

# The Bulletin

**Electric Railroaders' Association, Incorporated**

Vol. 62, No. 9

September, 2019

## **The Bulletin**

Published by the  
Electric Railroaders'  
Association, Inc.  
P. O. Box 3323  
Grand Central Station  
New York, NY 10163

For general inquiries,  
or *Bulletin* submissions,  
contact us at  
[bulletin@erausa.org](mailto:bulletin@erausa.org)  
or on our website at  
[erausa.org/contact](http://erausa.org/contact)

Editorial Staff:

**Jeffrey Erlitz**  
*Editor-in-Chief*

**Ronald Yee**  
*Tri-State News and  
Commuter Rail Editor*

**Alexander Ivanoff**  
*North American and  
World News Editor*

**David Ross**  
*Production Manager*

Copyright © 2019 ERA

### **This Month's Cover Photo:**

Flatbush Avenue & Fourth Avenue from Hanson Place. LIRR Flatbush Avenue terminal on the left. Fifth Avenue elevated train is stopped at the Atlantic Avenue station. c.1910. Underhill Photographers.

**In This Issue:  
The Genesis of  
Dashing Dan —  
A New Jamaica  
and the Main  
Line Complete  
...Page 2**



## **JOHN E. PAPPAS, 1943-2019** **by Alexander Ivanoff**

John Emanuel Pappas, ERA First Vice President and Associate Editor of **Headlights** magazine, died on the morning of Monday, July 29, 2019 at the age of 75. He had been battling cancer for almost a year.

John was a latecomer to the Electric Railroaders' Association, having joined in 2000. He quickly rose to the position of First Vice President, a title he held for 10 years until his death. As Associate Editor of **Headlights**, his prolific content contributions since 2006 continued growing until he wrote and mostly photographed full issues himself. He collaborated with Sandy Campbell on the multi-year "Rails to Rubber to Rail" series, followed by the single-feature issues on ERA's Japan, Poland, and Germany tours, and culminating with the 2018 issue focusing on the return of PCC Streetcars to El Paso, Texas.

John had been a railfan from an early age, having grown up in Los Angeles, California during the twilight years of the Pacific Electric interurban and Los Angeles Railway. It was that love of trains and electric traction, especially trolley buses, that helped set him on his career path of transit management. After a stint in the United States Army in Germany, John returned to the West Coast, working in San Francisco for transit consulting firms.

If you were to ask John what his greatest accomplishment was, he would proudly boast that he was instrumental in setting up the bus systems in the cities of Iowa City, Iowa and Chapel Hill, North Carolina. Four decades after leaving, Transit Director Brian Litchfield recognized John for his role in setting up the network in Chapel Hill.

John then went to work in Ohio. During a brief stint at the Greater Cleveland Regional Transit Authority, John worked on the rehabil-

itation of the two remaining Illinois Terminal PCCs that were used during a reconstruction project on the Shaker Heights Line (one of these cars is now preserved at the Connecticut Trolley Museum). At the close of the 1970s, John moved to Texas where he worked for Houston METRO for almost two decades before returning to Ohio where he worked for several years as head of operations for the Greater Dayton Regional Transit Authority.

It was his role as Senior Director of Schedules for the New York City Transit Authority that took John to New York City. After leaving NYC Transit, John served as an independent consultant for numerous transit systems across the United States, including Sacramento, San Francisco, Houston, and various other agencies. John also consulted for NJ Transit on the Hudson-Bergen Light Rail project. John made no secret of his ability to help any transit system with its scheduling woes.

Despite being from Los Angeles, John considered himself a citizen of the world. He was a prolific traveler, having visited all 50 states, parts of Asia, and most of Europe. John's wealth of information proved valuable on numerous ERA publications and could at a moment's notice recall the most trivial of information about a given system.

Unfortunately, John's failing health curtailed many travels he wanted to undertake, including the 2019 ERA Annual Convention to the Southwest. However, he managed to find the strength in July to travel to Pittsburgh on a private rail car charter with his close friend, ERA Treasurer Michael Glikin.

John was a man of deep faith, attending  
(Continued on page 4)

# THE GENESIS OF DASHING DAN — A NEW JAMAICA AND THE MAIN LINE COMPLETE

**by George Chiasson**  
**(Continued from August, 2019 issue)**

## **THE WOODSIDE-WINFIELD CUT-OFF**

While the LIRR did have a corporate expectation that most, if not all of its legacy grade crossings would ultimately be addressed within city boundaries, after the so-called Atlantic Avenue Improvements and the construction of Pennsylvania Station it was disinclined to take any initiative in this regard, if not to overtly search for guidance (and/or financial participation) from municipal authorities. As demonstrated above the most pressing need in this area after Penn Station's opening in September of 1910 was the Main Line's passage through the former Queens County Village of Woodside, which by this time had been transformed into a bustling residential and commercial neighborhood and was ripe for renewed development. While this district was in definite need of the LIRR's presence, and the rest of the Main Line was already being expanded or rebuilt to provide for the anticipated operational intensity associated with the Pennsylvania Tunnel & Terminal project, the railroad would stand to gain in economic and operational efficiency and the neighborhood in desirability, with a greater likelihood of profitable, stable growth were its twin two-track main lines to be diverted to some of its (then) more peripheral reaches. Again aided by its corporate parent, the LIRR was taking action to mitigate the costly, difficult operating environment of its original (1861) Main Line by designing the "Woodside-Winfield cut-off." This was an entirely new "pre-packaged" and grade-separated right-of-way across what was at that time sparsely settled land along Woodside's northerly perimeter. Property acquisition for this new right-of-way was actually begun as early as 1908 as a continuation of transactions related to the Sunnyside Yard project, with some survey work undertaken during the following year before the potentially massive endeavor entered a period of municipally-induced abeyance. It was finally re-started during 1912 in concert with the City of New York's thoroughfare initiative, which also relieved the LIRR (and by extension the Pennsylvania Railroad) of all political and certain financial responsibilities. The initiative was a progressive concept aimed at improving public mobility, forwarded under New York Mayor William Jay Gaynor, who was a Democratic jurist voted into office in 1909 as the pick of Tammany Hall, but proved to be too much of a reformer to maintain their support. Through the same impetus, the city was planning to expand or convert several local streets into a continuous Queens Boulevard which would reach from the new Queensborough (a/k/a Blackwell's Island) Bridge into the central areas of the borough. As things developed, the city also undertook an extension of Greenpoint Avenue into a road known as Roosevelt Avenue, built largely from scratch in support of an equally-new "municipal"

elevated rapid transit line (now the **7**) to Corona.

