



# **AGENDA**

## ***Transit Committee Meeting***

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### **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, November 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](http://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**

Committee Vice Chairman Murray

### **1. Public Comments**

### **Special Calendar**

There are no Special Calendar matters.



## **Consent Calendar (Items 2 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.

### **2. Approval of Minutes**

Approval of the minutes of the Transit Committee meeting of October 12, 2017.

### **3. Rail Programs and Facilities Engineering Quarterly Report**

Jennifer Bergener/James G. Beil

#### **Overview**

The Rail Programs and Facilities Engineering departments are responsible for the Orange County Transportation Authority's rail project development, rail capital programs, rail operations, OC Streetcar, and transit facilities engineering projects. This report provides an update on rail and facilities engineering programs through the first quarter (July, August, and September) of fiscal year 2017-18.

#### **Recommendation**

Receive and file as an information item.

### **4. Agreement for Pavement Striping and Markings at the Garden Grove Bus Base**

George Olivo/James G. Beil

#### **Overview**

The Orange County Transportation Authority's Board of Directors approved a pavement striping and markings project at the Garden Grove Bus Base as part of the Orange County Transportation Authority's Fiscal Year 2017-18 Budget. Bids were received in accordance with the Orange County Transportation Authority's public works procurement procedures. Board of Directors' approval is requested to execute the agreement.

#### **Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1925 between the Orange County Transportation Authority and PCI, the lowest responsive, responsible bidder, in the amount of \$74,500, for pavement striping and markings at the Garden Grove Bus Base.



**5. Agreement for Liquefied Natural Gas Storage Tank Removal at the Anaheim and Garden Grove Bus Bases**

George Olivo/James G. Beil

**Overview**

As part of the Orange County Transportation Authority's Fiscal Year 2017-18 Budget, the Board of Directors approved the removal of liquefied natural gas storage tanks at the Anaheim and Garden Grove bus bases. Bids were received in accordance with the Orange County Transportation Authority's public works procurement procedures. Board of Directors' approval is requested to execute the agreement.

**Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1756 between the Orange County Transportation Authority and Gems Environmental Management Services, Inc., the lowest responsive, responsible bidder, in the amount of \$1,791,306, for removal of liquefied natural gas storage tanks at the Anaheim and Garden Grove bus bases.

**6. Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and the Purchase and Delivery of Liquid Hydrogen for the Santa Ana Bus Base**

George Olivo/James G. Beil

**Overview**

The Orange County Transportation Authority has been awarded grant funds for the purchase of ten hydrogen buses, construction of a hydrogen fuel station, and modifications to facilities. In March 2017, the Board of Directors awarded a sole source agreement for the hydrogen station to the vendor identified in the grant; however, the vendor was unable to accept the terms and conditions of the proposed contract that were intended to protect the Orange County Transportation Authority from risk. A procurement was conducted and award of an agreement is recommended.

**6. (Continued)**

**Recommendations**

- A. Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1577 between the Orange County Transportation Authority and Trillium USA Company LLC, in the amount of \$6,472,127, for the construction, operation, and maintenance of a hydrogen fuel station, and liquid hydrogen deliveries for a three-year term, with two, one-year option terms.
- B. Amend the Orange County Transportation Authority's Fiscal Year 2017-18 Budget, in the amount of \$4,777,732, to accommodate the construction of a liquid hydrogen fuel station at the Santa Ana Bus Base.

**7. Amendment to Agreement for Schedule Checking Activities**

Johnny Dunning/Beth McCormick

**Overview**

On November 25, 2013, the Board of Directors approved an agreement with National Data and Surveying Services, doing business as Southland Car Counters, to conduct bus system schedule checking services for the Orange County Transportation Authority fixed-route bus service. The term of this agreement, as amended, expires on December 31, 2017. A contract amendment is required to exercise the second, one-year option term of the agreement.

**Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 3 to Agreement No. C-3-1855 between the Orange County Transportation Authority and National Data and Surveying Services, doing business as Southland Car Counters, in the amount of \$244,184, to exercise the second, one-year option term of the agreement through December 31, 2018 for schedule checking services. This will increase the maximum obligation of the agreement to a total contract value of \$1,273,483.



## **Regular Calendar**

### **8. Sole Source Agreement for the Purchase of Ten Hydrogen Fuel Cell Electric Buses**

P. Sue Zuhlke/Beth McCormick

#### **Overview**

The Orange County Transportation Authority has been awarded grant funds for the purchase of ten hydrogen buses, construction of a hydrogen fuel station, and modifications to facilities. The grant application was submitted in partnership with the bus and hydrogen fuel station manufacturers. A sole source agreement is required for the purchase of ten hydrogen fuel cell electric buses.

#### **Recommendations**

- A. Authorize the Chief Executive Officer to negotiate and execute sole source Agreement No. C-7-1701 between the Orange County Transportation Authority and New Flyer Industries, Inc., in the amount of \$13,307,125, for the purchase of ten hydrogen fuel cell electric buses.
- B. Amend the Orange County Transportation Authority's Fiscal Year 2017-18 Adopted Budget, in the amount of \$13,307,125, to accommodate the purchase of ten hydrogen fuel cell electric buses.

### **9. OC Bus 360° Update**

Kurt Brotcke/Kia Mortazavi

#### **Overview**

The Orange County Transportation Authority is implementing a comprehensive effort to reposition the bus system in response to changing market conditions. The goals are to reverse ridership declines by reducing passenger travel times, improving travel speeds, and designing services to benefit existing customers and attract new customers. A status report on major OC Bus 360° elements is presented for review.

#### **Recommendation**

Direct staff to request letters of interest from local agencies related to a future Project V call for projects, and return with an update in January 2018.



**10. Transit Master Plan - Corridor Line Evaluation**

Gary Hewitt/Kia Mortazavi

**Overview**

The Transit Master Plan will develop an integrated bus, rail, and paratransit plan for Orange County. This plan will identify future potential transit corridor studies and recommended changes to existing transit service. An evaluation of potential corridor lines is presented for review and potential next steps.

**Recommendation**

Direct staff to seek public/stakeholder input and return to the Board of Directors in January 2018 with an action plan.

**Discussion Items**

**11. Chief Executive Officer's Report**

**12. Committee Members' Reports**

**13. Closed Session**

There are no Closed Session items scheduled.

**14. Adjournment**

The next regularly scheduled meeting of this Committee will be held at **9:00 a.m. on December 14, 2017**, at the Orange County Transportation Authority Headquarters, 550 South Main Street, Board Room - Conference Room 07, Orange, California.



**Committee Members Present**

Al Murray, Vice Chairman  
Steve Jones  
Miguel Pulido  
Gregory T. Winterbottom

**Staff Present**

Darrell Johnson, Chief Executive Officer  
Ken Phipps, Deputy Chief Executive Officer  
Olga Prado, Assistant Clerk of the Board  
Sara Meisenheimer, Deputy Clerk of the Board  
James Donich, General Counsel  
OCTA Staff and members of the General Public

**Committee Members Absent**

Tim Shaw, Chairman  
Andrew Do  
Tom Tait

**Call to Order**

The October 12, 2017 meeting of the Transit Committee was called to order by Committee Vice Chairman Murray at 9:09 a.m.

**Pledge of Allegiance**

Director 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 6)**

**2. Approval of Minutes**

A motion was made by Director Winterbottom, seconded by Director Pulido and declared passed by those present, to approve the minutes of the Transit Committee meeting of September 14, 2017.

**3. Metrolink Fiscal Year 2016-17 Performance Report**

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

**4. Federal Transit Administration Sections 5307, 5310, 5337, and 5339 Program of Projects for Federal Fiscal Year 2017-18**

A motion was made by Director Winterbottom, seconded by Director Pulido, and declared passed by those present, to:

- A. Approve the federal fiscal year 2017-18 Federal Transit Administration Section 5307 Urbanized Area Formula, Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities, Section 5337 State of Good Repair, and Section 5339 Bus and Bus Facilities program of projects, including federal and local funds, and the use of match credit for projects.
- B. Approve the five-year programming plans for Federal Transit Administration Section 5307 and Federal Transit Administration Section 5337. Authorize staff to adjust individual project funding consistent with final apportionments and eligibility determinations through the Fixing America's Surface Transportation Act, and direct staff to include updated numbers in grant and programming status reports.
- C. Authorize the Chief Executive Officer to submit the federal fiscal year 2017-18 Federal Transit Administration grant applications to the Federal Transit Administration.
- 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.

**5. Grant Award for the Be The One Public Awareness Campaign**

A motion was made by Director Winterbottom, seconded by Director Pulido, and declared passed by those present, to:

- A. Adopt Orange County Transportation Authority Resolution No. 2017-079 authorizing the Chief Executive Officer, or designee, to accept the grant award and execute grant-related agreements and documents with the United States Department of Homeland Security.
- B. Amend the Orange County Transportation Authority fiscal year 2017-18 Budget to accommodate the awarded grant funds.

**6. Amendment to Agreement for Bus Stop Maintenance**

A motion was made by Director Winterbottom, seconded by Director Pulido, and declared passed by those present, to authorize the Chief Executive Officer to negotiate and execute Amendment No. 5 to Agreement No. C-4-1620 between the Orange County Transportation Authority and ShelterClean Services, Inc., in the amount of \$1,100,966, to exercise the first, two-year option term of the agreement through November 30, 2019 for bus stop maintenance, bringing the total contract value to \$2,617,653.

**Regular Calendar****7. Transit Division Performance Measurements Report for the Fourth Quarter of Fiscal Year 2016-17**

Beth McCormick, General Manager of the Transit Division, introduced Johnny Dunning, Jr., Manager of Scheduling and Customer Advocacy. Mr. Dunning provided a PowerPoint presentation as follows:

- Performance Measurements;
- Safety;
- Courtesy;
- Reliability – On-Time Performance;
- Reliability – Miles Between Road Calls;
- Fixed-Route-Ridership and Productivity;
- ACCESS-Ridership and Productivity;
- Farebox Recovery Ratio;
- Cost per Revenue Vehicle Hour;
- Performance: Local Routes;
- Performance: Community Routes;
- Performance: Express/Stationlink Routes;
- Performance: Contractor;
- Transit Performance and OC 360°;
- Performance: System-wide Trends;
- Performance: OC 360° Improvements;
- Performance: OC 360° Reductions; and
- Next Steps.

**7. (Continued)**

Committee Vice Chairman Murray commented that OC Bus 360° is trending in the right direction. Darrell Johnson, Chief Executive Officer (CEO), agreed with Committee Vice Chairman Murray and stated that Bus 360° is having the desired outcome in regards to ridership and productivity. Mr. Johnson referred to Page Four of Attachment A and stated that as a result of the audit that was brought to the Finance and Administrative Committee in August, this will be the official set of on-time performance data going forward.

A public comment was heard from Chris Gaarder, Policy Advisor of Transportation, County of Orange, who read a letter on behalf Director Do who could not be present at the meeting today. Director Do commented on the Orange County Transportation Authority's (OCTA) bus system ridership and productivity, OC Bus 360°, and stated he is looking forward to improvements to the on-time performance from the contracted fixed-route provider.

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

**8. February 2018 Bus Service Plan Recommendations**

Mr. Johnson, CEO, provided opening comments and introduced Gary Hewitt, Manager of Transit Planning. Mr. Hewitt provided a PowerPoint presentation as follows:

- OC 360°;
- Public Feedback;
- Changes to Recommendations;
- February 2018 Service Improvements;
- February 2018 Service Reductions; and
- Next Steps.

Committee Vice Chairman Murray expressed his appreciation to staff for considering public inputs and making adjustments to the proposed February 2018 bus service plan. Mr. Johnson, CEO, stated that this is a reallocation of existing resources, not a service cut. The advent of Proposition 1B allowed OCTA a reallocation versus a service cut coming into the budget year.

**8. (Continued)**

A motion was made by Committee Vice Chairman Murray, seconded by Director Jones, and declared passed by those present, to:

- A. Approve the final February 2018 Bus Service Plan and direct staff to begin implementation.
- B. Receive and file the February 2018 Bus Service Plan Public Involvement Program final report.
- C. Direct the Executive Director of Planning, or his designee, to file a Notice of Exemption from the California Environmental Quality Act related to the bus service changes.

**9. Micro-Transit Pilot Program**

Mr. Johnson, CEO, provided opening comments on the new pilot program and introduced Lloyd Sullivan, Department Manager of Information Systems. Mr. Sullivan provided a PowerPoint presentation as follows:

- What is Micro-Transit?;
- Where Could Micro-Transit Work in OC?;
- Transit Network Companies;
- OCTA Micro-Transit;
- Pilot Goals;
- Market Research;
- Service Zone Analysis;
- Huntington Beach;
- Aliso Viejo/Laguna Niguel/Mission Viejo;
- Service Levels and Pricing;
- Budget – One Year Pilot;
- Vehicles and Drivers;
- Dispatching;
- Pilot Performance Metrics;
- Pilot Timeline; and
- OC Flex.

A discussion ensued regarding:

- Cyber security is an important aspect to this stand-alone program.
- “OC Flex” provides a missing link and hopefully, will be used to its maximum potential.

**9. (Continued)**

- Marketing of this program by reaching out to city councils who are a part of the service zone and conducting presentations at city council meetings to expose people to the program.
- The risk in this program is identifying which vehicles will be used. The idea is to have vehicles that can be re-deployed into ACCESS service by using local funds.
- These vehicles are not ACCESS vehicles, but can be put into ACCESS service and will be fully accessible.

A motion was made by Committee Vice Chairman Murray, seconded by Director Pulido, and declared passed by those present, to by those present, to:

- A. Direct staff to implement a one-year micro-transit pilot program with the option to extend the program for one additional year subject to the service meeting performance metrics.
- B. Direct staff to provide performance metrics updates to the Board of Directors on the pilot program as part of the quarterly Transit Performance Measurements report.

**Discussion Items****10. Chief Executive Officer's Report**

Darrell Johnson, CEO, reported on the following:

- Mr. Johnson, CEO, attended the American Public Transportation Association (APTA) annual conference in Atlanta and met with the Federal Transit Administration, Acting Administrator, Jane Williams. It was announced publicly that the APTA expo in 2020 will be held in Anaheim.
- A two-minute video was presented showcasing different modes of transportation in Orange County.
- Mr. Johnson was in regular contact with staff regarding OCTA's active support of emergency operations in response to the Canyon Fire 2. Staff were at the Emergency Operations Center working all shifts, Emergency Preparedness staff was available and participated via WebOC, and buses were staged and available to evacuate people out of Silverado Canyon.

**11. Committee Members' Reports**

Committee Vice Chairman Murray thanked OCTA staff for their courageous efforts during the fires.





**12. Closed Session**

There were no Closed Session items scheduled.

**13. Adjournment**

The meeting adjourned at 9:55 a.m.

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

ATTEST

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Al Murray  
Committee Vice Chairman

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Sahara Meisenheimer  
Deputy Clerk of the Board



**November 9, 2017**

**To:** Transit Committee

**From:** Darrell Johnson, Chief Executive Officer

**Subject:** Rail Programs and Facilities Engineering Quarterly Report

### **Overview**

The Rail Programs and Facilities Engineering departments are responsible for the Orange County Transportation Authority's rail project development, rail capital programs, rail operations, OC Streetcar, and transit facilities engineering projects. This report provides an update on rail and facilities engineering programs through the first quarter (July, August, and September) of fiscal year 2017-18.

### **Recommendation**

Receive and file as an information item.

### **Background**

The Rail Programs and Facilities Engineering departments (Departments) are responsible for implementing the Orange County Transportation Authority's (OCTA) railroad capital projects, including station parking enhancements and expansions, new station developments, expanded rail services, OC Streetcar, and transit facilities engineering. Additionally, the Departments are responsible for improved and expanded operations of Orange County's rail system by providing rail service that supports and matches the growth and development patterns of Orange County and the region.

### **Discussion**

The report provides an update on the Departments' programs and projects, including Rail Capital, Transit Extensions to Metrolink, Rail Operations, and Transit Facilities Engineering.

### Rail Capital

Rail Capital projects include a wide range of projects necessary to sustain existing passenger rail services and support future increases in service. This includes new station developments, station parking expansions and enhancements, grade separations and grade crossing enhancements, and various other track and infrastructure projects.

#### Station Improvements

The Laguna Niguel/Mission Viejo Metrolink Station Improvements project construction was completed on September 20, 2017. The Project provides Americans with Disabilities Act (ADA)-compliant access ramps that replaced the existing elevators. The existing elevators were out of service prior to construction, and bus service was required to transport passengers in wheelchairs from one side of the station to the other. The existing elevator rooms were converted into a restroom, a vending machine, and storage rooms. The project's scope also included additional benches, shade structures, and relocation of the Moulton Niguel Water District's 33-inch sewer line, which was in conflict with the project. The construction notice to proceed (NTP) was issued on February 23, 2016. The contractor was able to open the east side ADA ramps to the public on August 25, 2017, and all the remaining facilities by September 12, 2017.

The Orange Transportation Center parking structure project represents a long-standing effort between the City of Orange and OCTA to increase the parking capacity to accommodate future growth in ridership of the Metrolink system. Per a cooperative agreement between OCTA and the City of Orange, the City of Orange is the lead on the design phase, and OCTA is the lead on the construction phase of the project. A groundbreaking ceremony was held on July 26, 2017. During excavation, contaminated soils were encountered which needed to be removed. A change order was presented to the Board of Directors (Board) for the necessary removal work. The January 2019 project completion date is not expected to be impacted.

The proposed Placentia Metrolink Station will be located on the BNSF Railway (BNSF) and City of Placentia-owned right-of-way (ROW). The station will include platforms, parking, a new bus stop, and passenger amenities. OCTA is the lead for design and construction of the project. Previously completed design plans are being revised to include a parking structure in lieu of surface parking. The project will also include a third track which should assist with the on-time performance of train operations and provide operational flexibility for both freight and passenger trains. BNSF will be the lead on the rail construction. An operations and maintenance agreement with BNSF for the work will need to be in place before a contract for construction is awarded. The

plans are anticipated to be complete and will be advertised for bid in April 2018, with an anticipated completion date of February 2020, pending the BNSF agreement is in place.

The Anaheim Canyon Metrolink Station Improvement project includes the addition of a second station track, platform, and passenger amenities, including ticket vending machines, benches, canopies, and signage. The existing platform will also be extended to accommodate longer train consists. OCTA is the lead agency on all phases of project development, including construction. Preliminary engineering (30 percent plans) and the California Environmental Quality Act (CEQA) clearance was obtained in January 2017, and the National Environmental Policy Act (NEPA) clearance was obtained in June 2017. Final selection of HNTB Corporation to prepare final plans, specifications, and estimates was approved by the Board on August 14, 2017, and construction is expected to begin in June 2019 and be completed in August 2020.

The City of Fullerton is the lead agency on a project to add an elevator tower to each side of the existing railroad pedestrian bridge at the Fullerton Transportation Center and modify the restrooms to be ADA compliant. The City of Fullerton issued the construction NTP in January 2016, and renovations to the restrooms have been completed. The contractor has experienced significant delays on the elevator work due to subcontractor issues and dry utility conflicts. The City of Fullerton is now estimating the completion of the project to be September 2018.

#### Rail Corridor Improvements

Rail corridor improvements consist of capital and rehabilitation projects that improve the safety, operations, or reliability of the rail infrastructure. OCTA owns approximately 48 miles of operating railroad.

There are currently six grade separation projects along the Los Angeles – San Diego – San Luis Obispo (LOSSAN) rail corridor that have completed the project study reports or environmental clearance and are not currently advancing due to lack of funding for subsequent phases.

The 17<sup>th</sup> Street Grade Separation project is progressing through the environmental clearance phase. The project report equivalent document was reviewed and approved by the stakeholders. The City of Santa Ana provided a CEQA statutory exemption determination for the project. With the California Department of Transportation (Caltrans) working with OCTA, both agencies reviewed the revised Finding of Effects document and submitted it to the Office of Historic Preservation (OHP) for review and concurrence. On October 5, 2017, Caltrans received a letter of concurrence from OHP on the Finding of No Adverse Effect. Caltrans requested a letter to document the

preliminary Section 4(f) *de minimis* impact determination. Section 4(f) of the Department of Transportation Act (49 USC 303) of 1966 prohibits the use of land from a historic site of national, state, or local significance. Upon completion of the requested documentation, Caltrans will complete the documents requested for categorical exclusion. The environmental phase is anticipated to be completed in November 2017.

The Laguna Niguel to San Juan Capistrano passing siding project will add approximately 1.8 miles of new passing siding railroad track adjacent to the existing mainline track. The project will enhance operational efficiency of passenger services within the LOSSAN rail corridor. Proposed modifications to the existing Rancho Capistrano private crossing, associated with the addition of passing track, were discussed with all the stakeholders, including the California Public Utilities Commission (CPUC). Alternatives to address concerns raised by the CPUC have been developed in coordination with the stakeholders. Staff met with the CPUC to discuss concerns regarding the private crossing and recently received an NTP with the proposed design. The completion of project design is anticipated to be December 2017 and advertisement for construction by February 2018. All advance utility relocation activities were completed in June 2017.

The San Juan Creek railroad bridge in the City of San Juan Capistrano was built in 1917. The existing 300-foot long bridge carries a single mainline track for passenger and freight rail traffic over San Juan Creek and is in need of replacement. The replacement bridge will be constructed adjacent to the existing bridge to minimize disruption of rail traffic. Additionally, the new railroad bridge will incorporate a future bikeway underpass on the south end of the track along the creek. OCTA and Metrolink are working with the County of Orange to develop a cooperative agreement to identify the roles, responsibilities, and funding to design and construct the future bikeway underpass to enhance the County of Orange's network of trails and bikeways. Metrolink is the overall project lead, and OCTA is the ROW lead. The draft Documented Categorical Exclusion was submitted to the Federal Transit Administration (FTA) for review and concurrence in compliance with NEPA. The project received revised CEQA clearance in May 2017. The Board approved the authority to obtain the necessary ROW for the project in June 2017. The preliminary ROW acquisition schedule is anticipated to be 18 months and construction ready by the third quarter 2018. The project budget is \$38.3 million based on the 60 percent design estimates. The Southern California Regional Rail Authority (SCRRA) is currently advancing the design to 90 percent completion by November 2017.

The Control Point (CP) Fourth project is located in the City of Santa Ana between Fourth Street and Chestnut Avenue, between mile posts 175.45 and 175.80. Metrolink operations utilize Centralize Traffic Control (a train traffic control system) in which a dispatcher controls the railroad traffic through the use of

signal blocks. A CP is a set of railroad signals and switches controlled by the dispatcher and authorizes a train to proceed or stop within the block of track it controls. The project includes installation of a turnout to a Union Pacific Railroad spur track, along with related civil, signal, and communication modifications and improvements. The project will provide rail operational efficiencies. On June 13, 2016, the Board approved a cooperative agreement with SCRRA to define the roles, responsibilities, and the funding requirements of the project. SCRRA began the removal of existing spur track and installation of a new track up to the new CP. A new turnout was installed in August 2017. SCRRA completed an agreement with Union Pacific Railroad on future maintenance responsibilities. Signal house, cables, and other related items will begin installation in late October 2017 to early November 2017. The project is expected to be complete by February 2018.

The Slope Stabilization project includes eight locations within OCTA-owned operating railroad ROW that have been identified for improvements to prevent erosion and slope instability. In September 2017, the OCTA design consultant submitted 100 percent design plans. In coordination with SCRRA, staff divided the plans into two sets. The first set will include four locations that require work on or in close proximity to the railroad. Due to the type of work and equipment necessary to perform the work, OCTA will enter into a cooperative agreement with SCRRA to complete these locations. OCTA will issue an invitation for bid (IFB), scheduled for release in December 2017, to complete the remaining locations.

Metrolink continues the implementation of positive train control (PTC) throughout the system. On October 16, 2017, Metrolink commenced interoperable PTC revenue service operations with BNSF. Over the coming weeks, Metrolink is expanding the PTC safety benefits to all of the 47 daily Metrolink trains that run over BNSF lines, as well as the Union Pacific Railroad, Amtrak, and the North County Transit District in 2018, depending on the PTC deployment status of those railroads.

#### Transit Extensions to Metrolink: OC Streetcar

The Transit Extensions to Metrolink Program is intended to broaden the reach of Orange County's backbone rail system to key employment, population, and activity centers. The OC Streetcar project will serve the Santa Ana Regional Transportation Center (SARTC) through downtown Santa Ana and the Civic Center to Harbor Boulevard in the City of Garden Grove.

