



REQUEST FOR INFORMATION (RFI)
RFI #18-R09
AUTONOMOUS TRANSIT VEHICLES

Return Response To:	LYNX Attn: Anthony Jackson 455 Garland Avenue Orlando, Florida 32801	Request For Information RFI No. 18-R09 Autonomous Vehicles
Point of Contact: Anthony Jackson, Senior Purchasing Agent, ajackson@golynx.com		

PROCUREMENT SCHEDULE	
Issue Date:	January 17, 2018
Non-Mandatory Pre-Informational Meeting:	January 26, 2018
Deadline for Questions:	January 30, 2018
RFI Response Due Date:	February 19, 2018

<p>Submittal Instructions: Place a label in the front of your sealed Response envelope or package. Your label shall contain the Purchasing Agent’s name, RFI number, RFI title, opening date and time, and the name of your company.</p> <p>Number of Copies Required: One (1) original, seven (7) copies and one (1) CD or USB flash drive shall be enclosed and sealed in the envelope. Your original must be clearly marked as an Original.</p> <p>Addendum: An Addendum may be issued to this solicitation. Any such Addendum will be posted on LYNX website. Prior to submitting your response please visit our website to download any Addendums that may have been issued. Please remember to sign and return the Addendum Acknowledgment Form with your completed Response Package.</p>
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SECTION 1: INTRODUCTION

PROFILE OF THE AUTHORITY

The Central Florida Regional Transportation Authority (“LYNX” or the “Authority”) is an agency of the State of Florida, created by the Florida Legislature to own, operate, maintain, and manage a public transportation system in the area of Orange, Osceola, and Seminole Counties. LYNX’s enabling legislation (Florida Statutes Section 343.64) has the express intention “that LYNX be authorized to plan, develop, own, purchase, lease, or otherwise acquire, demolish, relocate, equip, repair, maintain, operate, and manage a regional public transportation system and public transportation facilities; to establish and determine such policies as may be necessary for the best interest of the operation and promotion of a public transportation system; and to adopt such rules as may be necessary to govern the operation of a public transportation system and public transportation facilities.” In 1992, LYNX began doing business as “LYNX”.

LYNX has a service area of approximately 2,500 square miles which includes the metropolitan Orlando area and consists of a population of 2.1 million people as of 2016. Fixed route bus service operates from 4:15 AM to 3:05 AM each weekday and provides more than 26 million unlinked passenger trips each year. LYNX is governed by a five-member Board of Directors comprised of representatives from Orange, Osceola, and Seminole Counties, the City of Orlando, and the Florida Department of Transportation, the funding jurisdictions and partners who guide the development of LYNX family of services.

LYNX provides an array of transportation services including fixed route bus services, door-to-door Paratransit services, carpool/vanpool services, NeighborLink, and school pool matching services.

SECTION 2: REQUEST FOR INFORMATION

2.0 PURPOSE

The Central Florida Regional Transportation Authority (“LYNX” or the “Authority”) is requesting information from qualified Respondents knowledgeable in the design, development and implementation of Autonomous Vehicles (AV) for Transit Authorities. Information obtained through this Request for Information (RFI) may be used by LYNX to understand the Autonomous Vehicle technology, the capability of this technology in our current operations, and to develop a Request for Proposal for a Pilot Program. The Pilot Program will provide valuable information regarding this technology and the public reaction/acceptance to this technology in targeted service areas. This RFI will not result in a contract award.

2.1 GENERAL INFORMATION

Request For Information Costs

All costs and expenses incurred by any Respondent or party in responding to this Request for Information, preparing a Response to this Request for Information, participating in this Request for Information (i.e. Interviews, Questions and Answers Sessions, Meeting with LYNX staff, etc.), and any re-submittals, are the sole responsibility of the Respondent.

Compliance Requirement

Respondent shall show how their proposed AV will comply with all state and federal safety standards. Florida standards can be found at: www.leg.state.fl.us/statutes. Federal standards can be found at: <https://www.gpo.gov/fdsys/browse/collection.action?collectionnode=PLAW>.

If Respondent is unable to meet state and federal safety standards to test on public roads, Respondent must explain how National Highway Traffic Safety Administration (NHTSA) exemption will be obtained.

