The Bulletin

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The Bulletin

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This Month's Cover Photo:
Detroit United Rwy 1145 (J.G. Brill, 1904) and 56 (Detroit United Rwy, 1901) are on Woodward Avenue & Congress Street in this view north circa 1905. Detroit Publishing Company photograph

In This Issue:

BERLIN AND PARIS - TWO MAJOR METRO OPENINGS WITHIN TEN DAYS

Berlin's U5 Line Completed

On Friday, December 4, 2020, the Berliner Verkehrsbetriebe (BVG) inaugurated the 1.4-mile extension of Line U5 from Alexanderplatz to Hauptbahnhof, Hauptbahnhof. With 14 miles of track between Hönow and Hauptbahnhof, Line U5 is now the second longest subway line in the capital. Trains with passengers stopped for the first time shortly after 12 noon at the two new subway stations Rotes Rathaus and Unter den Linden.

The opening with, among others, Berlin's Governing Mayor Michael Müller, BMVI State Secretary Dr. Tamara Zieschang and BVG Chairman Eva Kreienkamp at the underground station Unter den Linden.
Oliver Lang/BVG photograph

Prior to this, Berlin's governing mayor Michael Müller, BMVI (Federal Ministry for Transport) State Secretary Dr. Tamara Zieschang and BVG Board Chairwoman Eva Kreienkamp had paid tribute to the importance of the "gap closure U5" for Berlin at the subway station Unter den Linden. They thanked all those who had contributed to the successful completion of this major project. Due to the corona pandemic, the small ceremony took place without guests. Berlin's Transport Senator Regine Günther handed over the certificate of approval to the BVG. Together with the BVG Supervisory Board Chairman Senator Ramona Pop, Works Director Dr. Rolf Erfurt set all signals to green at 12 noon at the subway station Rotes Rathaus and sent the first train on a free ride from Hönow to Hauptbahnhof. Many passengers and fans flocked to the new line in order to visit the new stations and take pictures.

Entrance of a Stadler Ik train (small profile with entrance steps) in the new underground station Rotes Rathaus. Due to a shortage of trains, these small profile trains of the Ik series are currently in service on the U5, along with the regularly assigned large profile equipment. ***Urban Transport Magazine*** photograph

A good three decades after the fall of the Wall, Berliners between east and west will be better connected via the new connection, which is running below Berlin's boulevard street "Unter den Linden," the Brandenburger Tor and the German Parliament (Bundestag).

More than "Just" Closing a Gap

With 1.4 miles of new tunnel between Alexanderplatz and Brandenburger Tor, the gap between the "old" U5 and the U55, which went into service in 2009, has now been

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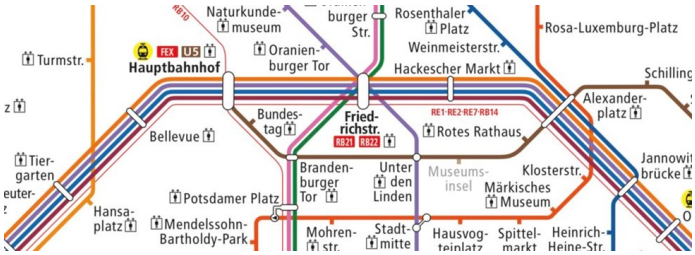
closed. Both lines have now been connected to one through-running Line U5. Three new subway stations, of which the Museumsinsel station will not be opened until Summer, 2021, offer even better access to Berlin's historic center. BVG expects around 155,000 passengers a day on the new section who will benefit from, among other things, an additional connection to Berlin's central station and a new direct connection from the east of Berlin to the city center.

"Berlin deeply connected" (in German: Berlin tief verbunden): The motto of the opening did not only describe the closing of the gap on Line U5 itself. For example, the possibility of interchanging between the S-Bahn and U-Bahn at the Brandenburger Tor will create new connections within the city. But above all, the new subway station Unter den Linden has it all. There will now be a transfer between Lines U5 and U6, which runs in a north-south direction.

The U6 trains between Alt-Mariendorf and Alt-Tegel started stopping at the upper platform of Unter den Linden at 12 noon on December 4, 2020. The former U6 station Französische Straße, which is only two short blocks away by foot, was permanently closed the same day. BVG expects around 50,000 transfers between Lines U5 and U6 at the Unter den Linden station every day.