During the reporting period, the design firm responded to comments by OCTA, the cities of Santa Ana and Garden Grove, and other project stakeholders on the 90 percent design plans for the streetcar infrastructure and facilities. The design firm also initiated its internal quality assurance review of the design plans with

oversight by OCTA's quality assurance manager. Upon completion of the designer's internal audit, OCTA will conduct an audit of plans and specifications prior to the IFB release. Work is proceeding on preparation of the procurement documents for the construction IFB, including responding to questions from potential bidders on the pre-qualification process. The IFB is scheduled to be released in November 2017.

Work was finalized on a series of technical project readiness documents and financial plans with FTA's Project Management Oversight Consultant (PMOC). Approval on project readiness from FTA's PMOC is expected in October 2017. The approval is the final step prior to the negotiation and approval of a Full Funding Grant Agreement.

Terms for utility relocation were agreed upon with the two remaining utility companies needed for the project (Southern California Edison [SCE] and the Orange County Sanitation District [OCSD]). These agreed-upon terms will be reflected in letters of intent to be approved by SCE and OCSD in October 2017. With the City of Santa Ana approving the resolution of necessity last quarter for the properties required for the maintenance and storage facility, the eminent domain proceedings were initiated and continued during the current reporting period. Negotiations continued with property owners for relocation assistance for the residential and commercial tenants. Staff continued to coordinate with representatives of the Orange County Flood Control District and the Army Corp of Engineers to obtain the permits required for the Santa Ana River Bridge.

Staff met with the CPUC and conducted a thorough field diagnostic review of the alignment. The CPUC made several requests for additional project safety modifications such as raised medians and protected left turns. CPUC approval of the grade crossings is required prior to the initiation of the construction work.

The vehicle manufacturing and delivery procurement continued with interviews of proposers conducted in September 2017. A best and final offer request will be issued in October 2017, with a contract award anticipated for February 2018.

Work continued on development of the scope of services for the operations and maintenance contractor. OCTA is hosting an industry forum in November 2017 as an opportunity to gain industry input on the scope of services for potential inclusion into the procurement.

### Rail Operations

As one of five member agencies that comprise Metrolink, OCTA participates in the design and operation of Metrolink service in Orange County. Rail Operations staff serve as the liaison with Metrolink and are involved in route and service planning, funding, and implementation. In addition to coordination of daily

Metrolink operations, the team coordinates the StationLink service, special trains, promotional activities, and outreach.

- The 2017 Metrolink Angels Express service ended on September 29, 2017, with just over 39,000 boardings; eight percent below the 2016 service. The Mobile Source Air Pollution Reduction Review Committee grant funded program served 54 weekday home games on the Orange County Line, including 15 Friday night games on the Inland Empire – Orange County (IEOC) Line, with an extension from Perris Valley.
- Metrolink has received 13 of 40 new Tier 4 clean emissions locomotives, with 20 more expected by the end of the calendar year. The first locomotive was operated in revenue service on October 12, 2017, and additional units are anticipated to be in service in the coming weeks.
- Mobile ticketing is completely functional and is available via the Metrolink app, with over 20 percent of Metrolink passengers systemwide as users. Almost half of the passengers on the IEOC Line use the app exclusively, mainly because there is no transfer in Los Angeles. Metrolink plans to fully integrate transfers through the Los Angeles County Metropolitan Transportation Authority transit access pass system with the installation of optical readers by December 2017. The beta version of the online ticket sales was launched at the end of September 2017 and is available on metrolinktrains.com. This initial version allows for a customer to buy a ticket online and display the ticket in the mobile app. The print-at-home feature is expected to launch in April 2018.

Metrolink performance data (ridership and revenue) for the first quarter of fiscal year (FY) 2017-18 will be made available in the next quarterly report to the Board.

Rail Operations staff also represents OCTA's interests in the LOSSAN Joint Powers Authority, including the ongoing coordination and service integration efforts on the LOSSAN rail corridor.

### Transit Facilities Engineering

Transit Facilities Engineering is responsible for the development and implementation of capital rehabilitation, facility modifications, and new capital projects for all OCTA transit facilities, including the five bus bases and seven park-and-ride lots. Design is underway on seven projects, including facility modifications for the ten hydrogen bus demonstration projects at the Santa Ana Bus Base, video surveillance system replacement at the Garden Grove and Santa Ana bus bases, liquid hydrogen fueling station utilities



at the Santa Ana Bus Base, preliminary engineering and environmental clearance for the proposed Transit Security Operations Center, and facilities condition assessment at all transit facilities. Design was completed on two projects, including minor rehabilitation of the bus dock platform at the Fullerton Park-and-Ride, and bus wash building metal framing and siding repairs at the Irvine Construction Circle (ICC) Bus Base.

There are five projects in the bid phase for construction, including removal of liquefied natural gas underground storage tanks at the Anaheim and Garden Grove bus bases, bus yard pavement striping and markings at the Garden Grove Bus Base, and the hydrogen fueling station at the Santa Ana Bus Base funded by California Air Resources Board as part of a ten hydrogen bus demonstration project. The bid process started on two projects including the bus wash building repair project at the ICC Bus Base and minor rehabilitation of the bus dock platform at the Fullerton Park-and-Ride.

Five projects were under construction this period, including the vehicle inspection station equipment canopy at the Garden Grove Bus Base, bus wash water run-off mitigation modifications at all bus bases, and replacement of heating and ventilation units at the Garden Grove Bus Base maintenance shop. Construction started on one new project, the hydrogen gas detection upgrades at the Santa Ana Bus Base for the single hydrogen bus demonstration project. The fence repair and bus parking stall wheel stops at the Anaheim Bus Base were completed on August 31, 2017.

### ***Summary***

The Departments are responsible for OCTA's rail project development, rail capital improvement programs, rail operations, and transit facilities engineering projects. For the period covering the first quarter of FY 2017-18, projects generally progressed consistent with scope and schedule.

***Attachment***

None.

**Prepared by:**



Jennifer Bergener  
Director, Rail Programs and Facilities  
Engineering  
(714) 560-5462

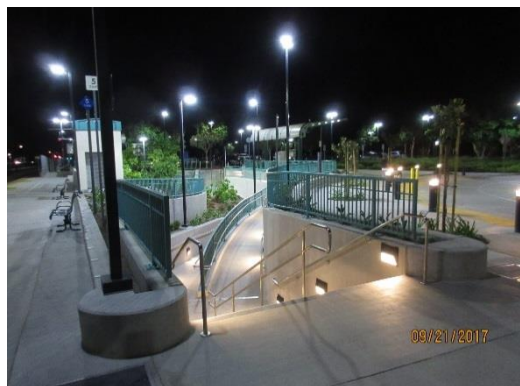
**Approved by:**



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

# Rail Programs and Facilities Engineering Quarterly Report

# Station Improvements




Project	Cost (millions)	2013	2014	2015	2016	2017	2018	2019	2020
Laguna Niguel/Mission Viejo Metrolink Station/Americans with Disabilities Act Ramp Improvements	\$8.52								
Orange Metrolink Station Parking Structure	\$34.80								
Placentia Metrolink Station	\$31.20								
Anaheim Canyon Metrolink Station Improvements	\$20.05								
Fullerton Transportation Center Elevator Upgrades	\$4.00								
Total	\$98.57	Note: All Costs do not include right-of-way (ROW) expenses.							

 Project Definition Report

 Project Approval/Environmental Document (PA/ED)

 Final Design

 Construction

 Funding Approval

 Project On Hold or Delayed

# Rail Corridor Improvements



## Schedule / Cost

Project	Cost (millions)	2013	2014	2015	2016	2017	2018	2019
17th Street Grade Separation	\$ 158.32							
Laguna Niguel-San Juan Capistrano Passing Siding	\$ 30.83							
San Juan Creek Bridge Replacement	\$ 38.33							
Control Point Fourth	\$ 8.51							
Positive Train Control Program (Orange County Transportation Authority (OCTA) Share)	\$ 39.92							
Rail ROW Slope Stabilization	\$ 2.00							
<b>Total</b>	<b>\$ 277.91</b>							

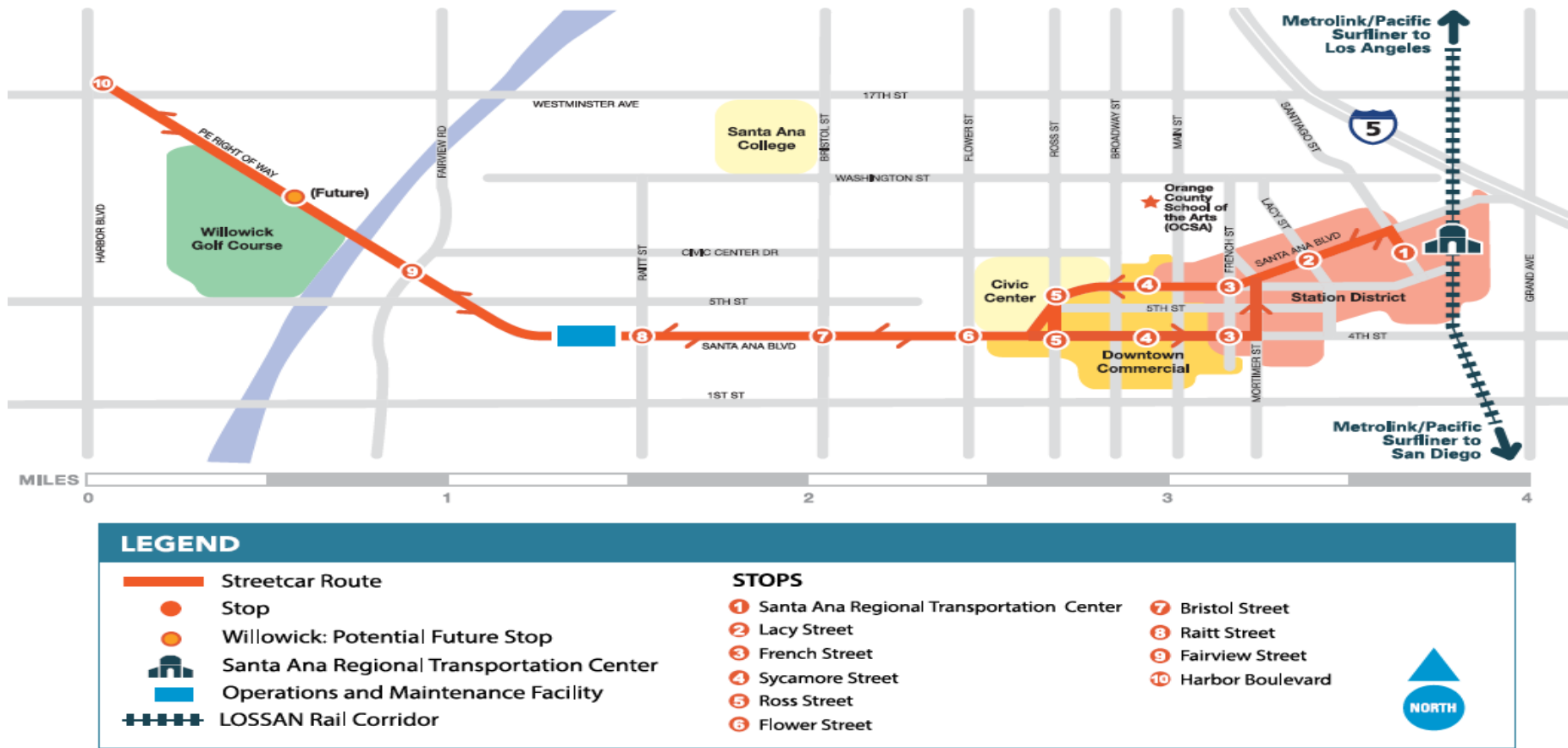
PA/ED

Final Design

Construction

Planning

# Transit Extensions to Metrolink: Santa Ana/Garden Grove Fixed-Guideway



Schedule	2013	2014	2015	2016	2017	2018	2019	2020
Alternatives Analysis, state/federal environmental clearance, and conceptual engineering								
Project Development/Preliminary Engineering/Engineering								
Full Funding Grant Agreement/Construction*								
Start up, Testing, and Certification								

\* Pursuing federal New Starts

# Rail Operations

## Angels Express

- Special Metrolink service to 54 home games from March 30 to September 29, 2017.
- OCTA received a Mobile Source Air Pollution Reduction Review Committee (MSRC) grant for operation of Metrolink trains with Tier 2 clean emissions locomotives.
- Adult tickets are \$7 round trip.
- Total ridership for the season was more than 39,000; eight percent below 2016.



## Tier 4 Locomotives

- Delivery and testing continues for the 40 Metrolink Tier 4 clean emissions locomotives.
- Following a press event the week before, the first Tier 4 locomotive ran in revenue service on October 12, 2017.
- Metrolink expects at least four locomotives to operate throughout the system by the end of October 2017.

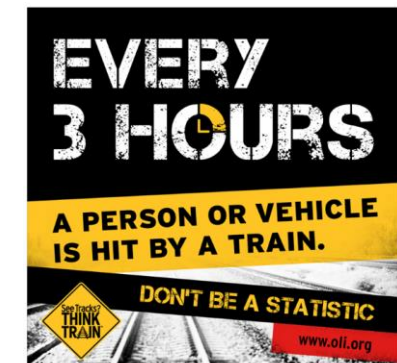


## Rail Safety Month

- In coordination with Operation Lifesaver, OCTA and Metrolink promoted September as rail safety month via social media and an e-news blast.

## Football Trains

- On September 10, 2017, Metrolink began special train service to seven Los Angeles Rams home games at the Coliseum.
- For \$7 round trip, Orange County football fans can ride the Orange County and 91/Perris Valley lines to Union Station and transfer to LA Metro rail for free.
- Metrolink received a MSRC grant for the service.





# Facilities Engineering

Project	Cost (millions)	2016	2017	2018
Ana, GG Bases - LNG Underground Storage Tanks Removal	\$ 1.50			
Ana Base - Fence Repair and Bus Parking Stall Wheel Stops	\$ 0.07			
Facilities Condition Assessment - All Transit Facilities	\$ 0.20			
FPNR - Bus Dock Platform Minor Rehabilitation	\$ 0.50			
GG Base - Maintenance Building HV Unit Replacement	\$ 0.29			
GG Base - Vehicle Inspection Station Equipment Canopy	\$ 0.26			
All Bases - Bus Wash Run-Off Mitigation	\$ 0.65			
SA Base - Liquid Hydrogen Fueling Station	\$ 4.77			
SA Base - Facility Modifications for Hydrogen Buses	\$ 1.13			
GG Base - Bus Yard Pavement Striping	\$ 0.07			
SA, GG Bases - Video Surveillance System	\$ 1.20			
TSOC - Preliminary Engineering and Environmental Clearance	\$ 0.92			
<b>TOTAL</b>	<b>\$ 11.56</b>			

Final Design
  Bid
  Construction

## OCTA Facility Legend:

Ana	Anaheim Bus Base
FPNR	Fullerton Park-and-Ride
GG	Garden Grove Bus Base
Irv CC	Irvine Construction Circle Bus Base
Irv SC	Irvine Sand Canyon Bus Base
BPNR	Brea Park-and-Ride
GWTC	Golden West Transportation Center
NPTC	Newport Transportation Center
LBTC	Laguna Beach Transportation Center
SA	Santa Ana Bus Base
TSOC	Transit Security Operations Center



SA Hydrogen Gas Detection  
Control Panel Wiring



Facility Condition Assessment  
Federal Transit Administration Guidance





**November 9, 2017**

**To:** Transit Committee

**From:** Darrell Johnson, Chief Executive Officer 

**Subject:** Agreement for Pavement Striping and Markings at the Garden Grove Bus Base

**Overview**

The Orange County Transportation Authority's Board of Directors approved a pavement striping and markings project at the Garden Grove Bus Base as part of the Orange County Transportation Authority's Fiscal Year 2017-18 Budget. Bids were received in accordance with the Orange County Transportation Authority's public works procurement procedures. Board of Directors' approval is requested to execute the agreement.

**Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1925 between the Orange County Transportation Authority and PCI, the lowest responsive, responsible bidder, in the amount of \$74,500, for pavement striping and markings at the Garden Grove Bus Base.

**Discussion**

The Orange County Transportation Authority (OCTA) completed construction of the Garden Grove Bus Base in 1977. Pavement striping and markings need to be replaced periodically to be clearly visible and ensure continued safe operations, and also to account for any revisions required over time by maintenance and operations. The existing bus yard pavement striping and markings have deteriorated and need to be replaced. Facilities Engineering staff worked with base maintenance and operations to complete the plans and specifications for the project.

***Procurement Approach***

This procurement was handled in accordance with OCTA's Board of Directors-approved procedures for public works projects. These procedures, which conform to both federal and state requirements, require that contracts are awarded to the lowest responsive, responsible bidder after a sealed bidding process.

Invitation for Bids (IFB) 7-1925 was issued electronically on August 30, 2017, on CAMM NET. The project was advertised on August 30 and September 6, 2017, in a newspaper of general circulation. A pre-bid conference was held on September 6, 2017, with no firms in attendance. Five addenda were issued to provide the pre-bid conference registration sheets and handle administrative issues related to the IFB. On October 5, 2017, three bids were received and publicly opened.

All bids were reviewed by staff from the Contracts Administration and Materials Management and Rail Programs and Facilities Engineering departments to ensure compliance with the contract terms and conditions, and technical specifications. The list of bidders and bid amounts is presented below:

<u>Firm and Location</u>	<u>Bid Amount</u>
PCI Azusa, California	\$74,500
ABC Resources Inc. Ontario, California	\$92,689
PTM General Engineering Services, Inc. Riverside, CA	\$126,026

The engineer's estimate for the project was \$92,000. The recommended firm's bid is 20 percent below the engineer's estimate and is considered by staff to be fair and reasonable.

State law requires award to the lowest responsive, responsible bidder. As such, staff recommends award to PCI, the lowest responsive, responsible bidder, in the amount of \$74,500, for pavement striping and markings at the Garden Grove Bus Base.

**Fiscal Impact**

The project was approved in OCTA's Fiscal Year 2017-18 Budget, Capital Programs Division, Account 1722-9022-D3122-0AL, and is funded through Federal Transit Administration Section 5309/5339 Grants.

**Summary**

Based on the information provided, staff recommends the Board of Directors authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1925 between the Orange County Transportation Authority and PCI, the lowest responsive, responsible bidder, in the amount of \$74,500, for pavement striping and markings at the Garden Grove Bus Base.

**Attachment**

None.

**Prepared by:**



George Olivo, P.E.  
Program Manager  
(714) 560-5872

**Approved by:**



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



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



**November 9, 2017**

**To:** Transit Committee

**From:** Darrell Johnson, Chief Executive Officer

**Subject:** Agreement for Liquefied Natural Gas Storage Tank Removal at the Anaheim and Garden Grove Bus Bases

### **Overview**

As part of the Orange County Transportation Authority's Fiscal Year 2017-18 Budget, the Board of Directors approved the removal of liquefied natural gas storage tanks at the Anaheim and Garden Grove bus bases. Bids were received in accordance with the Orange County Transportation Authority's public works procurement procedures. Board of Directors' approval is requested to execute the agreement.

### **Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1756 between the Orange County Transportation Authority and Gems Environmental Management Services, Inc., the lowest responsive, responsible bidder, in the amount of \$1,791,306, for removal of liquefied natural gas storage tanks at the Anaheim and Garden Grove bus bases.

### **Discussion**

The Orange County Transportation Authority (OCTA) completed construction of the Anaheim and Garden Grove bus bases in 1983 and 1977, respectively. As part of OCTA's alternative fuel program, OCTA transitioned from diesel buses to liquefied natural gas (LNG) buses beginning in 2000, and to compressed natural gas buses in 2007. To support operations out of the Anaheim and Garden Grove bus bases, two 25,000-gallon LNG underground tanks and LNG fuel station-related equipment were installed at each of these bases in 2000 and 2001. OCTA is currently phasing out the use of its LNG bus fleet and will no longer require LNG fueling facilities by the end of 2017. OCTA has been in discussions with the State of California (State) Department of Industrial Relations (DIR), Pressure Vessel Unit, which is the responsible regulatory agency for underground storage pressure vessels in the State, related to

inspection and removal of the tanks, and the DIR has agreed to allow OCTA to remove the tanks by the end of 2018 (Attachment A).

***Procurement Approach***

The procurement was handled in accordance with OCTA's Board of Directors (Board)-approved procedures for public works projects. These procedures, which conform to both federal and state requirements, require that contracts are awarded to the lowest responsive, responsible bidder after a sealed bidding process.

On July 24, 2017, the Board authorized the release of Invitation for Bids (IFB) 7-1756, which was issued electronically on CAMM NET. The project was advertised on July 26 and August 2, 2017, in a newspaper of general circulation. A pre-bid conference and job-walk were held on August 1, 2017, and was attended by 14 firms. Four addenda were issued to provide the pre-bid conference registration sheets and handle administrative issues related to the IFB. On August 24, 2017, one bid was received and publicly opened. The bid received from GEMS Environmental Management Services, Inc. (GEMS) was in the amount of \$ 1,791,306.

The bid was reviewed by staff from both the Contracts Administration and Materials Management (CAMM) and Facilities Engineering departments to ensure compliance with the contract terms and conditions, and technical specifications.

The engineer's estimate for the project was \$1,500,000. The recommended firm's bid is 19.4 percent over the engineer's estimate. Staff conducted an extensive cost analysis and assessment of the bid components with the design consultant, STV Incorporated. The project is specialized in nature and subject to extensive regulatory requirements.

An analysis of the bid showed that GEMS' cost elements for tank removal at the Garden Grove Bus Base exceeded the engineer's estimate. The primary reason for this was due to the limited staging space and the lack of available area adjacent to the excavation location at the bus base to stockpile the excavated material, thus requiring additional trucking resources to handle excavated materials. Costs for electrical materials and switchgear cabinet equipment removal were also underestimated for the job.

OCTA's Health, Safety, and Environmental Department has indicated a potential risk of state penalties for failure to complete the LNG tank removal by

December 31, 2018. Potential penalties range from \$7,000 per general violation, up to \$250,000 per willful violation. Given that the tank removal is anticipated to take 270 days for completion, re-bidding the project will not necessarily guarantee a lower price nor allow for the project to be procured and work completed within the timeframe as agreed upon with the DIR.

After a cost analysis of the bid components and consideration of site conditions, along with the urgency of the project to meet the requirements set forth by the State DIR, staff is recommending this award. The recommended firm met all the requirements of the IFB, as well as all federal and state requirements.

In accordance with OCTA's procurement policies and procedures, a single bid requires OCTA's Internal Audit Department (Internal Audit) to conduct a review to determine if there was adequate competition. Based on Internal Audit's review, the procurement was handled in a fair and competitive manner. In addition, CAMM contacted several bidders that downloaded the IFB from OCTA's CAMM NET website to inquire why bids were not submitted. Most of the bidders contacted indicated that a bid was not submitted due to lack of expertise in the scope of work, were busy with other projects, or did not have bonding capacity.

State law requires award to the lowest responsive, responsible bidder. As such, staff recommends award to GEMS, the lowest, responsible bidder, in the amount of \$1,791,306, for the project.

#### **Fiscal Impact**

The project was approved in OCTA's Fiscal Year 2017-18 Budget, Capital Programs Division, Account 0030-6049-D3120-MIR, and is funded with Federal Transit Administration 5337 State of Good Repair Grants.

#### **Summary**

Based on the information provided, staff recommends the Board of Directors authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1756 between the Orange County Transportation Authority and Gems Environmental Management Services, Inc., the lowest responsive, responsible bidder, in the amount of \$1,791,306, for liquefied natural gas tank removal at the Anaheim and Garden Grove bus bases.

