to choose multiple)	Frequency of service (59%)	Travel time compared to other modes (54%)	Convenient service hours (52%)
Most important connection within the study area	Disneyland Resort (39%)	Downtown Anaheim (17%)	Fullerton Transportation Center (13%)
Major activities participated within the study area (Able to choose multiple)	Working (64%)	Dining (54%)	Shopping (38%)

4. NEXT STEPS

A follow up to this report shall be prepared after the final round of Open House meetings in the fall.

APPENDIX

ATTACHMENT D

Central Harbor Boulevard Transit Corridor Study
Draft Evaluation Criteria

#	Criteria
1. Transit Performance	
a	Average Transit Operating Speed
b	Person Throughput
c	Travel Time Reliability / On-Time Performance
d*	Congestion Relief - New Linked Project Trips
2. Land Use	
a*	Transit-Compatible Land Uses - Station Area Population / Employment Density
b*	Economic Development - Transit Supportive Plans and Policies
c*	Environmental Benefits and Impacts - Vehicle Miles Traveled - Related (Traffic, Air Quality, Greenhouse Gas)
d*	Other Environmental Benefits and Impacts (Noise, Historic, etc.)
3. Connectivity	
a	Activity Center Connectivity
b	Zero and One Transfer Rides
c*	Compliance with Long Range Regional Mobility Goals
d*	First / Last Mile Connections - Bike / Pedestrian Amenities and Linkages
4. Corridor Constraints	
a	Optimally Allocate Roadway Infrastructure
b	Overall Safety / Collision Hot Spots
c	Optimize Traffic Operations
d	Physical Corridor Constraints (Bridges, Rail Crossings, etc.)
5. Mode Choices / User Experience	
a	New Riders (System-Wide)
b	Mode Share
c*	Mobility Improvement - Linked Trips on Project
d	Station User experience / Level of Amenities
6. Cost-Effectiveness	
a*	Cost-Effectiveness - Capital + Operations and Maintenance Costs / Project Trips
b	Incremental Cost per New Transit Trip
c	Farebox Recovery
d	Financial Feasibility (Cost, Suitability for Funding, etc.)

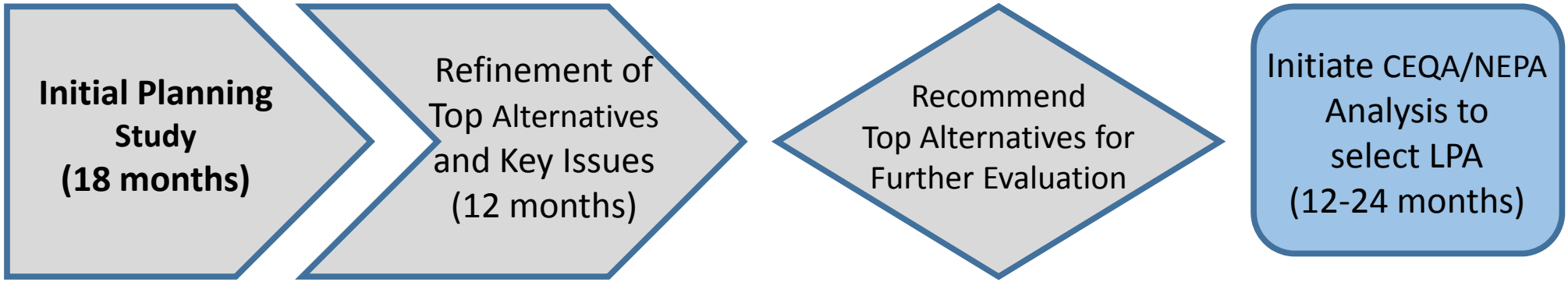
Note: Starred criteria match Federal Transit Administration New Starts evaluation criteria

7. Community Input	
a	Description of Outreach Plan Activities including Dates and Times
b	Summary of Comments Received and Key Issues

Central Harbor Boulevard Transit Corridor Study Update

Today's Update

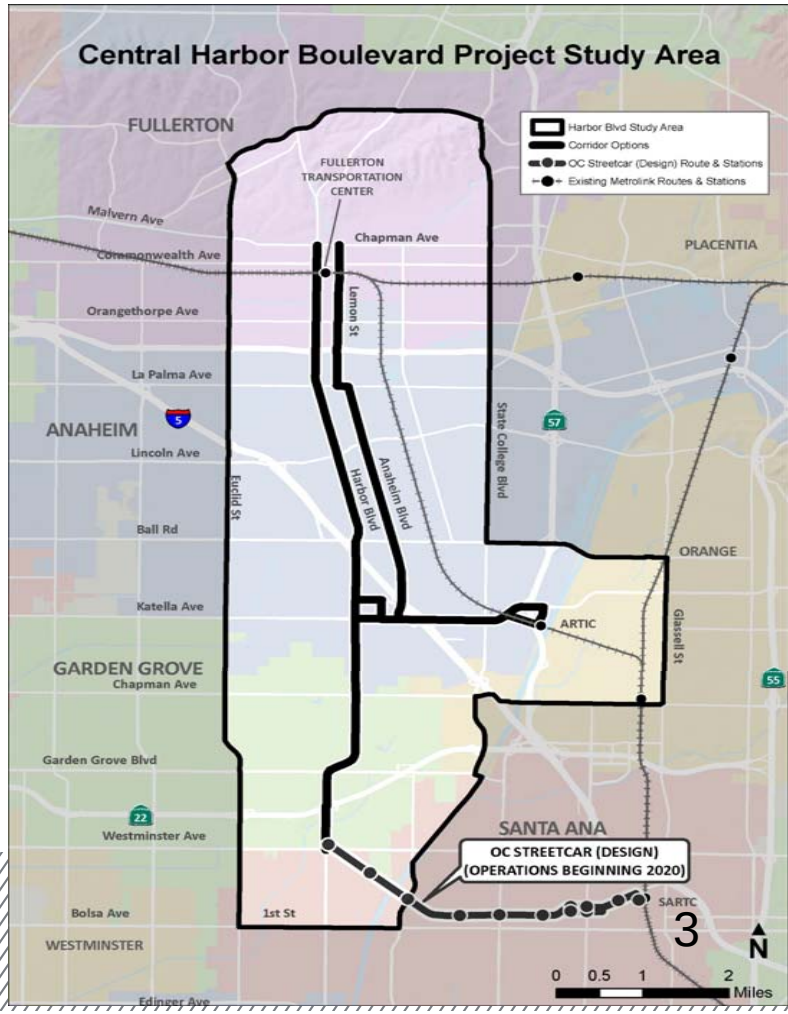
- Walk through 12 draft alternatives
- Share draft evaluation criteria
- Initiate second phase of outreach



CEQA - California Environmental Quality Act
NEPA - National Environmental Policy Act
LPA - Locally Preferred Alternative

Study Focus

- Identify transit improvement strategies for the Harbor Boulevard corridor between Westminster Avenue and the Fullerton Transportation Center
- Consider Anaheim Boulevard/Lemon Street as a viable alternative route
- Evaluate transit connections between Harbor Boulevard and the Anaheim Regional Transportation Intermodal Center

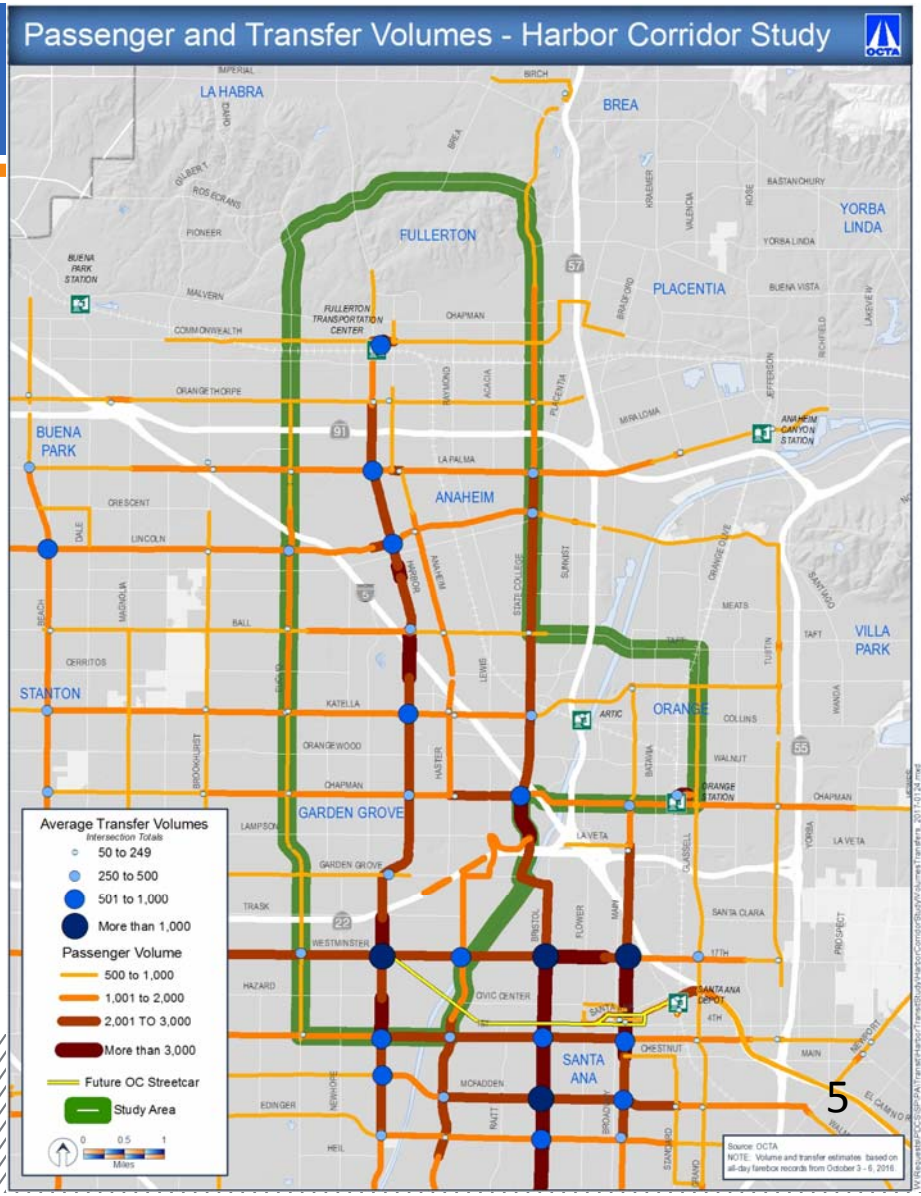


Study Phases and Schedule

- Purpose and Need: August 2015-December 2016
- Outreach 1: February-April 2016
- Alternatives Development: February 2016-April 2017
- Outreach 2: February-April 2017
- Alternatives Evaluation: April-May 2017
- Draft Final Report: July 2017

Mobility Needs

- Highest transit usage
- Commute focused trips
- Population and employment densities 20 percent higher than county average
- More development planned
- Central north-south transit spine