Detail of the new Berlin U Bahn (metro/subway) network map showing the section that just opened between Alexanderplatz and Brandenburger Tor. Museumsinsel station is not open yet so it is shown grayed out. The short section from Brandenburger Tor to Hauptbahnhof had been operating as the U55 shuttle for many years.
BVG map

One Project, Two Tunnels, Three Subway Stations

Under the management of Ute Bonde and Jörg Seegers, the "U5 gap closure" between Alexanderplatz and Brandenburger Tor was managed by the BVG subsidiary "Projektrealisierungs GmbH U5," which was found-

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THE BOARD OF DIRECTORS EXPRESSES ITS DEEPEST APPRECIATION FOR 28 MEMBER DONATIONS IN NOVEMBER, 2020

AMOUNT	DONOR(S)		
$1,500	Dennis Furbush		
$300	Edward Ridolph		
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ed in 2014 for this purpose and has been called "BVG Projekt GmbH" since the beginning of 2020. After completion of the subway station Museumsinsel, the construction costs – borne by the federal and state governments – will exceed the €525 million calculated in 2013 by only a few percent. The BMVI provided grants of more than €150 million for the entire project, the section from Alexanderplatz to Hauptbahnhof, including the already completed U55 subway line, as stipulated in the capital financing agreement.

Französische Straße on line U6 was permanently closed and replaced by the new station at Unter den Linden.
Urban Transport Magazine photograph

The dimensions involved in the construction of the new subway section were enormous: Between Summer, 2013 and Fall, 2015, the 700-ton "Bärlinde" tunnel boring machine created two tunnel tubes between the Marx-Engels-Forum and the Brandenburger Tor subway station. On peak days the tunnel team managed to drive up to 65½ feet. In March, 2017 the breakthrough from the new line to the Brandenburger Tor subway station took place. Later, 9,200 tons of ballast were distributed and more than 6,000 ties and 27,887 feet of rails were installed. BVG's specialist tradesmen laid around 155 miles of cable in the tunnel and the three stations.

The three new stations along the route each have their own unique character. The subway station Rotes Rathaus, for example, located directly in front of the Berlin government headquarters, has two levels: On the upper level is the double-track subway station, below which there is a four-track lay-up yard. The station, which was built using the top-down construction method, was designed by Oliver Collignon. The seven "mushroom headrests" in the middle of the tracks and the wall and floor coverings of white and black terrazzo are characteristic elements.

The most challenging new station in terms of construction is located below the co-called Museum Island, which gives the station its name, below the River Spree. Due to its special location, only the two ends of the station could be built in open construction. The entire platform area had to be constructed using a mining method under the protection of a huge body of ice. The 36,622 cubic yard large frost body was created by means of complex icing drillings and -37° Celsius cold calcium chloride brine. The station, designed by Max Dudler, is still undergoing the extension of access and mezzanine level, which is why trains will pass through without stopping until Summer, 2021. The starry sky, consisting of a total of 6,662 light points, under which the trains will enter the station in the future, is already complete.

The station Unter den Linden, designed by Prof. Axel Oestreich and Ingrid Hentschel, has a special "connecting" significance. This is where Lines U5 and U6 will cross from now on. The fact that the existing U6 in this area only had to be interrupted for around 17 months during construction is a remarkable planning and construction achievement.

With the 36 feet between the U5 platform on the lowest level and the station ceiling, unusual spaces open up at this station. Thanks to a total of 603 feet of escalators, passengers changing trains do not have to worry about long staircases. Creative accents are provided by the track walls of the U5 platform, designed by Humboldt University.

Unter den Linden upper-level station on line U6.
Urban Transport Magazine photograph

25 Years Construction Time – With Interruptions

The plans for the extension of Line U5 date back to the 1950s. The Cold War and the Berlin Wall put an end to that. After the fall of the Wall, planning for the extension began anew, and with it the new Hauptbahnhof would be connected to Berlin's subway network.

Construction began in 1995 but was stopped by the Berlin Senate in 2002 for financial reasons. At that time, the shells of the Hauptbahnhof and Reichstag stations were already completed. In order to avoid the reimbursement of €170 million in subsidies to the federal government, the line to the Brandenburger Tor was completed. A two-car train was then used to shuttle on

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one track along the slightly less than one-mile route. Due to further delays, the already completed Bundestag station was subsequently used as an event and film location. For example, the world premiere of Angie (a play about Angela Merkel), cart races and a party with Robin Williams during his tour took place there. Films were also shot here.

The shuttle service on the line, known as the U55, finally began on August 9, 2009, with a train consisting of two cars running every 10 minutes between Hauptbahnhof and Brandenburger Tor. The journey took two and a half minutes, with only one driver per shift. The federal government contributed €170 million to the construction costs of the U55, the total costs amounted to €320 million.

The use of eight Type F79 subway cars was originally planned for the line. In fact, only two cars were used. Due to the lack of a connection to the rest of the Berlin subway network, the cars were lowered onto the track by crane through the material inlet on Minna-Cauer-Straße. The two cars were lifted out of the tunnel in mid-January, 2013 for maintenance work. In March, 2017, the remaining Type F79s were exchanged for already decommissioned Type D vehicles from the late 1950s. These were modernized in terms of vehicle technology, but were only used on the line for a short time. Due to the outbreak of the Covid-19 pandemic and the sharp drop in passenger numbers, operations of the U55 were temporarily suspended on March 18, 2020. The section was only put back into service on December 4 as line U5.