In fact it was the city's initiative which blocked progress on the LIRR relocation for a period far surpassing that of Penn Station's opening, though the railroad(s) had hoped to complete it at the earliest possible date. The chief culprit in this regard became the long, slow development of Queens Boulevard in its initial form. As with Roosevelt Avenue, this was also in part built as an entirely new main road (on the undeveloped Thomson Avenue survey across Sunnyside) and partly transformed from the existing Thomson Avenue into Woodside, which involved a good bit of property condemnation and street reconfiguration. In addition the city led all design on the elaborate new LIRR overpass projected for "the Queens Boulevard" and a few others as well, all of which were subject to a public review for several reasons (including the aesthetic, as had been the case for the North Side Division overpass at Main Street in Flushing). This served to bog down the eventual construction process all the more, while the actions of both the city and the railroad were continuously subject to oversight by the state's Public Service Commission. As that new arterial was created by enlarging the existent Thomson Avenue, what resulted was a 3-section span with ornate steel facing suspended between Beaux-Arts concrete piers, each adorned with arches intended for pedestrian passage, including the provision of space through the center span for the Manhattan & Queens Traction trolley line to Jamaica. For its part, another contributing factor was lingering uncertainty regarding the elevated rapid transit line that the city sought to add to its new access network (eventually the joint IRT/BRT route to Corona and later Flushing), on which final design and construction could not proceed (nor that of extending Greenpoint Avenue into the new Roosevelt Avenue) until the landmark "Dual Contracts" agreements of March, 1913 were executed. Their consummation finally granted all parties a meaningful fair weather window in which to work on this multi-faceted project, and (as in Jamaica) the creation of a combination embankment and open cut for the new LIRR alignment began at last. Early in this project a larger though temporary station called "Woodside" was established with city and PSC permission for both the Main Line and North Side Division, off Woodside Avenue at Schroeder Place (now 60<sup>th</sup> Street at Woodside Plaza). The original stop was thus removed from a key construction site, being repositioned to a location which also made it easier for patrons to access the Corona trolley line of the New York & Queens County Railroad Company. This service used Anderson, Kelly, and Woodside Avenues (now 37<sup>th</sup> Avenue, 61st Street, and Woodside Avenue) to pass

*(Continued on page 3)*

## The Genesis of Dashing Dan

*(Continued from page 2)*

through the neighborhood until August, 1925.

To carry the railroad on an even grade from Woodside Avenue to Winfield Junction, a total of seven large steel and concrete bridges were constructed along the length of the project: 4th (57th) Street; Riker (39th) Avenue & 5th (58th) Street; Kelly Avenue (61st Street); (new) Roosevelt Avenue; Queens Boulevard (from Thomson Avenue); Fisk Avenue (69th Street) & Franklin Street (47th Avenue); and Monroe Street (48th Avenue) & Madison Avenue (70th Street). In contrast to previous experience, it can be noted that three of these were of a compound nature to enable all or part of a street intersection to be completed beneath the railroad. To compensate for a mild rise in the natural topography otherwise, four concrete-lined underpasses were also excavated for the new alignment at 10th (63rd) Street; Woodside Avenue; Bowne Avenue (65th Street); and Hyatt Avenue (65th Place). A total of six parallel, electrified tracks were constructed, continuing in their traditional configuration from north to south (two for the North Side Division [1 and 2] and four for the Main Line [numbered 3, 1, 2, and 4]), along with two new stations. One was a third version of "Woodside" with separate platforms for the Main Line Local and North Side tracks, while it would be passed up by Main Line Express trains on 1 and 2. The Woodside LIRR station was centered near Kelly Avenue (61st Street), approximately where the Roosevelt Avenue extension would pass underneath, while its accompanying elevated line was to cross over the railroad, with passenger interchange facilities provided in-between (mezzanine level ticket office and waiting area). The other new passenger station was created at Winfield, but unlike its predecessor would only serve the two North Side tracks, thereby removing it from the Main Line completely. Access to this third edition of Winfield station was to be achieved through a pedestrian underpass off the dead end of Lexington Avenue (72nd Street), about two blocks east of the older location. As familiar finishing touches, the so-called Woodside-Winfield cutoff would also be fully signaled and sport the distinctive steel skeleton masts that the LIRR had come to be known for across Brooklyn, Queens, and Nassau in its electrification era to provide for cable transmission.

Once underway, work proceeded rather rapidly (especially considering the large scope of the three compound overpasses and the jumbo, unlucky, and sometimes-decried span across Queens Boulevard). By February of 1915, a pair of temporary leads were established at ground level for Main Line tracks 1 and 2 from Madison to Maurice Aves. (70th Street to 51st Avenue) which routed them around the coming Winfield Junction link-up of the old and new alignments. Trains were then sorted through a series of crossovers controlled by "WJ" Tower to access either the Rockaway Beach Division or Jamaica station. This also forced the elimination of the long-standing (1861) Main Line station at Winfield and

relocation of that serving the North Side tracks to its new position "400 feet eastward" at Lexington Avenue, most likely with temporary low platforms. The new right-of-way was essentially complete by the late Summer of 1915, when a single track (North Side 1) was connected at the east end and the qualification of operating personnel began using temporary crossovers to access whatever trackage had been sufficiently completed to handle train movement.

On October 6 (a Wednesday) permanent connections were established from North Side 1 and Main Line 3 to the new alignment at Woodside Avenue and (new) Winfield Junction, and all westbound train traffic diverted onto the new cutoff, concurrently starting use of the new, high platforms at Winfield (North Side trains only) and Woodside (North Side and Main Line), with express trains crossing onto Main Line 3 at "WJ" for their passage across the new line. To retain access to the original alignment (from then on known as "the old line"), temporary crossings were also laid at each end between (old) North Side 2 and (new) Main Line 3. The completion of remaining trackage and special work (as controlled by the existing "WJ" Tower which had stood at the junction since 1884) occurred over the following two weeks, with all heavy construction finished and each eastbound iron on its permanent alignment (with final connections omitted) as of October 17. The installation of electrical facilities and signaling then followed for another three weeks and the Woodside-Winfield cutoff, including the two new stations in both directions, was opened in full on Monday, November 8, 1915. Finishing touches were then applied through the month of December, including the installation of the new eastbound high platform at the Winfield station, the physical relocation of "WJ" Tower to the south side of the right-of-way (next to the compound crossing of Fisk Avenue & Franklin Street), and a short extension of the North and South sidings (the outer leads from the Rockaway Beach Division) between Maurice (51st) Avenue and Winfield Junction. The "temporary" Main Line connections earlier laid around Winfield Junction then became a pair of team tracks, while the "old line" through Woodside village as well as the Woodside Branch (that final remnant of the ill-fated Flushing & Woodside venture), were quickly forsaken. This part of the original New York & Jamaica Rail Road survey was then turned over to the city in exchange for easements related to the new alignment — its curving, congested and grade crossing-choked profile soon to be overrun by the urban streetscape and through the years largely, if not completely forgotten. So marked the basic completion of the Long Island Rail Road's Main Line, and so it remains one hundred years later: a fast, level, electrified, and multiple-tracked right-of-way, bereft only of its Rockaway Beach connections, that discreetly passes through some of Queens' densest neighborhoods to link New York City with the Long Island suburbs.

*(Continued next issue)*

## AMTRAK SOLARI BOARD ON DISPLAY AT RAILROAD MUSEUM OF PENNSYLVANIA by Henry Raudenbush

The Railroad Museum of Pennsylvania is exhibiting the Solari departure/arrival board that served for many years at Philadelphia's William H. Gray 30<sup>th</sup> Street Station. Member Randy Glucksman passed along this remembrance from member Henry Raudenbush.