NO RETURN OF RESPONSE

All information submitted shall become the property of LYNX and shall not be returned.

RELIANCE UPON INFORMATION

This document is issued directly by LYNX and LYNX shall be the sole distributor of all addendums and/or changes to this document. It is the responsibility of the Respondent to confirm the legitimacy of procurement opportunities or notices directly with LYNX Procurement department. LYNX is not responsible for any solicitations advertised by subscriber publications, or other sources not connected with LYNX and the Respondent should not rely on such sources for information regarding any solicitation made by anyone other than LYNX.

THE PUBLIC RECORDS ACT AND TRADE SECRET INFORMATION

The Respondent is aware and understands that LYNX is a public entity and, as such, it is subject to the Florida Public Records Act. Subject to certain exemptions, Responses received by LYNX are public records and may be subject to disclosure. The Respondent is aware of this fact and that it is possible that its Response may be disclosed by LYNX pursuant to a public records request.

A Respondent's Response may include certain information which the Respondent believes to be a "trade secret." If a Respondent would like for LYNX to treat such information as confidential, particularly in the event LYNX receives a public records request, then the Respondent must clearly, in bold and large type, identify the specific information which it deems to constitute a trade secret and be confidential. It is unacceptable to LYNX for the Respondent to classify, for example, its entire Response as trade secret and thus confidential.

In the event LYNX receives a request for a copy of a Respondent's Response, LYNX will endeavor to notify the Respondent and will endeavor to comply with the Public Records Law as to what is required to be produced. Absent any clear identification by the Respondent that a portion of its Response is a trade secret and is confidential, LYNX will furnish a copy of the Response in response to any valid public records request and LYNX shall have no liability whatsoever for such disclosure. If the Respondent so identifies a portion of its Response as being a trade secret and confidential, or if LYNX in its discretion determines that a portion of the Response is not subject to disclosure and should not be disclosed (such as if the disclosure would compromise LYNX security systems), LYNX will endeavor to assert said exemption.

In the case of any exemption being asserted by LYNX based upon action by the Respondent (e.g., the Respondent asserts that information in its Response is a trade secret and, as a result, LYNX declines to satisfy a public records request for the portion of the Response which has been identified as a trade secret), the Respondent will indemnify and hold LYNX harmless from any claims, expenses, including attorneys' fees, that LYNX may incur if the person requesting said information pursues its demand that the public record be furnished.

CURRENT ENVIRONMENT:

LYNX currently operates four Bus Rapid Transit lanes, collectively branded as “LYMMO.” The routes range from a fully exclusive guideway (Link 60 – Orange Line) to mostly mixed traffic operations (Link 63 – North Quarter). Each of the routes is located in public right-of-way downtown in the City of Orlando. More detailed information on the system and each of the four routes is provided in Section 5: Description of The Current LYMMO System.

Service is provided using 35 foot Gillig low floor Bus Rapid Transit vehicles. A bus operator drives the route, provides information upon request to passengers, and assists with boarding and alighting of individuals with disabilities or impairments. Stops and stations (stops with bus shelters and seating) are located approximately every city block. Stops are served on request while stations are mandatory stops with doors opened regardless of whether a request is received from passenger on the bus or a person is waiting to board.

All services are current fare-free with boarding and alighting at both front and rear doors. Future service may or may not have a fare with the potential for onboard or off-board fare payment.

SECTION 3: SCOPE OF WORK

LYNX plans to develop an Autonomous Vehicle (AV) Pilot Program to determine which AV will be appropriate for the LYNX LYMMO Bus Rapid Transit (BRT) in downtown Orlando, Florida. LYNX anticipates piloting multiple AV to allow LYNX to evaluate each AV type and to allow the public to gain familiarity with and to gauge the public reaction and acceptance to this new technology.

Potential Single Vehicle Capacity

- 9- 35 passengers
- 2 – 8 passengers

As part of the AV Response, Respondent should indicate the maximum capacity of their vehicle.

REQUIREMENTS FOR AUTONOMOUS VEHICLE:

The below are the minimum requirements in order to operate an Autonomous Vehicle in Orlando Florida for LYNX.