***Attachment***

- A. Letter from Donald C. Cook, Principal Safety Engineer, State of California Department of Industrial Relations, to James J. Kramer, P.E., Principal Civil Engineer, Orange County Transportation Authority, Dated September 14, 2012

**Prepared by:**



George Olivo, P.E.  
Program Manager  
(714) 560-5872

**Approved by:**



James G. Beil, P.E.  
Executive Director, Capital Programs  
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Virginia Abadessa  
Director, Contracts Administration and  
Materials Management  
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## STATE OF CALIFORNIA

Edmund G. Brown Jr., Governor

## DEPARTMENT OF INDUSTRIAL RELATIONS

Division of Occupational Safety &amp; Health

Pressure Vessel Unit

1515 Clay Street, Suite 1302

Oakland CA 94612-1402

Tel: (510) 622-3052 Fax: (510) 622-3063



Page 1 of 1

September 14, 2012

James J. Kramer, P.E.  
Principal Civil Engineer  
Orange County Transportation Authority  
550 South Main St  
Orange CA 92863

Subject: Underground LNG Fuel Vessels

Dear Mr. Kramer,

Our office has reviewed the information you supplied in an email dated June 8, 2012 and followed up with additional information emailed dated June 16 and 22, 2012 concerning four underground Liquefied Natural Gas (LNG) vessels. These vessels are located at two different facilities; two are at the Garden Grove Bus Base 11790 Cardinal Circle Garden Grove CA and the other two are at the Anaheim Bus Base 1717 East Via Burton Anaheim CA. The LNG has been used to fuel your buses. The vessels were installed in 2000 and 2001. Acceptance of these installations was granted in letters dated January 13, 1999 and December 17, 1999, respectively, from the Division.

At each site, these LNG tanks are 25,000 gallons each and are ASME Code manufactured vacuum jacketed and are made of stainless steel. The vessels have continuously been monitored with an immersed current corrosion protection system to ensure that the vessel is protected from corrosion. The records you supplied indicate that vessel remain in good condition.

The vessels were installed without test plates that could be pulled up at a three year interval due to the immersed current system providing satisfactory corrosion protection. The original acceptance depended upon the vessels being exposed so a through external inspection could be performed at fifteen years after installation. This would be in 2015 and 2016.

Operations of the LNG facilities are scheduled to end in 2018. You have requested to not expose the tanks for an external inspection and wait until the operations cease and then remove them from service. This request is based upon the positive corrosion protection that has been in place since the vessels were installed. It is also based upon the low level of risk of a leak occurring and not being noticed. Because the vessels are vacuum jacketed, any through wall corrosion in the outer jacket will result in a loss of vacuum. This will cause the LNG contained in the inner vessel to increase in temperature and pressure which will result in a system upset and shutdown. If this occurs, the vessels shall be emptied and uncovered for a complete inspection prior to any filling operations taking place.

Your request is acceptable. The vessels shall be removed from no later than December 31, 2018.

Sincerely,

A handwritten signature in cursive script, reading "Donald C. Cook".

Donald C. Cook  
Principal Safety Engineer





**November 9, 2017**

**To:** Transit Committee *Handwritten signature: J. Kenneth R. [unclear] for*  
**From:** Darrell Johnson, Chief Executive Officer  
**Subject:** Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and the Purchase and Delivery of Liquid Hydrogen for the Santa Ana Bus Base

### **Overview**

The Orange County Transportation Authority has been awarded grant funds for the purchase of ten hydrogen buses, construction of a hydrogen fuel station, and modifications to facilities. In March 2017, the Board of Directors awarded a sole source agreement for the hydrogen station to the vendor identified in the grant; however, the vendor was unable to accept the terms and conditions of the proposed contract that were intended to protect the Orange County Transportation Authority from risk. A procurement was conducted and award of an agreement is recommended.

### **Recommendations**

- A. Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1577 between the Orange County Transportation Authority and Trillium USA Company LLC, in the amount of \$6,472,127, for the construction, operation, and maintenance of a hydrogen fuel station and liquid hydrogen deliveries for a three-year term, with two, one-year option terms.
- B. Amend the Orange County Transportation Authority's Fiscal Year 2017-18 Budget, in the amount of \$4,777,732, to accommodate the construction of a liquid hydrogen fuel station at the Santa Ana Bus Base.

### **Discussion**

On February 13, 2017, the Orange County Transportation Authority (OCTA) Board of Directors (Board) authorized the Chief Executive Officer to negotiate and execute an agreement with the Center for Transportation and the Environment (CTE) to accept \$13,241,092 in grant funds from the California

Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD). OCTA partnered with CTE, the Alameda Contra Costa Transit District, New Flyer of America, and Linde LLC (Linde) to submit a grant application that would provide OCTA with ten hydrogen fuel cell buses, a liquid hydrogen fueling station, and modifications to facilities for the detection and emergency evacuation of hydrogen gas.

On March 13, 2017, the OCTA Board awarded a sole source agreement to Linde for the construction of the hydrogen fuel station. After several months of negotiations, Linde would not accept various terms and conditions within the agreement intended to protect OCTA from risk. Since Linde was a named partner in the grant application, CTE and OCTA staff consulted ARB to determine if a new partner could be identified. ARB agreed, provided that the hydrogen station would meet the performance standards identified in the grant agreement and the hydrogen station could be commissioned within the grant time limit. Since CTE is the direct grant recipient, CTE led the procurement effort.

### ***Procurement Approach***

The procurement was conducted by CTE in consultation with OCTA's Contract Administration and Materials Management (CAMM), Facilities Engineering, and Transit Maintenance departments. All solicitation documents, evaluation criteria, and scoring met OCTA procurement guidelines. In addition to cost, award is recommended to the firm offering the most comprehensive overall proposal, considering factors such as qualifications, staffing, and project organization.

CTE released the request for proposals (RFP) on July 12, 2017, to 18 firms and one trade organization. A pre-proposal conference and job walk were held on July 25, 2017, with 14 firms in attendance. Additionally, staff from ARB and SCAQMD attended as the agencies providing the grant funds. Four addenda were issued to provide a copy of the pre-proposal conference registration sheets, respond to questions, clarify technical specifications, and extend the proposal due date.

On September 8, 2017, six proposals were received. An evaluation committee consisting of staff from CTE and OCTA's CAMM, Facilities Engineering, and Transit Maintenance departments met to review the submitted proposals. The proposals were evaluated based on the following criteria and weights:

- |                                     |            |
|-------------------------------------|------------|
| • Qualifications of the Firm        | 30 percent |
| • Staffing and Project Organization | 30 percent |
| • Work Plan                         | 20 percent |
| • Cost and Price                    | 20 percent |

A higher level of importance was assigned to the qualifications of the firm and staffing and project organization emphasizing the importance of the firm's related experience, with a proven history in successfully completing similar station construction, maintenance, and providing uninterrupted fuel supply. The work plan was weighted at 20 percent as firms needed to address every aspect of the requirements specified in the scope of work, demonstrate knowledge and understanding of the requested services of building and maintaining the station, and providing training. The cost and price was weighted at 20 percent of the total proposal score as it was a critical requirement for firms to demonstrate competitiveness in pricing to carry out the required services; and was further divided with 30 percent attributed to the construction of the station, 35 percent attributed to operation and maintenance (O&M), and 35 percent attributed to fuel price to ensure best value for the operation of the station.

On September 19, 2017, the evaluation committee met to review all proposals based on the evaluation criteria and short-listed four firms listed below in alphabetical order:

Firm and Location

Clean Energy (CE)  
Newport Beach, California

ITM Power Inc. (ITM)  
Anaheim, California

Nel Hydrogen (Nel)  
Palo Alto, California

Trillium USA Company LLC (Trillium)  
Houston, Texas

On September 26, 2017, the evaluation committee held interviews with the four short-listed firms. Each firm had the opportunity to present its approach for accomplishing the requested services and resolving any foreseen issues, as well as respond to evaluation committee questions.

On September 29, 2017, a best and final offer (BAFO) was requested from each of the four short-listed firms to provide more competitive pricing.

After considering the information obtained from interviews and the BAFO, the evaluation committee made adjustments to preliminary scores. The first and

second-ranked firms remained unchanged, while the third and fourth-ranked firms changed places.

Based on the evaluation of the written proposals, the information obtained from the interviews, and the BAFO, it is recommended that Trillium be selected to provide a hydrogen fueling station, O&M, and delivery of liquid hydrogen. The following is a brief summary of the proposal evaluation results.

#### Qualifications of the Firm

All four firms are established companies with experience in providing fueling station construction to various agencies, with OCTA doing business with both Trillium and CE in recent years.

Trillium has over 20 years of experience in designing alternative fueling stations and specializes in serving the transit industry. Three of OCTA's compressed natural gas (CNG) stations were built and are maintained by Trillium. Air Products, Trillium's proposed subcontractor, built and commissioned a liquid hydrogen based bus fueling station for the Stark Area Regional Transit Authority in Canton, Ohio. Locations include headquarters in Texas, as well as offices in California, Oklahoma, and Utah. Trillium is owned and financially backed by Love's Travel Stops & Country Stores, which is widespread throughout 40 states.

CE has been providing alternative fueling solutions for customers for over 20 years. One of OCTA's CNG stations was built and is maintained by CE, and currently CE provides OCTA with liquefied natural gas fuel as well. Linde, CE's proposed subcontractor, designed AC Transit's hydrogen bus fueling station. In addition to locations in New Hampshire and Texas, CE has local headquarters in Newport Beach, California.

ITM was founded in 2004 in the United Kingdom (UK) and established in 2012 in Irvine, California; the company owns and operates fueling stations in Riverside, California, in addition to refueling station sites in the UK and the United States (US). ITM's regional offices are in California, Germany, the Nordics, and Benelux regions.

Nel was previously owned by Norsk Hydro, a company focused on electrolyzers, which then turned its focus to hydrogen in 2011. Making deliveries to over 80 countries with employees in the US and Europe, its primary experience is in providing equipment and support for fueling stations. Nel has a location in San Francisco and proposed adding one in Orange County.

### Staffing and Project Organization

All firms presented solid key staff and proposed a construction schedule that fits within OCTA's timeline.

Trillium has partnered with Air Products for the project. Air Products will stock and provide all major equipment. Air Products will also control the schedule. Trillium will dedicate an engineer and an on-site project manager, each with approximately 20 years of industry experience, specifically to this project. There have also been three principle staff identified to oversee each of the three main phases of the project: design, build, and operations. Trillium has listed seven assigned staff members, and Air Products has identified four. Trillium will remain the primary point of contact and be responsible for all tasks, ensuring that the project stays within budget and on schedule. A Station Performance Manager has been selected to enforce checks and balances built into the project plan for quality assurance. OCTA's hydrogen station will be viewed as a critical project at the highest levels of management within Trillium.

CE proposed to partner with Linde to provide equipment and liquid hydrogen, and proposed to work with Fueling & Service Technologies Inc. (FASTECH) to provide construction services. Designated staff includes five from CE, two from Linde, and two from FASTECH. CE proposed to use e-Builder, a cloud-based construction management software throughout the project. The project manager will monitor and maintain the master schedule, and all information will flow through that individual. Bi-weekly coordination meetings and monthly progress reports will be required.

ITM proposed to work with EPC, LLC (EPC) and hire additional subcontractors after award. EPC's project manager has over 45 years of experience and will assist with the design and construction of the station. ITM has split the project into two phases, identifying two sets of dedicated staff accordingly. The proposed individuals have been with ITM for a range of one to 15 years, with the majority being over ten years. The project lead and project manager will maintain open reporting channels and hold weekly meetings.

Nel proposed to work with Fiedler Group, Nicosia Contracting International, and Praxair to provide all deliverables. Fiedler will manage civil works, engineering, and permitting. Nicosia will execute the civil works. Praxair will deliver and maintain the leased liquid hydrogen equipment and manage a continuous delivery of hydrogen. Nel will act as Project Manager on behalf of the partners and will manufacture, install, and conduct O&M on the equipment. Six designated staff have been identified from Nel, one from Praxair, two from Fiedler, and two from Nicosia.

## Work Plan

Trillium will prepare station plans, technical specifications, and will be responsible for new utility infrastructure, including electrical, communications, water, and natural gas. Air Products will provide the design, equipment, construction, commissioning, and training. Air Products will deliver liquid hydrogen to the station on a weekly basis. The liquid hydrogen storage tank and vaporizer will be leased. Trillium is knowledgeable about OCTA's Fleetwatch data system and will ensure that the dispenser is properly integrated. Trillium will be able to provide data reports and metrics similar to those requested in the RFP. Trillium will also be supplying preventive O&M services on a daily basis. The proposed fueling time per bus is six to ten minutes, with continuous bus fills per hour. There is no waiting time between fills due to the addition of extra gas cooling in the hydrogen compression system, going beyond the scope of work for required equipment. The proposed compression system will allow for the option of expanding the fleet to 20 buses without the purchase of additional equipment.

CE proposed to provide design, engineering, permitting, construction management, and O&M. Linde will manage the logistics and hydrogen deliveries to a liquid hydrogen storage tank installed at the station. The dispenser will be made and provided by Linde, as well as the vaporizers on the tank used to supply hydrogen to the compressors. Two compressors will supply compressed hydrogen to a three-bank cascade storage system. Linde listed a different set of equipment than what was originally proposed for the grant, changing the fueling time per bus to 9.3 minutes and restricting capacity to four bus fills per hour, temperature limited. The station will be monitored by Linde's Siemens PLC system, which will scan all operations and safely shut down operations if any parameter is out of range. CE has successfully integrated a hydrogen dispenser with the Fleetwatch system at AC Transit's hydrogen station and proposed to do the same for OCTA. The firm's Operations Center is in Newport Beach, California, and staff will be available immediately to evaluate and respond to any issue. There will be one appointed project manager to maintain a project master schedule and use e-Builder software to provide project status reporting throughout the process. The proposed design allows for the scalability of 50 to 100 buses with the purchase of additional equipment.

ITM deviated in proposing an on-site system that would require OCTA to double its current electricity from 600 amps to 1,200 amps. The firm offered an oversized compression and storage system with an electrolyzer that consumes tap water when generating hydrogen. This system would allow for future expansion to fill 16 to 20 buses, but it would necessitate the addition of 1,200 amps of electricity for a total of 2,400 amps. The proposed fueling time

per bus is five to seven minutes, with ten bus fills per hour. Subcontractors will specify, bid, and procure the compressors, storage tanks, and dispenser during the design process. ITM and EPC will coordinate delivery of all major technologies. EPC will prepare an O&M manual to support field operations. Local contractors will be hired to perform the civil works and electrical interconnections. Performance monitoring will be remote, and any alarms will receive a response within three hours. ITM will work with OCTA and CTE to ensure the data acquisition tool provides sufficient detail. The control system will meet all requirements and will interface seamlessly with the required Fleetwatch system.

Nel has proposed a hydrogen station to be built to accommodate both liquid and gaseous hydrogen delivery by truck. For liquid delivery, a leased liquid tank and a vaporizer would provide hydrogen to a compressor that increases the pressure and delivers this into supply storage. The vaporizer is built to prepare the station for future expansion. The dispenser is able to provide two back-to-back bus fills per hour, with a fueling time per bus of ten minutes. Fueling capacity could be doubled by adding a second complete set of equipment for an additional cost, ensuring a fully redundant system where each dispenser operates independently. Nel guarantees a two hour or less, 24/7 response time for remote event resolution. Nel is actively working to establish large-scale, renewable hydrogen production based on electrolysis. Once available, the liquid supply will be replaced, as the proposed equipment is prepared to accommodate a gaseous supply. The fueling solution adapts the fueling dispenser to interface with the Fleetwatch system at OCTA.

### **Cost and Price**

All firms were asked to propose a total firm-fixed price for equipment purchases (including warranties and minimum one year of O&M), a firm-fixed price for annual fees for equipment lease for an initial three-year term, plus two, one-year option terms, and a maximum not to exceed price for fuel charges for the same term. The total cost and price constituted 20 percent of the total proposal score and consisted of three subcategories that were weighted separately: construction of the station (30 percent), O&M (35 percent), and fuel price (35 percent). Price scores were based on a formula which assigned the highest score to the lowest cost in each subcategory, and scored the other proposals' subcategory pricing based on the relation to the lowest pricing in each subcategory. Firms were also asked to provide optional pricing for the installation of a second dispenser.

Attachment B shows the comparative prices amongst all firms for both the basic proposal totals as well as the optional price for the second dispenser. Trillium's

proposed lowest overall price not only included the base requirements, but also provided two additional years of O&M as value added services at no additional cost. Furthermore, Trillium's proposed lowest overall price will allow OCTA to purchase the optional second dispenser and still fall within the grant total. The price proposals submitted by the remaining firms would require extra funding, which OCTA would have to supplement beyond the grant amount.

Based on the evaluation of written proposals, the firm's qualifications, and information obtained from the interviews and the BAFO, the evaluation committee recommends award to Trillium, in the amount of \$6,472,127, for the construction of the hydrogen station, O&M of the station, and liquid hydrogen deliveries. The firm demonstrated a thorough understanding of OCTA's specific requirements for the construction and maintenance of a hydrogen fueling station and submitted a comprehensive proposal responsive to all requirements of CTE's RFP and the grant terms.

#### **Fiscal Impact**

The project was not included in OCTA's Fiscal Year (FY) 2017-18 Budget. Funds will be added to Capital Programs/Facility Engineering, Account 1722-9022-D2157-OMO, Hydrogen Fuel Station. The expenditure is offset by the ARB grant revenue in Account 0030-6053-D2157-YHS, approved by the Board on February 13, 2017, and is funded through the Low Carbon Transportation Investments and Air Quality Improvement Program grant from the California ARB's allocation of Cap and Trade Program funds. The budget for fuel charges will be included in OCTA's next proposed FY 2018-19 budget.

#### **Summary**

Based on the information provided, staff recommends the Board authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1577 between the Orange County Transportation Authority and Trillium USA Company LLC, in the amount of \$6,472,127 for the construction, operation, and maintenance of a hydrogen fuel station and liquid hydrogen deliveries for a three-year term, with two, one-year option terms.



***Attachments***

- A. Review of Proposals, Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries
- B. Cost and Price, Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries
- C. Proposal Evaluation Criteria Matrix ("Short-listed Firms), Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries
- D. Contract History for the Past Two Years, Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries

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**Review of Proposals**  
**Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries**  
 Presented to Transit Committee - November 9, 2017  
**Six proposals were received, Four firms were interviewed, One firm is being recommended.**

Overall Ranking	Proposal Score	Firm & Location	Sub-Contractors	Evaluation Committee Comments	Three-Year Initial Term
1	87	Trillium USA Company LLC Houston, Texas	Air Products	Highest-ranked firm overall with excellent work plan. Firm has over 20 years of experience in designing alternative fueling stations. Enhanced compression system allows for scalability of fleet to 20 at no cost. Second dispenser and three years of operations and maintenance (O&M) included within the grant budget. Knowledgeable with Fleetwatch data system and will provide metrics. Meets continuous fueling demand of six to ten buses per hour. Proposed all-inclusive competitive price with fuel costs remaining constant.	\$6,472,127
2	75	Nel Hydrogen Palo Alto, California	Fiedler Group Nicosia Contracting International Praxair Inc.	Second-ranked firm. Strong overall proposal. Firm has experience in providing hydrogen equipment. Proposed station could accommodate liquid and gaseous hydrogen. Fueling pace of two back-to-back fills per hour then requires 35 minutes down. Fueling capacity could double by adding module including second dispenser. One year O&M included in grant range but not second dispenser. Fuel charges remain constant regardless of usage.	\$9,857,550
3	73	ITM Power Inc. Anaheim, California	EPC, LLC	Majority of proposed staff has been with company for over ten years. Established location in Irvine, California in 2012. Requires additional electricity and potable water. Scalability to 20 with 1,200 more amps of electricity with total of 2,400 amps. Work plan includes fueling ten buses per hour and one year O&M costs. Offered competitive pricing for second dispenser but over grant budget. Fuel prices remain similar over life of agreement regardless of usage.	\$7,080,382
4	71	Clean Energy Newport Beach, California	Linde, LLC Fueling & Service Technologies	Firm has over 20 years of experience providing alternative fueling solutions. Headquarters in Newport Beach, California. Integrated a dispenser into Fleetwatch system for AC Transit. Does not allow for scalability without relative purchase of required equipment. Pricing includes one year O&M costs and raises substantially thereafter. Proposed fueling capability of four buses per hour. Fifteen percent management fee added to each fuel delivery.	\$8,262,046

**Evaluation Panel:**

Center for Transportation and the Environment (2)  
 Contracts Administration and Materials Management (1)  
 Maintenance and Motorist Services (1)  
 Rail Programs and Facilities Engineering (1)

**Proposal Criteria**

Qualifications of the Firm  
 Staffing and Project Organization  
 Work Plan  
 Cost and Price  
     Design and Build - 30 percent  
     Operation and Maintenance - 35 percent  
     Fuel Price - 35 percent

**Weight Factors**

30 percent  
 30 percent  
 20 percent  
 20 percent

**Cost and Price**  
**Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and Liquid Hydrogen Deliveries**  
Presented to Transit Committee - November 9, 2017

Categories	Trillium USA Company, LLC	Clean Energy	ITM Power, Inc.	Nel Hydrogen
Construction of the Station (30 percent)*	\$3,914,756	\$4,777,732	\$4,777,732	\$4,777,732
Operation and Maintenance (O&M) (35 percent)**	Included in Construction Cost	\$626,725	\$130,000	\$119,818
Fuel Charges (35 percent)***	\$2,136,700	\$2,561,683	\$2,066,400	\$2,460,000
Subtotal	\$6,051,456	\$7,966,140	\$6,974,132	\$7,357,550
Optional Second Dispenser (Not Scored)	\$420,671	\$295,906	\$106,250	\$2,500,000
Grand Total	\$6,472,127	\$8,262,046	\$7,080,382	\$9,857,550

\* Construction of the Station includes performance and payment bonds, design/engineering and support for permit application, general contracting for civil work and site preparation, equipment purchases, setup and installation, commissioning, training for employees and first responders, one year of O&M, and warranties.

\*\* O&M includes equipment lease of liquid tank, vaporizer, and other equipment as well as O&M (preventive and corrective) for years two and three.

\*\*\* Fuel Charges include fuel pricing per kg, delivery charges for 34 estimated annual deliveries assuming 280 kg/day; 82,000 kg/year.

**ATTACHMENT C****PROPOSAL EVALUATION CRITERIA MATRIX ("SHORT-LISTED FIRMS")****Agreement for the Construction, Operation, and Maintenance of a Hydrogen Fuel Station, and  
Liquid Hydrogen Deliveries**

<b>FIRM: TRILLIUM USA COMPANY LLC</b>						<b>Weights</b>	<b>Average Score</b>
<b>Evaluator Number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
Qualifications of Firm	5.0	4.5	4.5	4.0	4.5	6	27.0
Staffing/Project Organization	4.5	5.0	4.5	4.0	4.0	6	26.4
Work Plan	5.0	5.0	4.5	4.0	4.5	4	18.4
Cost and Price	3.8	3.8	3.8	3.8	3.8	4	15.3
<b>Overall Score</b>	<b>92.3</b>	<b>92.3</b>	<b>87.3</b>	<b>79.3</b>	<b>84.3</b>		<b>87</b>
<b>FIRM: NEL HYDROGEN</b>						<b>Weights</b>	<b>Average Score</b>
<b>Evaluator Number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
Qualifications of Firm	4.0	4.0	3.5	4.0	4.0	6	23.4
Staffing/Project Organization	4.0	3.5	4.0	3.5	3.5	6	22.2
Work Plan	3.0	3.5	3.0	3.0	3.0	4	12.4
Cost and Price	4.4	4.4	4.4	4.4	4.4	4	17.5
<b>Overall Score</b>	<b>77.5</b>	<b>76.5</b>	<b>74.5</b>	<b>74.5</b>	<b>74.5</b>		<b>75</b>
<b>FIRM: ITM POWER INC.</b>						<b>Weights</b>	<b>Average Score</b>
<b>Evaluator Number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
Qualifications of Firm	3.5	3.5	3.5	4.0	3.5	6	21.6
Staffing/Project Organization	3.5	3.0	3.5	3.0	3.5	6	19.8
Work Plan	3.0	3.0	3.5	3.5	3.0	4	12.8
Cost and Price	4.7	4.7	4.7	4.7	4.7	4	18.9
<b>Overall Score</b>	<b>72.9</b>	<b>69.9</b>	<b>74.9</b>	<b>74.9</b>	<b>72.9</b>		<b>73</b>
<b>FIRM: CLEAN ENERGY</b>						<b>Weights</b>	<b>Average Score</b>
<b>Evaluator Number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
Qualifications of Firm	4.0	4.5	4.0	3.5	4.0	6	24.0
Staffing/Project Organization	4.0	4.0	4.0	3.5	4.0	6	23.4
Work Plan	3.5	2.5	3.0	3.0	3.0	4	12.0
Cost and Price	2.9	2.9	2.9	2.9	2.9	4	11.6
<b>Overall Score</b>	<b>73.6</b>	<b>72.6</b>	<b>71.6</b>	<b>65.6</b>	<b>71.6</b>		<b>71</b>


Scores for the non-short-listed firms range from 55-58.