I am old enough to remember when train arrivals were noted — in remarkable chalk handwriting on glass "blackboards" at 30<sup>th</sup> Street, and the Arrivals Levels at Penn Station and Grand Central — another bit of history. I wonder if anyone photographed them — I think I thought of it but I don't think I did.

Another bit of information history — the telautograph which showed the latest arrival information. At Grand

Central there was a telautograph receiver for public view at both the upper and lower information booths. Just now I looked up "telautograph" on the web and bingo! Lots of information. So we can celebrate tomorrow (July 31) the 131<sup>st</sup> anniversary of Elisha Gray's patent of the telautograph.

Brooklyn railfan (and ERA member) Bob Presbrey was a technician for the Telautograph Company. He told me how that device was heavily used on Wall Street because it could transmit signatures authorizing transactions. Probably less likely to be abused than today's fax!

### John E. Pappas, 1943-2019

(Continued from page 1)

services at the Brooklyn Tabernacle almost every Sun-

day. He is survived by his son Tim, daughters Nancy and Beth, nine grandchildren, and a lifetime of wonderful memories.



John Pappas handing out safety vests and hardhats during a tour of the Hudson-Bergen Light Rail system that he organized, February 4, 2006.

Sandy Campbell photograph

# Commuter and Transit Notes

No. 368

by Ronald Yee and Alexander Ivanoff

## MTA LONG ISLAND RAIL ROAD

Representatives from Kawasaki Rail Car, Incorporated said at the July 24 MTA Board meeting that the first of the Long Island Rail Road's M-9 multiple-unit cars should be in service in August. A team of Kawasaki executives offered assurances that the Japanese manufacturing giant is committed to completing the project promptly.

In September, 2013, the railroad awarded a \$1.8 billion contract to Kawasaki to design and manufacture the cars, which are expected to address the LIRR's booming ridership and replace the aging 1980s-era M-3 electric cars. LIRR ridership is expected to grow further once the railroad links to Grand Central Terminal in 2022.

The first 92 cars, priced at about \$403 million, originally were supposed to roll out in September, 2017, but their manufacturing has been besieged by setbacks, including from design problems and a derailment last year of several of the cars before they could be delivered. The LIRR expected to debut the trains in May, but President Phillip Eng said some new issues that arose in testing again pushed back the rollout.

The railroad has exercised an option to buy an additional 110 cars, bringing the cost of the fleet of 202 to \$734 million.

Kawasaki President Yoshinori Kanehana said with about 80 percent of all outstanding problems fixed, he expects the LIRR to begin accepting the first 41 new cars "before the end of August." Testing of some of the new trains on the LIRR's tracks was scheduled to commence Wednesday night, July 24.

Among the issues still to be resolved, Kawasaki officials said, is a problem with the trains' automatic speed control function and with a new automatic station identification system on the cars. Kawasaki officials said the fix involves fine-tuning the exact location of the LIRR's 124 stations.

As with Siemens with the issues with PTC, the MTA Board last month sent a letter to Kawasaki executives requesting that they appear before them to answer for the recent problems with manufacturing the new trains. Despite the frustration with the late deliveries, both LIRR management and the MTA were satisfied with Kawasaki's attendance and saw it as a gesture of goodwill.

The SPEED unit that the MTA set up to examine speed restrictions and to increase maximum authorized speeds will see its scope expanded to include the commuter rail lines and to improve speeds where appropriate, including ensuring that signals are calibrated. (*Newsday* via Randy Glucksman, July 25)

On Monday, August 12, the LIRR shifted its Merillon Avenue station on the Main Line several hundred feet west to temporary platforms. This enabled the Main Line Third Track contractors, 3TC, to begin demolishing

the remaining, easterly portions of the original concrete, high-level platforms. Those concrete high-level platforms, probably built in the late 1980s, replaced the original timber and asphalt high-level platforms constructed in 1968-9 for M1 service.

3TC will build the new westbound platform in the same location as the original one and the new eastbound platform will be built south of where the new third track will eventually be located, on the south side of the right of way. The new platforms will be 12 cars long and be equipped with canopies, something that was completely missing from the existing 10-car platforms.



On the first day of service at the temporary Merillon Avenue station, M-7 7667 (Bombardier Transportation, 9/2006) brings train #1705 (operating from Huntington to Penn Station, and on to West Side Yard) to a station stop. These platforms are reminiscent of the ones that had existed during grade crossing elimination projects in years past.

Jeffrey Erlitz photograph



M-7 7451 (Bombardier Transportation, 6/2005) leads train #1705 (Huntington-Penn Station) through the remains of the previous set of platforms. They had been shortened from ten to six car lengths several months ago. The centers of the temporary platforms are about 550 feet west of the west ends of the platforms you see here.

Jeffrey Erlitz photograph

(Continued on page 6)

### Commuter and Transit Notes

*(Continued from page 5)*



In another view taken from the east end of the temporary east-bound platform, C-3 5007 (Kawasaki Rail Car, 12/1999) leads train #2743 (Speonk to Jamaica, with equipment on to Long Island City) non-stop through the now-closed platforms. To the right, you can see the supports for the new eastbound platform under construction. The third track will be located where the eastbound platform is currently.

Jeffrey Erlitz photograph

Over the weekend of August 17-18, 3rd Track Constructors (3TC), the design-build firm constructing the third track on the Main Line, rolled another new bridge into place, this time at South Tyson Avenue in Floral Park. This new bridge replaced the north half of the two-track bridge that carried the Hempstead Branch over this street. The bridge that got replaced had been put into service when the Floral Park area was grade-separated in 1962. This new bridge was required because that is the spot where a new switch will be installed to begin the third Main Line track.



M-3 9940 (Budd-GE, 9/1986) leads #7512 (Atlantic Terminal-East Williston) at the Floral Park station on Saturday, August 17, 2019. All Hempstead Branch trains were rerouted to Mineola for the weekend during the bridge replacement so, for the first time in many years, Main Line trains made station stops at Floral Park. These trains operated without passengers from Mineola to East Williston to turn.

James Mardigian photograph



At about 3:20 PM on Saturday, August 18, as #7512 leaves the Floral Park station en route to Mineola and finally East Williston, the new bridge has already been installed and crews are preparing to reinstall the westbound Hempstead Branch Track 1 over it. If you look closely at the center distance, you can see the old bridge had been lifted out and placed on the embankment just east of South Tyson Avenue. Note the new end cap on the trailing M-3, 9935. This pair of M-3s is also one of this class that are receiving PTC equipment. The short box on the roof of this last car has all of the new PTC antennas on it.

James Mardigian photograph



C-3 5012 (Kawasaki Rail Car, 8/1999) leads #6551 (Oyster Bay-Jamaica) over the Main Line's bridge over South Tyson Avenue east of the Floral Park station on Sunday, August 18, 2019. Just to the right of center, the new Hempstead Branch/Main Line Third Track bridge is in place. Westbound Hempstead Branch Track 1 has been reinstalled over the new bridge but the third rail has yet to be installed.