- 1) Continuously transport passengers at a low speed (25 mph limit)
- 2) AV shall be Level 3 Autonomy or higher
- 3) AV shall make both visual and audible internal next stop announcements in English and Spanish
- 4) AV shall be climate controlled. A/C to maintain internal temperature no higher than 75 degrees Fahrenheit and heating to maintain no less than 65 degrees.
- 5) AV shall have 4G or better wireless connectivity with the ability to stream video and other data in real-time for both management and operations of the vehicles, as well as, for passengers.
- 6) AV shall be electric, preferably with charging without wireline infrastructure.
- 7) AV shall be WAVE/IEEE 1609 and SAE J2735 DSRC Message Set Dictionary and WCAG 2.0 and Section 508 (1973 Rehabilitation Act) and Americans with Disabilities Act (1990) compliant.
- 8) AV shall include a display to host real-time information for LYNX services connecting with www.LYNXBustracker.com and other AVL and tracking systems including Clever and Trapeze platforms.
- 9) AV will allow for vehicle exterior wrap with space to advertise and identify project partners.

- 10) Allow for the Highly Automated Vehicles (HAV) system to receive and interpret Signal Phase and Timing (SPaT) and MAP messages from forthcoming Roadside Units (RSU) if installed or planned for installation.
- 11) Respondent shall provide certification of their vehicle consistent with Federal Motor Vehicle Safety Standards (FMVSS) and the HAV system consistent with the US DOT 15-point Safety Assessment for deploying automated vehicle technologies. If a Respondent cannot certify that their proposed vehicle complies with all applicable FMVSS, an exemption from the National Highway Traffic Safety Administration (NHTSA) must be obtained in order to test on public roads.
- 12) Use cybersecurity best practices to protect against unwanted access by outside parties for the purpose of modifying system operations or accessing data governing the system.
- 13) Be appropriately designed and constructed to operate safely and efficiently within the test environment described in this solicitation.

INFORMATION REQUESTED:

LYNX plans to develop an Autonomous Vehicle (AV) Pilot Test to determine which AV will be appropriate for the LYNX LYMMO Bus Rapid Transit (BRT) in downtown Orlando, Florida. LYNX anticipates piloting multiple vehicles to allow LYNX to evaluate different AV types and to allow the public to gain familiarity with and receive transportation service AV technology.

LYNX would like for the Respondents to provide their information pertaining to their AV Technology in addition to the below information.

- Information and plans about Automated Transit Vehicle that are appropriate for the Bus Rapid Transit lines in downtown Orlando.
- Services (maintenance, charging, cleaning, equipment, etc.) to support for testing the Autonomous Vehicles operating on the Bus Rapid Transit lines.
- Cost breakdown for lease vs purchase analysis.
- Funding and financing strategies for the operating and capital elements (V2V, V2X, etc.) associated with similar Automated Transit Vehicle demonstrations.

Questionnaire

Question	Can Provide (Yes/No)	Comments
1. Does your Autonomous Vehicle transport passengers along a low speed controlled roadway?		
2. Do you contract with a service to provide maintenance of the AV?		
3. Americans with Disabilities Act accessibility		
4. Proof-of-concept or pilot Autonomous Vehicle service deployment within the LYMMO Bus Rapid Transit exclusive guideway.		
5. Proof-of-concept or pilot Autonomous Vehicle service deployment within the LYMMO Bus Rapid Transit mixed traffic.		

Question	Can Provide (Yes/No)	Comments
6. Are you willing to Participate in a Pilot Program?		
7. Do you provide the service to operate the Autonomous Vehicle?		
8. Do you have a leasing program for the Autonomous Vehicle?		

Respondents are requested to provide the following information:

- a. Autonomous Vehicle Technology, e.g. system technology, sensor technology, electric, charging infrastructure platform, e.g. depot and enroute, renewable power supply integration; vehicle range in miles, chassis and drive systems.
- b. Describe the navigation, obstacle detection, and traffic signal interface.
- c. Describe vehicle Communications capability.
- d. Identify archived and real-time datasets that could be shared with LYNX for evaluation purposes and how an Automated Transit Vehicle could include compatibility with LYNX Bus Tracker and other real-time and Automatic Vehicle Location systems.
- e. Size and capacity of your fleet.