[illegible]



**November 9, 2017**

**To:** Transit Committee

**From:** Darrell Johnson, Chief Executive Officer 

**Subject:** Amendment to Agreement for Schedule Checking Activities

### **Overview**

On November 25, 2013, the Board of Directors approved an agreement with National Data and Surveying Services, doing business as Southland Car Counters, to conduct bus system schedule checking services for the Orange County Transportation Authority fixed-route bus service. The term of this agreement, as amended, expires on December 31, 2017. A contract amendment is required to exercise the second, one-year option term of the agreement.

### **Recommendation**

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 3 to Agreement No. C-3-1855 between the Orange County Transportation Authority and National Data and Surveying Services, doing business as Southland Car Counters, in the amount of \$244,184, to exercise the second, one-year option term of the agreement through December 31, 2018 for schedule checking services. This will increase the maximum obligation of the agreement to a total contract value of \$1,273,483.

### **Discussion**

The Orange County Transportation Authority (OCTA) has an agreement with National Data and Surveying Services, doing business as Southland Car Counters (Southland Car Counters), to provide bus system schedule checking services. Under the terms of the agreement, the contractor observes and documents bus passenger boardings, on-time performance, and collects other information used to improve bus operations, scheduling, and service planning. Checking tasks include on-board bus schedule checks, street corner checks, and National Transit Database passenger checks as required by the Federal Transit Administration.

***Procurement Approach***

This procurement was originally handled in accordance with OCTA's Board of Directors (Board)-approved procedures for professional and technical services and was awarded on a competitive basis. On November 25, 2013, the Board approved the agreement with Southland Car Counters for a three-year initial term with two, one-year option terms. The total maximum cumulative payment obligation of the initial term was \$783,747.

The proposed Amendment No. 3 is to exercise the second, one-year option term of the agreement. Amending this agreement will increase the maximum cumulative payment obligation by \$244,184, bringing the total contract value to \$1,273,483. The hourly rate escalation will remain as originally negotiated.

The term of this agreement expires on December 31, 2017. Exercising the option term will allow continued collection of bus ridership and schedule adherence information for OCTA fixed-route service.

***Fiscal Impact***

The project is included in the approved OCTA Fiscal Year 2017-18 Budget, Transit Division, Scheduling, and Customer Advocacy Department, Account 2128-7519-D4106-97S, and is funded through Local Transportation Funds.

***Summary***

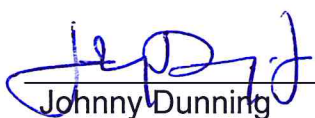
Staff recommends the Board authorize the Chief Executive Officer to negotiate and execute Amendment No. 3 to Agreement No. C-3-1855 with Southland Car Counters to exercise the second option term in the amount of \$244,184, for a total contract amount value of \$1,273,483, to collect bus ridership information through schedule checking activities for fixed-route bus service. This amendment also extends the terms of the agreement through December 31, 2018.



**Attachment**

- A. National Data and Surveying Services, Inc., doing business as Southland Car Counters, Agreement No. C-3-1855 Fact Sheet

**Prepared by:**

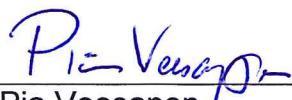


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## **ATTACHMENT A**

### **National Data and Surveying Services, doing business as Southland Car Counters, Agreement No. C-3-1855 Fact Sheet**

1. November 25, 2013, Agreement No. C-3-1855, \$783,747, approved by Board of Directors (Board).
  - To collect bus ridership information through schedule checking activities for fixed-route bus service.
  - Three-year initial term with two, one-year option terms.
2. October 24, 2016, Amendment No. 1 to Agreement No. C-3-1855, \$245,552 approved by the Board.
  - Extend the term of the agreement for an additional 12 months by exercising the first one-year option term through December 31, 2017 and increasing the maximum obligation to \$1,029,299.
3. May 1, 2017, Amendment No. 2 to Agreement No. C-3-1855, \$0, approved by Contracts Administration and Materials Management Department.
  - Scope of Work revision to add the provision to loan five survey checking devices for the data collection process.
4. November 13, 2017, Amendment No. 3 to Agreement No. C-3-1855, \$244,184, pending approval by the Board.
  - Exercise the second, one-year option term of the agreement effective January 1, 2018 through December 31, 2018.

Total commitment to National Data and Surveying Services, doing business as Southland Car Counters, Agreement No. C-3-1855, \$1,273,483.



**November 9, 2017**

**To:** Transit Committee

**From:** Darrell Johnson, Chief Executive Officer

**Subject:** Sole Source Agreement for the Purchase of Ten Hydrogen Fuel Cell Electric Buses

### **Overview**

The Orange County Transportation Authority has been awarded grant funds for the purchase of ten hydrogen buses, construction of a hydrogen fuel station, and modifications to facilities. The grant application was submitted in partnership with the bus and hydrogen fuel station manufacturers. A sole source agreement is required for the purchase of ten hydrogen fuel cell electric buses.

### **Recommendations**

- A. Authorize the Chief Executive Officer to negotiate and execute sole source Agreement No. C-7-1701 between the Orange County Transportation Authority and New Flyer Industries, Inc., in the amount of \$13,307,125, for the purchase of ten hydrogen fuel cell electric buses.
- B. Amend the Orange County Transportation Authority's Fiscal Year 2017-18 Adopted Budget, in the amount of \$13,307,125, to accommodate the purchase of ten hydrogen fuel cell electric buses.

### **Discussion**

On February 13, 2017, the Orange County Transportation Authority (OCTA) Board of Directors (Board) authorized the Chief Executive Officer to negotiate and execute an agreement with the Center for Transportation and the Environment (CTE) to accept \$13,241,092 in grant funds from the California Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD). OCTA partnered with CTE, the Alameda Contra Costa Transit District, New Flyer Industries, Inc. (New Flyer), and Linde LLC to submit a grant application that would provide OCTA with ten hydrogen fuel cell electric buses, a liquid hydrogen fueling station, and modifications to facilities for the detection and emergency evacuation of hydrogen gas.

New Flyer was chosen because it has considerable experience with hydrogen fuel cell buses dating back to the early 1990s and is currently developing the only manufacturer warranted hydrogen fuel cell bus. In order to comply with the terms of the grant agreement and meet the ARB deadlines, a sole source agreement with New Flyer is necessary to purchase ten hydrogen fuel cell electric buses.

Under the terms of this firm fixed-price agreement, New Flyer will build ten hydrogen fuel cell electric buses on the Xcelsior platform, similar in design to OCTA's most recent 40-foot bus purchase. The propulsion system will consist of the Siemens Elfa electric-drive system energized by a bank of batteries that maintain a steady state of charge from a Ballard fuel cell with peak power of 85 kilowatts. The bus will include five tanks to accommodate 38 kilograms of hydrogen storage, with an anticipated range of 300 miles. The fuel cell, batteries, and electric-drive propulsion system come with a six-year warranty.

OCTA will provide a local match of \$7 million towards the purchase of the ten buses, which includes a \$1 million grant from SCAQMD. OCTA reduced its recent order of 40-foot buses specifically for these buses to ensure the fleet is properly sized. Funds from the reduction of the order will be used as OCTA's match. CTE will provide the in-plant inspection services and pay for OCTA staff travel to New Flyer for the production meeting and the inspection of the first article bus.

Major milestones include the delivery of the first article bus no later than May 2018, acceptance of the first article following 40 hours of revenue testing by the end of June 2018, and delivery of the nine remaining buses from December 2018 through January 2019.

### ***Procurement Approach***

The procurement was handled in accordance with OCTA Board-approved policies and procedures for a sole source procurement.

OCTA is one of the grant recipients of the award for the purchase of ten hydrogen fuel cell electric buses, construction of a hydrogen fuel station, and modification to facilities.

New Flyer is one of the members of the Fuel Cell Electric Bus Commercialization Consortium. In order to maintain the grant eligibility, OCTA is required to use New Flyer to build the hydrogen fuel cell electric buses.

The grant funding for the buses is a fixed amount of \$13,307,125, and includes ten hydrogen fuel cell electric buses. The warranty, service, and support provisions include the following:

- Standard two-year bumper-to-bumper warranty
- Twelve-year warranty on the chassis
- Six-year warranty and service and support for the fuel cell, batteries, and hybrid-drive electric propulsion system
- Standard 15-year warranty on hydrogen storage tanks
- New Flyer Connect data monitoring system and telematics with real-time data tracking during the six-year warranty, service, and support period

New Flyer's bid was reviewed by staff from the Contracts Administration and Materials Management and Motorist Services departments to ensure compliance with the contract terms and conditions, as well as the technical requirements.

OCTA's procurement policy requires that sole source procurements over \$50,000 be reviewed by OCTA's Internal Audit Department. However, since this is a grant award and the price of the buses was already established as part of the award, a cost analysis is not needed.

#### **Fiscal Impact**

The project was not included in the fiscal year 2016-17 budget. Funds will be added to account 2114-9024-D2157-OMN, Hydrogen Buses, upon Board approval of the budget amendment. This expenditure is offset by the ARB grant revenue in account 0030-6053-D2157-YHS, approved by the Board on February 13, 2017.


#### **Summary**

Based on the information provided, staff recommends award of Agreement No. C-7-1701 to New Flyer Industries, Inc., in the amount of \$13,307,125, for the purchase of ten hydrogen fuel cell electric buses.

***Attachment***

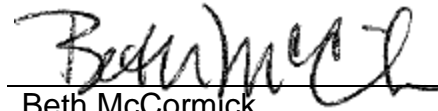
None.

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**November 9, 2017**

**To:** Transit Committee  
**From:** Darrell Johnson, Chief Executive Officer  
**Subject:** OC Bus 360° Update

### **Overview**

The Orange County Transportation Authority is implementing a comprehensive effort to reposition the bus system in response to changing market conditions. The goals are to reverse ridership declines by reducing passenger travel times, improving travel speeds, and designing services to benefit existing customers and attract new customers. A status report on major OC Bus 360° elements is presented for review.

### **Recommendation**

Direct staff to request letters of interest from local agencies related to a future Project V call for projects, and return with an update in January 2018.

### **Background**

To address continuing bus ridership declines, in 2015, the Board of Directors (Board) endorsed a comprehensive action plan (Plan), known as OC Bus 360°. This effort included a comprehensive review of current and former rider perceptions, a peer review panel that reviewed the Orange County Transportation Authority's (OCTA) performance and plans, new branding and marketing tactics tied to rider needs, upgraded bus routes and services to better match demand and capacity, technology changes to improve the passenger experience, and pricing and other revenue changes to stimulate ridership and provide new funding.

Extensive work was invested by OCTA divisions to implement the Plan (Attachment A). This work included: (1) implementation of new faster bus routes; (2) redeployment of services in June and October 2016 and June and October 2017 to improve efficiencies and build ridership; (3) competitively-awarded grants to local agencies for transit services tailored to community needs; (4) a promotional fare; (5) rollout of new technologies,

including mobile ticketing and real-time bus arrival information; and (6) extensive marketing, public outreach, and promotional campaigns.

### ***Discussion***

#### **National and Regional Ridership**

Nationwide, bus ridership is down 4.2 percent, comparing the second quarter calendar year 2017 to 2016. Regionally, ridership is also down on bus systems operated by Long Beach Transit, Los Angeles County Metropolitan Transportation Authority, North County Transit District (San Diego), Norwalk Transit, Omnitrans (San Bernardino), Riverside Transit, and others (Attachment B).

The Southern California Association of Governments (SCAG) and the Institute for Transportation Studies at the University of California Los Angeles (UCLA) are working together to identify major external factors impacting regional ridership. In September 2017, UCLA released preliminary findings that indicate an increase in vehicle ownership, particularly among those most likely to take transit, is a key factor contributing to the decline. Low fuel prices, increased driver licensing, and the rise of Transportation Network Companies (TCNs), such as Uber and Lyft, have also been suggested as potential causes, but UCLA research so far suggests these correlations are less clear. The SCAG/UCLA report is expected to be complete by December 2017, and will be included in subsequent OC Bus 360° and related updates.

#### **OC Bus 360° Ridership Changes**

Despite regional and national trends, OC Bus 360° efforts are showing positive signs, especially considering the impacts of external factors. While OCTA ridership declined by three percent comparing the second quarter of 2017 to 2016, ridership on routes that were improved in October 2016 increased by 19.6 percent (comparing average weekday ridership September 2017 to September 2016). As a result, continued investment in productive routes appears to be helping stem the ridership declines. Monitoring these changes is critical to continuing success, and recent changes to quarterly ridership reports include additional monitoring methods and data.

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### Continuing and New Strategies

Keeping pace with external factors impacting ridership presents new challenges. For OCTA, ridership and fare revenue declines underscore the need for implementation of strategies to improve productivity and reduce costs. Improving productivity (boardings/revenue vehicle hour {B/RVH}) is now a key goal as part of OC Bus 360°. For example, between 2013 and 2016, B/RVH declined 19 percent. The February 2018 bus service change, approved by the Board in October 2017, will implement major changes to improve productivity.

Combined with prior bus service changes in fiscal year (FY) 2017-18, resources for traditional fixed-route bus service will decline by approximately 15,000 RVH that can be used to grow service in other markets through on-demand and other potential transit services.

### On-Demand Transit

OCTA is seeking to gain greater experience working with technology companies to test on-demand software systems and transit service. These technology options allow users to obtain point-to-point rides through smart phone apps integrated with payment systems and service providers. While TNCs may be part of future efforts, the Federal Transit Administration (FTA) has raised concerns with transit operators and TNCs in certain circumstances. The FTA's concerns relate to meeting specific requirements included in the Americans with Disabilities Act and other federal laws (Attachment C).

OCTA is therefore pursuing two on-demand transit demonstration projects that would respond to the issues raised by the FTA. These demonstration projects will gather lessons learned for a future point-to-point element of the transit system. Transaction-level data collection will be a critical part of the project to evaluate performance, verify costs, and ensure that the system is scalable and secure. Separate staff reports provide details on this overall effort.

### Project V Services

Project V is a competitive program under Measure M2 for local jurisdictions to develop local bus transit services such as community based circulators and shuttles that complement regional bus and rail services, and meet needs in areas not adequately served by regional transit. Numerous projects and services are being planned and implemented by local agencies (Attachment D). These include vanpool services from local employment centers to transportation hubs, special event and seasonal services that operate during heavy traffic periods, and local community circulators that carry passengers between various shopping, medical, and transportation-related centers. While some services have been cancelled due to low usage, other services are performing above the minimum performance standard.



Some local agencies have expressed interest in a future Project V call for projects (call) with an emphasis on special event services. Given this interest, staff recommends soliciting letters of interest from local agencies for a potential 2018 Project V call. Letters would be due to OCTA by December 1, 2017. OCTA is currently collecting updated performance data for all the current services, and a report will be provided to the Board in January 2018 that would also include information related to the proposed letters of interest.

#### **Asset Scan**

Finally, OCTA is underway with a comprehensive review of OCTA's physical assets for cost reduction strategies. This overall effort will present options for further cost-cutting efforts that go beyond major initiatives that have already been implemented (e.g., contracting more services, pension reform, fleet reduction, headquarters lease, lower contract costs, and others). A first step in this effort was provided to the Board on April 24, 2017, as part of a paratransit workshop that underscored the increasing proportion of OCTA's operating budget that is dedicated to paratransit services and limiting the growth of fixed-route service. An update and status report on these efforts will be provided to the Board as part of the FY 2018-19 budget development process. Further, efforts are underway to restructure agreements with non-profit service agencies that would better match reimbursements and costs.

#### **Summary**

Elements of the OC Bus 360° plan are proving successful, and new strategies are being pursued to improve productivity. These new strategies include fixed-route changes, new local services, testing new technologies, on-demand transit, and reviewing ways to further reduce costs. Soliciting letters of interest from local agencies is recommended related to a potential future Project V call.

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**Attachments**

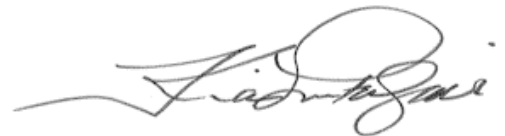
- A. OC Bus 360 Update
- B. National, State, and Regional Transit Operator Ridership Trends
- C. Letter from Anthony R. Foxx, The Secretary of Transportation, Department of Transportation, Dated December 5, 2016
- D. Measure M2 Community-Based Transit Circulators (Project V),  
By Local Agency

**Prepared by:**



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**Approved by:**



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# OC BUS 360 UPDATE

## RIDERSHIP



**↑ 19.5%**

increase in OC Bus weekday ridership (September 2017) for routes improved in October 2016

**↓ 4.2%**

decrease in nationwide ridership (Q2 2016 - 2017)

**↓ 3.0%**

overall decline in OC Bus weekday ridership (Q2 2016 - 2017)

## REAL-TIME BUS APPS



More than

**1,000,000**

app sessions per month

## MOBILE TICKETING APP



**67,000**

downloads  
(06/16 - 10/17)

**7%**

• total fare revenue  
• double industry average

**300**

new app users per week on average

## MARKETING



**20,000**

OC residents responded to bus marketing campaigns (06/16 - 10/17)

**6,000**

new prospects continue to ride the bus (06/16 - 10/17)



SANTA ANA COLLEGE

### PILOT COLLEGE PASS PROGRAM

Every student can ride with a student I.D.

In the first 8 weeks nearly

**3,000**

students signed up

**= 171,555**

boardings

## BRAVO! 560



**57%**

say travel time improved by 15 minutes or more

**32%**

new riders (riding less than a year)

**NATIONAL, STATE, AND REGIONAL TRANSIT OPERATOR RIDERSHIP TRENDS**

<b>All Modes: United States and Canada</b>	<b>Q2 2017 versus 2016</b>
Heavy Rail	↓ -1.37 percent
Light Rail	↓ -2.22 percent
Commuter Rail	↓ -0.87 percent
Trolleybus	↓ -3.48 percent
Bus: Population Total ( <i>referenced in staff report</i> )	↓ -4.24 percent
Bus: Population 2,000,000+	↓ -4.48 percent
Bus: Population 500,000 to 1,999,999	↓ -3.92 percent
Bus: Population 100,000 to 499,999	↓ -3.97 percent
Bus: Population Below 100,000	↓ -1.13 percent
Demand Response	↑ 0.79 percent
Other	↑ 2.20 percent
<b>United States Total</b>	<b>↓ -2.64 percent</b>
<b>Canada Total</b>	<b>↑ 0.58 percent</b>

<b>Bus: California Large Agencies</b>	<b>Q1 2016 versus 2017</b>
Long Beach Transit	↓ -6.09 percent
Los Angeles County Metropolitan Transportation Authority (LA Metro)	↓ -6.94 percent
Alameda-Contra Costa Transit District	↓ -2.63 percent
Orange County Transportation Authority ( <i>referenced in staff report</i> )	↓ -2.98 percent
San Diego Metropolitan Transit System (MTS)	↓ -2.15 percent
San Francisco Muni	↑ 0.49 percent
Santa Clara Valley Transportation Authority	↓ -6.57 percent
Santa Monica Big Blue Bus	↓ -19.81 percent

<b>Bus: Other Local Connecting Agencies</b>	<b>Q1 2016 versus 2017</b>
Anaheim Resort Transit	↑ 0.78 percent
City of Irvine (iShuttle)	Not Reported
Norwalk Transit	Not Reported
North County Transit District (NCTD)	↓ -9.41 percent
Riverside Transit	↓ -2.77 percent
Omnitrans (San Bernardino)	↓ -4.40 percent
Foothill Transit (San Gabriel Valley)	↑ 2.07 percent

<b>Commuter Rail: Southern California</b>	<b>Q1 2016 versus 2017</b>
Metrolink	↓ -1.97 percent
North County Transit District Coaster	↓ -6.81 percent

<b>Light/Heavy Rail: Southern California</b>	<b>Q1 2016 versus 2017</b>
LA Metro Heavy Rail	↑ 1.10 percent
LA Metro Light Rail	↑ 1.66 percent
NCTD Light Rail	↓ -1.57 percent
San Diego MTS Light Rail	↑ 1.51 percent

Source: American Public Transportation Association Ridership Report: Second Quarter 2017  
(<http://www.apta.com/resources/statistics/Pages/ridershipreport.aspx>)



**THE SECRETARY OF TRANSPORTATION**  
WASHINGTON, DC 20590

December 5, 2016

Dear Colleague:

The U.S. Department of Transportation encourages innovation and welcomes the interest of Transportation Network Companies (TNCs) and other private entities in meeting the travel needs of riders through partnerships with transit agencies. I applaud the transit industry for embracing the use of innovations in technology and new mobility concepts to create a more traveler-centric mobility environment that empowers travelers to make smart mobility decisions that address their individual needs, while contributing to desirable system outcomes. With that in mind, I am writing to remind you of your obligation to ensure equity and access as you partner with TNCs and continue to develop relationships with other private entities that offer the potential to provide improved service at a lower cost.

At the Department, we believe it is important to balance technological innovation with the basic civil rights principles of equity and accessibility inherent in the provision of transit service. There are basic Federal requirements that apply to transit service, including partnerships with TNCs and service operated under contract or other arrangement or relationship with private entities. Some of these are conditions of eligibility for Federal assistance (Title VI of the Civil Rights Act of 1964), while others apply independently regardless of whether Federal funding is involved (the Americans with Disabilities Act (ADA) of 1990).

For example, TNC services typically rely almost exclusively on the use of a smartphone linked to a credit or debit card to arrange for service, which presents a significant barrier to lower income and limited English proficiency individuals who do not own a smartphone and/or who do not have a credit card or bank account. Given that communities of color are disproportionately low-income, each public transit agency has an obligation under Title VI to ensure that alternative methods of both payment and reservations are available. Most TNCs currently lack accessible vehicles for persons with disabilities, including those who use wheelchairs. When your agency enters into a covered partnership with a TNC, however, you must ensure that your service is accessible to and usable by persons along the full spectrum of disabilities, including both physical and intellectual disabilities.

Unlike many other requirements, the transportation requirements under the ADA apply regardless of whether Federal funding is involved. The specific provisions of the Department's ADA regulations vary according to type of service provided, such as whether it is fixed route or demand-responsive. Currently the majority of partnerships with TNCs involve demand-responsive service. As such, you should be aware of two important points.

First, under DOT ADA Regulations (49 C.F.R. section 37.77), public entities operating a demand-responsive service must either acquire accessible vehicles or otherwise ensure that such services provide equivalent service to persons with disabilities, including those who use wheelchairs and/or have intellectual disabilities.



The need for your transit agency to provide wheelchair-accessible vehicles could be met in a number of ways, such as requiring the TNC to provide a sufficient quantity of vehicles as a condition of entering into an agreement with the transit agency; entering into a separate agreement with another entity that is capable of providing accessible vehicles; or relying on accessible vehicles that are already part of the paratransit fleet.

Second, service is considered equivalent when persons with disabilities, including wheelchair users, are provided with the same level of service according to the following criteria (see 49 C.F.R. section 37.77(c)):

- 1) Response time;
- 2) Fares;
- 3) Geographic area of service;
- 4) Hours and days of service;
- 5) Restrictions or priorities based on trip purpose;
- 6) Availability of information and reservations capability; and
- 7) Any constraints on capacity or service availability.

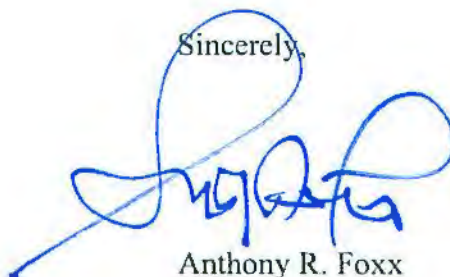
Some transit agencies have explored integrating TNCs into their paratransit service. The Department believes that TNCs have the potential to improve the provision of paratransit service, with the possibility of lowering costs while improving service to paratransit-eligible riders. Yet, it is important to emphasize that any such service improvements must benefit all paratransit riders. It would not be appropriate, for example, to offer real-time service to ambulatory paratransit riders, while leaving wheelchair users with next-day service.

Finally, it is important to ensure that TNC personnel are highly trained in professional and respectful interactions with persons with disabilities. All personnel should be familiar with requirements concerning the accommodation of service animals, for example, and personnel operating accessible vehicles must know how to operate boarding and securement equipment. Where TNCs are used to provide paratransit service, personnel should be familiar with the paratransit service criteria and the requirement to provide origin-to-destination service.