James Mardigian photograph

Just one week later, over the weekend of August 24-25, 3rd Track Constructors will be rolling in the new bridge at the former grade crossing at Covert Avenue in New Hyde Park.

### OTHER TRANSIT SYSTEMS

#### BOSTON, MASSACHUSETTS

MBTA announced on August 15 that the first six new CRRC-manufactured cars for the Orange Line had entered service. These six new cars entering passenger service are the first of 152 new cars that will completely replace and expand the current Orange Line fleet

*(Continued on page 7)*

### Commuter and Transit Notes

*(Continued from page 6)*

(which is composed of 120 cars), ensuring an additional 30,000 riders per day can be accommodated on the Orange Line once all cars have entered passenger service.

As part of the MBTA's \$8 billion, five-year capital investment plan, the Orange Line is being completely rebuilt. The Orange Line Improvement Program includes infrastructure improvements, signal upgrades, and the complete replacement of the Orange Line car fleet.

The new Orange Line cars incorporate a variety of new features that improve reliability, maintainability, communications, safety, and comfort. They include more spacious interiors, LED lighting, automatic passenger counters, closed circuit cameras and video recording, and onboard diagnostics for operators and maintenance staff. The new vehicles also feature various accessibility improvements, including wider door openings, gap mitigation devices, additional passenger emergency intercoms, more handrails, four accessible access locations per car (two more than current cars), and modern audio and visual passenger information.

When all of the new cars are in service and infrastructure projects have been completed, Orange Line headways will be reduced from six minutes to 4.5 minutes. The larger standardized fleet of entirely new cars will also allow the MBTA to implement a lifecycle maintenance program that will result in better maintained vehicles, fewer disabled trains and breakdowns that cause service disruptions, and an extended service life of at least thirty years.



New Orange Line cars make their debut, here at the Wellington station in Medford.

*Joshua Qualls-Metro Report International* photograph

Delivery of the new Orange Line cars is underway with all cars being assembled and tested at CRRC's Rail Car Assembly Facility in Springfield, Massachusetts, before entering a testing phase at the Wellington Yard and Maintenance Facility. It is anticipated that the next brand

new six-car Orange Line train will enter service in the Fall of 2019 with new cars continuing to enter passenger service incrementally through 2022. (MBTA press release via **Mass Transit** Magazine, August 15)

The Massachusetts Bay Transit Authority's (MBTA) new Red Line Wollaston station opened on August 16. Prior to its closure, Wollaston was the last of 22 stations on the Red Line that was not ADA-compliant.

New features and upgrades to the station include elevators, additional customer paths, upgraded stairways, new bathrooms, and additional lighting. New electrical, fire protection, security, flooding mitigation, and site utility upgrades will also occur to support the accessible improvements.

Improvements include three elevators; two escalators; additional customer paths to/from the new station, including two additional stairways; new bathrooms; and energy-efficient lighting.

With customers' safety in mind and to accelerate the \$36 million station reconstruction, Wollaston was closed for approximately 20 months. The station project is component of a series of major investments along the south side of the Red Line and is part of the MBTA's five-year, \$8 billion Capital Investment Plan that is now underway. (MBTA press release via **Mass Transit** Magazine, August 16)



**Wollaston Station.**  
Massachusetts Bay Transportation Authority

### SPRINGFIELD, MASSACHUSETTS

Daily passenger train service between the city's Union Station, Holyoke, Northampton, and Greenfield was to begin as soon as August 30. However, the start date could be pushed back depending on results of passenger-less nighttime test runs Amtrak made from Springfield to Greenfield along the Knowledge Corridor line the week of August 12, according to the Massachusetts Department of Transportation. Track and signal work have already delayed the start of service.

Officials have said the test runs are meant to familiarize staffers with the route and make sure Amtrak's equipment can operate safely on the line that already hosts Amtrak's *Vermont* long-distance train running from St. Albans, Vermont, to Washington, D.C.

CTrail ridership in Springfield totals 11,000 after its

*(Continued on page 8)*

## Commuter and Transit Notes

(Continued from page 7)

first year; Union Station welcomed 2.5 million passengers. Overall, the CTrail Hartford Line has hosted more than 630,000 passengers in its first year.

The trains will be a continuation of Amtrak shuttles from Springfield to New Haven, Connecticut, part of the Hartford Line service it has operated with CTrail for a little over a year. The extended service to Greenfield is a two-year pilot program.

Governor Charlie Baker and U.S. Representative Richard E. Neal announced the rail plans last year at a news conference in Union Station. Neal long championed the \$108 million rehab of Union Station including \$11 million of platform and elevator work for Platform C that will make it accessible to those with physical handicaps.

In January 2010, Massachusetts was awarded \$70 million in federal stimulus funds for design and construction of the Knowledge Corridor along the Connecticut River. Track restoration began in 2013 and was completed in late 2014. Amtrak's *Vermonter* service was rerouted back onto this original, shorter and faster line, avoiding a reverse move in Palmer, Massachusetts. (*The Springfield Republican* via **Mass Transit** Magazine, August 16)

### PHILADELPHIA, PENNSYLVANIA

The Southeastern Pennsylvania Transportation Authority (SEPTA) commenced its seventh consecutive Trolley Tunnel Blitz in early August where crews shut down the tunnel for nine days for maintenance and construction tasks.

During this year's nine-day tunnel closure, members of SEPTA's in-house Engineering, Maintenance & Construction Division crews worked around-the-clock on key maintenance and construction tasks throughout the five-mile, single loop Center City tunnel. (SEPTA press release via **Mass Transit** Magazine, August 6)

### LOS ANGELES, CALIFORNIA

The Foothill Gold Line Construction Authority Board of Directors awarded the main design-build contract for the Foothill Gold Line light rail extension to Kiewit-Parsons, a Joint Venture, which includes an \$805.6 million base scope for the first nine miles of the project from Glendora to Pomona, with a two-year contract option to complete the full 12.3-mile project to Montclair for a total contract amount of \$1,186.900,000 if additional funds are secured by September, 2021.

The base scope includes all elements of design and construction for the first nine-mile segment, including relocation of the existing freight track, installation of the light rail track system, four new light rail stations (in Glendora, San Dimas, La Verne, and Pomona), improvements at 40 grade crossings (nearly half with new or renovated bridges), and much more. The contract option would extend the work of the design-build team to complete the full 12.3-mile project to Montclair and add stations in Claremont and Montclair.

The Foothill Gold Line was the first Measure M-funded

light rail project to break ground and is named as one of L.A. Metro's 28 priority projects to be completed before the 2028 Olympic Games in Los Angeles. (via **Mass Transit** Magazine, August 15)

### SAN DIEGO, CALIFORNIA

The San Diego Association of Governments (SANDAG) has issued \$335 million of its Series 2019 Capital Grant Receipt Revenue Bonds to help finance the construction of the Mid-Coast Trolley Project. The bonds will accelerate SANDAG's receipt of an approximately \$1.04 billion grant with the Federal Transit Administration under the Capital Investment Grant (CIG) program.