SECTION 3: PRICING

Respondent shall provide the potential cost to include, but not be limited to the following:

- Provide the cost of one Autonomous Vehicle (Standard Form)
- Cost of maintenance of the Autonomous Vehicle
- The approximate cost to operate the Autonomous Vehicle
- Training Cost (Operators and Maintenance)

SECTION 4: RESPONSE FORMAT

- Respondent shall submit original response and seven (7) copies and one (1) original on a CD or USB flash drive. Responses shall be organized as follows:
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Section One	Cover letter introducing Respondent
Section Two	Respondent Experience and Organizational Structure
Section Three	Autonomous Vehicles Documentation, i.e. types, functionality, operations requirements, warranty, design, capacity, etc.
Section Four	Research and Studies Conducted for Autonomous Vehicles
Section Five	Pricing
Section Six	Autonomous Vehicles suitable for downtown Orlando, Promotional literature

SECTION 5: DESCRIPTION THE OF CURRENT LYMMO SYSTEM

LYNX PROPOSED AUTONOMOUS VEHICLE TESTING RIGHT OF WAY (LYMMO LINES)



LYNX operates four Bus Rapid Transit (BRT) routes branded collectively as “LYMMO.” Each operates downtown within the City of Orlando. Each route is currently provided fare-free; however, any designs for service shall include the potential for both on-board and off-board fare collection. It is likely that off-board fare collection with “proof of payment” would be used if a fare was implemented, but on-board fare collection shall not be eliminated in design decisions.

LYNX currently operates 16 35-foot Gillig low floor BRT buses, each with a capacity of 32 seated individuals and up to 25 standees, on the LYMMO routes. Each vehicle has a fold out wheelchair ramp at the front door to accommodate mobility devices and fold up passenger seats to provide access to two separate securement areas for mobility devices. Devices are secured by the vehicle operator. The current service allows customers to board using either the front or rear doors as no fare is collected.

Each LYMMO service currently operates using the same service hours; however, each LYMMO shall be designed to allow for unique service hours and include the ability to change service hours for special events. The current operating hours are:

Monday through Thursday:	06:00 AM to 10:45 PM
Friday:	06:00 AM to 12:00 AM (midnight)
Saturday:	10:00 AM to 12:00 AM (midnight)
Sunday:	10:00 AM to 10:00 PM

The LYMMO vehicles currently stop at every station (stop with a shelter), opening the doors to allow boarding and alighting regardless of whether or not a request is made or a rider is present. LYMMO vehicles currently only stop at stops (pole with sign but no shelter present) on request or if a passenger is present waiting to board. Each station and stop is served once every 5 to 15 minutes during normal office hours and once every 15 minutes in the evenings and on weekends (see headway for each LYMMO, listed below with each line's description).

LYNX operates some fixed route buses in the LYMMO lanes to assist in their movements in the downtown core. These buses do not stop at the LYMMO stops or shelters (with the exception of KnightLYNX 212) and do not pass LYMMO buses (with the exception of at Livingston Street and Hughey Avenue westbound where the LYMMO bus has a pull out bay). Buses will only pass a disabled bus, parked vehicle, or obstruction. Only LYNX buses and emergency vehicles are to use the LYMMO lanes; however, occasional violations occur by general traffic vehicles, including vehicles operating in the wrong direction within a LYMMO lane).

Additionally, each route must accommodate the ability to change route in case of a lane blockage due to construction, accidents, emergency vehicle activity, or other disruption to the normal routing. It shall be noted that emergency vehicles use LYMMO exclusive guideway and will stop in the lane. Any Automated Transit Vehicle technology shall require the ability to determine if a vehicle is stopped in the lane and needs to be passed. It shall also require the ability to distinguish between emergency vehicle lights and traffic lights. Some lines, as noted below in the descriptions, cross railroad tracks and will need to determine when to yield at the crossings and shall not stop on the tracks or within the railroad right-of-way.