As long as all passengers are receiving service according to the service criteria or in the same manner, there is nothing to prevent transit agencies from engaging the services of TNCs—including for provision of paratransit services.

Once again, I commend the transit industry for embracing technology and innovation as a means to expand and improve the provision of transit services. As we embark on a new era in personal mobility, together we will ensure that our transportation system continues to provide effective mobility for all.

Sincerely,



Anthony R. Foxx

**Measure M2 Community-Based Transit Circulators (Project V)**  
**By Local Agency**

	<b>Project Name</b>	<b>Service Description</b>	<b>Service Type</b>	<b>Service Details</b>
<b>1</b>	<b>Anaheim</b> Anaheim Regional Transportation Intermodal Center (ARTIC) -Downtown (Ctr City) Local Community Circulator	The City of Anaheim is operating a local community circulator connecting the ARTIC to Ctr City Anaheim. This service provides connections at ARTIC, Medical Centers, Anaheim City Hall, St. Joseph Heritage Medical, L3- Interstate Electronics Corporation, Disney Travel, Disney College Internship Program, Anaheim Packing House, Platinum Triangle, Senior centers and stadium crossing. The service operates Monday through Friday during commute hours and occasionally on Fridays and Saturdays to serve evening events.	Commuter and Special Events	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> October 2017</li> <li>• <b>Service Frequency:</b> Every 30 minutes</li> <li>• <b>Service Days:</b> 255 days a year (Monday through Friday) and Special Events</li> </ul>
<b>2</b>	<b>Costa Mesa</b> Local Circulator	The City of Costa Mesa is operating a local community circulator connecting the City of Costa Mesa to the City of Anaheim Resort Area. This service will have various stops in Costa Mesa such as Sheraton Park Hotel, Grand Plaza, Hilton Costa Mesa, Crowne Plaza, South Coast Plaza and in Anaheim at ARTIC and Disneyland.	Local Circulator	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> July 2017</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 365 days a year</li> </ul>
<b>3</b>	<b>County of Orange</b> Ranch Ride Service	The County is Orange is providing local community transit circulator service connecting Metrolink Stations at San Juan Capistrano and Laguna Niguel/Mission Viejo, Saddleback Community College, The Shops at Mission Viejo, Mission Hospital and downtown San Juan Capistrano. Additional special event services will be provided connecting Sendero residential areas to the recreation center and commercial areas as well as the Esencia recreation centers and Ladera commercial centers.	Local Circulator and Special Event Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> June 2017</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> Monday through Friday and Special Events</li> </ul>
<b>4</b>	<b>Dana Point</b> Summer and Special Event Trolley	The City of Dana Point operates a PCH Summer Trolley, seasonal Harbor Shuttle, and three miscellaneous special event shuttles, as well as implemented bus stop improvements.	Seasonal Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> Summer 2015</li> <li>• <b>Service Frequency:</b> 15 minutes</li> <li>• <b>Service Days:</b> Monday through Sundays during the Summer</li> </ul>
<b>5</b>	<b>Dana Point</b> Pacific Coast Highway (PCH) and Special Event Trolley	Dana Point expanded their current PCH Trolley Service including adding stops at Costco, Ralphs and Albertsons Shopping Center, Senior Center and Community Center, providing connections to cities of San Juan Capistrano and Laguna Niguel. New stop locations have been added to fill the service gaps of the Orange County Transportation Authority (OCTA) Route 187 and Route 191 that will no longer be in service.	Seasonal Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> June 2017</li> <li>• <b>Service Frequency:</b> 15 minutes</li> <li>• <b>Service Days:</b> Monday through Sundays during the Summer</li> </ul>

**Measure M2 Community-Based Transit Circulators (Project V)**  
**By Local Agency**

	<b>Project Name</b>	<b>Service Description</b>	<b>Service Type</b>	<b>Service Details</b>
<b>6</b>	<b>Huntington Beach</b> Special Event Shuttle	The City of Huntington Beach is providing a free shuttle from the Goldenwest Transportation Center to Downtown Huntington Beach on July 4th annually and during the two weekends of the annual US Open of Surfing event. Addition of two high school parking lots as park and ride locations during the US open.	Special Event Shuttle	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> July 2015</li> <li>• <b>Hours of Operation:</b> 8:00 a.m. to 11:00 p.m.</li> <li>• <b>Service Days:</b> July 4th and the two weekends of the US Open</li> </ul>
<b>7</b>	<b>Huntington Beach</b> Seasonal Trolley	The City of Huntington Beach is proposing to operate seasonal local transit service that will both supplement current OCTA services by providing additional connection opportunities to existing routes and provide local circulation connecting many of the City's key destinations and target communities. The service will operate for approximately 12-14 hours per day.	Seasonal Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> July 2017</li> <li>• <b>Service Frequency:</b> Every 30 minutes</li> <li>• <b>Service Days:</b> Weekend Service - 112 days per year (June to October)</li> </ul>
<b>8</b>	<b>Irvine</b> iShuttle Route E - Irvine Metrolink Station East	The City of Irvine is proposing to add a new iShuttle route connecting Irvine Metrolink Station to the employment centers, retail centers and residential areas to the east and south of the station with the stops along Muirlands, Bake, Research, Irvine Center Drive and in Los Olivos. The new route will serve the commuters five days a week during the peak periods.	Commuter Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Planned</li> <li>• <b>Anticipated Start Date:</b> October 2018</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 255 days a year (Monday through Friday)</li> </ul>
<b>9</b>	<b>Irvine</b> iShuttle Route W from Tustin Station – Irvine Business Complex (IBC) West	The City of Irvine is proposing to add a new iShuttle route connecting Tustin Metrolink Station to the employment centers, retail centers, schools and residential units in the western part of the IBC with the stops along Armstrong and Gillette Avenues, Barranca, Deere, Alton, McGaw and Reynolds. The new route will serve the commuters five days a week during the peak periods.	Commuter Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Planned</li> <li>• <b>Anticipated Start Date:</b> October 2018</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 255 days a year (Monday through Friday)</li> </ul>
<b>10</b>	<b>La Habra</b> Local Circulator	The City of La Habra ran a community circulator through the City of La Habra to St. Jude Hospital and Fullerton Transportation Center.	Local Circulator	<ul style="list-style-type: none"> <li>• <b>Status:</b> Cancelled</li> <li>• <b>Cancellation Date:</b> October 2017</li> </ul>
<b>11</b>	<b>La Habra</b> Special Event Shuttle Services	The City of La Habra implemented special event services from offsite parking locations at Sonora High School, La Habra High School and The Market Place. Services will be provided for four events: Annual Corn Festival, Annual La Fiesta, Annual Tamale Festival and Annual Citrus Fair.	Special Event Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> November 2016</li> <li>• <b>Service Frequency:</b> Every 20 minutes</li> <li>• <b>Service Days:</b> 2-3 days a week (Friday – Sunday)</li> </ul>



**Measure M2 Community-Based Transit Circulators (Project V)**  
**By Local Agency**

	<b>Project Name</b>	<b>Service Description</b>	<b>Service Type</b>	<b>Service Details</b>
<b>12</b>	<b>Laguna Beach</b> Weekend Shuttle	The City of Laguna Beach is operating an off-season weekend shuttle service and expanded summer service.	Special Event Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> March 2015</li> <li>• <b>Hours of Operation:</b> Fridays 4:00 p.m. to 11:00 p.m. Saturdays 9:00 a.m. to 11 p.m. Sundays 11:00 a.m. to 8:00 p.m.</li> <li>• <b>Service Days:</b> 24 weekends, up to 42 weekends based on demand</li> </ul>
<b>13</b>	<b>Laguna Beach</b> Residential Trolley	The City of Laguna Beach is operating year-round weekend residential trolley service that supplements the City's weekend trolley service along Coast Highway. Proposed routes will interconnect and meet at the Transit Depot on 20-30 minute intervals connecting to OCTA Routes 1 and 89 and the City's "Coastal" and "Canyon" routes during the summer festival season. The special event services will be provided for President's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Patriots Day Parade, Taste of Laguna, Rotary Car Show, Oak Street Halloween Festival, KX93.5 Fall Concert, Sawdust Winter Fantasy, Montage Holiday Tree Lighting, and Hospitality Night.	Year Round and Seasonal Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Anticipated Start Date:</b> July 2017</li> <li>• <b>Service Frequency:</b> Every 20-30 minutes</li> <li>• <b>Service Days:</b> 365 days a year</li> </ul>
<b>14</b>	<b>Lake Forest</b> Vanpool Service between Irvine Station and Oakley	The City of Lake Forest operated a Vanpool service from the Irvine Station to Oakley, Inc. in a 9 passenger van.	Commuter Vanpool Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Non Active</li> </ul>
<b>15</b>	<b>Lake Forest</b> Vanpool Service between Irvine Station and Ossur Americas	The City of Lake Forest operates a Vanpool service from the Irvine Station to Ossur Americas.	Commuter Vanpool Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> 2015</li> <li>• <b>Service Frequency:</b> Twice a day</li> <li>• <b>Service Days:</b> Monday through Friday</li> </ul>
<b>16</b>	<b>Lake Forest</b> Shuttle Service between Train Station and Oakley	The City of Lake Forest is proposing to provide a shuttle service between <b>Irvine</b> Metrolink Train Station and Oakley. This service will be provided for 252 days of the year during the commute hours in the morning and afternoon.	Commuter Shuttle Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Planned</li> <li>• <b>Anticipated Start Date:</b> July 2018</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 252 days a year</li> </ul>
<b>17</b>	<b>Lake Forest</b> Shuttle Service between Train Station and Panasonic	The City of Lake Forest is operating a shuttle service between the <b>Irvine</b> Metrolink Train Station and Panasonic Avionics. This service is provided for 251 days of the year during the commute hours in the morning and afternoon.	Commuter Shuttle Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> June 2017</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 251 days a year</li> </ul>

**Measure M2 Community-Based Transit Circulators (Project V)  
By Local Agency**

	<b>Project Name</b>	<b>Service Description</b>	<b>Service Type</b>	<b>Service Details</b>
<b>18</b>	<b>Mission Viejo</b> Local Circulator	The City of Mission Viejo is operating a local community circulator that connects Laguna Niguel/Mission Viejo Metrolink Station, The Shops at Mission Viejo, Mission Hospital, Saddleback College, residential areas, community center and Capistrano Valley High School. This service operates for approximately 12 hours a day during the week Monday through Friday.	Local Circulator	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> October 2016</li> <li>• <b>Service Frequency:</b> Every 45 minutes</li> <li>• <b>Service Days:</b> 255 days a year (Monday through Friday)</li> </ul>
<b>19</b>	<b>Newport Beach</b> Balboa Peninsula Trolley Service	The City of Newport Beach is operating summer and special events trolley services within the City providing connections at Hoag Hospital, Balboa Pier on the Balboa Peninsula via PCH, Newport Boulevard, and Balboa Boulevard. This service operates during the summer weekends on Saturdays and Sundays for approximately ten hours day and also provides special event service on 4th of July.	Seasonal Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> June 2017</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> 4th of July Special event service and summer weekends (Saturday-Sunday).</li> </ul>
<b>20</b>	<b>San Clemente</b> Rideshare Service	The City of San Clemente implemented a year-round rideshare program. The service provides transit services for former riders of OCTA routes 191 and 193. Special events services are also provided for OceanFest at the San Clemente Pier during a weekend in July, Fiesta Music Festival in August and Classic Car Show in June.	Year Round, On-Demand	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> October 2016</li> <li>• <b>Service Frequency:</b> Varies</li> <li>• <b>Service Days:</b> 365 days a year</li> </ul>
<b>21</b>	<b>San Clemente</b> Trolley Service	The City of San Clemente is operating summer weekends and special events trolley services connecting the new Outlets, San Clemente Pier, Metrolink Station, El Camino Real and Avenida Del Mar. This service operates during the summer weekends on Fridays, Saturdays and Sundays for approximately ten hours day as well as provides special event service on 4th of July, Memorial Day and Labor Day.	Seasonal and Special Event Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Started</li> <li>• <b>Start Date:</b> May 2017</li> <li>• <b>Service Frequency:</b> Every 15 minutes</li> <li>• <b>Service Days:</b> Summer weekends (Friday – Sunday) and Special Events</li> </ul>
<b>22</b>	<b>San Juan Capistrano</b> Summer Trolley	The City of San Juan Capistrano ran a summer trolley service circulating through the City and connecting to the City of Dana Point Summer Trolley Service. This service operated for 40 days throughout the year on Fridays, Saturdays and Sundays providing service for approximately five to 11 hours a day.	Seasonal and Special Event Service	<ul style="list-style-type: none"> <li>• <b>Status:</b> Complete</li> <li>• <b>Run Date:</b> June through September 2017</li> <li>• <b>Service Frequency:</b> Every 30 minutes</li> <li>• <b>Service Days:</b> Summer weekends (Friday - Sunday) and 4th of July</li> </ul>
<b>23</b>	<b>Westminster</b> Little Saigon Local Circulator	The City of Westminster ran a local community circulator that traveled through the Little Saigon Area in the City of Westminster. The circulators traveled in clockwise and counterclockwise directions along Magnolia Street, Bolsa Avenue, Brookhurst Street and Bishop Place.	Local Circulator	<ul style="list-style-type: none"> <li>• <b>Status:</b> Cancelled</li> <li>• <b>Cancellation Date:</b> April 2017</li> </ul>
<b>24</b>	<b>Fountain Valley</b> Planning Study	Planning study to determine feasibility of implementing a transit circulator within the City of Fountain Valley using Go-Local Step Two Study.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> In-Progress</li> <li>• <b>Anticipated Date:</b> May 2018</li> </ul>
<b>25</b>	<b>Garden Grove</b> Planning Study	Planning study to determine ridership demand and feasibility for expansion of Westminster Little Saigon Circulator.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> Cancelled</li> <li>• <b>Cancellation Date:</b> September 2017</li> </ul>

**Measure M2 Community-Based Transit Circulators (Project V)**  
**By Local Agency**

	<b>Project Name</b>	<b>Service Description</b>	<b>Service Type</b>	<b>Service Details</b>
<b>26</b>	<b>Laguna Niguel</b> Planning Study	Planning study to determine number of vehicles and service required to provide local transit circulator.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> Complete</li> <li>• <b>Completion Date:</b> April 2017</li> </ul>
<b>27</b>	<b>Mission Viejo</b> Planning Study	Planning for two routes connecting to senior centers, activity centers, Metrolink Station, and other locations.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> In-Progress</li> <li>• <b>Anticipated Date:</b> December 2017</li> </ul>
<b>28</b>	<b>Placentia</b> Planning Study	Planning study to determine feasibility to operate special event and a transit circulator within the City of Placentia.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> In-Progress</li> <li>• <b>Anticipated Date:</b> December 2017</li> </ul>
<b>29</b>	<b>Rancho Santa Margarita</b> Planning Study	Planning study to explore options for Antonio Parkway Circulator	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> In-Progress</li> <li>• <b>Anticipated Date:</b> December 2017</li> </ul>
<b>30</b>	<b>Tustin</b> Planning Study	Planning study to determine feasibility of implementing a transit circulator within the City of Tustin.	Planning Study	<ul style="list-style-type: none"> <li>• <b>Status:</b> In-Progress</li> <li>• <b>Anticipated Date:</b> December 2017</li> </ul>



**November 9, 2017**

**To:** Transit Committee  
**From:** Darrell Johnson, Chief Executive Officer  
**Subject:** Transit Master Plan – Corridor Line Evaluation

### **Overview**

The Transit Master Plan will develop an integrated bus, rail, and paratransit plan for Orange County. This plan will identify future potential transit corridor studies and recommended changes to existing transit service. An evaluation of potential corridor lines is presented for review and potential next steps.

### **Recommendation**

Direct staff to seek public/stakeholder input and return to the Board of Directors in January 2018 with an action plan.

### **Background**

The Orange County Transportation Authority (OCTA) initiated the Transit Master Plan (Plan) in summer 2016. This process is taking a high-level look at long-term transit needs throughout Orange County (County) and recommending a series of corridors suitable for additional transit improvement. In addition, the Plan will guide future recommendations for fixed-route bus service. Projects identified in the Plan will be considered in the OCTA Long-Range Transportation Plan and position OCTA for upcoming transit funding opportunities.

### **Discussion**

In July 2017, staff presented the draft Transit Opportunity Corridors to the Board of Directors (Board). Ten draft corridors were recommended after an initial screening was conducted on more than 30 potential corridors throughout the County. The ten corridors were finalized based on Board and stakeholder feedback. Some of the ten corridors were split or combined to make 11 lines for further evaluation (see the following list). Most lines have a range of mode options which could be considered in a subsequent study (Attachment A).

- North Harbor Boulevard-Santa Ana Boulevard: Rapid streetcar or bus rapid transit (BRT) between California State University, Fullerton and the Santa Ana Regional Transportation Center, primarily via Harbor Boulevard (and including the OC Streetcar alignment currently in design),
- Westminster Avenue-Bristol Street: Rapid streetcar or BRT between the Goldenwest Transportation Center and the University of California, Irvine, via 17<sup>th</sup> Street/Westminster Avenue and Bristol Street (including short segments of Main Street and the OC Streetcar alignment),
- Harbor Boulevard South: BRT or rapid bus on Harbor Boulevard between 17<sup>th</sup> Street/Westminster Avenue and Hoag Hospital in Newport Beach,
- State College Boulevard: BRT or rapid bus on Bristol Street and State College Boulevard between the Brea Mall and Downtown Santa Ana,
- Beach Boulevard: Rapid bus on Beach Boulevard between the Fullerton Park-and-Ride and Downtown Huntington Beach,
- Main Street: Rapid bus on Main Street between Anaheim Regional Transportation Intermodal Center and the South Coast Plaza Park-and-Ride,
- La Palma Avenue-Lincoln Avenue: Rapid bus on La Palma Avenue and Lincoln Avenue between Hawaiian Gardens and the Anaheim Canyon Station,
- Chapman Avenue: Rapid bus on Chapman Avenue from Hewes Street to Beach Boulevard,
- McFadden Avenue-Bolsa Street: Rapid bus on McFadden Avenue and Bolsa Avenue from Goldenwest Transportation Center to Larwin Square,
- Interstate 5 (I-5): Freeway BRT on I-5 from the Fullerton Park-and-Ride to Mission Viejo/Laguna Niguel Station,
- State Route 55 (SR-55): Freeway BRT on SR-55 from the Santa Ana Regional Transportation Center to Hoag Hospital in Newport Beach.

#### Transit Opportunity Line Evaluation

The 11 lines were evaluated using the 29 criteria included in the Transit Investment Framework. Each line was modeled for future ridership and projected cost to determine its performance. For routes where multiple modes are being considered, the most intensive mode was used during the evaluation in order to model the highest potential costs and benefits. Each criterion was ranked on a scale from one (worst) to five (best). The results are shown in Attachment B (Appendix B).

The North Harbor Boulevard-Santa Ana Boulevard and Westminster Avenue-Bristol Street lines had the highest projected ridership and highest overall scores. Ridership was highest because the lines included some of the highest existing bus ridership segments, and streetcar/BRT service would attract the highest number of new riders.

The Main Street and Beach Boulevard lines ranked the highest of the corridors where BRT and rapid bus were considered. The freeway BRT routes also performed well because of their speed and land use adjacent to the proposed stop locations.

The draft Transit Opportunity Corridors were presented to the OCTA Citizen's Advisory Committee, Elected Officials Workshop, and the Planning Director's Workshop. There was general consensus on the need for high capacity transit and on the opportunity corridors presented.

#### Corridor Potential Next Steps

Based on the evaluation, the project team developed potential next steps for the Transit Opportunity Corridors. For major capital investments, these steps would closely follow the Federal Transit Administration's process that includes well-defined criteria linked to possible future federal grant opportunities. Potential next steps include:

- Conducting corridor studies for the North Harbor Boulevard-Santa Ana Boulevard and Westminster Avenue-Bristol Street lines. A section of North Harbor Boulevard is currently being studied,
- Implementing Rapid Bus Service on Beach Boulevard (Bravo! Route 529),
- Studying upgrading Main Street corridor to Rapid Bus service,
- Developing strategies for incremental speed and amenity improvements for existing and future Rapid Bus (Bravo!) corridors,
- Conducting a Freeway BRT network study.

Most of these efforts focus on additional feasibility studies prior to advancing into the formal project development process. The Bravo! 529 service is already planned for implementation in 2019 using grant funding.

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**Potential Next Steps Beyond the Corridors**

Throughout the Plan, staff received input regarding transit needs outside of the core service area where most Transit Opportunity Corridors would serve. Stakeholders and the public acknowledge that these areas may not be best served by infrequent fixed-route bus service. Potential options for these areas were developed collaboratively by members of the project team and incorporate feedback received from the Board, the Citizens Advisory Committee, and the public throughout this process. Potential next steps for these areas include:

- Considering additional service areas for “OCFlex” micro-transit, pending results from the pilot project,
- Improving service on non-opportunity corridor bus routes to meet Transit Investment Framework standards,
- Supplementing year-round transit service with special event and seasonal shuttles,
- Working with local jurisdictions to enhance transit access and develop transit-supportive projects.

Some service improvements to key bus routes outside the core service are planned for February 2018 as part the OC Bus 360° effort. Future improvements may be made through additional service reallocation.

**Next Steps**

Through November 2017, staff will be soliciting feedback on the proposed recommendations from the public and stakeholders using an online survey. An action plan will be developed based on feedback received, and staff will return to the Board in early 2018 with final plan recommendations. The Plan document will also be finalized based on Board, stakeholder, and public input.

**Summary**

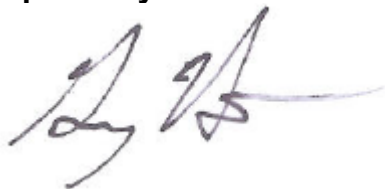
This report provides the results of the Transit Opportunity Line evaluation. Based on the evaluation, potential next steps are presented for the highest performing corridors. Based on input received during the Plan process, next steps were also developed for transit needs outside of the core service area.

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***Attachments***

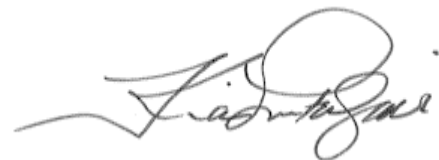
- A. Map of Transit Opportunity Line Alignments and Potential Modes
- B. OC Transit Vision, Transit Opportunity Corridors, Line Evaluation, October 2017

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Map of Transit Opportunity Line Alignments and Potential Modes





# OC TRANSIT VISION

## Transit Opportunity Corridors Line Evaluation

October 2017



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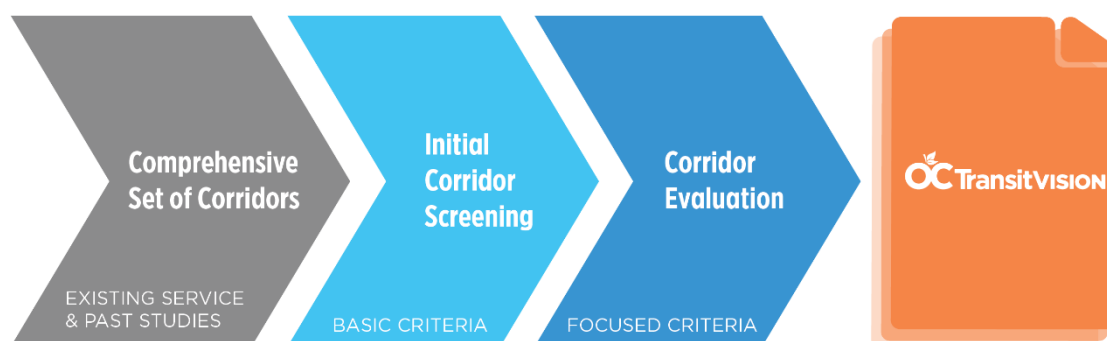
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# 1 EXECUTIVE SUMMARY

This report describes the final evaluation of Transit Opportunity Corridors (TOCs) for the OC Transit Vision project. TOCs are those corridors in Orange County that—based on an initial screening of more than 30 corridors—are candidates for investment in high-quality transit service, including high-capacity or rapid transit service using modes such as rapid streetcar, bus rapid transit, and rapid bus on arterial corridors and Freeway BRT on state routes and interstates (see the State of OC Transit report for more information on transit modes).