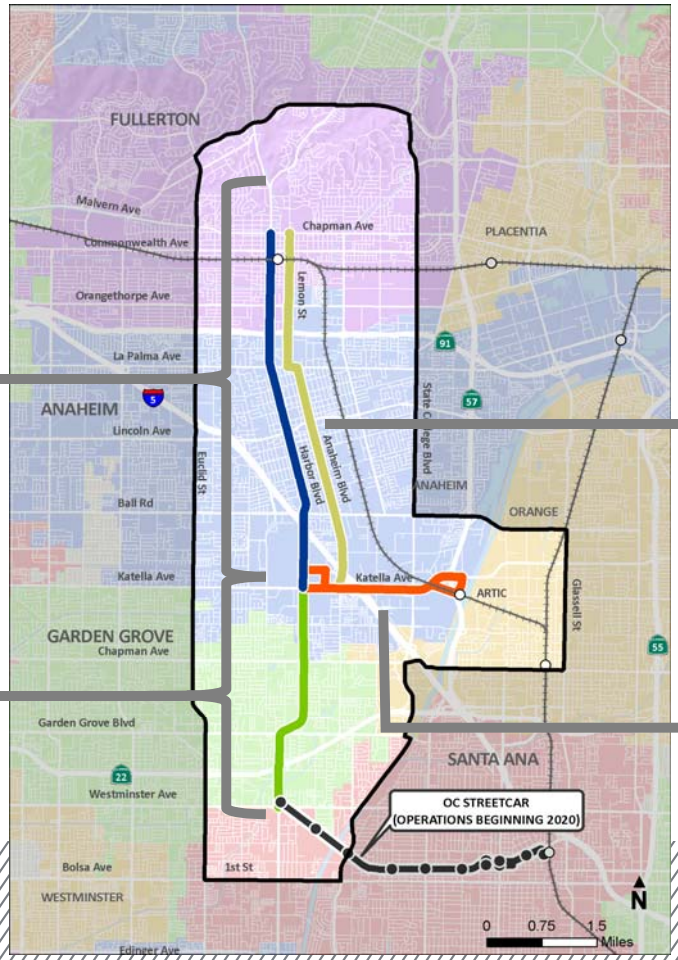
Evaluation Criteria Recommendations

- Transit Performance
- Land Use
- Connectivity
- Corridor Constraints
- Mode Choices/User Experience
- Cost-Effectiveness
- Community Support

Alignment Options

HARBOR NORTH

HARBOR SOUTH



ANAHEIM/LEMON

KATELLA

Mode/Feature Options

Enhanced Bus

Shared Lane
Enhanced Stations
Queue Jumpers
Signal Priority
All Door Boarding
Off-Board Fare Collection

Streetcar

Shared Lane
Enhanced Stations
Queue Jumpers
Signal Priority
All Door Boarding
Off-Board Fare Collection

Bus-Rapid Transit

Enhanced Bus plus:
Dedicated Transit Lanes

Rapid Streetcar

Streetcar plus:
Dedicated Transit Lanes

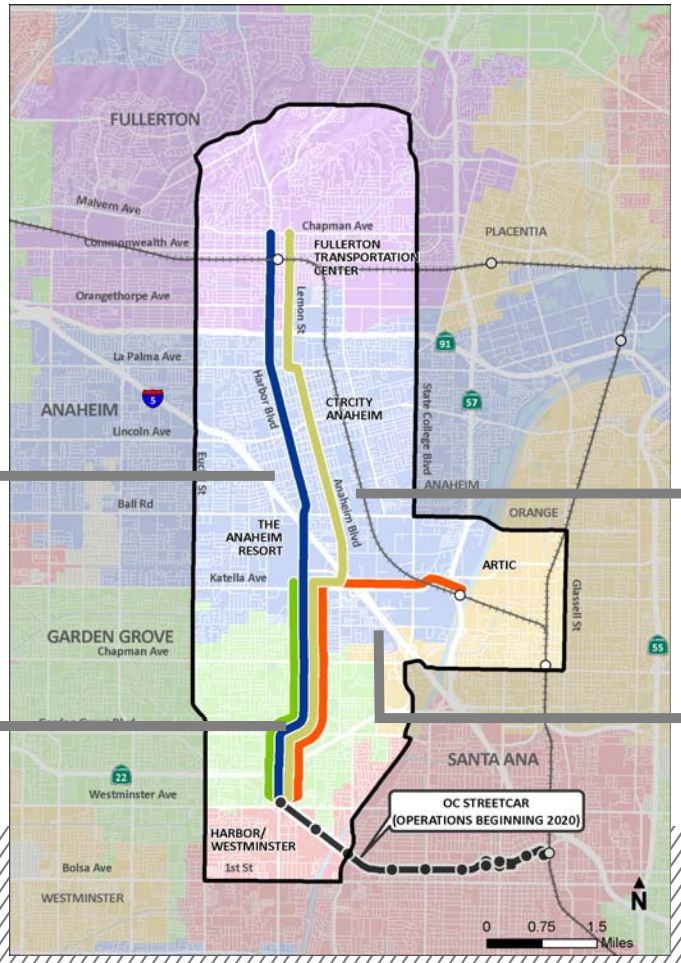
12 Draft Alternatives

HARBOR LONG

- H-2: Harbor Long Streetcar
- H-3: Harbor Rapid Streetcar
- H-4: Harbor Enhanced Bus
- H-5: Harbor Bus Rapid Transit

HARBOR SHORT

- H-1: Harbor Short Streetcar



ANAHEIM/LEMON

- L-1: Anaheim/Lemon Streetcar
- L-2: Anaheim/Lemon Rapid Streetcar
- L-3: Anaheim/Lemon Enhanced Bus
- L-4: Anaheim/Lemon BRT

KATELLA

- K-1: Katella Streetcar
- K-2: Katella+ Anaheim/Lemon Enhanced Bus
- K-3: Katella + Harbor Hybrid

No Build Alternative

Alignment:

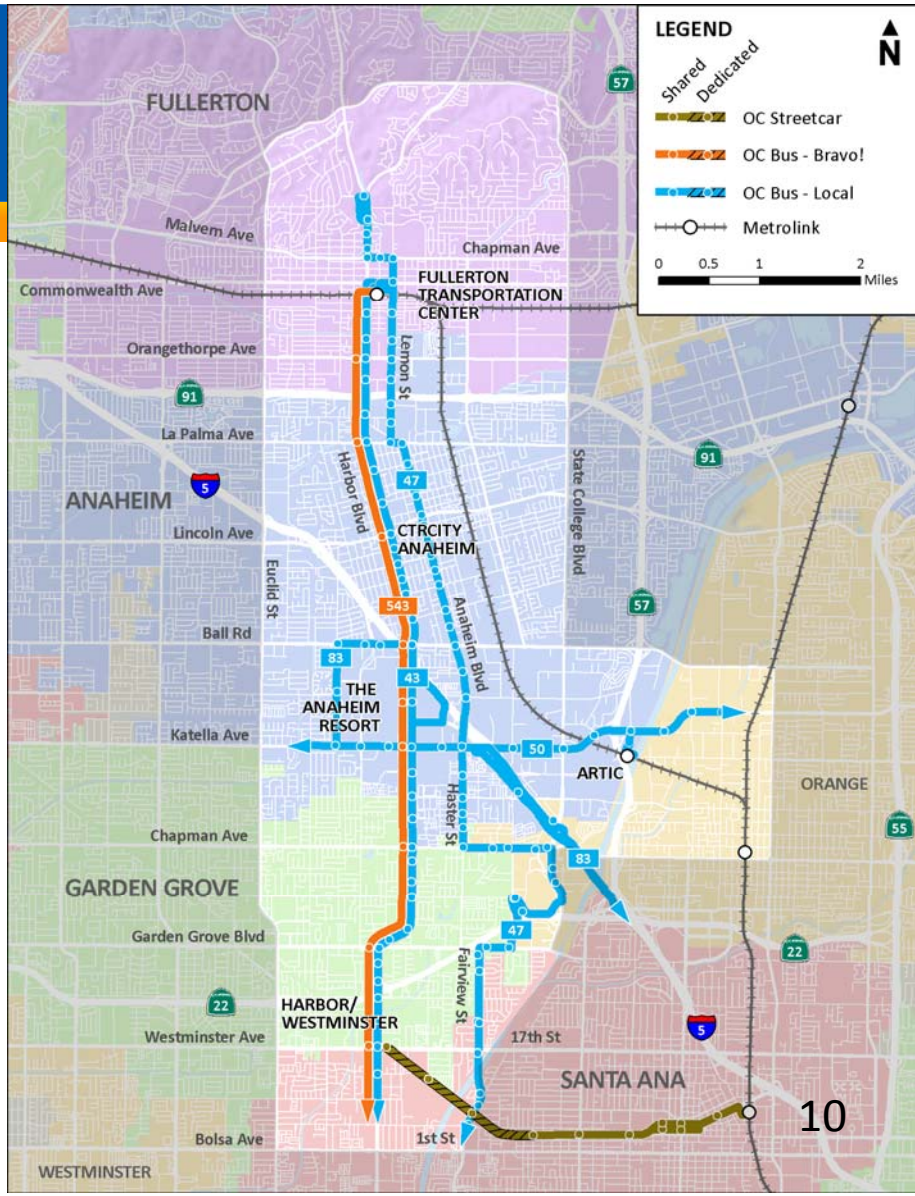
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Unchanged	Unchanged



H-1: Harbor Short Streetcar

Alignment:

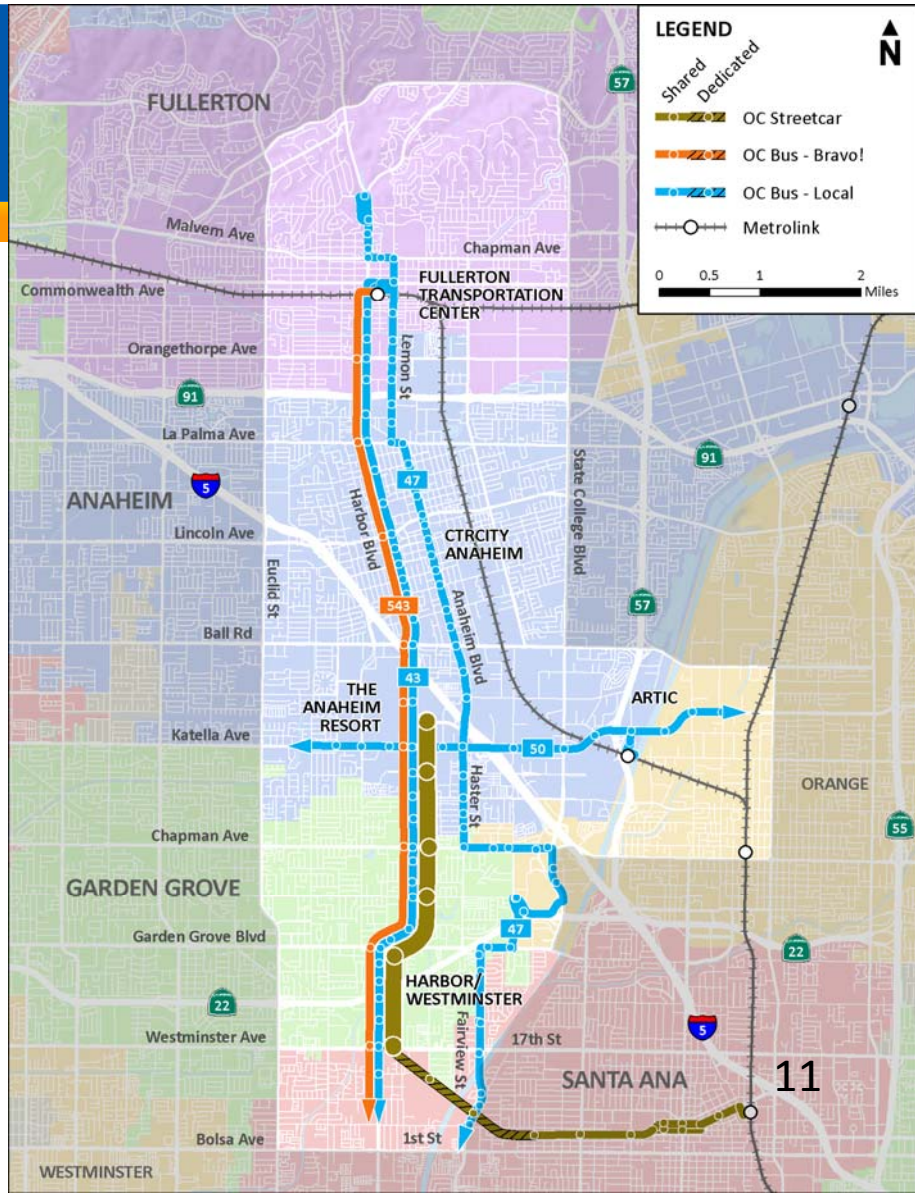
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Unchanged	Unchanged