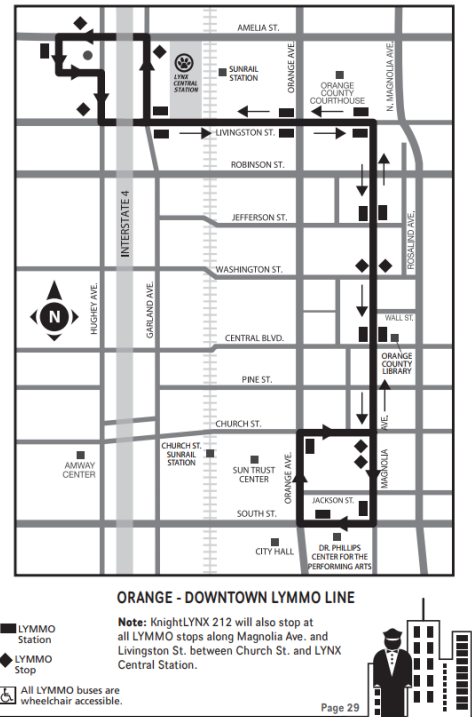
Each route has a layover point at which the bus holds to then pull out at a time interval to maintain a headway (space between buses). For example, the Orange Line (Link 60) buses will layover in the parking garage structure, and then pull out on the next 5 minute increment. A bus that arrives at 2:37 PM will hold and then pull out at 2:40 PM while a bus arriving at 3:01 PM will hold and pull out at 3:05 PM. The headway of between 5 to 15 minutes would need to be maintained by Automated Transit Vehicles, including making it understood by customers why the bus is not moving.



LYMMO routes use traffic signals similar to those pictured above for exclusive lanes and exclusive signal phases in mixed traffic intersections. Routes use the general traffic signal with other traffic at intersections without an exclusive phase for the LYMMO vehicles. The vertical bar is equivalent to a green phase, the diagonal bar is equivalent to a yellow phase, and the horizontal bar is equivalent to a red phase.

ORANGE – DOWNTOWN LYMMO LINE – LINK 60

This route is expected to be used for the initial demonstration of Automated Transit Vehicles. Link 60, the Orange Line, operates on 2.5 miles of roadway, all in exclusive right-of-way. It does not operate in mixed traffic. It crosses intersections using BRT-style traffic signals (vertical, diagonal, and horizontal white bars). Each signal has an exclusive phase for the LYMMO buses. It crosses an active rail line in both directions on Livingston Street between Hughey Avenue and Orange Avenue. The line operates through and lays over within a concrete parking structure located off of Amelia Street west of Hughey Avenue. It also operates approximately one block each way under the elevated lanes of Interstate 4, operating westbound on Amelia Street and eastbound on Livingston Street. All lane segments have adjacent pedestrian sidewalks and most encounter pedestrian crossings at intersections, at crosswalks (at the Orange County Courthouse), and midblock pedestrian crossings throughout. Service partially overlaps with Links 61, 62, and 63.



This route may experience an increase in pedestrians from events at the Bob Carr Theatre.

Link 60 operates every 5 to 7 minutes during office hour and every 15 minutes during evenings, weekends and holidays.

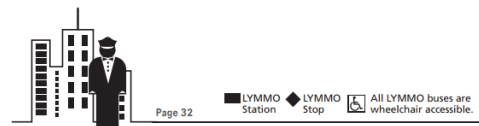
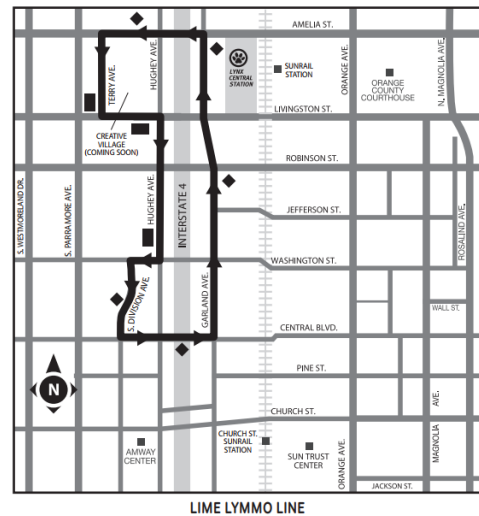
FISCAL YEAR 2017 RIDERSHIP