The Mid-Coast Trolley Project, which is currently under construction, will add nine new stations and extend San Diego Trolley service for 11 miles from Old Town to UC San Diego and University City. It is expected to begin service in late 2021.

The cost of the \$2.1 billion project is being split between the federal New Starts Program, which has committed \$1.04 billion, and the region's TransNet program, the local half-cent sales tax for transportation administered by SANDAG. (San Diego Association of Governments press release via **Mass Transit** Magazine, August 19)

### LONDON, ENGLAND

Transport for London announced on August 6 that the Bombardier Transportation-built Class 710 Aventra electric multiple-units have now taken over operation of London Overground's Gospel Oak-Barking Line.

The eight four-car trainsets, of which six are required for regular service, replace the fleet of two-car DMUs that operated the orbital inner-suburban line before it was electrified at 25,000 volts/50 Hertz last year.

The launch of electric services was delayed by problems with the Class 710s. As an interim measure, three existing Class 378 EMUs used on other London Overground routes were temporarily put into service on the Gospel Oak-Barking route, as the DMUs had been redeployed to serve routes in the West Midlands. While overall line capacity was maintained, headways were lengthened due to the equipment shortage. With the full Class 710 fleet now in service, the 15-minute frequency has been reintroduced.

Free travel from August 31 to October 1 is being offered as compensation for the late arrival of the new fleet. This is to be funded by Bombardier Transportation.

The first Class 710 EMU entered passenger service in late May; Bombardier is maintaining the fleet at its Willesden depot. The walkthrough trains from Bombardier's Aventra family have capacity for 675 passengers including 195 seated; there are also spaces for wheelchairs. The trains have 36 USB charging sockets, wi-fi supplied by Icomera, and LCD advertising and real-time passenger information screens. The air-conditioned vehicles are equipped with "intelligent" lighting and temperature control. Maximum speed is 120

(Continued on page 9)

## Commuter and Transit Notes

(Continued from page 8)

kilometers per hour.

Bombardier Transportation is supplying a total of 54 Class 710 trains to TfL from its Derby factory. This includes a base order of 45 four-car trainsets under a contract awarded in 2015 that includes options for up to 96 more units; TfL exercised an option for nine in 2017. The base order covers 31 trains equipped for 25,000 volts/50 Hertz overhead electrification and 14 dual-voltage units also able to operate on 750 volts d.c. third rail. The six five-car and three four-car sets in the option are all dual-voltage variants.



New Class 710 train leaving Harringay Green Lanes.

Photograph from *Metro Report International*



Class 710 interior.

Photograph from *Metro Report International*

Class 710 units are to be deployed on the Euston-Watford route as well as the West Anglia routes running

from Liverpool Street. TfL expects the first Class 710s for both routes to be in service by the end of the year.

London Overground services are operated by Arriva Rail London on behalf of TfL under a 7½ year concession that commenced on November 13, 2016. (*Metro Report International*, August 6)

### JERUSALEM, ISRAEL

The TransJerusalem J-Net consortium of CAF and Shapir has been awarded a PPP (Public-Private Partnership) concession to build and operate the Green Line tram project in Jerusalem.

TransJerusalem J-Net beat a bid from a consortium of Shikun & Binui, Egged, CRRC, Comsa, Efatec, and MPK.

As well as construction and operation of the 20.6-kilometer Green Line, the concession includes the construction of a 6.8-kilometer extension of the existing Red Line. A total of 53 stops are to be built across the two lines.

Both projects are due to be completed by 2025. The consortium will operate both lines for 15 years and maintain them for 25 years, with options to extend these terms.

Each company has an equal share in the special purpose vehicle that is being established, and CAF says that its share of the contract is worth €500 million.

CAF will supply 114 Urbos trams for the Green Line and will refurbish the 46 Alstom Citadis trams on the Red Line. It will also be responsible for signaling, communications, and power supplies.

The 13.8-kilometer Red Line with 23 stops opened in 2011 and currently carries 145,000 passengers a day. (*Metro Report International*, August 9)

### SHANGHAI, CHINA

The Songjiang tramway in Shanghai was extended on August 10, taking the route to 26.8 kilometers with 40 stops.

Route T2 has been extended from Zhongchen Road to North Sanxin Road, so it now forms a circular route. Route T1 has also been extended from Jinxi Road to Xinmiaosan Road. The extension adds a total of 12.9 kilometers to the network.

Services operate every 10 minutes between 6 AM and 11 PM, using a fleet of 30 Alstom Citadis trams. The Shanghai Keolis joint venture of Shanghai Shentong Metro Group (51%) and Keolis (49%) is providing operations and maintenance under a five-year contract awarded in August, 2018.

The eastern section of Route T1 from Xinmiaosan Road to Xinqiao Railway Station is due to open by the end of the year. This would take the network to 31 kilometers and complete the first phase.

The initial 13.9-kilometer stage of the Songjiang tramway opened in December. Four further routes are planned. (*Metro Report International*, August 12)

## Around New York's Transit System

### Another “Summer from Hell”

The Summer of 2019 has not been kind to rail commuters in the greater New York area. On July 13, 42 years to the day after the Blackout of 1977, a Con Edison transformer caught fire, plunging almost all of Midtown and parts of both the Upper East and West Sides into darkness. Power and subway service were restored by late evening on the 13th. Except for the **G** and **J** trains, all service was delayed, short-turned, or suspended.

On July 19, the computer servers for the Automatic Train Supervision (ATS) system that manages train dispatching and route lineup for Subdivision “A” (IRT) failed at the height of the evening rush hour, delaying service for several hours during the start of that weekend’s heat wave. According to internal documents received by the web publication The City, transit officials flagged Automatic Train Supervision system failures for subway problems at least 13 times since the previous month alone, contributing to more than 300 train delays on the numbered lines.

Furthermore, cancellations on NJ Transit trains have continued to be an issue. Since May, 100 trains a week have been canceled, primarily due to crew or equipment shortages. Coincidentally, NJ Transit is to graduate 100 new locomotive Engineers by the end of the calendar year.

### 42nd Street Shuttle to be Transformed

The MTA announced on August 2 that the 42nd Street Shuttle, which moves thousands of customers between the subway system’s two busiest stations, will undergo a historic transformation that includes replacing the Times Square terminal with a larger and accessible station, reconfiguring platforms at Grand Central, and modernizing shuttle train operations. The project will result in a 42nd Street Shuttle that is fully accessible, has more capacity, and is easier for customers to use.