H-2: Harbor Long Streetcar

Alignment:

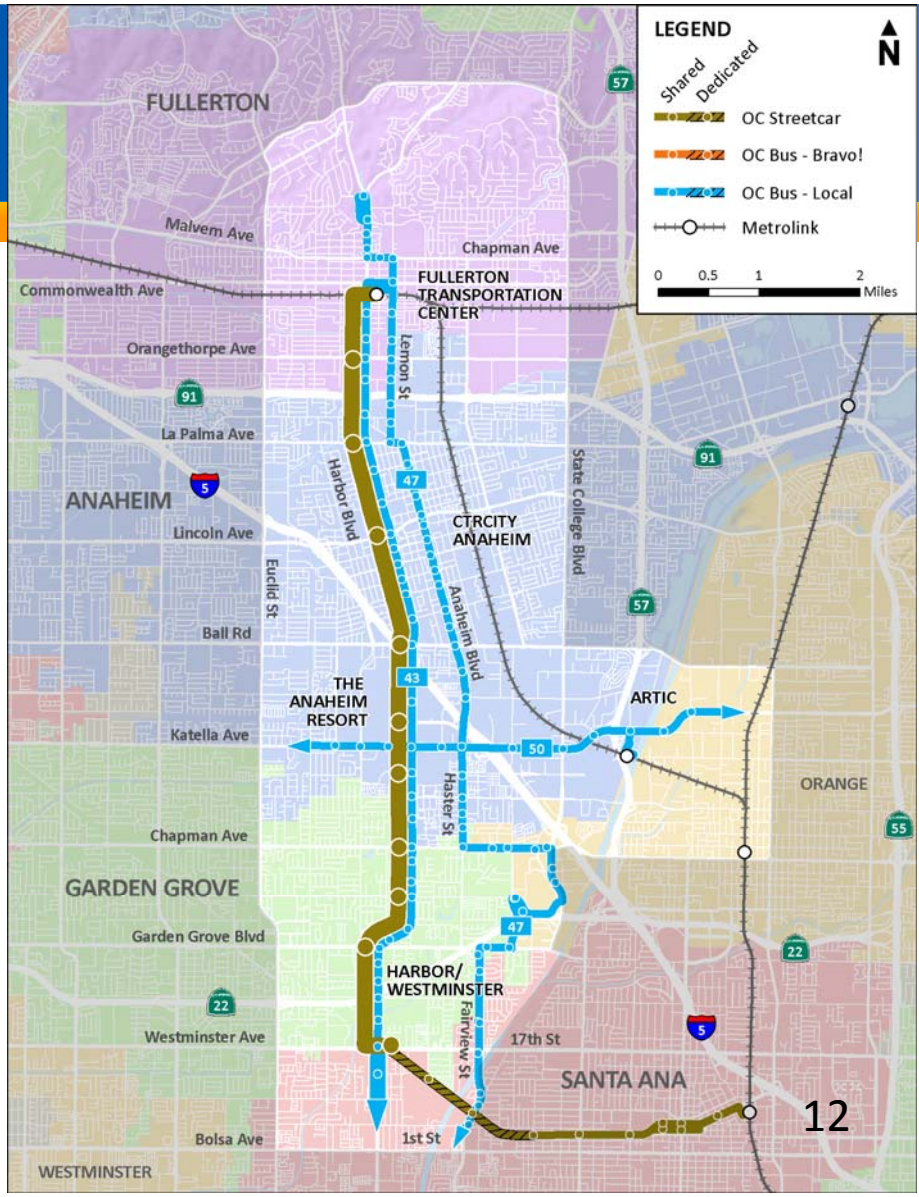
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Enhanced S of Westminster	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



H-3: Harbor Rapid Streetcar

Alignment:

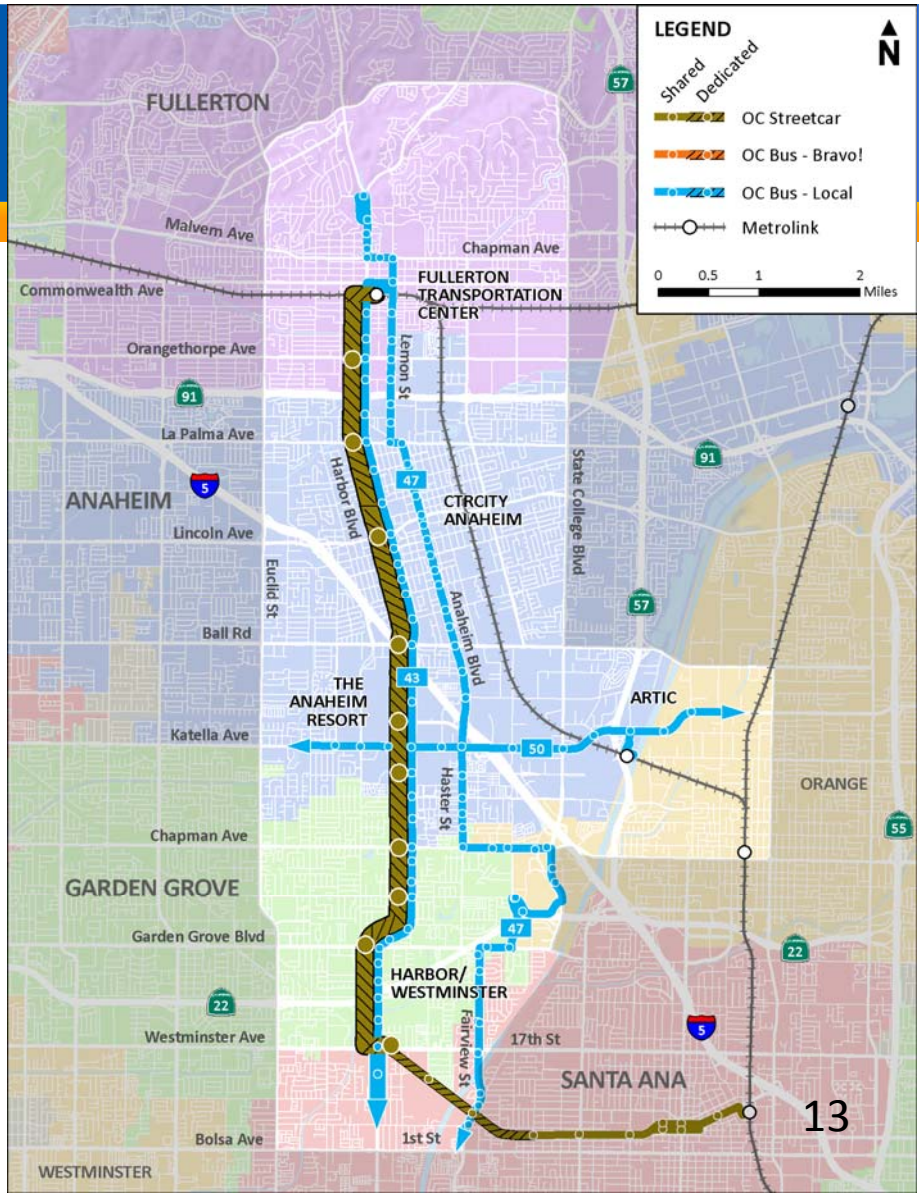
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Enhanced S of Westminster	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



H-4: Harbor Enhanced Bus

Alignment:

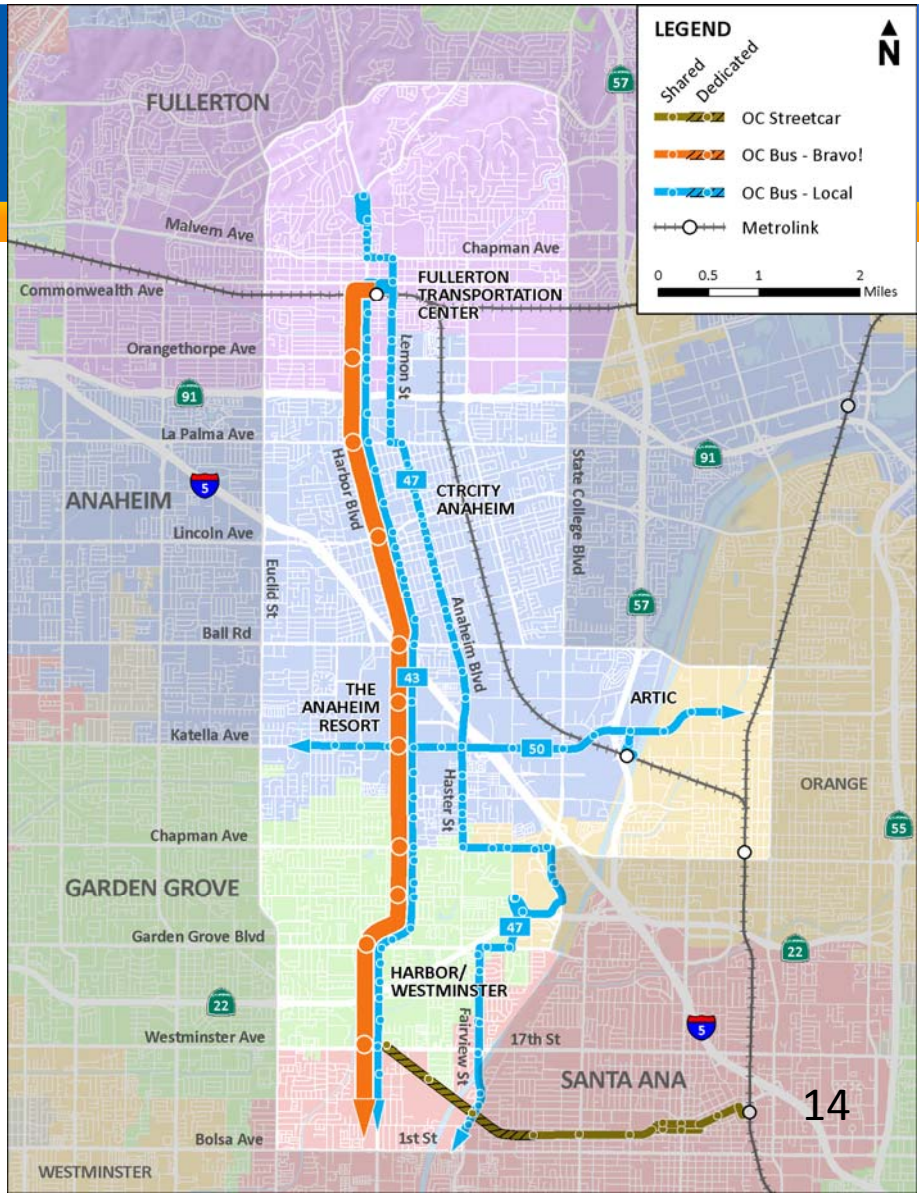
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Enhanced	Unchanged