ORANGE LINE				
Link #	60			
Month	Avg. Weekday	Avg. Saturday	Avg. Sunday	Total Month
Oct-16	2,172	1,263	978	54,643
Nov-16	2,091	1,112	953	54,255
Dec-16	2,153	1,093	850	56,237
Jan-17	2,200	956	957	57,004
Feb-17	2,233	1,000	954	52,479
Mar-17	2,012	1,024	1,024	53,773
Apr-17	2,176	1,102	853	53,289
May-17	2,432	1,244	942	63,182
Jun-17	2,598	1,124	861	65,095
Jul-17	1,689	1,087	1,053	61,807
Aug-17	1,511	661	861	62,683
Sep-17	1,448	991	661	49,457
				683,904

LIME – PARRAMORE – LINK 61

Link 61, the Lime Line, operates on 2.1 miles of roadway, 1.52 miles in exclusive lanes and .58 miles in mixed traffic. It crosses intersections using BRT-style traffic signals (vertical, diagonal, and horizontal white bars) while in exclusive lanes and using general traffic signals while in mixed traffic. It operates approximately one block each way under the elevated lanes of Interstate 4, operating westbound on Amelia Street and eastbound on Livingston Street. All lane segments have adjacent pedestrian sidewalks and most encounter pedestrian crossings at intersections, and midblock pedestrian crossings throughout. This route lays over at the corner of Terry Avenue and Livingston Street. Service partially overlaps with Link 60, and 62.

Link 61 operates every 10 minutes during office hour and every 15 minutes during evenings, weekends and holidays.

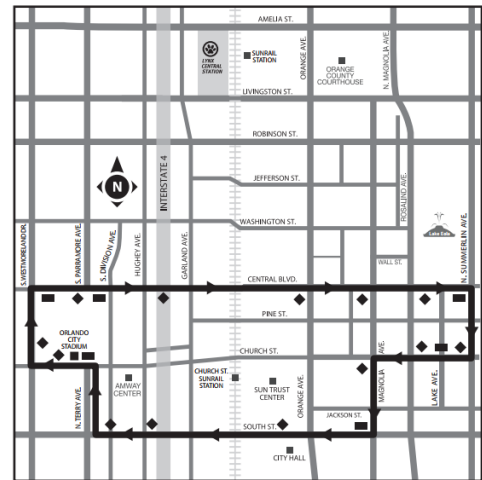


FISCAL YEAR 2017 RIDERSHIP

LIME LINE				
Link #	61			
Month	Avg. Weekday	Avg. Saturday	Avg. Sunday	Total Month
Oct-16	336	106	119	7,849
Nov-16	252	154	103	6,577
Dec-16	227	104	146	6,100
Jan-17	294	119	92	7,403
Feb-17	277	103	90	6,306
Mar-17	252	112	112	6,602
Apr-17	259	147	87	6,357
May-17	166	69	52	4,176
Jun-17	167	116	84	4,473
Jul-17	148	94	106	4,061
Aug-17	145	97	106	4,830
Sep-17	186	63	73	4,210
				68,944

GRAPEFRUIT – LINK 62

Link 62, the Grapefruit Line, operates on 3.73 miles of roadway, 1.9 miles in exclusive lanes and 1.83 miles in mixed traffic. It crosses intersections using BRT-style traffic signals (vertical, diagonal, and horizontal white bars) while in exclusive lanes and using general traffic signals while in mixed traffic. It operates approximately one block each way under the elevated lanes of Interstate 4, operating westbound on South Street and eastbound on Central Boulevard. All lane segments have adjacent pedestrian sidewalks and most encounter pedestrian crossings at intersections, and midblock pedestrian crossings throughout. This route can experience a high volume of pedestrian traffic including mid-block crossings during events at the Amway Center and the Orlando City Stadium. This route lays over under Interstate 4 on Central Boulevard. Service partially overlaps with Links 60, 61, and 62. The route may be extended west to Camping World Stadium on game days. LYNX works with the City of Orlando to designate temporary exclusive use lane during these events. These event will have heavy pedestrian traffic. City or Orlando police officers will manually change general traffic signals to prioritize the operation of the LYMMO vehicles during these game day shuttles.