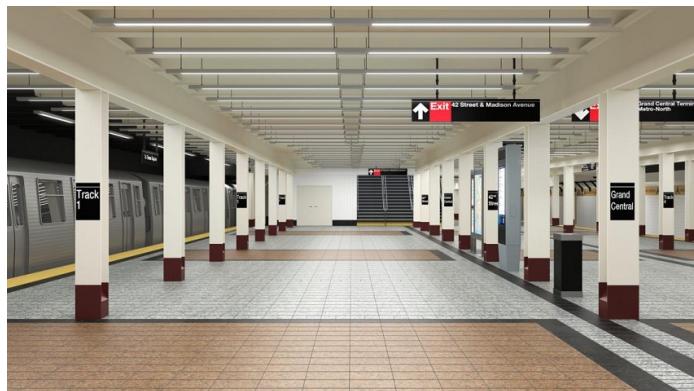
Work to modernize the 42nd Street Shuttle, which is part of the original 1904 subway system, is scheduled to run from August 16, 2019 through 2022. The 42nd Street Shuttle service will continue operating during a multi-phased construction timeline, with only minor service reductions scheduled to minimize customer impact and changes to arrival tracks. Additional information is posted on the project website, <https://new.mta.info/42StShuttle>.

More than 100,000 customers use the 42nd Street Shuttle daily. During peak hours, approximately 10,000 customers use the Shuttle to travel crosstown between the subway system’s two largest station complexes. It currently operates on tracks and stations built 115 years ago as part of the first IRT subway line, which ran from City Hall across 42nd Street to Harlem. The track seg-

ment along 42nd Street was later repurposed as the existing crosstown 42nd Street Shuttle.

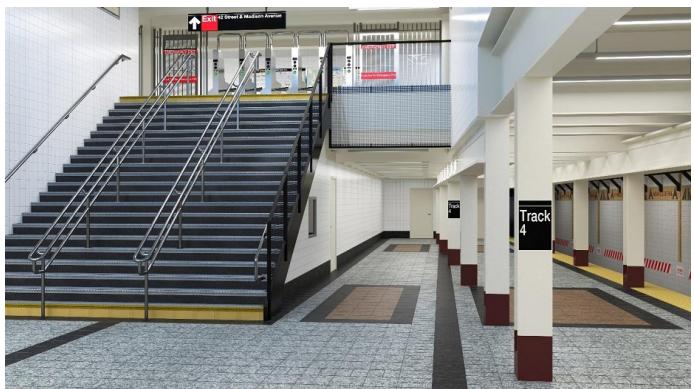
The project will modernize every aspect of the 42nd Street Shuttle, from the track operations and signaling to accessible platforms and new station entrances, including expanding current 3- and 4-car train lengths to 6-car trains; paring down both terminals to two-track operations with better platforms; upgrading the signal system; and station enhancements to improve traffic flow. Construction will be scheduled in multiple phases to minimize service impacts and customer inconvenience.

Approximately 640,000 customers pass through the Times Sq-42 St station complex and approximately 490,000 customers use the Grand Central-42 St subway complex each weekday, making them the two busiest stations in the subway system.



Rendering of the Grand Central shuttle platform looking west. To the right of the columns on the right is where Track 3 used to be. Track 3 is what originally was the northbound express track.

MTA New York City Transit rendering



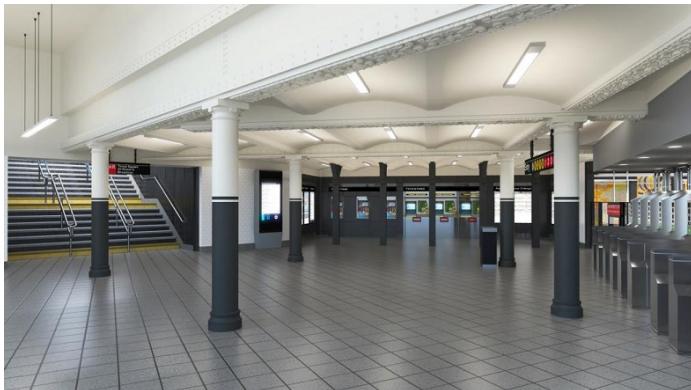
The west end of the revised Grand Central platform, also looking west, at the new, enlarged staircases leading to the west fare control area.

MTA New York City Transit rendering

*(Continued on page 11)*

### Around New York's Transit System

(Continued from page 10)



**Rendering of the reconfigured fare control area at the Times Square end of the shuttle. Today, in this location, is where passengers make their way to the Tracks 3 and 4 platforms.**

MTA New York City Transit rendering



**Rendering of the Times Square platform looking east, with Track 1 to the right and Track 4 to the left. The platform covers the former track spaces of express tracks 3 and 2. It is proposed that a mid-block entrance/fare control area at the far end of this platform be built, with an underground connection to the IND Sixth Avenue Line **B D F M**.**

MTA New York City Transit rendering

### NYC Transit's Save Safe Seconds Program Update

by Jeffrey B. Erlitz

Additional speed improvements have been made on various subway lines since the August **Bulletin**. Except for the one location shown below, north of 121 St **J Z**, the only adjustments made have been to unenforced

speed restrictions. These are locations where there is a speed limit sign without enforcement by the signal system. At 121 St, the GT-30 sign was changed to GT-35, so I am assuming that this grade time section was actually sped up. I believe this is the first grade timer that was sped up.

Shown below are the additional locations of speed restrictions that have been modified:

DATE	LOCATION	TRACK	FROM (MPH)	TO (MPH)
7/25/2019	n/o North Channel Bridge <b>A</b>	F3	25	Removed
"	s/o North Channel Bridge <b>A</b>	F4	25	Removed
7/30-31/2019	n/o Euclid Av <b>A C</b>	A2	10 <sup>1</sup>	21
"	n/o Euclid Av <b>A C</b>	A4	10 <sup>1</sup>	21
"	s/o Euclid Av <b>A C</b>	K2	10 <sup>1</sup>	20
8/1-2/2019	n/o Lafayette Av <b>A C</b>	A1	-	26 <sup>2</sup>
"	s/o Hoyt-Schermerhorn <b>A C</b>	A1	25	40
"	s/o Hoyt-Schermerhorn <b>A</b>	A3	28	35
"	n/o Hoyt-Schermerhorn <b>A C</b>	A4	20	26
8/6-7/2019	DeKalb Av <b>D N</b>	F3	18	20
"	n/o 121 St <b>J Z</b>	J1	30	35
8/7-8/2019	n/o Wall St <b>2 3</b>	3	20	25
"	s/o Fulton St <b>2 3</b>	2	20	29
"	n/o Fulton St <b>2 3</b>	3	15	22
"	s/o Park Place <b>2 3</b>	2	15	21
"	s/o Park Place <b>2 3</b>	3	15	26
"	Park Place <b>2 3</b>	3	-	20 <sup>2</sup>
8/8/2019	n/o 149 St-Grand Concourse <b>4</b>	4	20	29
"	n/o Burnside Av <b>4</b>	1	25	37
"	s/o Fordham Rd <b>4</b>	4	25	Removed
8/13-14/2019	s/o President St <b>2 5</b>	2	15	35
"	n/o Sterling St <b>2 5</b>	2	30	Removed

Notes:

<sup>1</sup>At this location, there previously had been no speed restriction signs in place. Where there are no speed restriction signs posted, diverging moves over switches are restricted to 10 mph, so this is an implied increase for the diverging moves.