H-5: Harbor Bus Rapid Transit

Alignment:

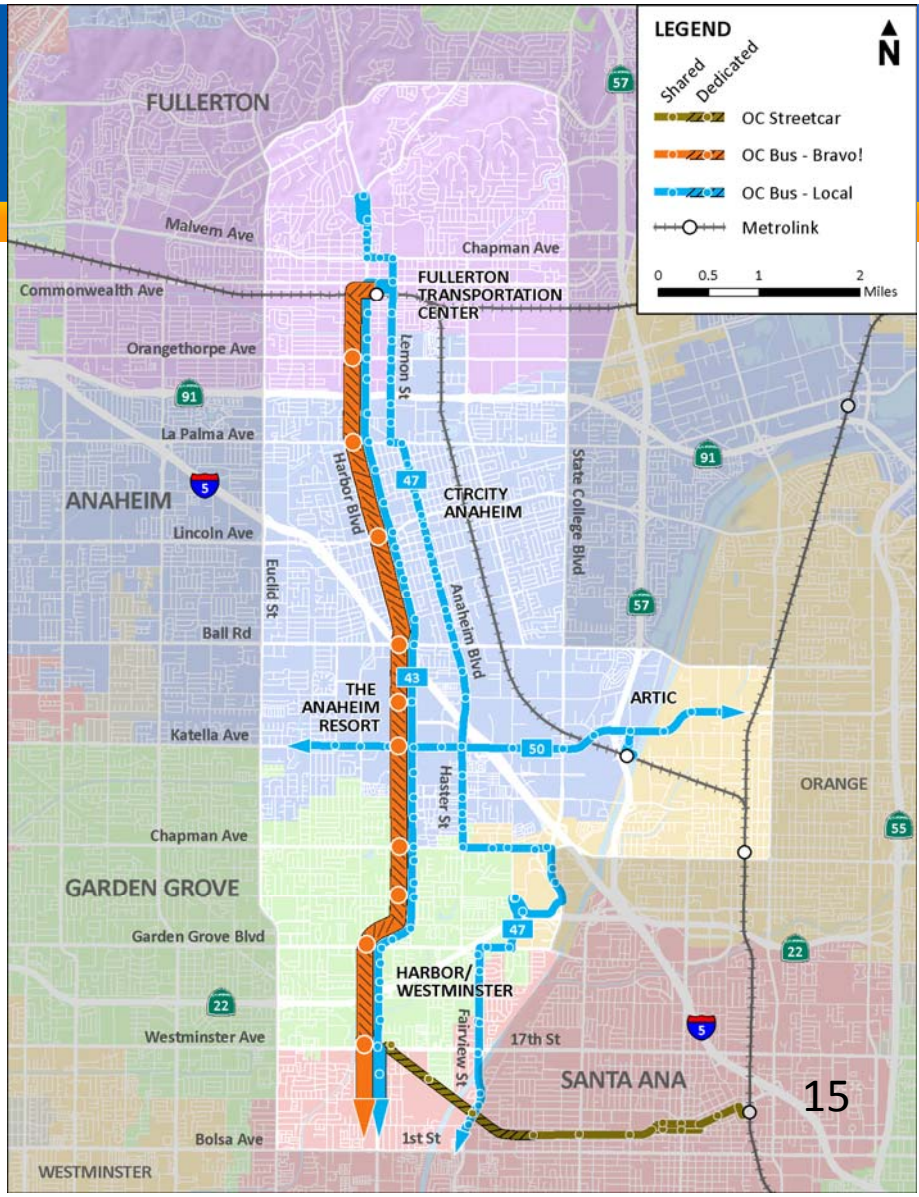
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



L-1: Anaheim/Lemon Streetcar

Alignment:

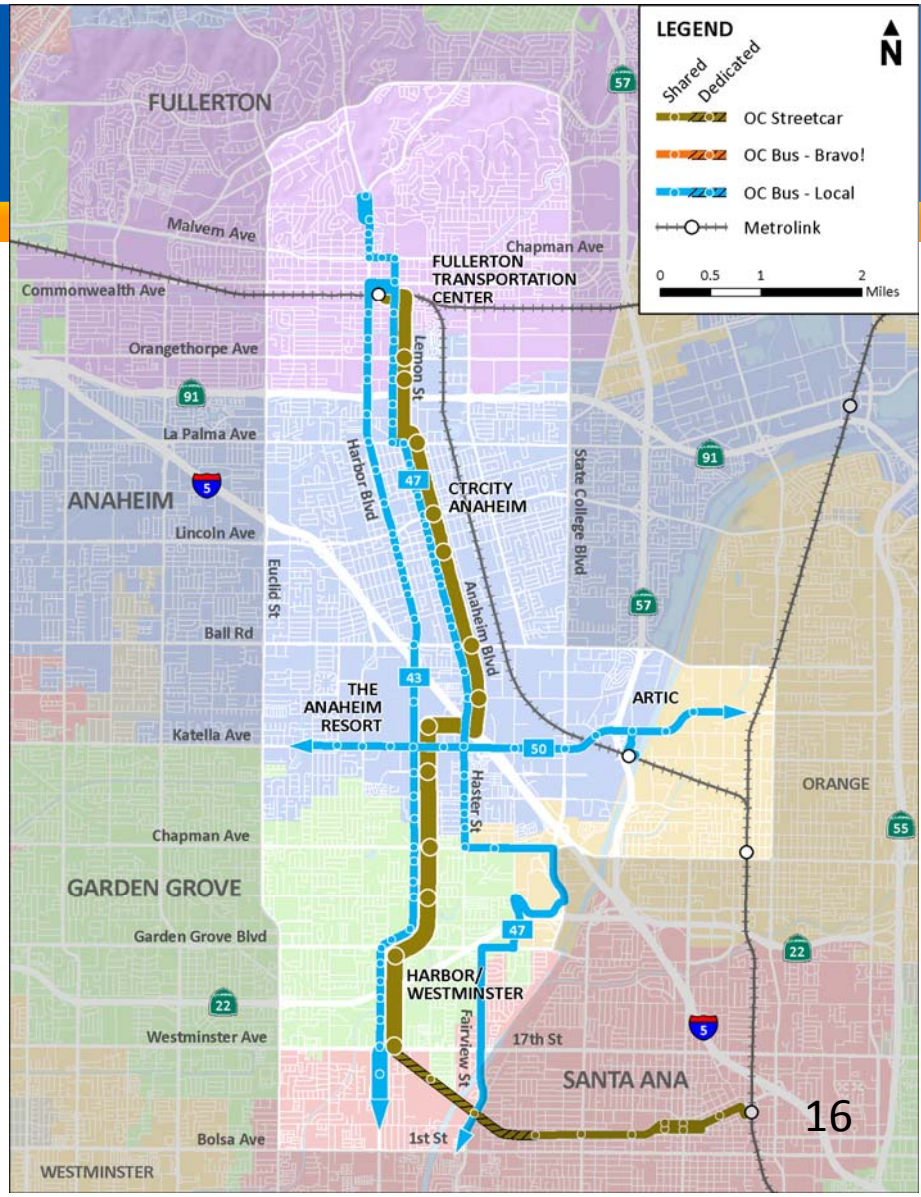
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Enhanced S of Westminster	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



L-2: Anaheim/Lemon Rapid Streetcar

Alignment:

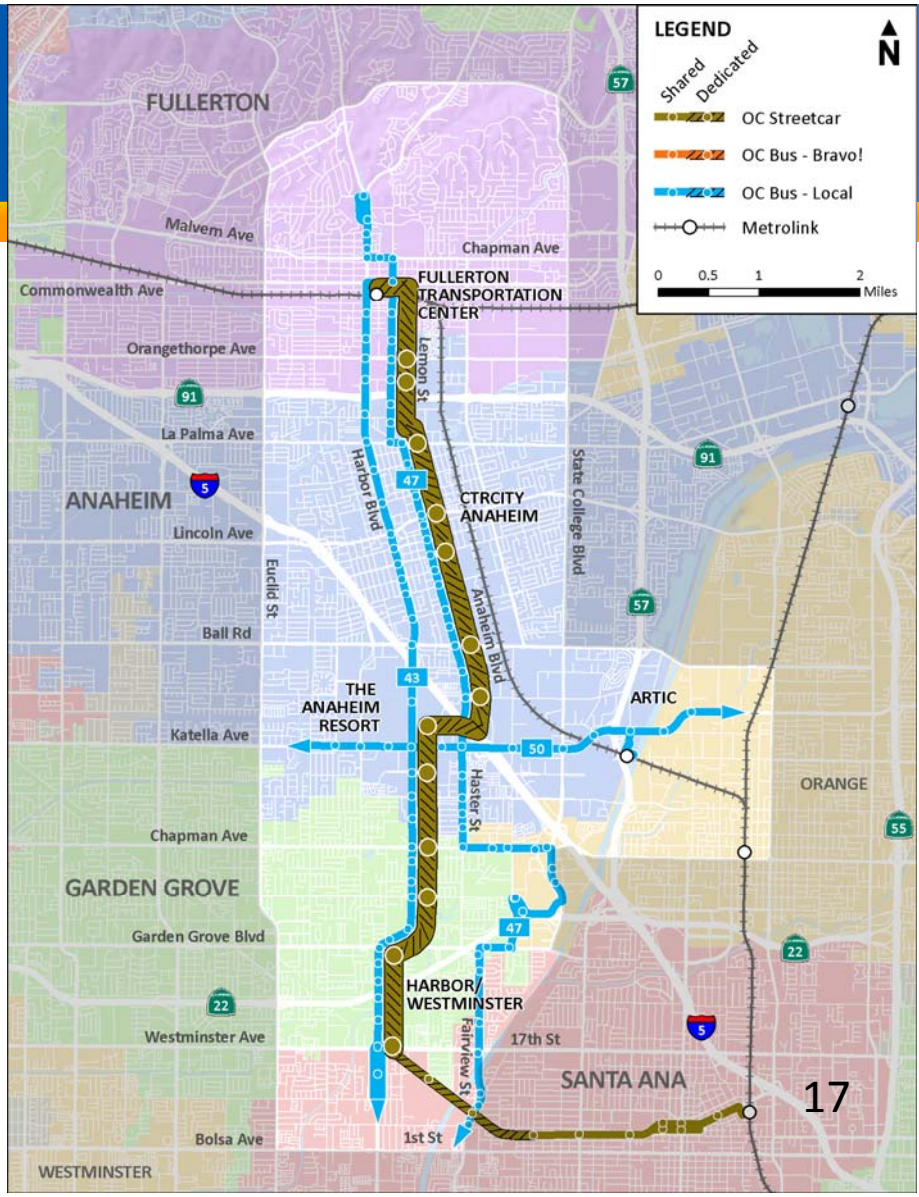
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Enhanced S of Westminster	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



L-3: Anaheim/Lemon Enhanced Bus

Alignment:

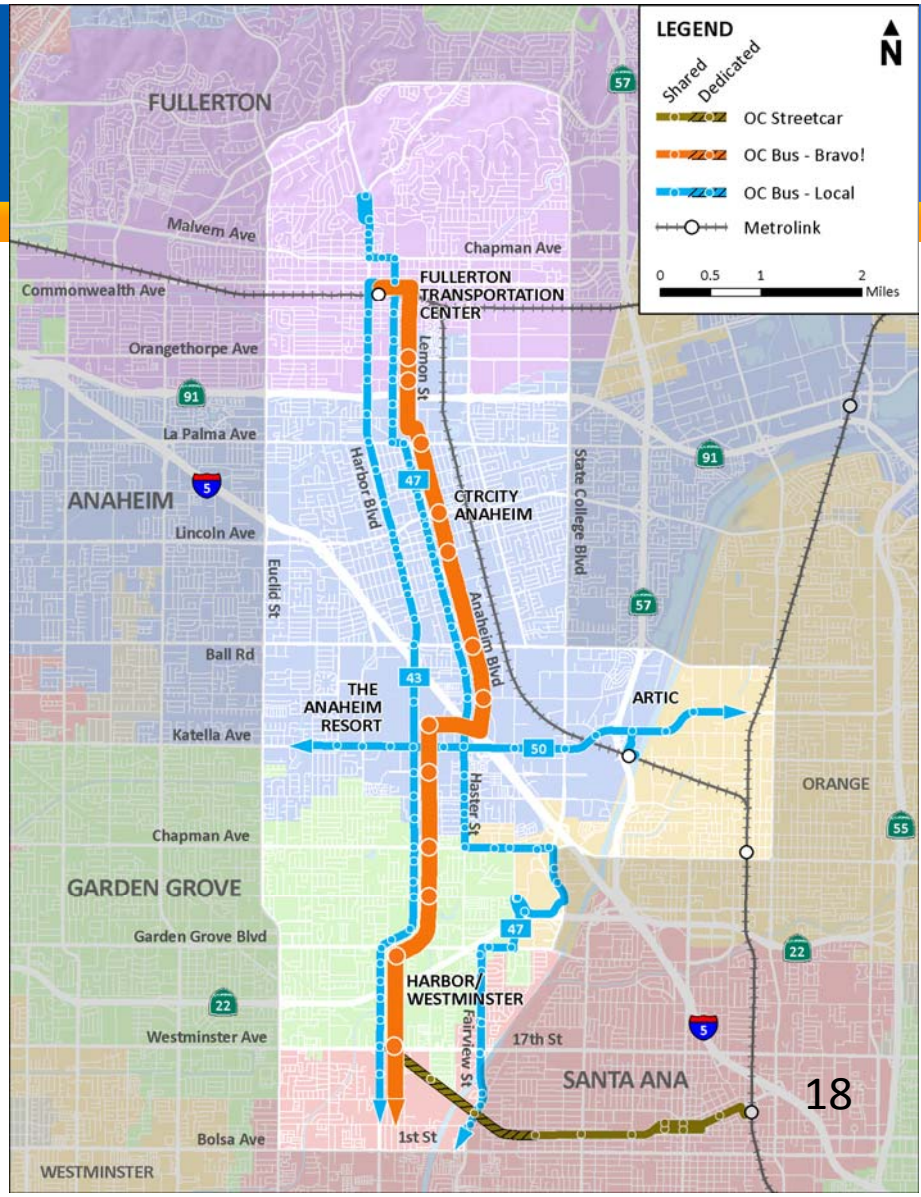
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Enhanced / Rerouted	Unchanged



L-4: Anaheim/Lemon Bus Rapid Transit

Alignment:

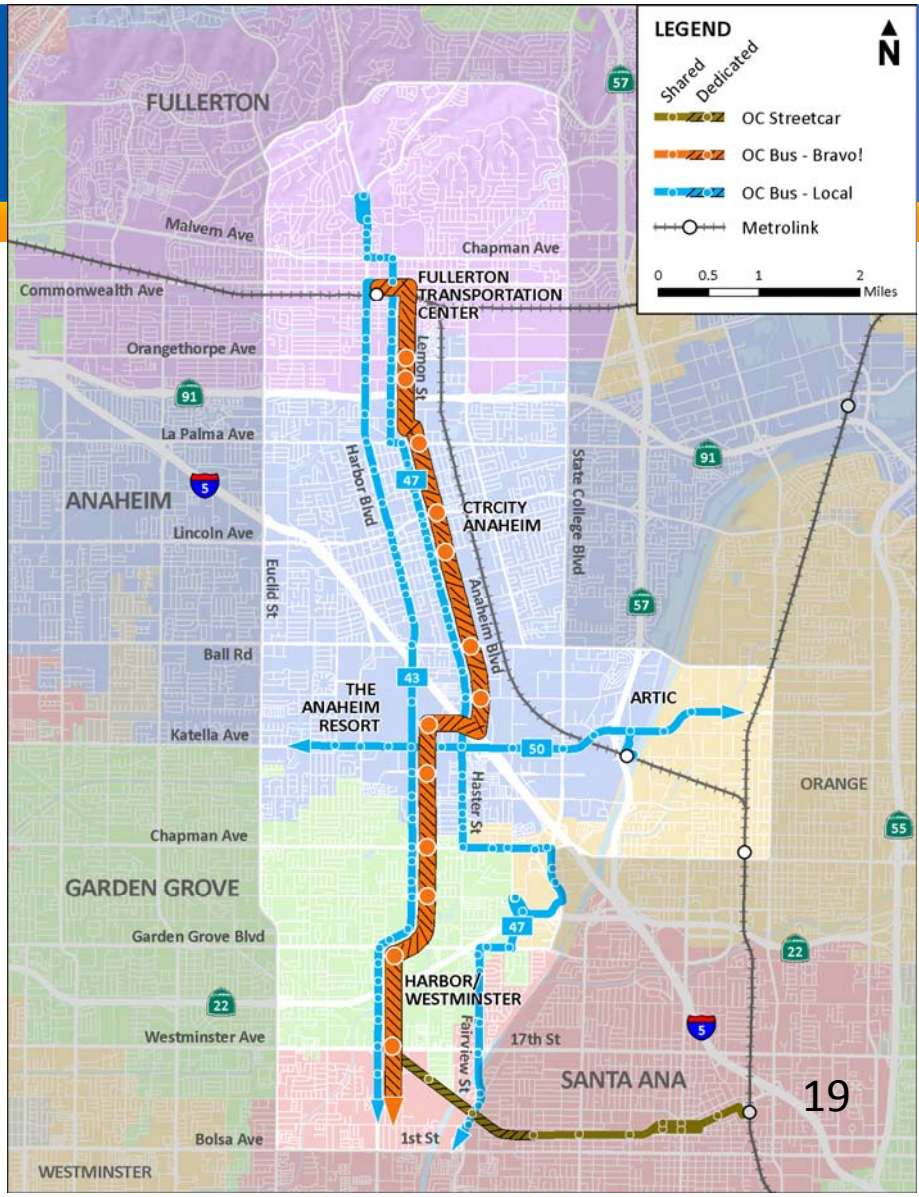
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Discontinued	Unchanged



K-1: Harbor-Katella Streetcar

Alignment:

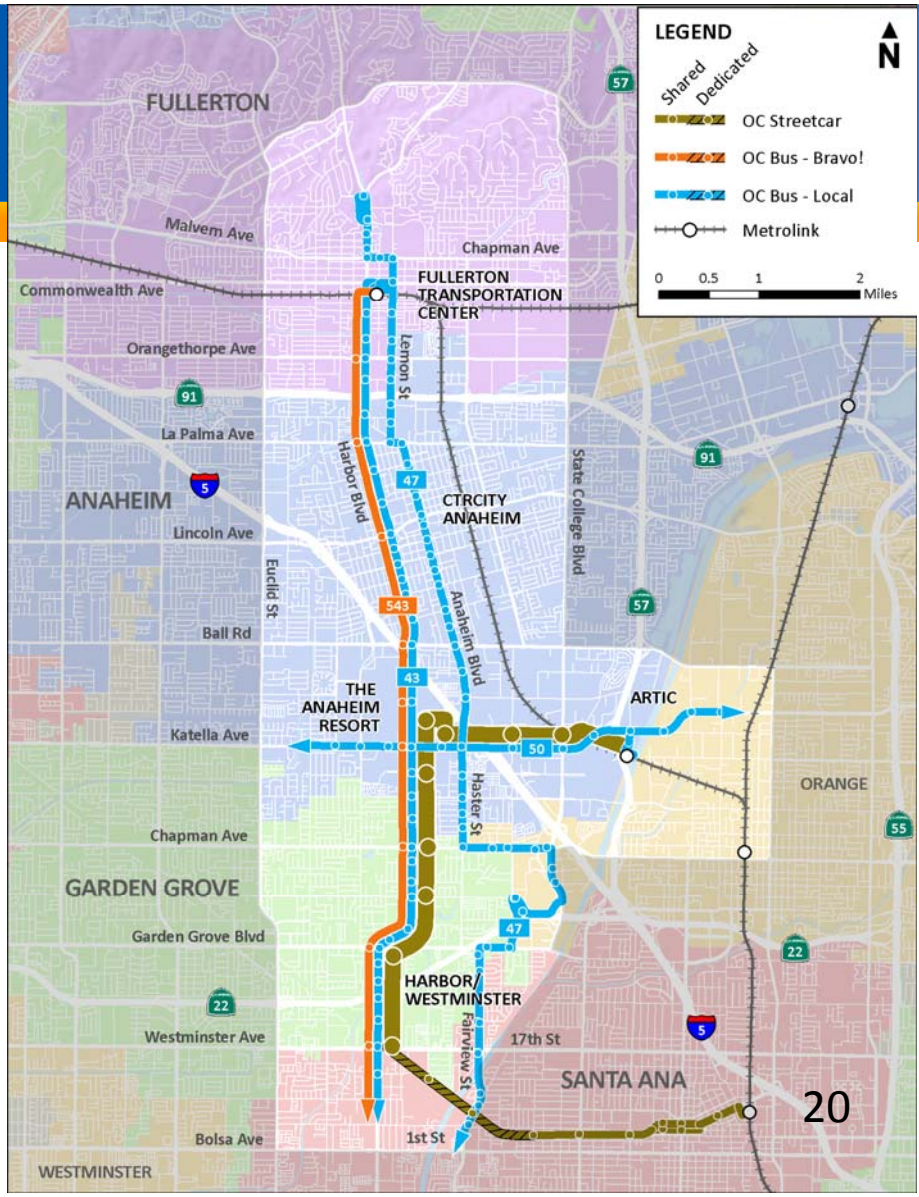
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Unchanged	Unchanged



K-2: Katella + Anaheim/ Lemon Enhanced Bus

Alignment:

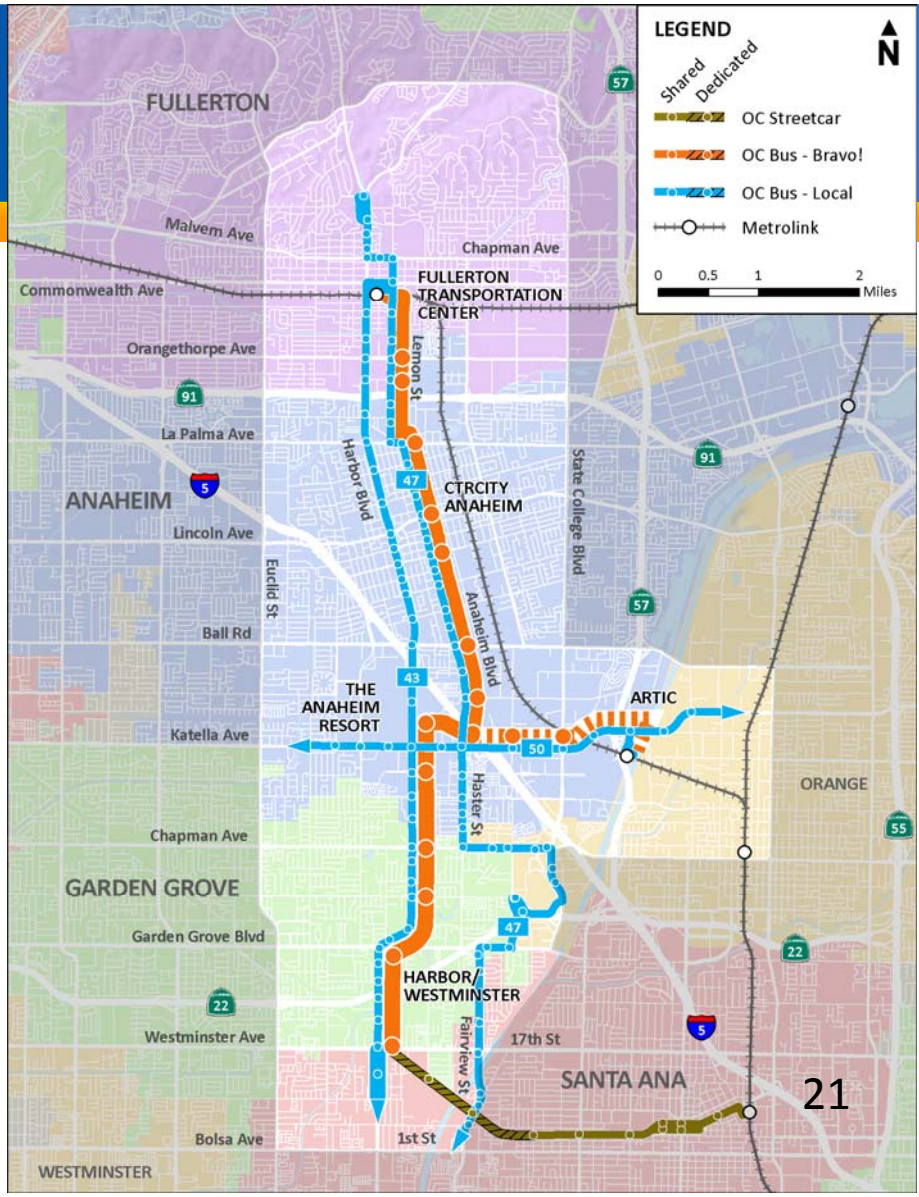
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Enhanced S of Westminster	Unchanged
Harbor Bravo! 543	Katella Local 50
Enhanced / Rerouted	Unchanged



K-3: Katella + Harbor Hybrid

Alignment:

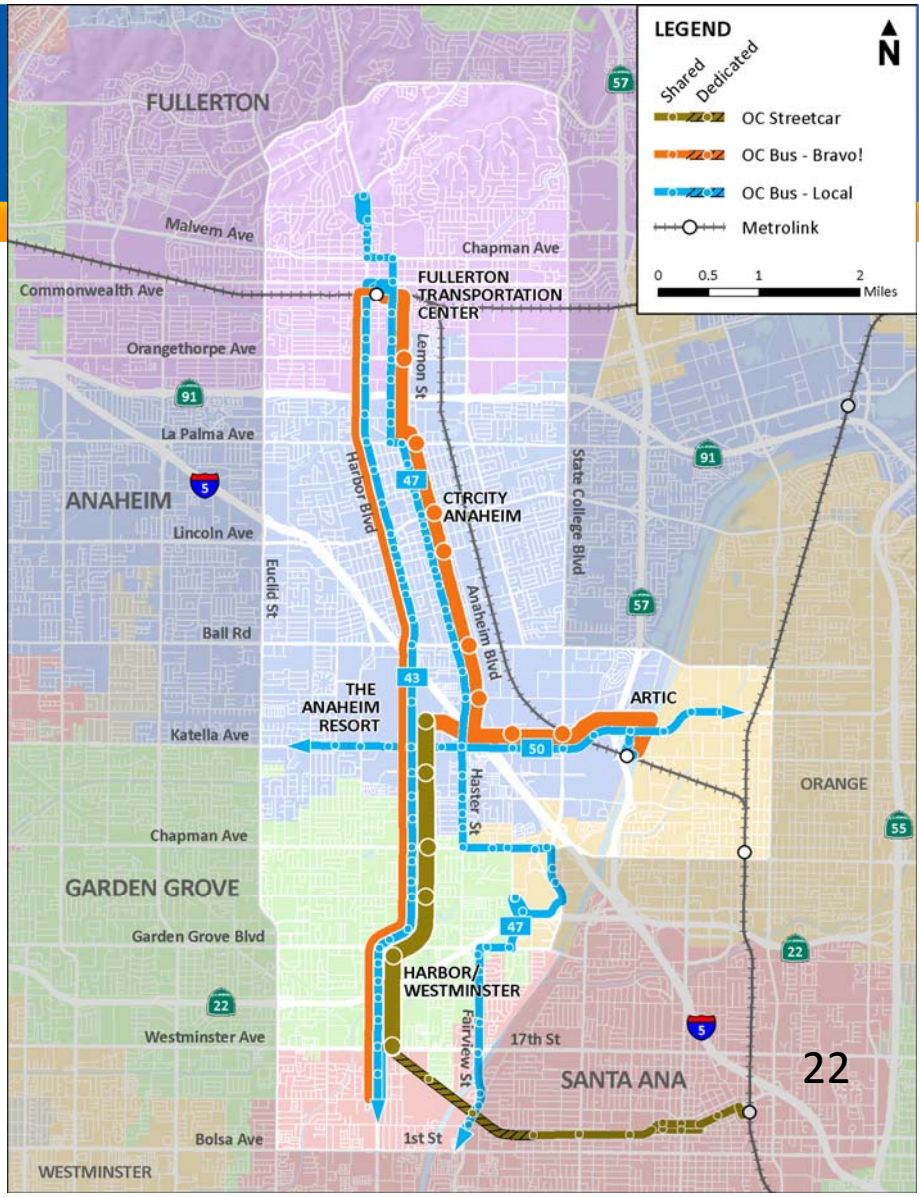
Harbor South	Anaheim/Lemon
Harbor North	Katella

Mode:

Enhanced Bus	Streetcar
Bus Rapid Transit	Rapid Streetcar

Changes to Bus Service:

Harbor Local 43	Anaheim/Lemon Local 47
Unchanged	Unchanged
Harbor Bravo! 543	Katella Local 50
Enhanced / Rerouted	Unchanged



Outreach Plan

- City council updates
- Stakeholder Working Group meeting
- Public workshops in Anaheim and Santa Ana
- Online public engagement
  - Online survey
  - Virtual public workshops

Next Steps

- Perform outreach
- Refine draft alternatives based on comments received
- Begin evaluation of alternatives
- Draft final report
  - Summary of results
  - Recommendations

OCTA

MEMO

February 8, 2017

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: **Board Committee Transmittal for Agenda Item**

The following item is being discussed at a Committee meeting which takes place subsequent to distribution of the Board agenda. Therefore, you will be provided a transmittal following that Committee meeting (and prior to the Board meeting) informing you of Committee action taken.

Thank you.

February 9, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Overview of Options for OC Streetcar Operations and Maintenance

Overview

The Orange County Transportation Authority is the lead agency for the design, construction, operations and maintenance of the OC Streetcar in the cities of Santa Ana and Garden Grove. As part of the request for a full funding grant agreement to the Federal Transit Administration, an organization plan is required to prepare for future operations and maintenance of the service. Staff has developed key considerations for the evaluation of options for operations and maintenance of the OC Streetcar for Board of Directors' review.

Recommendation

Direct staff to return to the Board of Directors with an evaluation of the OC Streetcar operations and maintenance organization plan based upon the key considerations.

Background

Revenue service for the OC Streetcar is scheduled to begin in December 2020. As part of the full funding grant agreement to the Federal Transit Administration (FTA), the Orange County Transportation Authority (OCTA) is required to develop a plan for the organization of the system's operations and maintenance (O&M).

The OC Streetcar operations will require specialized skills to support operations, including operational control systems, electrical systems, tracks, switches, signals, and communications. The maintenance of rail vehicles and electrical systems represent new responsibilities for OCTA. Additionally, all aspects of safety and security of the OC Streetcar will have to meet strict requirements and obtain approvals from both the FTA and the California Public Utilities Commission.

Discussion

The initial step in organizing OC Streetcar O&M is for OCTA to determine if the O&M is to be provided through in-house resources with OCTA employees or to be contracted out in various structures to the private sector.

Four operating options are proposed for consideration:

In-House O&M

The in-house O&M option is defined as OCTA hiring employees to manage operations, operate vehicles, maintain vehicles, and maintain right-of-way (ROW). Specific technical functions could be contracted, but the majority of O&M would be performed by OCTA employees.

O&M Contractor

The O&M contractor would be procured by OCTA to provide management, operations, vehicle maintenance, and ROW maintenance for a five- to ten-year period. The majority of responsibilities would be assigned to the O&M contractor, and OCTA would provide contract administration and oversight.

Management by Private Contractor

Management by private contractor involves contracting with a private entity to oversee and manage the operation of the system by providing key management staff under a contract with OCTA, and OCTA employees serving as operators, and vehicle and ROW maintainers.

In-House Operations/Maintenance Contractor

Under this option, OCTA would provide management and operations with OCTA employees and procure a contractor for vehicle and ROW maintenance. This option would utilize OCTA's experience with transit operations and contract for the specialized maintenance services associated with a streetcar operation.

Through the provision of bus services, OCTA has demonstrated success with both in-house and O&M contractors. The proven track record indicates that OCTA has the experience necessary to pursue any of these four options. However, it is important to take into consideration that streetcar services are a more specialized mode of service with which OCTA has no prior experience.

To determine which of the models best fits OCTA's needs both operationally and financially, the following key considerations are proposed to evaluate each of the operating options.

Cost

Similar to bus operations, the annual operating costs for project operations include a high percentage in labor, inclusive of wages and benefits. Other factors that influence operating costs, depending upon the operating option, are contract administration expenses, overhead, and specialized services, such as electrical services for the overhead contact system and traction power substations.

Operational Flexibility

Small, startup streetcar systems depend upon employees that have multiple skills to support O&M. Flexibility is needed in job responsibilities and work assignments. Lack of flexibility may lead to higher costs for operation. Many of the specialized tasks involved are not full-time jobs in an operation of less than ten scheduled trains operating daily. The initial OCTA operation calls for a maximum of six trains operating daily. Flexibility is needed in utilizing employees for several different tasks.

Quality of Service

The ability to deliver safe, reliable and courteous service with good on-time performance and a minimum of missed trips and service interruptions is critical. The factors influencing the quality of service include the management of the operation, effectiveness of the equipment, and communications to customers.

Organizational Impacts

The ability to incorporate the operation of the OC Streetcar into the OCTA organization ensures good coordination between the bus program and the OC Streetcar operation. Organizational impacts also include the amount of effort needed to recruit experienced personnel to direct, operate, and maintain the OC Streetcar service. A greater reliance on outside resources will be necessary for additional training.

Qualifications of Personnel

Ability to attract experienced personnel in key positions and the ability to retain employees over a long period of time will be critical to the OC Streetcar project. There is a shortage of personnel in the job market experienced in managing and maintaining streetcar operations due to the relatively recent introduction of modern streetcar systems and the lack of lengthy experience with these operating systems. OCTA or a contractor may experience challenges in obtaining qualified personnel with direct streetcar experience.

Attachment A includes a description of how other streetcar systems in the United States, either in service or in the planning process, have established their respective O&M structures. In 2001, Portland introduced the first modern streetcar operation in mixed traffic in the United States. Since that time, ten other cities have established modern streetcar systems, and three more have selected an organizational approach for operations.