GRAPEFRUIT LYMMO LINE

Note: KnightLYNX 212 will stop at the LYMMO stop located at Magnolia Ave. and Church St.

LYMMO Station
 LYMMO Stop
 All LYMMO buses are wheelchair accessible.



Link 62 operates every 10 minutes during office hour and every 15 minutes during evenings, weekends and holidays.

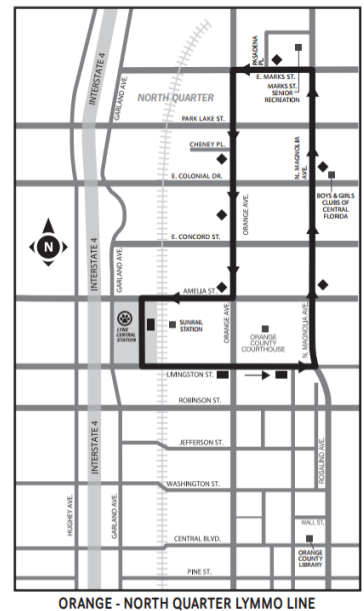
FISCAL YEAR 2017 RIDERSHIP

GRAPEFRUIT LINE				
Link #	62			
Month	Avg. Weekday	Avg. Saturday	Avg. Sunday	Total Month
Oct-16	1,176	765	868	31,695
Nov-16	1,331	618	773	34,840
Dec-16	1,191	857	777	33,596
Jan-17	1,208	928	772	34,152
Feb-17	1,320	845	751	32,790
Mar-17	1,154	749	749	32,388
Apr-17	1,202	746	805	31,799
May-17	1,366	913	774	37,572
Jun-17	1,174	883	815	32,612
Jul-17	1,199	745	680	33,660
Aug-17	1,337	838	671	42,295
Sep-17	1,245	764	866	40,044
				417,443

ORANGE – NORTH QUARTER LYMMO LINE – LINK 63

Link 63, the North Quarter, operates on 1.5 miles of roadway, approximately 1.25 miles in mixed traffic and 0.25 miles in exclusive guideway. It crosses intersections using BRT-style traffic signals (vertical, diagonal, and horizontal white bars) in the exclusive guideway and general purpose traffic signals at all other intersections. LYMMO buses move with general traffic at all signals not in the exclusive lanes. It crosses an active rail line westbound on Amelia Street between Hughey Avenue and Orange Avenue and eastbound on Livingston Street between the same intersections. All lane segments have adjacent pedestrian sidewalks and most encounter pedestrian crossings at intersections and midblock pedestrian crossings throughout.

The line operates through and lays over within LYNX Central Station under a metal canopy roof located off of Amelia Street east of Hughey Avenue. The bus must merge from the right lane to left lane on North Magnolia Avenue (three lane one-way northbound street) to turn left on Marks Street. It must make an unprotected left turn lane across two opposing lanes on Amelia Street turning south into LYNX Central Station and across an exclusive bus lane with cross traffic when exiting south from LYNX Central Station. The bus must operate in a heavy pedestrian environment within LYNX Central Station and layover in a bus bay. Service partially overlaps with Link 60.



ORANGE - NORTH QUARTER LYMMO LINE

LYMMO Station
 LYMMO Stop
 All LYMMO buses are wheelchair accessible.

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Link 63 operates every 15 minutes during office hour and every 15 minutes during evenings, weekends and holidays.

FISCAL YEAR 2017 RIDERSHIP

NORTH QUARTER				
Link #	63			Link 63
Month	Avg. Weekday	Avg. Saturday	Avg. Sunday	Total Month
Oct-16	147	119	71	3,886
Nov-16	127	113	57	3,470
Dec-16	108	80	56	2,996
Jan-17	115	73	72	3,180
Feb-17	140	90	67	3,426
Mar-17	124	71	71	3,390
Apr-17	136	134	113	3,955
May-17	117	91	82	3,353
Jun-17	144	100	129	4,075
Jul-17	151	93	97	4,071
Aug-17	140	85	83	4,257
Sep-17	110	80	72	3,152
				43,211