Figure 1 illustrates the screening and evaluation process, which has included the identification of candidate corridors, screening of those corridors, and detailed evaluation and prioritization of the TOCs (the focus of this report).

Figure 1 Corridor Evaluation Process



This report is organized into five chapters. Chapter 2 includes a description of the evaluation framework. Chapter 3 summarizes the initial screening and identification and definition of the 11 transit lines evaluated in this document. Chapter 4 details findings from that evaluation. Chapter 5 identifies potential next steps for advancing the TOCs.

Following is a brief summary of each chapter:

## SCREENING AND EVALUATION CRITERIA

In this chapter, the evaluation framework used for both initial screening and the detailed evaluation is described. The 29 performance metrics in the framework are based on the previously developed and adopted OC Transit Vision goals and objectives, and are organized into the following 11 categories:

- Speed and Reliability
- Ridership/VMT Reduction
- Density/Connections to Activity Centers



- Multimodal Connectivity
- Capacity
- Safety
- Passenger Comfort/Amenities
- Equity
- Economic Development
- Transit-Supportive Policy
- Cost-Effectiveness/Productivity

## TRANSIT OPPORTUNITY CORRIDORS

In this chapter, results of the initial screening are summarized and the process for developing the TOC lines evaluated in this report is described. That process involved converting the ten TOCs recommended for detailed evaluation at the conclusion of the initial screening into 11 transit lines that could be subjected to measures of route (and not just corridor) performance such as productivity and cost-effectiveness. This required initial assignment of modes, of which four were used: “rapid” streetcar (featuring transit-only lanes), bus rapid transit (also with transit-only lanes), rapid bus (without transit-only lanes, but with other transit-priority features), and freeway-based (rather than arterial-based) BRT. Based on projected demand, network connectivity, and available right-of-way, the following TOC lines were developed:

- North Harbor Boulevard-Santa Ana Boulevard: Rapid streetcar or bus rapid transit (BRT) between Cal State Fullerton and the Santa Ana Regional Transportation Center, primarily via Harbor Boulevard (and including the OC Streetcar alignment currently in design)
- Westminster Avenue-Bristol Street: Rapid streetcar or BRT between the Goldenwest Transportation Center and the University of California, Irvine, via 17<sup>th</sup> Street/Westminster Avenue and Bristol Street (including short segments of Main Street and the OC Streetcar alignment)
- Harbor Boulevard South: BRT or rapid bus on Harbor Boulevard between 17<sup>th</sup> Street/Westminster Avenue, and Hoag Hospital in Newport Beach
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- Main Street: Rapid bus on Main Street between Anaheim Region Transportation Intermodal Center and the South Coast Plaza Park-and-Ride
- La Palma Avenue-Lincoln Avenue: Rapid bus on La Palma Avenue and Lincoln Avenue between Hawaiian Gardens and the Anaheim Canyon Station
- Chapman Avenue: Rapid bus on Chapman Avenue from Hewes Street to Beach Boulevard,
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- Interstate 5 (I-5): Freeway BRT on I-5 from the Fullerton Park-and-Ride to Mission Viejo/Laguna Niguel Station
- State Route 55 (SR-55): Freeway BRT on SR-55 from the Santa Ana Regional Transportation Center to Hoag Hospital in Newport Beach

## EVALUATION RESULTS

In this chapter, the evaluation results are described on a criterion-by-criterion basis.

## CONCLUSION

### Findings

The findings may be summarized as follows:

- The corridors evaluated for rapid streetcar/BRT lines, in particular North Harbor/Santa Ana, outperformed other lines by a wide margin, scoring higher across a broad range of categories. They were also projected, however, to have the highest capital costs.
- Performance among BRT and rapid bus projects varied, with lines on Main, McFadden/Bolsa, State College and Beach scoring highest overall (the highest projected ridership was in the La Palma/Lincoln corridor).
- Freeway BRT projects performed relatively well, in part due to their speed advantages and the proximity of major destinations to freeway interchanges.

### Corridor Potential Next Steps

The corridor potential next steps may be summarized as follows:

- Conduct corridor studies for North Harbor/Santa Ana and Westminster/Bristol Corridors.
- Implement Bravo! Route 529 (Beach).
- Study feasibility of upgrading Main corridor from Xpress to Bravo! service.
- Develop strategy for incremental speed and amenity improvements for existing and future Bravo! Corridors.
- Conduct a network study of “freeway BRT” corridors and potential project design elements.

## 2 SCREENING AND EVALUATION CRITERIA

The OC Transit Vision corridor screening and evaluation criteria developed as part of the OCTA Transit Investment Framework are shown in Table 1. The criteria are based on and align with the OC Transit Vision adopted vision and goals<sup>1</sup>. The initial screening used a smaller number of criteria than the more detailed evaluation, which is typical for a process in which a large number of candidate corridors must be analyzed.





The screening and evaluation criteria measured both potential project performance as well as corridor characteristics such as population and employment density, transit propensity of the population based on demographic analysis, and other transit-supportive factors. The screening phase focused on corridor characteristics, while the evaluation phase focused on potential project performance based on preliminary definition of mode, design of the right-of-way, and stop locations. Note that some criteria were modified slightly during the evaluation process based on available data.





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<sup>1</sup> The vision is: “Provide compelling and competitive transit service that expands transportation choices for current riders, attracts new riders, and equitably supports immediate and long-term mobility in Orange County.” Goals included “Enhance” (“Make it more desirable to take transit”), “Connect” (“Connect Orange County’s people and places with effective transit”), “Simplify” (“Make transit easier to use and more convenient”), “Collaborate” (Make Orange County a more attractive place to live, work, and visit by providing transit service that supports community priorities”) and “Sustain” (“Create a system that is resilient over the long term”). There were a total of 47 objectives.



Table 1 Corridor Screening and Evaluation Criteria

Category	Measures	Initial Screening Methodology	Evaluation Methodology
 <b>Speed &amp; Reliability</b>	% of Route w/ Transit-Only ROW	--	Calculation based on conceptual design
	% of Route w/ Grade Separation	--	Calculation based on conceptual design
	Peak and Base Frequency	--	From conceptual service plan
	Average Speed	--	From model
 <b>Ridership/Mode Shift/VMT Reduction</b>	New Transit Trips	--	Forecast project ridership per mile (from model)
	Vehicle Miles Traveled/CO2 Emissions	--	Based on ridership
 <b>Density/Connections to Activity Centers</b>	Population Density Within ½ Mile	GIS analysis (Census data)	GIS analysis (Census data)
	Employment/Postsecondary Enrollment Density Within ½ Mile	GIS analysis (Census data)	GIS analysis (Census data)
	Density of Hospital Beds/Retail Stores Within ½ Mile	GIS analysis (available sources)	GIS analysis (available sources)
	Additional Major Destinations (e.g., Stadiums & Theme Parks) Within ½ Mile	GIS analysis (based on assessment of “destinations”)	GIS analysis (based on assessment of “destinations”)
	Traffic Volumes at Arterial Intersections per Corridor Mile (Within ½ Mile)	GIS analysis (available sources)	GIS analysis (available sources)
 <b>Multimodal Connectivity</b>	# of Connections to Existing or Future Metrolink Stations, Transit Centers, Major Routes, and Park-and-Rides	GIS analysis (available sources)	GIS analysis (available sources)
	Intersection Density per Square Mile	GIS analysis (available sources)	GIS analysis (available sources)
	Pedestrian Network Serving Transit	WalkScore within ½ mile of corridor	WalkScore within ½ mile of corridor

Category	Measures	Initial Screening Methodology	Evaluation Methodology
	# of Connections to Existing or Planned High-Quality Bicycle Facilities (Off-Street or Protected On-Street)	--	Based on review of existing routes/plans
 <b>Capacity</b>	Person Throughput	--	Analysis based on vehicle capacity, conceptual service plan, and roadway capacity
	Traffic Impact	--	Change in volume/capacity ratio along TOC Line
 <b>Safety</b>	Potential for Reduction in Collision Rates and Severity	--	Based on ridership and existing rates of severe collisions
 <b>Passenger Comfort/Amenities</b>	Passenger Comfort	--	Qualitative assessment based on vehicle capacity, movement (e.g. lateral sway)
	System Legibility	--	Qualitative assessment based on visibility, alignment
 <b>Equity</b>	Density of Households with Annual Incomes < \$40,000	GIS analysis (Census data)	GIS analysis (Census data)
	Density of Seniors and People with Disabilities	GIS analysis (Census data)	GIS analysis (Census data)
	CalEnviroScreen Scores	Analysis based on EnviroScreen ratings for disadvantaged communities	Analysis based on EnviroScreen ratings for disadvantaged communities

Category	Measures	Initial Screening Methodology	Evaluation Methodology
 <b>Economic Development</b>	Support for Retail Activity	Density of retail jobs within ½ mile of corridor	Qualitative assessment based on project design (e.g., turn restrictions, additional sidewalk space, parking impacts)
 <b>Transit-Supportive Policy</b>	Support for Transit-Oriented Development	Qualitative assessment based on inclusion of corridor in regional and local transit-oriented plans and adoption of supportive zoning	Qualitative assessment based on inclusion of corridor in regional and local transit-oriented plans and adoption of supportive zoning
 <b>Cost-Effectiveness/ Productivity</b>	Capital Cost per Boarding	--	Analysis based on high-level capital cost estimates (based on peer review, service plan and high-level travel time estimates) + ridership from OCTAM model
	Operating Cost per Boarding	--	From OCTAM model
	Boardings per Revenue Hour	--	Ridership from OCTAM model / revenue hours derived from operating cost estimates
	Boardings per Revenue Mile		Ridership from OCTAM model / revenue miles derived from operating cost estimates

### 3 TRANSIT OPPORTUNITY CORRIDORS

The process used to develop the Transit Opportunity Corridors is described in this chapter, starting with the TOC identification and screening process.

Initial screening was conducted on more than 30 potential TOCs. To support more refined analysis, the corridors were divided into 96 corridor segments and 32 potential locations for freeway-based bus rapid transit (Freeway BRT) stops. These stops were identified to account for the fact that Freeway BRT would operate over long stretches without stopping, rendering corridor-based analysis irrelevant.

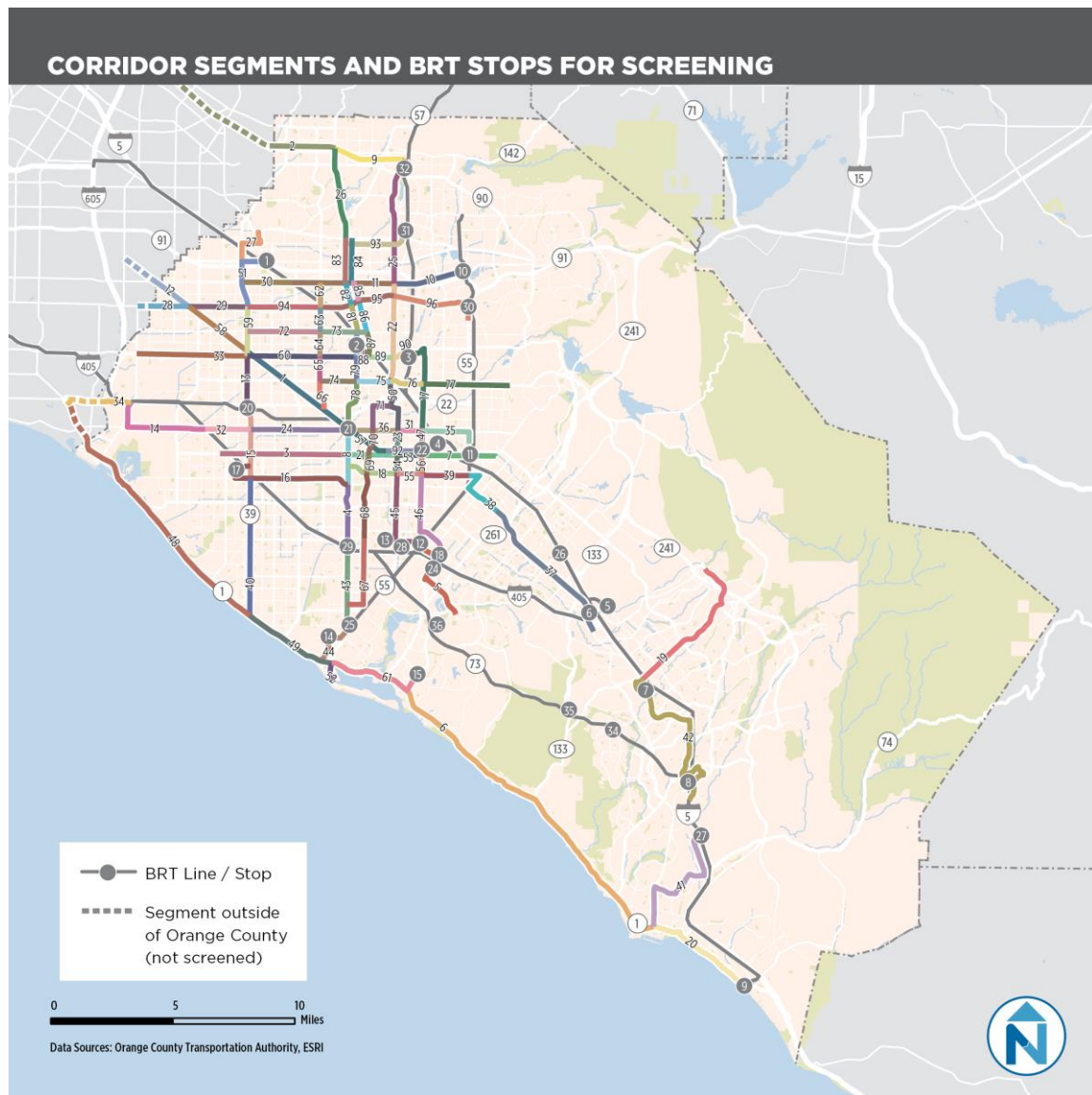
The corridors, segments, and Freeway BRT stop locations were identified based on the following sources:

- Public input including stakeholder interviews and the “Build Your Own Transit System” interactive survey;
- Corridors identified in previous studies, from 1990s proposed CenterLine light rail alignments to the current Central Harbor Boulevard Transit Corridor Study;
- Demographic, land use, and existing transit service analysis conducted as part of the OC Transit Vision and summarized in the State of OC Transit report;
- The Transit Investment Framework, which includes guidance for identifying potential high-capacity transit corridors;
- Discussions with OCTA staff from various departments, the OCTA Board, and the OCTA Citizens Advisory Committee; and
- Additional OCTA analysis of high-ridership segments of existing bus routes.

The potential corridors, segments, and Freeway BRT stops were located throughout Orange County, although the majority were in the more urbanized north and central parts of the county, where existing and projected future demand for transit service is higher. Some corridors also extended a short distance into Los Angeles County in order to provide connections to existing and planned regional transit hubs.

The comprehensive set of corridor segments and stop locations subjected to initial screening is shown in Figure 2.

Figure 2 Screening Segments and Stops



Results of the initial screening were detailed in the “Transit Opportunity Corridors Initial Screening and Preliminary Recommendations” report. Key findings included the following:

- The segments that scored highest overall were located in the northern and central part of the county, primarily in Santa Ana and Anaheim. This area has some of the highest population densities in the county as well as relatively low incomes and other factors indicative of transit demand. Existing transit services in this area include the highest-ridership OC Bus routes, consistent with the land uses and demographics.
- While several of the highest-scoring Freeway BRT stop locations were along or near the highest-ranking segments in the northern part of the county, stop locations in Downtown Costa Mesa and near Laguna Hills Mall also ranked highly.

Figure 3 illustrates summary findings from the screening of corridor segments, while Figure 4 shows findings from the screening of Freeway BRT stop locations.

Figure 3 Segment Screening Results

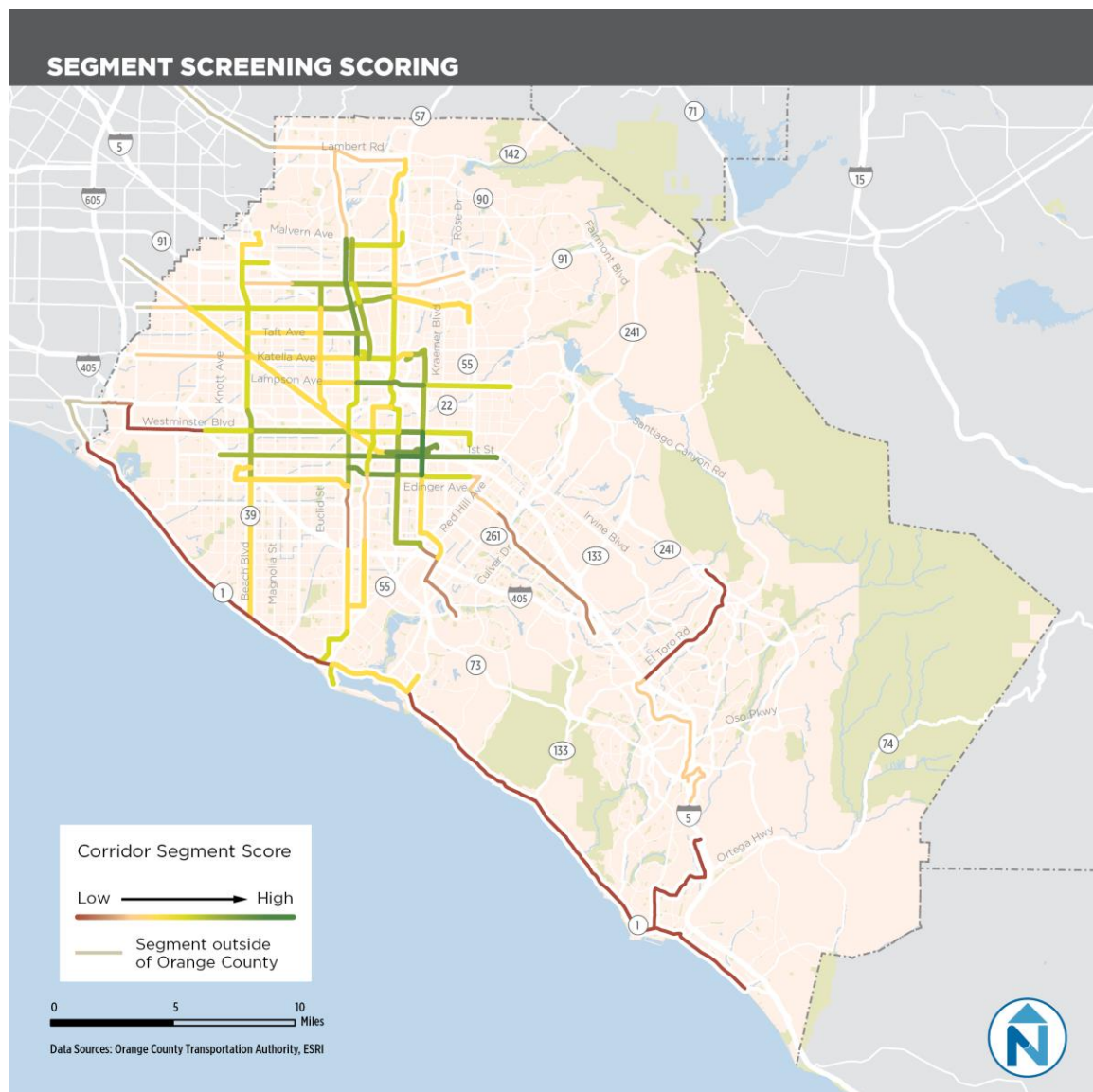
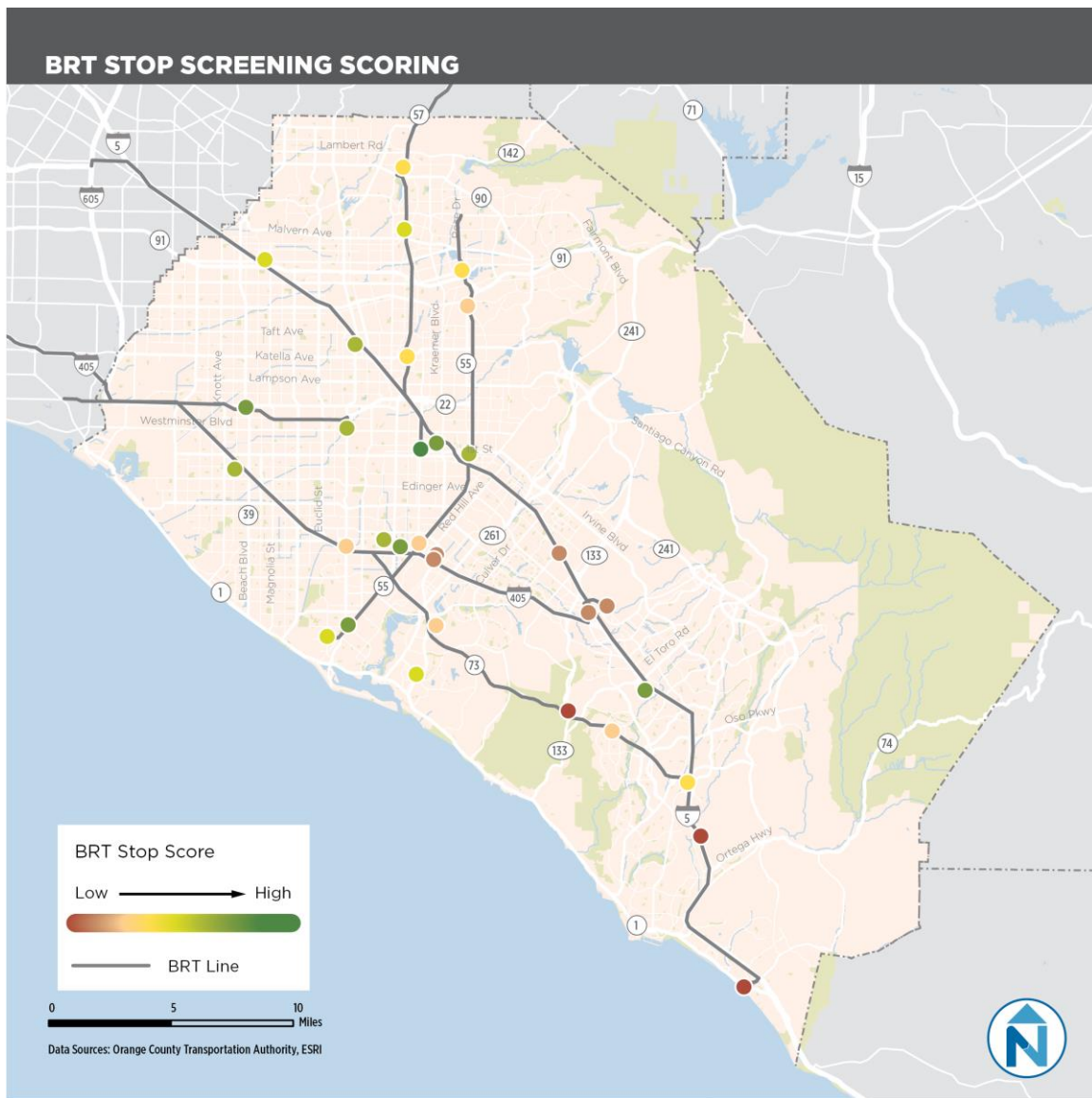




Figure 4 Stop Screening Results



Based on the screening results and subsequent discussions among the project team, 10 TOCs were recommended for detailed evaluation. Each of the corridors included segments or stop locations that rated highly in the initial screening. Some included segments that scored somewhat lower, but were included to form “complete” corridors with anchors (major destinations or transit hubs) at each end.

Eight arterial corridors (four north-south and four east-west) and two Freeway BRT corridors were advanced for further development and evaluation. Several of these follow or closely follows existing OC Bus routes.

**Arterial corridors:**

- **Beach Boulevard** from Fullerton Park-and-Ride to Downtown Huntington Beach
- **Harbor Boulevard** from Cal State Fullerton to Hoag Hospital Newport Beach
- **State College Boulevard/Bristol Street** from Brea Mall to the University of California, Irvine
- **Main Street** from Anaheim Regional Transit Intermodal Center (ARTIC) to South Coast Plaza Park-and-Ride
- **La Palma Avenue/Lincoln Avenue** from Hawaiian Gardens to Anaheim Canyon Station
- **Chapman Avenue** from Beach Boulevard to Hewes Street
- **17<sup>th</sup> Street/Westminster Avenue** from Cal State Long Beach to Tustin Street
- **McFadden Avenue/Bolsa Avenue** from Goldenwest Transportation Center to Larwin Square

**Freeway BRT corridors:**

- **I-5** from Fullerton Park-and-Ride to Mission Viejo/Laguna Niguel Station
- **SR-55** from Santa Ana Regional Transportation Center to Hoag Hospital Newport Beach

The corridors are shown in Figure 5.