<sup>2</sup>At this location, a speed sign was installed where one did not exist before.

## THREE ISLANDS OF ITALY

### by Jack May

### (Continued from August, 2019 issue)

### (Photographs by the author)

WEDNESDAY, APRIL 13

We had an excellent breakfast at our B&B, sharing conversation in broken English with some other guests. After paying our bill we asked if we could leave our luggage in our room until our evening train and whether we could have two sets of keys, as Clare and I would be going our separate ways for most of the day. Both wishes were granted, but first Clare and I did a little joint sightseeing. It was cloudy when we woke up but the forecast was for sun, and by the time we had toured the archeological museum it was shining brightly. Our B&B was located in the "old city," but it was only a few blocks walk to the modern part of this small municipality of 132,000. We found the museum easily and enjoyed its exhibits, which date from the Nuragic Age (1,800 B.C.) to the middle ages. But I was soon anxious to start exploring the city's tramway so we headed out.

The 950-millimeter gauge tramway has seven stops along a 1.5-mile-long route in city streets that almost encircles (but does not enter) the old city. Its route is like an elongated letter "U" with the left side continuing over an FdS rail line for another 1.1 miles to terminate one stop beyond the city's central railway station at Santa Maria di Pisa (see <http://www.urbanrail.net/eu/it/sass/sassari.htm>). ARST operates the 2.6-mile-long Metrosassari with a fleet of four double-ended 100 percent low-floor AnsaldoBreda Sirio cars, similar to those found in Naples and several other European cities, including Athens, Milan and Florence, and Samsun and Kayseri in Turkey.

It is an unusual operation in several respects. While there are two tracks at the terminals, the virtually all single-track line has only two passing sidings. The tram-train portion runs over regular railway ballasted track, but the remainder of the line uses girder rail embedded in pavement, segregated from auto traffic at the sides of streets. Two cars are on the line at all times, providing an average 21-minute headway. But the intervals between them are 15 and 27 minutes, with a one-way running time of about 17 minutes. This means that cars pass each other alternately at the Cliniche and Stazione stops, and some passengers have to wait almost a half-hour for the next car (if heading inbound, they could just

as easily board an outbound car if that comes first, as that would become the next inbound car and at least they will be able to sit — on 1-and-1 plastic seats). Nevertheless, ridership was not bad.

As mentioned in earlier parts of this report, graffiti is a challenge for ARST. While there was the usual amount on the diesel rail lines in Sassari, it was clear that a greater effort is being made to remove it from the trams. However, while you cannot see it clearly on the bodies, if you look hard enough you can see graffiti on the accordion-style articulations. The tram-train portion of the line is double track, but only one is electrified, so for all practical purposes, it is a mirror image of the other end of the line.

I hiked from the museum to the Metrosassari's Emiciclo Garibaldi terminal and after a few photos began walking the route in search of a good spot to take additional pictures. Unfortunately, the line is placed directly along the south curb of Viale Italia, and so it was all in shadow, which would not likely change until the late afternoon. But when it curves around the lower end of its "U" route into the Cliniche stop, it reaches an excellent location for pictures, being wide open and having a second track for passing. Then, noting that there was no equipment on the upper end of the line, I boarded the next car, which was an outbound, and rode back to Emiciclo Garibaldi. I observed that both cabs of the Sirio unit were curtained, preventing front and rear viewing, and decided to settle on an austere plastic seat near the middle of the unit. I rode all the way through to Santa Maria di Pisa, noting that the ride was very smooth along the "city" portion of the route, but on the railroad right-of-way it was noisy and bumpy, with grinding sounds, like traditional pre-PCC-type equipment. We took all special work extremely slowly, including the switches to the carhouse/shop and crossings leading into the station's ladder for the diesel railcars. I then rode back to Stazione to look around the combined Trenitalia and FdS facility.

The narrative will continue in the next portion of the report, which will include the photos taken at the railway station and during the remainder of my visit to Sardinia's second city.

*(Continued on page 13)*

### Three Islands of Italy

(Continued from page 12)



Contrasting views of the old and new Sassari.



Emblems of ARST, the operator of transit services in Sardinia, including the tram-trains in Sassari and Cagliari, plus the narrow gauge FdS rail lines. The stylized M is specifically used for the Metrosassari tramway, and is shown at the austere Cliniche stop.



Head-on view of one of Metrosassari's four AnsaldoBreda Sirio trams. The oval-shaped front end is virtually identical to the cars running in Athens, Florence, Naples, and many other cities.

(Continued on page 14)

### Three Islands of Italy

*(Continued from page 13)*



Two views at the Emiciclo Garibaldi terminal. The second track is hardly visible in the left view (but the overhead is), because it is rarely used, as the separation between cars entering the terminal is at least 15 minutes. In the right photo, an AnsaldoBreda Sirio has entered the curve leading to Viale Italia from the off-street terminal. It is above the switch to the second track, which is hidden by overgrowth.



The Cliniche-Universitarie station. Information showing arrival times or schedules is conspicuously missing from this and all other stops.



My favorite part of the system is the street running along Via della Conce near Porta Utzeri, one stop from the railroad station. The track here has operation in both directions and I consider this one of the best locations for photos of Metrosassari.

*(Continued next issue)*

# CANARSIE LINE UPDATE - STATION IMPROVEMENTS IN BROOKLYN AND QUEENS

## by Subutay Musluoglu

### (Photographs by the author)

The reconstruction of the Canarsie Line's 14th Street Tubes, damaged in 2012 by Superstorm Sandy, has been underway since April 26. The project, originally envisioned as a 15-month-long full closure of the line between Bedford Avenue in Brooklyn and Eighth Avenue in Manhattan, was modified with a revised plan that retained normal service during weekdays, while providing partial service on overnights and weekends, enabled by single-track operation while one tube is closed.

By all accounts, with the exception of a few operational hiccups during the first two weekends, and a couple of delayed recoveries as contractors demobilized to prepare for the morning rush hour, the work has been proceeding relatively smoothly. NYCT's efforts to educate customers with the revised details of the closure and the alternative travel options appear to have been successful in avoiding the chaos that had been feared in the weeks leading up to the start of the work.

Two high-profile elements of the project are the expansion of the 1 Av station in Manhattan and the Bedford Av station in Brooklyn. At 1 Av, a new fare control area with street entrances and elevators is being built at the east end of the station (Avenue A). As reported in the February, 2019 *Bulletin*, the overall program also includes the construction of capacity improvements at several subway stations across northern Brooklyn and at Court Square in Queens. These capacity-increasing measures include reconfiguring fare control areas, reopening long closed street access stairways and station mezzanines, and widening key internal stairways while also building new ones at critical locations.