A Look Into the Future

What will be the next step of subway planning in Berlin? During the opening of Line U5, Governing Mayor Michael Müller (SPD) advocated even more subway extensions. He mentioned the connections to the Märkisches Viertel (U8), to the new airport BER (U7) and the U3 from Krumme Lanke to Mexikoplatz. “There are areas where you can simply add two or three more stations to an existing line,” said Müller. Not mentioned was the planned extension of the U5 from the Hauptbahnhof to Turmstraße, which has been under discussion in recent years. It is currently unclear whether the tramway or the subway will be extended there. It was once planned for the U5 to run in the west from the Hauptbahnhof further through the district of Moabit via Turmstraße, the S-Bahn and regional railway station Jungfernheide to the former airport Tegel. From today’s perspective, this extension is highly unlikely.

At the Rotes Rathaus station, a further transfer station has been built as a provision. The future Lines U3 and U10 are to run on the lower level of the two-level structure. Since it is not expected that the U3 or U10 will become reality soon, this level was now built as a four-track yard for U5 trains. A possible conversion to a later station with side platforms was taken into account. (***Urban Transport***, December 4, 2020)

Paris Extends Line 14

A 3.6-mile extension to Line 14 of the Paris Métro was placed into service on December 14, 2020. Stretching northward from the previous terminal at Saint-Lazare, there are intermediate stations at Pont Cardinet, Porte de Clichy and Saint-Ouen, with a new north terminal at Mairie de Saint-Ouen. The Porte de Clichy station was not yet ready to debut but is expected to open in January, 2021.

Regional transportation authority Île de France Mobilités and Paris Métro operator RATP officially inaugurated the extension with a brief, pandemic aware, socially distanced ceremony, followed by a well-attended public opening. In the days following, the extension was reported to be seeing decent usage. The extension brings the Paris Métro's route and track mileage to 139.8 miles and 279.6 miles, respectively, with a total of 304 stations.

To officially inaugurate service on Line 14's northern extension, elected officials and dignitaries representing the central Paris region and local municipalities, and senior leadership representing Île de France Mobilités and RATP, all perform a ribbon-cutting ceremony at the new northern terminal at Mairie de Saint-Ouen on December 14, 2020.
Île de France Mobilités photograph

The line was constructed with two Tunnel Boring Machines (TBMs) for the running tunnel, a single bore containing both trackways, while the stations were built with the cut-and-cover method. Under construction since 2014, the extension was built at a cost of €1.38 billion (2012 prices).

The new stations share a common design theme, and each offers interchange with other rail lines. From Pont Cardinet a short walk offers Transilien Line L (suburban services); Porte de Clichy will provide transfers to Métro Line 13's northwest branch, RER Line C, and Tram Line T3b; Saint-Ouen has another transfer to RER Line C; and at Mairie de Saint-Ouen, to Line 13's northeast branch. Line 14 is expected to operate with headways of just 85 seconds during peak periods and with an av-

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erage speed of 25 mph, travel time from Mairie de Saint-Ouen to Châtelet in central Paris is just 15 minutes.

Shortly after the ceremony's completion, Mairie de Saint-Ouen and the extended line were opened to the public. Note the wide, expansiveness of the station box, the intermediate mezzanine, and the glass enclosed top mezzanine above, offering a view down to the platforms and trackways below. It's been reported that there are unfinished punch list items remaining at the stations, such as metal cladding panels, due to delivery delays. And of course, one station has yet to be finished - the Porte de Clichy station will open in January, 2021.
Ortferroviaire photograph, http://transportparis.canalblog.com

With this extension, Line 14 finally has an important feature it has lacked since it first opened - a proper maintenance shop and storage yard for the line's trains. In 1998, basic day to day maintenance and running repairs were conducted in a basic workshop on the tail tracks beyond Bibliothèque Francois Mitterrand, the southern terminal at the time. These tail tracks were later incorporated into the Olympiades station when it became the southern terminal in 2007, at which time maintenance functions relocated to the new set of tail tracks beyond there to a larger and better equipped shop. Trains requiring more involved repairs at one of the Métro's larger shops were moved to and from the rest of the network via a connecting track to Line 6 near the Bercy station.

The new dedicated maintenance shop and storage yard is located at Docks de Saint-Ouen, on the site of an abandoned warehouse complex once served by a branch of the Petite Ceinture, the inner belt railway which previously encircled Paris and is now disused. The shop is accessed via a connecting track just north of Saint-Ouen Station and is specifically equipped to handle the technical needs of the new MP14 trainsets that are being introduced to Line 14. These cars were described in detail in last month's ***Bulletin***. The MP14 trains will eventually supplant the current fleet of MP89CA and MP05 trains, cascading them to Line 4.