Figure 5 Transit Opportunity Corridors



In order to evaluate the TOCs using the detailed evaluation criteria from the evaluation framework—several of which are measures of transit performance, such as cost-effectiveness, rather than corridor characteristics—it was necessary to identify conceptual transit lines that might operate in the corridors. This required selection of mode options for each corridor (and, in some cases, for individual segments) based on factors including projected demand, network connectivity, and available right-of-way. These modes were selected for purposes of evaluation, and different modes may be selected as part of future project development processes within corridors.

With the assignment of modes, transit lines were assembled from parts of different corridors and modifications were made to some corridors, including one significant change: Rapid streetcar was determined to be the most appropriate mode for the 17<sup>th</sup>/Westminster corridor east of Beach Boulevard. However, extending tracks and overhead catenary wires west to Long Beach would be expensive and cost-ineffective given likely insufficient demand; therefore the line was deviated to an existing rail right-of-way paralleling Hoover Boulevard and terminated at the Goldenwest Transportation Center (the western segment of the corridor would continue to be served by frequent bus service).

Four modes were assumed for the evaluation. These were described in detail in the *State of OC Transit* report and are summarized as follows:

- *Rapid streetcar.* This would be similar to the planned OC Streetcar line in Santa Ana, but because the TOCs are relatively long, stations would be more widely spaced and transit-only right-of-way would be provided wherever feasible, either in the roadway median or along the curb. In terms of speed and reliability, rapid streetcar would be similar to at-grade light rail such as the Los Angeles County Metro Blue, Expo, and Gold lines. However, it would use the same medium-capacity vehicles as the OC Streetcar line (and indeed, the conceptual routes would incorporate the OC Streetcar line). Rapid streetcar was assumed for segments of the most promising corridors that would allow connections to the under-construction OC Streetcar line.
- *Bus rapid transit (BRT).* BRT lines would feature widely-spaced stations and transit-priority elements including transit-only right-of-way where feasible. As with rapid streetcar, BRT-only lanes could be shared with autos on a limited basis, for example by allowing right turns by motorists and reverting to parking lanes outside of peak periods, as on Wilshire Boulevard in Los Angeles. BRT was selected for segments of high-demand corridors that were not included in rapid streetcar lines.
- *Rapid bus.* This would be similar to BRT, but without transit-only lanes. Other transit-priority elements such as transit signal priority, queue jump bypass lanes at intersections, off-board fare payment, all-door boarding, and near-level boarding would be used to enhance speed and reliability. Rapid bus was selected for remaining arterial segments.
- *Freeway BRT.* Most of the TOCs primarily follow arterial streets, but I-5 and SR-55 corridors are freeway-based. In these corridors, buses would largely operate in existing high-occupancy vehicle (HOV, or carpool) lanes or planned “managed” high-occupancy toll (HOT) lanes. Unlike existing express routes that use these lanes, however, they would operate in both directions all day and could make use of transit-only on- and off-ramps or stations in the median of the freeway, such as those on the Harbor Freeway in Los Angeles County. For purposes of evaluation, stops at existing park-and-rides and other stops near freeway ramps were assumed.

In addition to modes and segments with transit-only lanes, general locations of stations (e.g., intersections) and service plans were identified. The service plan for most lines was based on 10-

minute peak and 15-minute off-peak service (15-minute peak and 30-minute off-peak service for Freeway BRT corridors), as well as spans of service (operating hours) consistent with the “Major” category in the Transit Investment Guidelines: 5 a.m. to midnight weekdays, and 6 a.m. to midnight weekends. Existing bus routes along the corridors covered by TOCs were modified to operate every 20 minutes peak and 30 minutes off-peak, or were assumed to be replaced (Route 83 along I-5, and Bravo! Routes 543 and 560 would be eliminated).

The 11 TOC lines were:

- North Harbor Boulevard-Santa Ana Boulevard: Rapid streetcar or bus rapid transit (BRT) between Cal State Fullerton and the Santa Ana Regional Transportation Center, primarily via Harbor Boulevard (and including the OC Streetcar alignment currently in design)
- Westminster Avenue-Bristol Street: Rapid streetcar or BRT between the Goldenwest Transportation Center and the University of California, Irvine, via 17<sup>th</sup> Street/Westminster Avenue and Bristol Street (including short segments of Main Street and the OC Streetcar alignment)
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- Interstate 5 (I-5): Freeway BRT on I-5 from the Fullerton Park-and-Ride to Mission Viejo/Laguna Niguel Station
- State Route 55 (SR-55): Freeway BRT on SR-55 from the Santa Ana Regional Transportation Center to Hoag Hospital in Newport Beach

The TOC lines are illustrated in Figure 6, and in greater detail (including station locations) in Appendix A.

Figure 6 TOC Lines and Potential Modes



## 4 EVALUATION RESULTS

Following are summary findings from the detailed evaluation. Complete results can be found in Appendix B.

For each TOC line or freeway BRT station location and criterion, a score of 1 (lowest) to 5 (highest) was assigned based on the analysis. For corridor/station area-based criteria, the area of analysis was a half-mile radius around the alignment or station, representing a “typical” walkshed of about 10 minutes for an able-bodied adult. When mode was a factor in evaluation, the highest intensity mode considered for the line was used in the evaluation.

While quantitative values representative of the findings from analysis were assigned for each TOC line or freeway BRT station location and criterion, values should not simply be summed to calculate a “total score” for each line. This is because the evaluation exercise is not meant to serve as the sole basis for the decision-making process. Instead, it is one tool for planners and policy makers to use in developing recommendations.

Following are summary findings from the evaluation for each criterion.

### SPEED AND RELIABILITY

#### Percentage of Route with Transit-Only Right-of-Way

This is a measure of potential travel time reliability or schedule adherence. As modes were associated with transit-only right-of-way as part of the TOC line development process (see Chapter 3), the selection of mode options for each line determined performance in this category: Lines with transit-only ROW from end to end (rapid streetcar and BRT lines) were assigned a value of 5; lines with transit-only lanes for most of their length (rapid streetcar lines, which would operate in traffic in central Santa Ana) were assigned a value of 4; freeway BRT lines operating primarily in HOV or managed lanes were assigned a value of 3; and rapid bus lines operating in traffic were assigned a value of 1.

#### Percentage of Route with Grade Separation

This is also a measure of potential travel time reliability or schedule adherence. Because freeway BRT lines would operate primarily (but not entirely) on freeways, they were assigned a value of 4, while lines operating at-grade, on surface streets with intersections, were assigned a value of 1.

#### Peak and Base Frequency

Performance in this category was a factor of service plan. Arterial lines with a service plan based on 10-minute peak and 15-minute off-peak headways were assigned a value of 4, while freeway BRT lines with a service plan based on 15-minute peak and 30-minute off-peak headways were assigned a value of 2.

### Average Speed

Average projected year 2040 peak-period speeds for each line were projected as part of the modeling process, based on mode, right-of-way and traffic conditions. Freeway BRT lines were found to be significantly faster than arterial routes, and the I-5 line was found to be significantly faster (an average of 29.6 miles per hour) than the SR-55 line (21.8 mph). The I-5 Freeway line, then was assigned a value of 5, and the SR-55 line a value of 4. Arterial lines were found to have comparatively similar average speeds (between 15 and 20 mph), so each was assigned a value of “3.” (Note that while transit-only lanes were not associated with significantly higher average speeds, they can be expected to improve both speed and reliability within a corridor.)

## RIDERSHIP/VMT REDUCTION

### New Transit Trips

This measure is based on projected year 2040 average weekday boardings per mile. Based on ridership forecasting conducted using the OCTAM model, lines with rapid streetcar as an option were projected to have high ridership – generally in the range of 20,000 boardings per weekday – while bus-only projects were projected to have significantly lower ridership. For this reason, rapid streetcar/BRT projects performed well, while bus-only projects showed mixed results: La Palma/Lincoln was projected to have the highest net increase among bus-only corridors.

### Vehicle Miles Traveled/Carbon Emissions

This measure is based on net ridership, as reductions in VMT and corresponding carbon emissions generally correlate with increases in transit ridership.

## DENSITY/CONNECTIONS TO ACTIVITY CENTERS

### Population Density Within Half-Mile

Based on GIS analysis, the North Harbor/Santa Ana and McFadden/Bolsa lines were found to have the highest population densities within a half-mile, while the SR-55 Freeway line was found to have the lowest.

### Employment/Postsecondary Density Within Half-Mile

This category takes into account both number of workers and numbers of college and university students, as people in both categories must make regular trips to the same destination. Based on GIS analysis, the State College and SR-55 Freeway lines were found to have the highest numbers of workers and students within a half-mile, while the Beach line was found to have the lowest.

### Density of Hospital Beds/Retail Stores Within Half-Mile

This category takes into account other major generators of travel demand: medical centers and shops. Based on GIS analysis, the Chapman and SR-55 Freeway lines were found to have the highest numbers of hospital beds and retail stores within a half-mile, while the Westminster/Bristol, Beach and McFadden/Bolsa lines were found to have the lowest.



## **Additional Major Destinations (e.g. Stadiums and Theme Parks) Within Half-Mile**

Analysis in this category was based on identification of other regional destinations such as Angel Stadium and Disneyland. Lines with two or more such destinations within a half-mile including the North Harbor/Santa Ana and Main lines, while lines with no such destinations within included the Westminster/Bristol, South Harbor, McFadden/Bolsa and SR-55 Freeway lines.

## **Traffic Volumes at Arterial Intersections per Corridor Mile (Within Half-Mile)**

This category is an indirect measure of the presence of nearby destinations or travel demand generators; importantly, it was found through the transit propensity analysis described in the State of OC Transit report to be a key indicator of transit demand. The Beach line had the highest traffic volumes per mile within a half-mile, while the I-5 Freeway line was found to have the lowest.

## **MULTIMODAL CONNECTIVITY**

### **Number of Connections to Existing or Future Metrolink Stations, Transit Centers, Major Routes, and Park-and-Rides**

This is a measure of transit network connectivity. The North Harbor/Santa Ana and I-5 Freeway lines were found to have the most major connections within a half-mile, while the South Harbor, La Palma/Lincoln and Chapman lines had the fewest.

### **Intersection Density per Square Mile**

This is a measure of pedestrian network connectivity. The South Harbor and Beach lines were found to have the highest intersection density within a half-mile, while the State College and I-5 Freeway lines were found to have the lowest.

### **Pedestrian Network Serving Transit**

This measure was based on WalkScore scores, which in turn are based primarily on numbers of destinations within walking distance. The North Harbor/Santa Ana, South Harbor, Main, and McFadden/Bolsa lines were found to have highest WalkScores within a half-mile, while the I-5 Freeway line was found to have the lowest.

### **Number of Connections to Existing or Planned High-Quality Bicycle Facilities (Off-Street or Protected On-Street)**

This is a measure of bicycle network connectivity. The Westminster/Bristol and Main lines were found to have the most major connections to existing or planned (as part of local bicycle plans) bike paths or separated bike lanes within a half-mile, while the La Palma/Lincoln line was found to have the fewest.

### CAPACITY

#### Person Throughput

This is a measure of the capacity of a right-of-way to move people, and not just vehicles. Lines that would replace general-purpose lanes with higher-capacity transit-only lanes, and that could potentially use larger vehicles – rapid streetcar/BRT lines – were assigned a value of 5. BRT/rapid bus lines with transit-only lanes were assigned a value of 4, and remaining lines that would not change the capacity of the roadway were assigned a value of 3.

#### Traffic Impact

This is a measure of the potential impacts on auto delay and congestion of conversion of general-purpose lanes to transit-only lanes, as is proposed for rapid streetcar and BRT projects. The metric used was roadway segment volume-to-capacity ratio, a standard measure of traffic levels. Changes to V/C ratios in adjacent lanes were projected, and numbers of roadway segments in which the ratio would increase from less than 0.9 to more than 0.9 – the latter representing level of service (LOS) of “E” or “F” using the Highway Capacity Manual method – were counted. For all rapid streetcar and BRT lines, between three and five segments (out of between nine and 20, depending on the line) would be impacted, so each was assigned a value of 2. Remaining lines where numbers of traffic lanes would not be reduced were assigned a 3, representing no change.

### SAFETY

#### Potential for Reduction in Collision Rates and Severity

Transit improvements like those evaluated here can improve safety in two ways: 1) through project design including safety features, and 2) by shifting trips to transit and reducing rates of driving. At this stage of project evaluation, prior to design, the former cannot be evaluated, but transit ridership and vehicle miles traveled can be, and are, under other metrics. For this measure, we multiplied projected net ridership in each corridor by numbers of severe collisions recorded in the corridor over an eight-year period, and normalized for route length. Rapid streetcar/BRT lines, with their higher projected ridership, were found to have the greatest potential to reduce collisions.

### PASSENGER COMFORT/AMENITIES

#### Passenger Comfort

This is largely a measure of comfort aboard vehicles, as it is assumed that all stations would include shelters, benches and other high-quality amenities. Rapid streetcar/BRT lines, which could potentially use larger vehicles providing a smoother ride, were assigned a value of 5, and freeway BRT lines, which would make fewer stops and starts, were assigned a 4. All other lines, which would provide comfort levels similar to existing limited-stop lines, were assigned a value of 3.



## System Legibility

This is largely a measure of the visibility of transit lines, as it is assumed that passenger awareness of all lines would be enhanced using branding, maps and other measures. Rapid streetcar/BRT lines, which might follow tracks, were assigned a value of 5, while BRT/rapid bus lines with transit-only lanes were assigned a value of 4. All other lines, which would largely use existing infrastructure, were assigned a value of 3.

## EQUITY

### Density of Households with Annual Incomes Below \$40,000

Based on GIS analysis, the North Harbor/Santa Ana and McFadden/Bolsa lines were found to have the highest densities of low-income households within a half-mile, while the State College and I-5 Freeway lines were found to have the lowest.

### Density of Seniors and Persons with Disabilities

Based on GIS analysis, the Beach and McFadden/Bolsa lines were found to have the highest densities of older persons and persons with disabilities within a half-mile, while the State College and SR-55 Freeway lines were found to have the lowest.

### CalEnviroScreen Scores

CalEnviroScreen is a mapping tool that helps identify California communities that are most affected by many sources of pollution, and where people are often especially vulnerable to pollution's effects. The North Harbor/Santa Ana and La Palma/Lincoln lines were found to have the highest CalEnviroScreen scores, indicating the greatest impacts from pollution, while the South Harbor line had the lowest.

## ECONOMIC DEVELOPMENT

### Support for Retail Activity

Based on GIS analysis, the Main and SR-55 Freeway lines were found to have the highest densities of retail jobs within a half-mile, while the North Harbor/Santa Ana, La Palma/Lincoln and Chapman lines were found to have the lowest.

## TRANSIT-SUPPORTIVE POLICY

### Support for Transit-Oriented Development

This measure was based on analysis of: current zoning, specifically transit-supportive zoning such as multifamily residential and mixed uses; year 2035 population and employment density, and increases to both over the base year of 2012; and proximity of Southern California Association of Government (SCAG)-designated "High Quality Transit Areas," or areas with frequent transit service (note that because all TOC lines would meet the HQTA definition of "frequent" – 15-minutes or better peak service – all lines were assumed to serve as the basis for a future HQTA). For each category, "high," "medium," and "low" values were assigned, and these were combined

to produce composite 1-to-5 scores. The North Harbor/Santa Ana, Westminster/Bristol, State College, Main, I-5 and SR-55 lines had the highest scores, while the South Harbor line had the lowest.

## COST-EFFECTIVENESS/PRODUCTIVITY

### Capital Cost per Boarding

This is a simple measure of estimated capital cost divided by estimated number of annual boardings. In more advanced stages of project development, capital cost estimates are itemized and costs are annualized based on different rates of depreciation in order to determine “true” costs per boarding. At this preliminary stage of project development, capital cost estimates are order-of-magnitude, in this case based on per-mile costs for similar recent projects in Orange County and Southern California. The Main and La Palma/Lincoln rapid bus projects were found to be least expensive to construct on a per-passenger basis and freeway BRT projects were found to be most expensive to construct, although this assumes some construction of dedicated facilities (rather than simply making use of existing ramps and park-and-rides).

### Operating Cost per Boarding

This is a measure of estimated annual operating and maintenance (O&M) costs divided by annual numbers of boardings, for all new or modified lines in a TOC. O&M costs were estimated using revenue hours projections for the year 2040 and existing OCTA costs per hour of revenue service, adjusted to take into account additional costs for elements such as station maintenance (hours of revenue service are estimated based on service plans and projected speeds). The rapid streetcar/BRT corridors were found to have the lowest per-boarding costs, due to the high ridership projected for rapid streetcar/BRT lines, while the SR-55 Freeway corridor had the highest per-boarding costs.

### Boardings per Revenue Hour

This is a widely used measure of productivity and cost-effectiveness, applied, once again, to all new or modified lines in a TOC. Once again, corridors with high-ridership rapid streetcar/BRT lines were found to have the strongest performance, while the SR-55 Freeway corridor had the weakest performance.

### Boardings per Revenue Mile

This is another standard measure of productivity, taking into account distance. Once again, corridors with high-ridership rapid streetcar/BRT lines were found to have the strongest performance, while the SR-55 Freeway corridor had the weakest performance.

## 5 CONCLUSION

### FINDINGS

As was noted in the introduction to the previous chapter, the evaluation exercise was not meant to serve as the sole basis for decision making. Instead, it is one tool for planners and policy makers to use in developing recommendations.

As was further described in Chapter 2, as part of the Transit Opportunity Corridors development process, modes were associated with corridor segments in order to form TOC lines or projects that could be subjected to evaluation using key performance measures such as ridership, productivity, and cost-effectiveness. Because many of the metrics were based on project performance, and because each mode has inherent advantages and disadvantages, mode played a major role in project performance.

In summary:

- Lines modeled with a rapid streetcar option outperformed other lines by a substantial margin. While the OCTAM model used for ridership forecasting projected ridership for rapid streetcar projects several times higher than for bus-based projects, the rapid streetcar projects were projected to have capital costs of several hundred million dollars. In return for this expense, however, they would perform well across a broad range of categories. (Note that rapid streetcar ridership could vary significantly depending on factors including whether or not to provide transit-only lanes.)
- Performance among bus-based projects varied: La Palma/Lincoln was projected to have the highest ridership, but Main, McFadden/Bolsa, State College and Beach were projected to have the strongest performance overall.
- The freeway BRT projects performed moderately well, in part due to their speed advantage over other modes and the proximity of major travel demand generators to I-5 and SR-55 interchanges. A key question going forward will be what Freeway BRT means in Orange County: all-day, bidirectional express lines, or full bus rapid transit lines with dedicated infrastructure. Depending on direction, capital costs could vary substantially (based on peer review, a cost of approximately \$11.5 million per mile was assumed, but this could be significantly higher or lower).

### CORRIDOR POTENTIAL NEXT STEPS

Our preliminary corridor potential next steps are as follows:

- Based on their superior performance in a broad range of categories, OCTA should conduct corridor studies for the North Harbor/Santa Ana and Westminster/Bristol corridors.

Implementation of rapid streetcar or BRT in these corridors would greatly expand the fixed-guideway network, suggesting a phased implementation strategy. The North Harbor/Santa Ana line somewhat outperformed the Westminster/Bristol line in the evaluation exercise, and indeed the Central Harbor segment is already undergoing study by OCTA. We recommend as part of all future streetcar or BRT project development processes that a project alternative based on exclusive right-of-way for rapid streetcar or BRT operations be considered.

- In the near term, OCTA should proceed with introduction of Bravo! service in the Route 29/Beach corridor, and over the medium term it should consider addition of Bravo! service to the Main corridor, as well as others. It should also seek to upgrade both these and existing Bravo! routes to improve speed and amenities. Initial steps could include introduction of off-board fare payment, all-door boarding, and transit signal priority. In the long-term OCTA should consider queue jumps, improved shelters, priority transit lanes on the highest ridership corridors.
- Freeway BRT is a new mode for OCTA, and one that has varied widely in its implementation elsewhere. Rather than advance individual projects, we recommend that OCTA proceed to a network study of potential Freeway BRT corridors including I-5, SR-55, and others such as I-405. This study would seek to both identify the most promising corridors as well as begin to define which infrastructure elements (e.g., dedicated ramps) should be included and where.