Of the six cities with prior rail experience, five of them have selected in-house operations. Two cities had rail experience but different agencies as the owner: Atlanta and Washington D.C. Atlanta chose to operate in-house, but has commenced a process to transition to an O&M contractor. The remaining six cities had no prior rail experience, and of these, five selected the O&M contractor option and one (Tucson) selected management by private contractor. To date, no modern streetcar is operated with the mixed in-house operations/maintenance contractor option.

Next Steps

Pending Board of Directors (Board) feedback on the key considerations, staff will return to the Board in March 2017 with a qualitative analysis of the advantages and disadvantages of each of the four options. Additionally, a cost comparison will also be provided.

The O&M strategy selection is needed to complete the O&M organization plan. The O&M organization plan is a required document that will be submitted to FTA in April 2017, as part of the full funding grant agreement application.

Summary

Staff is seeking Board feedback on the key considerations for the evaluation of options for the OC Streetcar O&M organization plan prior to presenting a detailed analysis on the organization options to the Board in March 2017.

Attachment

A. Modern Streetcar Systems Operation and Maintenance Structure (Planned and In Service)

Prepared by:

Mary Shavalier
Program Manager
(714) 560-5856

Approved by:

Jim Beil, P.E.
Executive Director, Capital Programs
(714) 560-5646

ATTACHMENT A

Modern Streetcar Systems Operation and Maintenance Structure (Planned and In Service)

	Owner	Operator	Year of Start	Organization for Operations
Prior Rail Experience				
Dallas	Dallas Area Rapid Transit	Dallas Area Rapid Transit	2015	In-House
Charlotte	Charlotte	Charlotte Area Transit System	2016	In-House
Portland	Portland	Portland Streetcar, Inc. Non-Profit (NP)	2001	Management by Private Contractor
Salt Lake City	Utah Transit Authority	Utah Transit Authority	2014	In-House
Tacoma	Sound Transit	Sound Transit	2004	In-House
Seattle	Seattle	King County	2008	In-House
Other Rail Experience				
Atlanta	Atlanta	Atlanta	2015	In-House
Washington D.C.	Washington D.C.	Washington D.C.	2016	Operations and Maintenance Contractor
No Prior Rail Experience				
Cincinnati	Cincinnati	Southwest Ohio Regional Transit Authority	2016	Operations and Maintenance Contractor
Detroit	M-1 Rail(NP)	M-1 Rail (NP)	2017	Operations and Maintenance Contractor
Kansas City	Kansas City	Kansas City Streetcar Authority (NP)	2016	Operations and Maintenance Contractor
Milwaukee	Milwaukee	Milwaukee	2018	Operations and Maintenance Contractor
Oklahoma City	Oklahoma City	EMBARK	2018	Operations and Maintenance Contractor
Tucson	Tucson	Tucson	2014	Management by Private Contractor

Overview of Options for OC Streetcar Operations and Maintenance

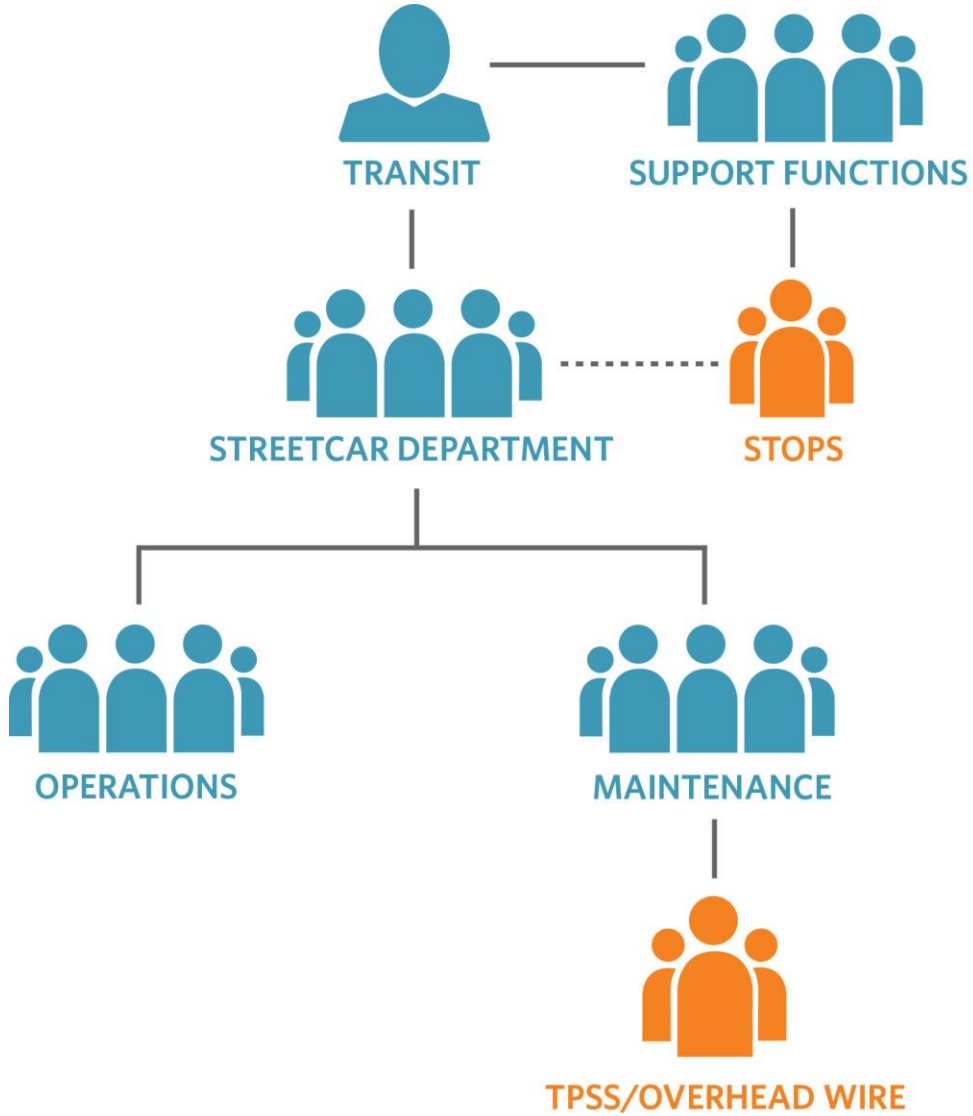
OC Streetcar Operations and Maintenance Characteristics

Day of Week	Operating Hours	Daily Hours of Service
Monday – Thursday	6:00 a.m. to 11:00 p.m.	17 hours
Friday – Saturday	6:00 a.m. to 1:00 a.m.	19 hours
Sunday/Holidays	7:00 a.m. to 10:00 p.m.	15 hours

Organization Options

- In-House Operations
- Operations and Maintenance Contractor
- Management by Private Contractor
- In-House Operations/Maintenance Contractor

In-House Operations



EXAMPLES

- Dallas
- Charlotte
- Salt Lake
- Tacoma
- Seattle
- Atlanta

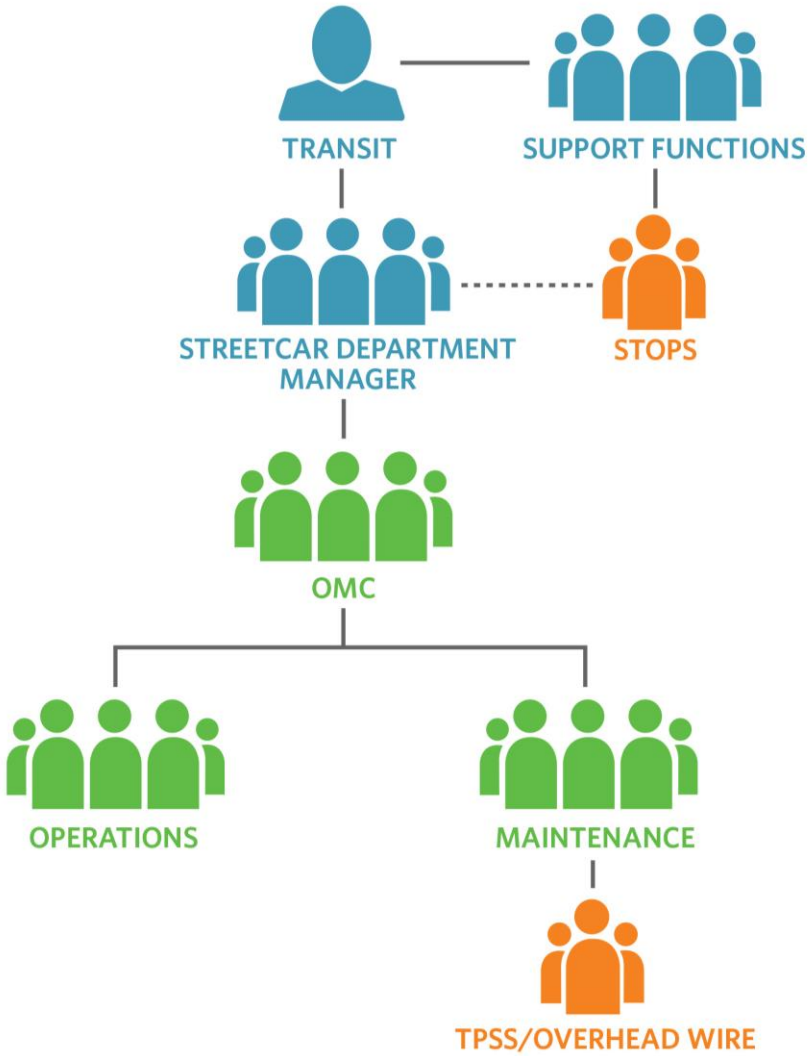
LEGEND

OCTA

Specialized Contractor

*TPSS - Traction Power Sub Station

Operations and Maintenance Contractor



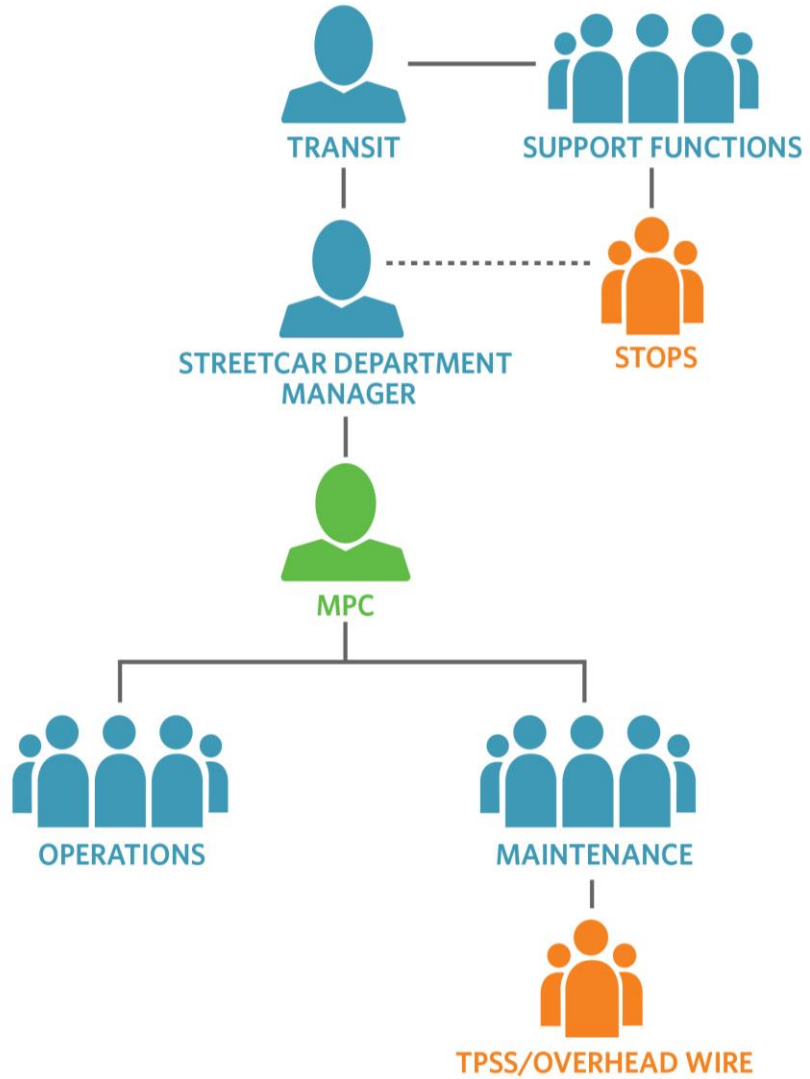
EXAMPLES

- Washington, D.C.
- Cincinnati
- Detroit
- Kansas City
- Milwaukee
- Oklahoma City