These efforts, all to facilitate increased passenger throughput, will not only mitigate the congestion anticipated during the reconstruction of the tubes, but remain as permanent features. This addresses the population growth that has occurred throughout the area over the last 20 years, which has stressed many of the stations in question. The scope of the capacity improvements include:

- Court Sq **G** — Two new mezzanine-to-platform stairs and expanded turnstile capacity were completed in early 2018. It should be noted that the two moving walkways linking the Court Sq **G** mezzanine to the Court Sq-23 St **E M** mezzanine were removed in the summer of 2018 to accommodate increased crowds in the passageway
- Nassau Av **G** — Expanded turnstile capacity
- Metropolitan Av **G** — New mezzanine to south-bound platform stair, partial reopening of the south mezzanine including the reopening of six mezzanine-to-platform stairs (three to each platform), reopening of two street stairs (one to Hope Street and one to Powers Street), and expanded turnstile capacity at the north mezzanine
- 14 St-Union Sq **L** — Reconfigured and widened stairs linking the Canarsie Line platform to both Broadway Line platforms were completed earlier this year
- Bedford Av **L** — Expanded Bedford Avenue mezzanine with two new street stairs (in addition to the two existing stairs to be reconstructed), two new mezzanine-to-platform stairs (in addition to the reconstructed existing stair), expanded Driggs Avenue mezzanine with two new street stairs (in addition to the two existing stairs to be reconstructed), and one new mezzanine-to-platform stair (in addition to the reconstructed existing stair). Elevators are also being installed at the Bedford Avenue mezzanine
- Marcy Av **J M Z** — Widening of the two street stairs to Havemeyer Street (one from each platform) for increasing capacity and meeting ADA compliance was completed earlier this year
- Hewes St **J M** — Reopening of two street stairs (northbound platform to Hewes Street, and southbound platform to Montrose Avenue) was completed late in 2018
- Flushing Av **J M** — Reopening of two street stairs to Fayette Street (one from each platform) was completed in July, 2017
- Broadway Junction **J L Z** — Increased stair capacity between the **L** platform and the **J Z** platform

While not strictly a Canarsie Line-related improvement, new elevators are also being installed at the Greenpoint Av **G** station for ADA access.

Selected views of some of the completed improvements are in the photo essay that follows:

*(Continued on page 16)*

### Canarsie Line Update

(Continued from page 15)



New stair P7 from mezzanine to platform at Court Sq **G** station. April 18, 2018

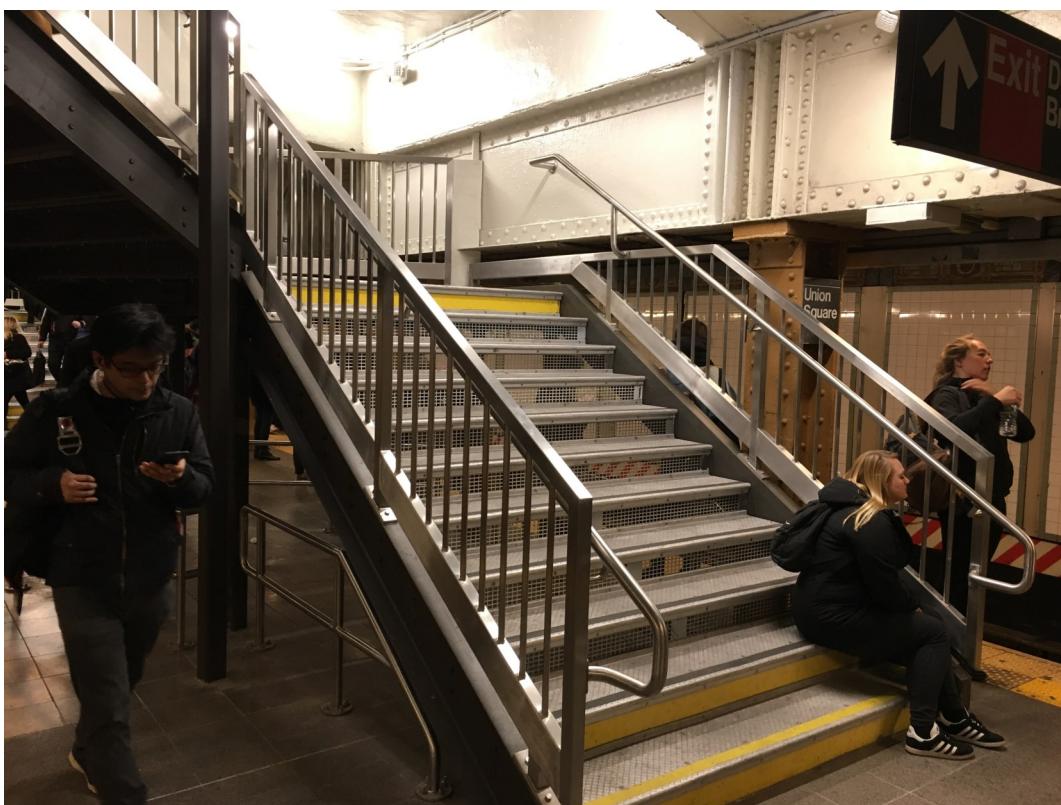


On February 28, 2019, NYCT reopened the south mezzanine at the Metropolitan Av **G** station, with three reopened stairs to the Queens-bound platform on the right, and three reopened stairs to the Church Avenue-bound platform on the left. From this mezzanine, two street stairs were reopened - one to Hope Street, and one to Powers Street (behind the camera). The mezzanine, presumed to be closed since the 1970s, actually extends further south to Grand Street (behind the camera), and this portion remains closed to the public. An additional new stair was opened midway along the southbound platform, connecting to the Metropolitan Avenue mezzanine leading to the transfer with the Lorimer St **L** station. March 7, 2019

(Continued on page 17)

**Canarsie Line Update**

(Continued from page 16)



Widened stair P7 from the Canarsie Line platform to the southbound N Q R W platform at 14 St-Union Sq, March 27, 2019.



Expanded Bedford Avenue mezzanine showing the two new stairs down to the 1 platform. The final railings and bannisters will be installed later as part of the final station finishes. The original stair dating to the station's 1924 opening is just out of view to the left, and is currently closed for reconstruction. March 27, 2019

(Continued on page 18)

### Canarsie Line Update

(Continued from page 17)



The original 1924 stair from the Bedford Avenue mezzanine to the **L** platform, now closed. It will be reconstructed and narrowed to create room for an elevator prior to reopening. The loss of space is offset by the two new aforementioned stairs. March 27, 2019



The first of two new street stairs leading to the Driggs Avenue mezzanine of the Bedford Av **L** station. This is at the northeast corner at N. 7th Street, facing north along Driggs Avenue. The original stair facing east along N. 7th Street has been reconstructed, and both stairs join at a shared intermediate landing from which one wide stair descends to the mezzanine. Across N. 7th Street, at the southeast corner of Driggs Avenue, a similar arrangement is taking place, with the currently closed original stair facing east along N. 7th Street soon to be joined with a new stair facing south along Driggs Avenue. The new, second mezzanine-to-platform stair opened earlier this past summer, while the original stair is under reconstruction. Meanwhile at the Bedford Avenue end, two new street stairs have opened at the

northeast and southeast corners facing north and south along Bedford, while the two original stairs facing east along N. 7th Street are closed for reconstruction. The final railings and bannisters will be installed later as part of the final station finishes. May 24, 2019