# APPENDIX A CONCEPTUAL MAPS OF TOC LINES

Figure A-1 North Harbor-Santa Ana Rapid Streetcar/BRT Line



Figure A-2 17<sup>th</sup>-Westminster-Bristol Rapid Streetcar/BRT Line





Figure A-3 South Harbor BRT/Rapid Bus Line



Figure A-4 State College BRT/Rapid Bus Line

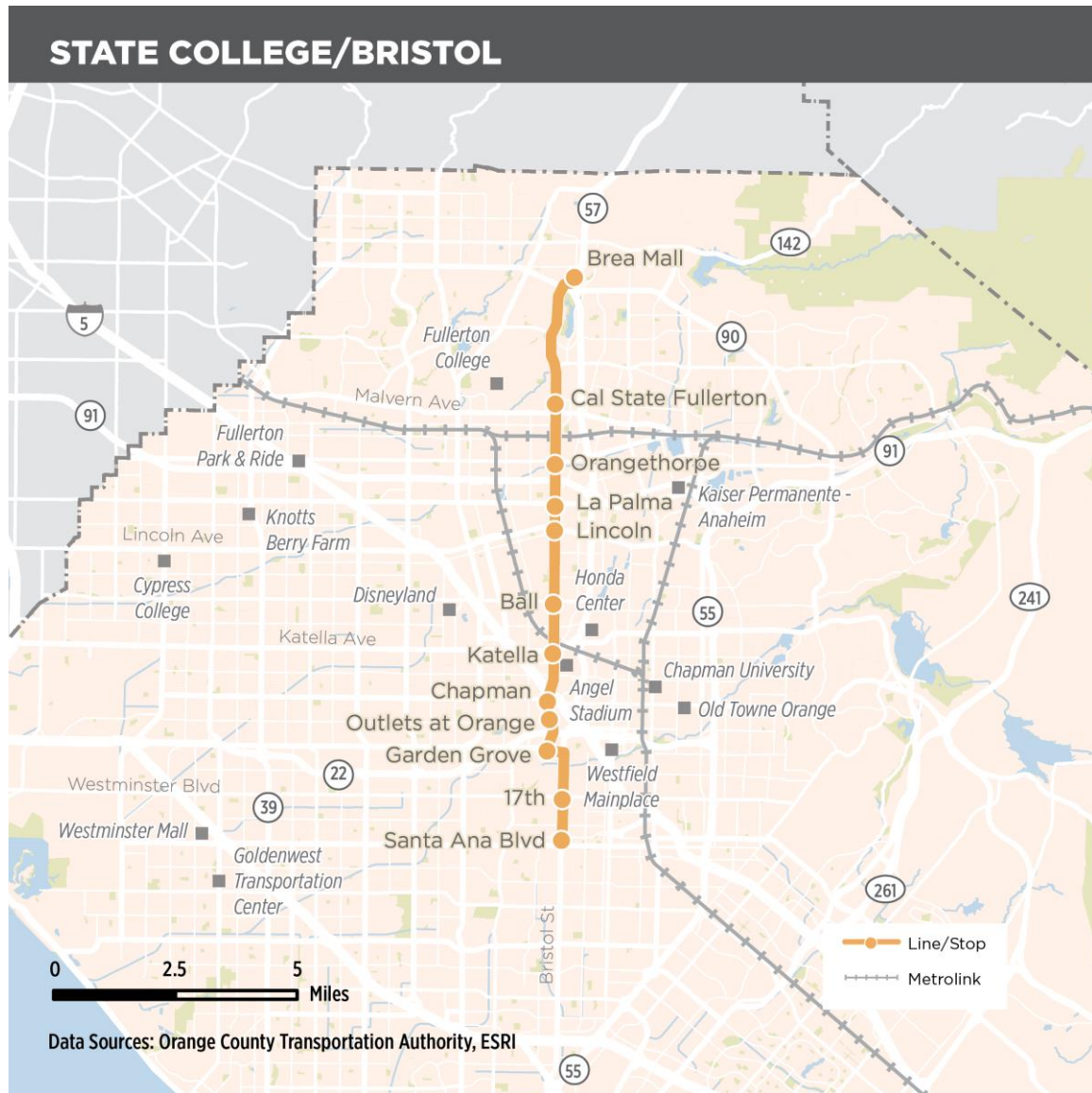




Figure A-5 Beach Rapid Bus Line



Figure A-6 Main Rapid Bus Line

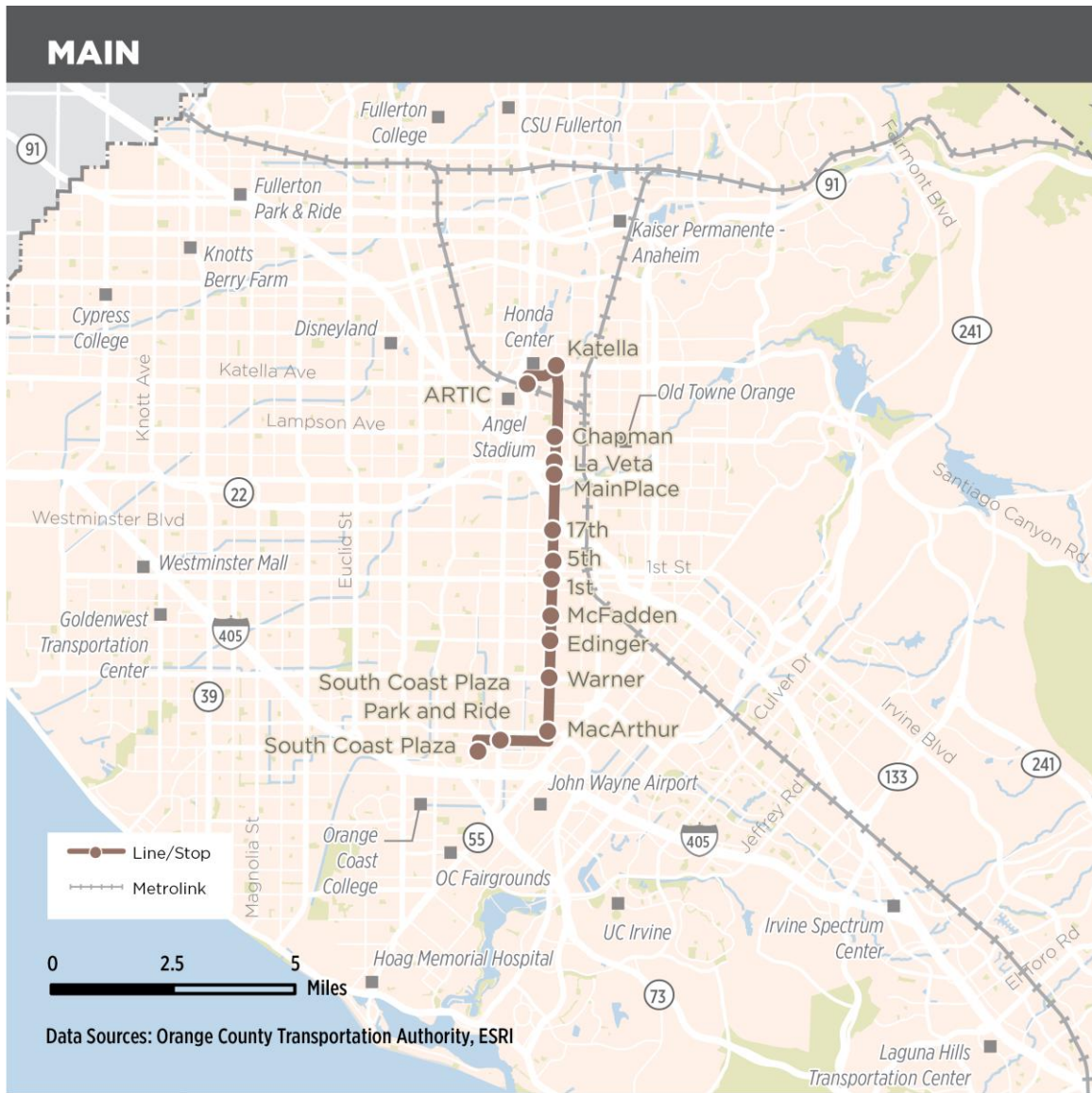


Figure A-7 La Palma/Lincoln Rapid Bus Line

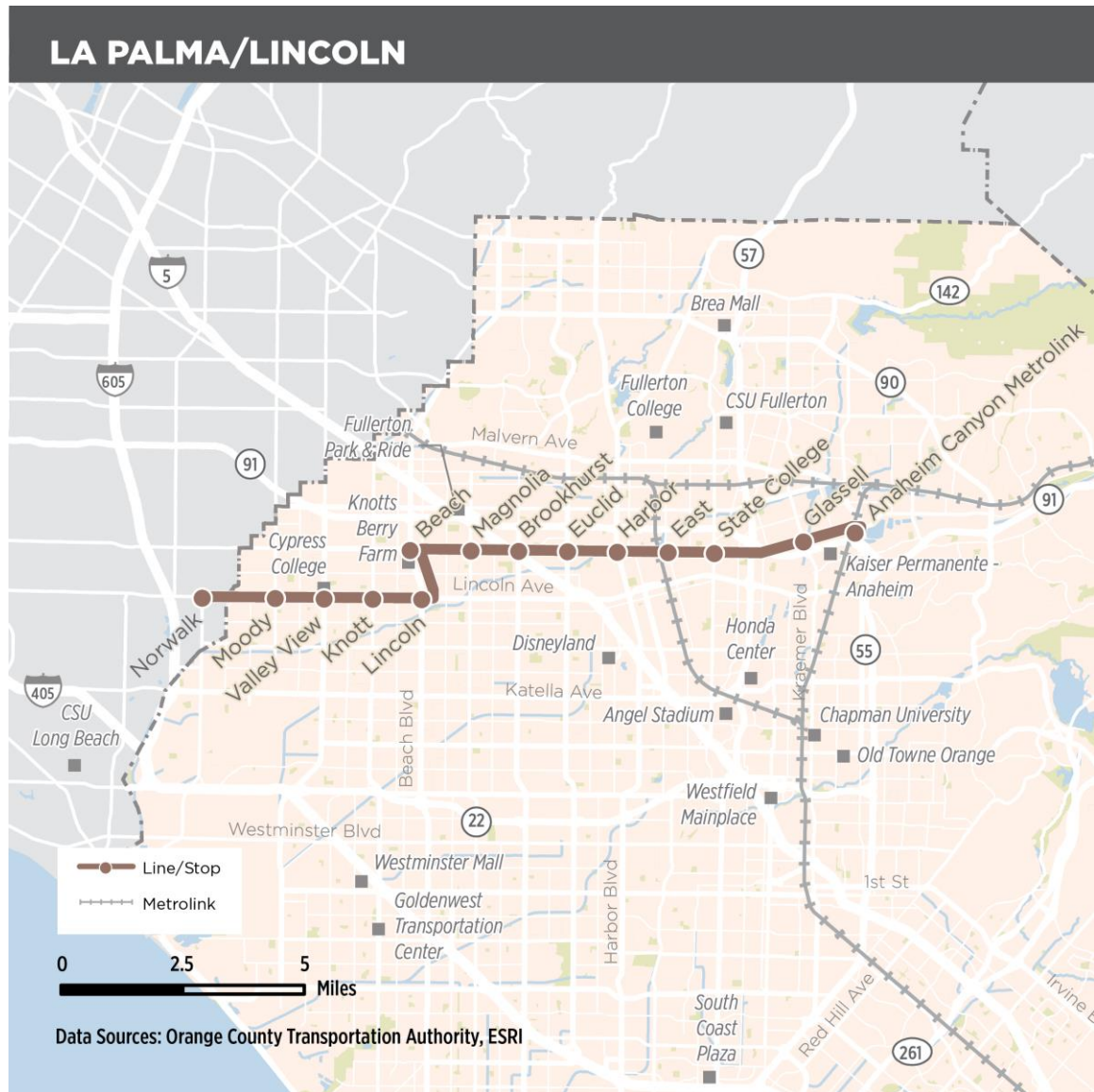




Figure A-8 Chapman Rapid Bus Line

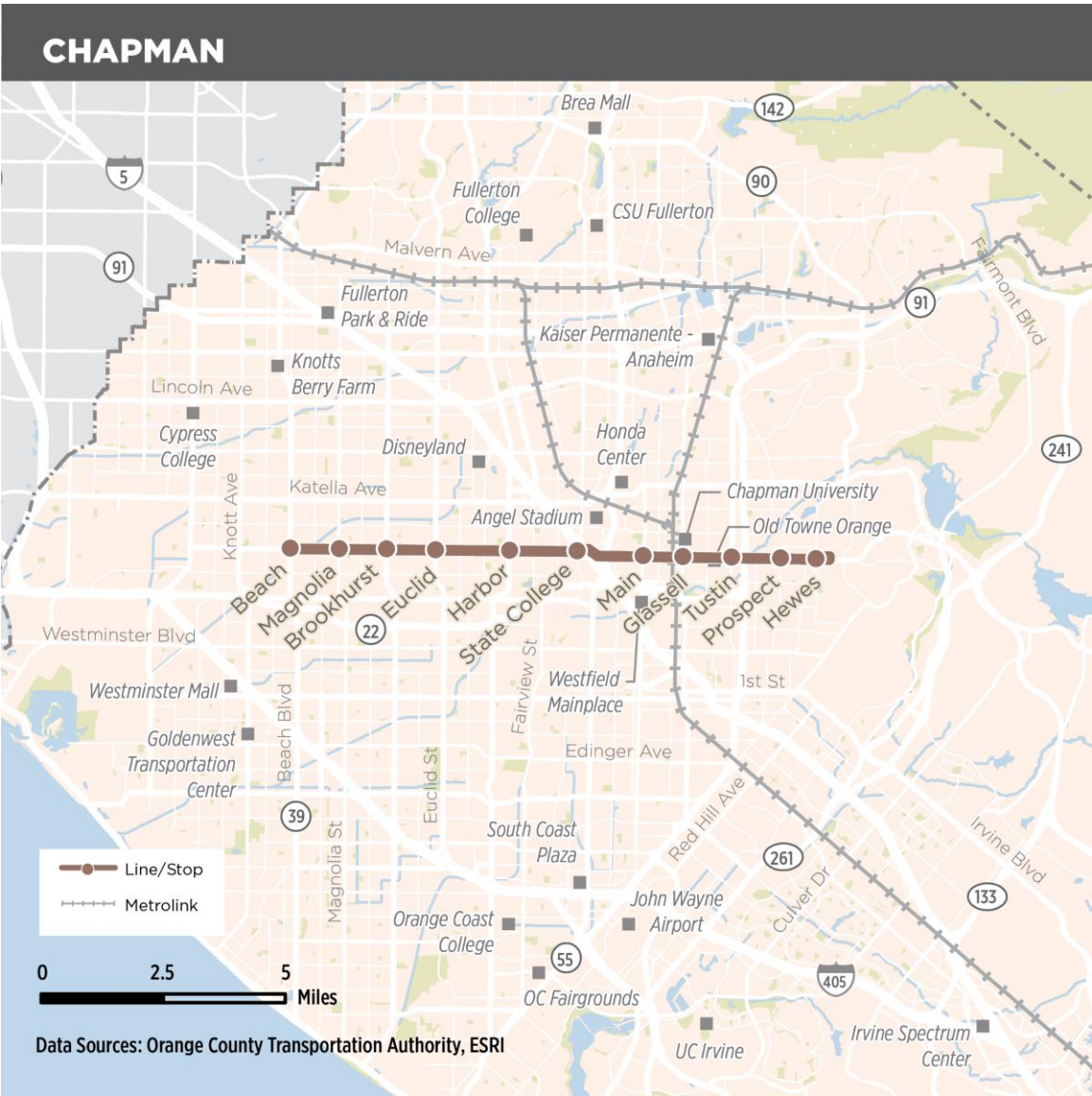


Figure A-9 McFadden/Bolsa Rapid Bus Line



### Figure A-20 I-5 Freeway BRT Line







Figure A-31 SR-55 Freeway BRT Line



## APPENDIX B COMPLETE EVALUATION RESULTS

Table B-1 provides scores for each criterion, TOC line and freeway BRT stop location. A score of “1” represents least benefit or most impact, while a score of “5” represents most benefit or least impact.



Table B-1 Complete Evaluation Results

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
 <b>Speed &amp; Reliability</b>	% of Route w/ Transit-Only ROW	4	4	5	5	1	1	1	1	1	3	3
	% of Route w/ Grade Separation	1	1	1	1	1	1	1	1	1	4	4
	Peak and Base Frequency	4	4	4	4	4	4	4	4	4	2	2
	Average Speed	3	3	3	3	3	3	3	3	3	5	4
 <b>Ridership/Mode Shift/VMT Reduction</b>	New Transit Trips	5	5	1	2	1	2	2	1	1	1	1
	Vehicle Miles Traveled/CO2 Emissions	5	5	1	2	1	2	2	1	1	1	1









## APPENDIX B COMPLETE EVALUATION RESULTS

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
 <b>Density/ Connections to Activity Centers</b>	Population Density Within ½ Mile	5	4	3	3	4	4	3	3	5	2	1
	Employment/Postsecondary Enrollment Density Within ½ Mile	4	4	3	5	1	4	3	2	2	4	5
	Density of Hospital Beds/Retail Stores Within ½ Mile	2	1	2	3	1	3	2	5	1	4	5
	Additional Major Destinations (e.g., Stadiums & Theme Parks) Within ½ Mile	5	1	1	3	3	5	3	3	1	3	1
	Traffic Volumes at Arterial Intersections per Corridor Mile (Within ½ Mile)	4	4	4	3	5	3	2	3	5	1	3

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
 <b>Multimodal Connectivity</b>	# of Connections to Existing or Future Metrolink Stations, Transit Centers, Major Routes, and Park-and-Rides	5	4	1	2	3	3	1	1	4	5	2
	Intersection Density per Square Mile	3	2	5	1	5	2	3	2	4	1	2
	Pedestrian Network Serving Transit	5	3	5	2	3	5	3	4	5	1	3
	# of Connections to Existing or Planned High-Quality Bicycle Facilities (Off-Street or Protected On-Street)	4	5	3	4	2	5	1	2	3	3	2
 <b>Capacity</b>	Person Throughput	5	5	4	4	3	3	3	3	3	3	3
	Traffic Impact	2	2	2	2	3	3	3	3	3	3	3

## APPENDIX B COMPLETE EVALUATION RESULTS

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
 Safety	Potential for Reduction in Collision Rates and Severity	5	5	1	2	2	2	2	1	2	1	1
 Passenger Comfort/Amenities	Passenger Comfort	5	5	3	3	3	3	3	3	3	4	4
	System Legibility	5	5	4	4	3	3	3	3	3	3	3
 Equity	Density of Households with Annual Incomes < \$40,000	5	4	3	1	3	3	2	2	5	1	3
	Density of Seniors and People with Disabilities	3	4	2	1	5	2	3	3	5	2	1
	CalEnviroScreen Scores	5	4	1	4	3	4	5	2	3	2	2

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
 Economic Development	Support for Retail Activity	1	2	2	3	4	5	1	1	2	3	5
 Transit-Supportive Policy	Support for Transit-Oriented Development	5	5	3	5	4	5	4	4	4	5	5
 Cost-Effectiveness/ Productivity	Capital Cost per Boarding	2	2	1	2	3	5	5	3	3	1	1
	Operating Cost per Boarding	5	5	3	4	3	3	4	2	3	3	2
	Boardings per Revenue Hour	5	5	2	4	3	3	4	2	3	2	2
	Boardings per Revenue Mile	5	5	2	3	2	3	3	2	3	1	1

## APPENDIX B COMPLETE EVALUATION RESULTS

Category	Measure	Rapid Streetcar/BRT		BRT/Rapid Bus		Rapid Bus					Freeway BRT	
		North Harbor/ Santa Ana	West-minster/ Bristol	South Harbor	State College	Beach	Main	La Palma/ Lincoln	Chap-man	Mc-Fadden/ Bolsa	I-5	SR-55
Average Score (1-to-5 scale)		4.0	3.7	2.6	2.9	2.8	3.2	2.7	2.4	3.0	2.6	2.6

# **Transit Master Plan - Corridor Line Evaluation**

# OC Transit Vision - Corridor Line Evaluation



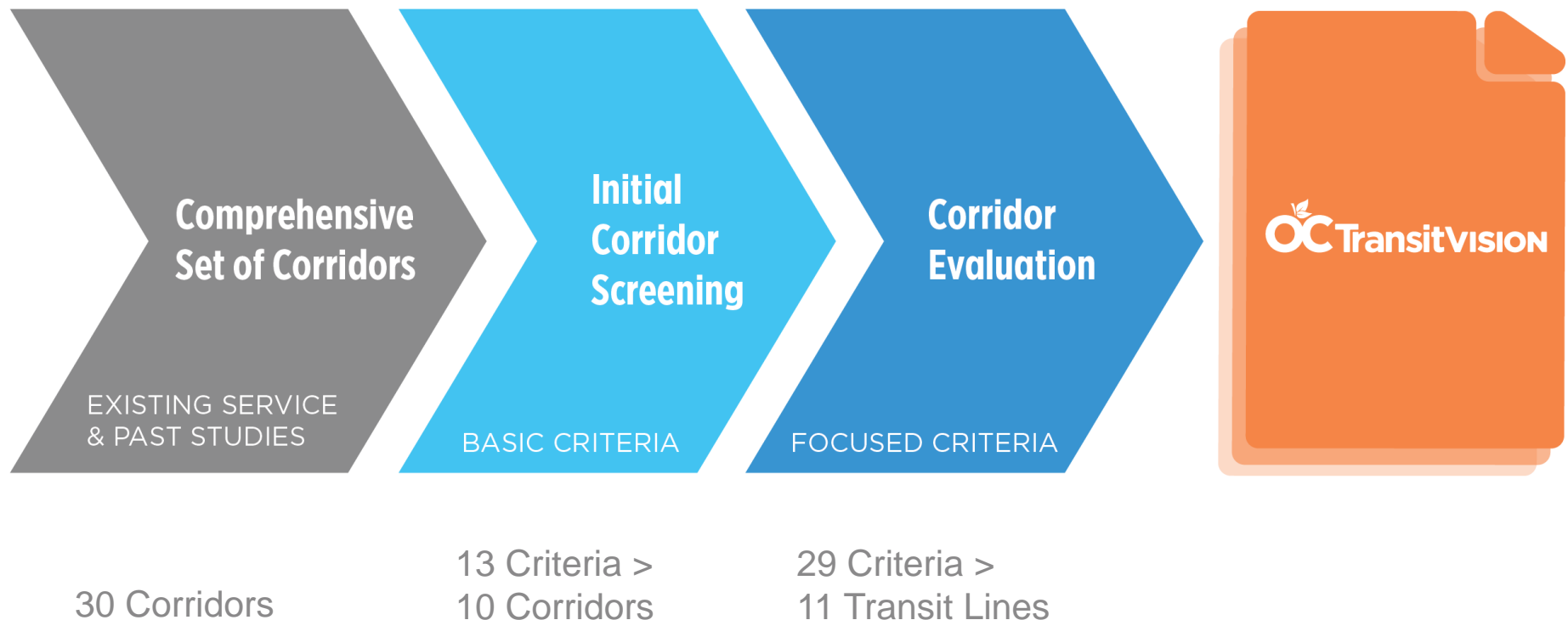


# Context of Transit Master Plan

- Countywide Study of Long-Term Transit Needs
- Input for Long-Range Transportation Plan
- Guides Future Bus Service Recommendations
- First Step in Project Development Process
  - Master Plan
  - Feasibility Studies
  - Environmental Review
  - Engineering/Design



# Opportunity Corridor Evaluation



**Legend:**

- Streetcar/BRT
- BRT/Rapid Bus
- Rapid Bus
- Freeway BRT
- Metrolink

**Scale:** 0 5 10 Miles

**Data Sources:** Orange County Transportation Authority, ESRI

# Corridor Evaluation- Modes

Corridor	Limits	Rapid Streetcar	Bus Rapid Transit (BRT)	Rapid Bus
Harbor Boulevard/ Santa Ana Boulevard	California State University, Fullerton to Santa Ana Regional Transportation Center	✓	✓	
Westminster Avenue/ Bristol Street	Goldenwest Transportation Center to UC Irvine	✓	✓	
Harbor Boulevard (South)	17 <sup>th</sup> Street/Westminster to Hoag Hospital Newport Beach		✓	✓
State College Boulevard	Brea Mall to Downtown Santa Ana		✓	✓
Beach Boulevard	Fullerton Park-and-Ride to Downtown Huntington Beach			✓
Main Street	Anaheim Regional Transportation Intermodal Center to South Coast Plaza Park-and-Ride			✓
La Palma Avenue/Lincoln Avenue	Hawaiian Gardens to Anaheim Canyon Station			✓
Chapman Avenue	Hewes Street to Beach Boulevard			✓
McFadden Avenue/Bolsa Street	Goldenwest Transportation Center to Larwin Square			✓
Interstate 5 Freeway	Fullerton Park-and-Ride to Mission Viejo/Laguna Niguel Station		✓	
State Route 55 Freeway	Santa Ana Regional Transportation Center to Hoag Hospital		✓	

# Corridor Evaluation: Criteria

- Speed and Reliability
- Ridership/Mode Shift/Vehicle Miles Traveled Reduction
- Density/Connections to Activity Centers
- Multimodal Connectivity
- Capacity
- Safety
- Passenger Comfort/Amenities
- Equity
- Economic Development
- Transit-Supportive Policy
- Cost-Effectiveness/Productivity

# Corridor Evaluation: Assumptions

## ■ Right-of-Way

- Streetcar/BRT Corridors: Priority Transit Lane
- Rapid Bus: Mixed-Flow
- Freeway BRT: High-Occupancy Vehicle Lanes

## ■ Weekday Frequencies

- Streetcar, BRT, Rapid Bus: 10 minutes peak, 15 minutes off-peak
- Freeway BRT: 15 minutes peak, 30 minutes off-peak

# Key Findings: Streetcar / BRT

- **Harbor Boulevard/Santa Ana Boulevard and Westminster Avenue/Bristol Street had highest projected ridership compared to other corridors**
- **Key factors:**
  - Streetcar modeled corridors projected to have higher ridership than BRT/Rapid Bus
  - Modes have inherent advantages (capacity, system visibility)
  - Highest existing ridership bus segments and major regional destinations are included in these corridors

# Key Findings: BRT / Rapid Bus

## ■ Freeway BRT

- Much faster speeds
- Provides access to major destinations
- More conceptual work needed for station locations/design

## ■ BRT/Rapid Bus

- Main Street and Beach Boulevard corridors ranked highest
- La Palma Avenue/Lincoln Avenue had highest ridership, but weaker in other measures

# Corridor Potential Next Steps

- **Corridor Studies for Harbor Boulevard/Santa Ana Boulevard and Westminster Avenue/Bristol Street Lines**
  - Harbor Study underway with results in December
  - Determine next segment to study
- **Implement Rapid Bus Service on Beach Boulevard (Bravo! 529)**
  - Project to be implemented in 2019
- **Study Upgrading Main Street Corridor to Rapid Bus**
- **Develop Strategy for Incremental Speed and Amenity Improvements for Rapid Bus (Bravo!) Corridors**
  - Near/medium term: off-board fare payment, all-door boarding, signal priority
  - Long term: queue jumps, improved shelters, business access/transit lanes
- **Conduct Freeway BRT Network Study**
  - Determine cost-benefit of dedicated infrastructure (ramps, stations)
  - More focused analysis of corridors (specific to freeway BRT)
  - Conceptual design for priority corridors (e.g., where to add ramps/stations)



# Other Potential Next Steps

- **Consider Additional Areas for OCFlex Service**
  - Pending results of pilot project
- **Improve Bus Service Routes Countywide Based on Transit Investment Framework Standards**
  - Some improvements for February 2018 service change
- **Supplement Orange County Transportation Authority (OCTA) Year-Round Bus Service with Special Event and Seasonal Shuttles**
- **Work with Local Jurisdictions to Enhance Transit Access and Develop Transit-Supportive Projects**
  - Guidelines in development for final plan

# Upcoming Study Timeline

- Public/Stakeholder Survey Through November
- Present to the Transit Committee and the Board of Directors (Board) in November
- Return to the Board in January with Final Report and Action Plan