LEGEND

- OCTA
- Prime Contractor
- Specialized Contractor

Management by Private Contractor



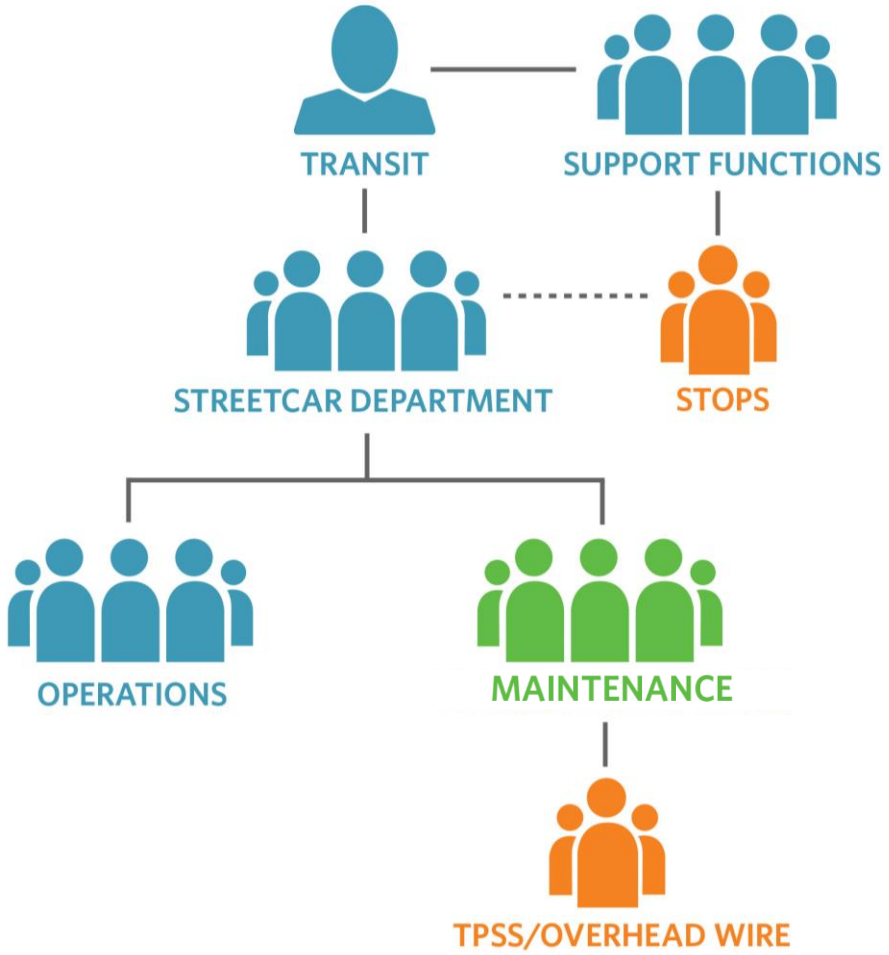
EXAMPLES

Portland
Tucson

LEGEND

- OCTA
- Prime Contractor
- Specialized Contractor

In-House Operations/Maintenance Contractor



EXAMPLES

None

LEGEND

- OCTA
- Prime Contractor
- Specialized Contractor

Key Considerations

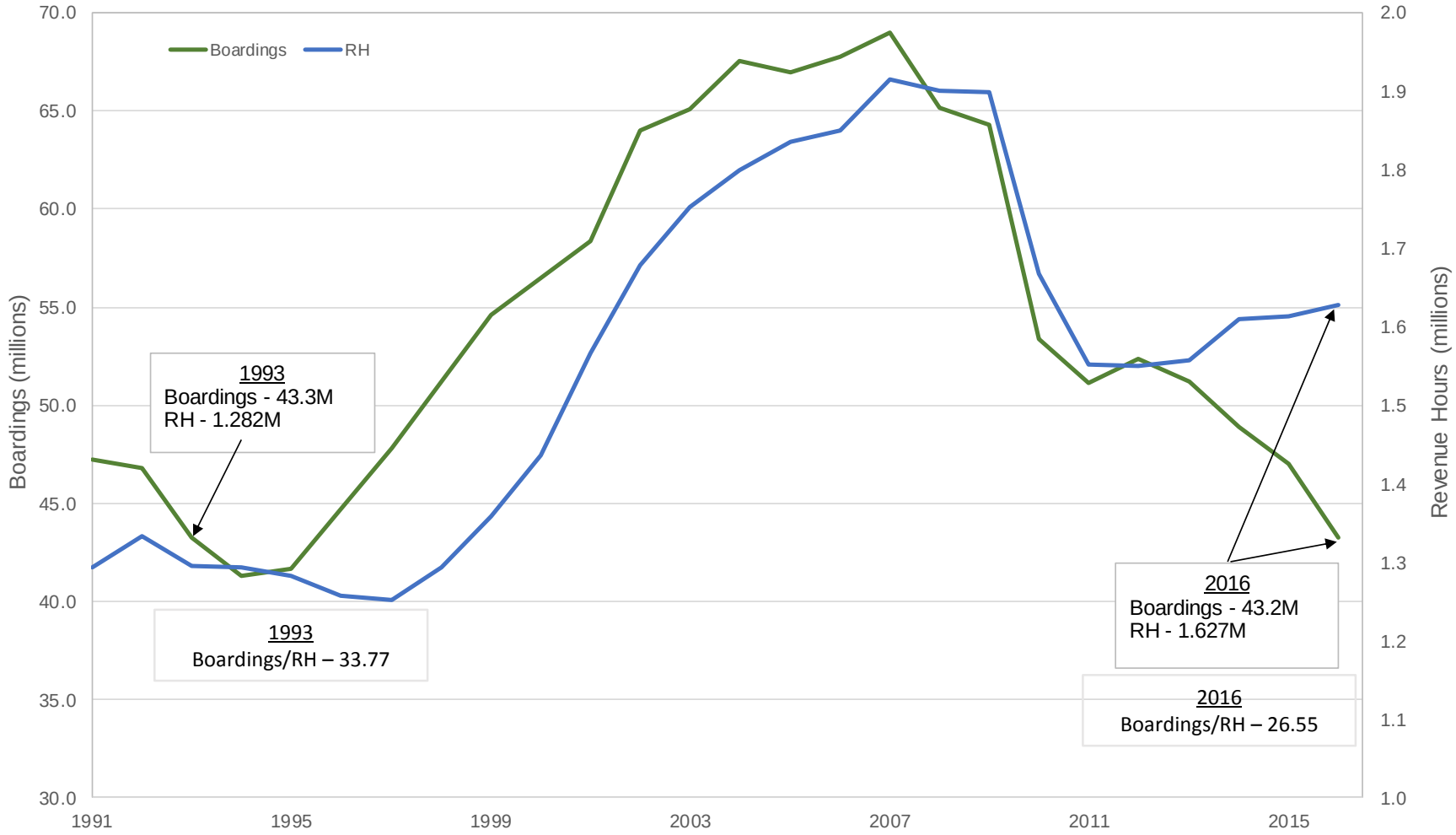
Consideration	Description
Cost	Annual operating cost.
Operational Flexibility	Flexibility in job responsibilities and work assignments. Inflexible work rules will lead to higher costs to operate.
Quality of Service	Safe, reliable, and courteous service. Good on-time performance and minimum of missed trips/service interruptions.
Organizational Impacts	Ability to incorporate operation into OCTA.
Qualifications of Personnel	Ability to attract and retain experienced personnel.

Next Steps

- Receive Board of Directors' (Board) feedback on key considerations
- Complete cost comparison and implementation schedule
- Using key considerations, prepare recommendation on operations and maintenance organization
- Return to the Transit Committee and Board in March 2017 to consider recommendation

Mobile Ticketing & On-Demand Service

Fixed-Route Boardings and Revenue Hours



Replace lower-productivity service with private, shared-mobility services to reduce capital requirements (OC Bus 360).

Current Situation

- Transit Network Providers (TNC's) Agreements
  - Uber, Lyft, Bridge, Curb, Via, etc.
  - Limited flexibility and challenging to execute

- Federal Transit Administration Regulations,
  - On-demand service would have to be accessible to persons with disabilities, including those who use wheelchairs

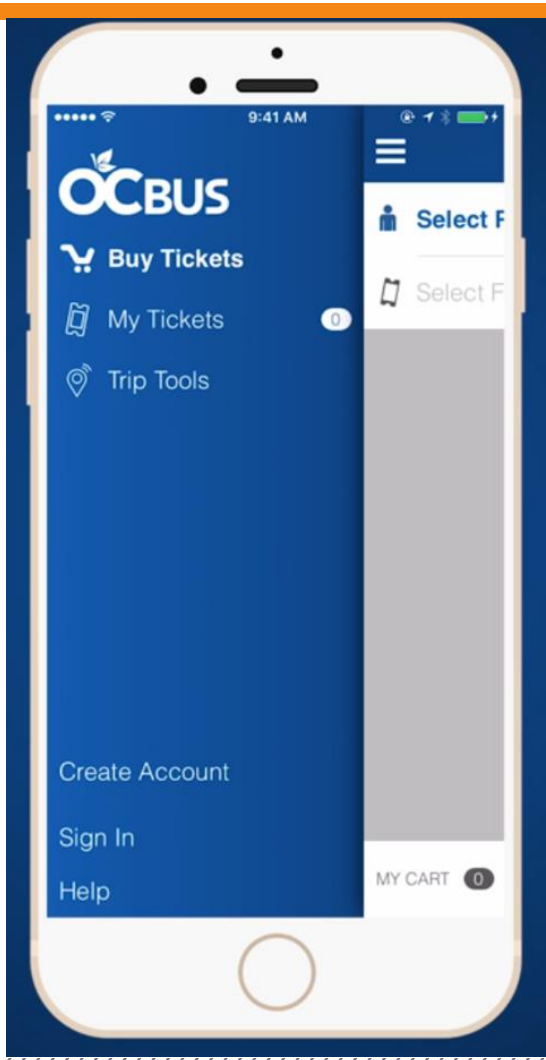
- Office of Innovation
  - Worked in conjunction with a cross-divisional team to find a solution

Proposed Solution

- OCTA Mobile Ticketing Application via moovel North America
  - Board of Directors approved five-year contract with two additional option years
  - Expires December 2020
  - Leverage to provide seamless customer integration to all participating TNC's

- American Disability Act (ADA) Requirements
  - Addressed through customer choice of participating TNC providers equipped with ADA compliant vehicles

- Geofence technology
  - Allows for specific transit stops, routes, and geographic areas to be targeted for customer subsidies



RideTap