Incidentally, the aforementioned tail tracks beyond Olympiades are being incorporated into Line 14's southern extension to Orly Airport, currently under construction (more on this below).

First opened in 1998, two years before the Métro's centenary, Line 14 was the fifth line equipped for rubber-tired operation in Paris; while the others - Lines 1, 4, 6, and 11 were conversions from steel rail - Line 14 was the first to be purpose built from the start. The line is a key piece in the Paris network and represented a significant technological advance for being the world's first fully automated subway line, with driverless operation enabled by an advanced signaling system, platform edge screen doors, and a new generation of advanced trains controlled from a central command center.

Line 14's inception and evolution was born out of a need to provide relief to the central parts of the Paris rail network, a mission which it continues to fulfill to this day. In the late 1980s, the central core of the network had become quite congested. At the time, Line 1, the Métro's backbone since it first opened in 1900, was the busiest line in the system.

More significantly, Line A of the RER, opened in 1969 as the first line of the five-line regional express rail system that operates as a hybrid commuter rail / subway in the Île-de-France region, had become of a victim of its own success. By the late 1980s, it was carrying close to a million passengers a day, making it the busiest railway line in Europe, and one of the busiest in the world.

Various projects were undertaken to alleviate the pressure, including the installation of a proto-CBTC moving block signaling system and the purchase of bi-level EMUs for Line A. While these measures helped, as the 1990s dawned it became clear that only a significant expansion of capacity would offer relief.

The program that was conceived contained three individual projects. The first, already in the works at the time, was to complete the central section of Line D of the RER between Gare de Lyon and Châtelet-Les Halles. Achieved in 1995, Line D runs parallel to the busiest section of Line A. Also involving the RER, the second project was the construction of Line E from the eastern suburbs with a central city tunnel from Gare de l'Est to Saint-Lazare, opening in July 1999. Line E is currently being extended to the western suburbs.

The third project was conceived as Météor - for Métro Est Ouest Rapide (East-West Rapid Metro), a new subway line which would showcase the latest in French rail systems technology and civil engineering techniques. A TBM was utilized to construct a single bore containing both trackways, and an immersed tunnel for the crossing under the Seine. Besides adding capacity, the line introduced service to new neighborhoods, including a major redevelopment zone in the southeast, centered around the new national library.

The Météor project was approved in October 1989, construction began in 1992, and opened as Line 14 on October 5, 1998 with a 4.4-mile initial segment between Bibliothèque Francois Mitterrand and Madeleine.

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A view of the fare array at the Mairie de Saint-Ouen station, December 14, 2020.
Julian Pepinster photograph

A close-up view of the platform edge screen doors at the Mairie de Saint-Ouen station, with both tracks occupied - an MP89CA on the left and an MP05 train on the right.
Julian Pepinster photograph

A 0.2-mile extension from Madeleine north to Saint-Lazare opened on December 16, 2003, followed by a 0.4-mile extension from Bibliothèque Francois Mitterrand south to Olympiades which opened on June 25, 2007.

Line 14 was seen as a success and plans were developed for it to continue to grow and relieve congestion on other lines. From Saint-Lazare, the intention was to extend northward and take over the northwest branch of Line 13, which was then, and is today, one of the Métro's busiest lines, with a challenging operational pattern due to the two northern branches. The takeover plan was the stated intention for several years; however, it came with serious engineering and operational challenges.

One station to the south, a view of the tail end of an MP05 train at Saint-Ouen.
Julian Pepinster photograph

First and foremost, Line 13 is a traditional steel-railed line, and the branch would need to have been converted to rubber-tired operation. Suspending service to carry out this work was not an ideal option due to the disruption it would inflict on tens of thousands of daily commuters for an extended period. For this and other secondary reasons, the takeover plan was discarded in favor of the extension that has just been opened, which will draw traffic away with its direct penetration of the same catchment area, offering a much faster trip to the center of Paris, along with direct transfer connections to both the northwest and northeast branch at Porte de Clichy and Mairie de Saint-Ouen, respectively. Planners have forecast that Line 13 congestion may be reduced by as much as 25% by the Line 14 extension.

In the south, a takeover of one of steel-railed Line 7's branches, with an extension to Orly Airport, was also contemplated but was dropped for the same factors cited above. It was also determined that Orly Airport would be better served with a dedicated, faster line.

Prior to the global coronavirus pandemic, Line 14 was carrying around 500,000 passengers a day, placing it among the middle tier of Paris Métro lines in terms of daily ridership. With this extension, and presuming that ridership returns to pre-pandemic levels, Line 14's daily ridership is anticipated to increase to 750,000, which would make it one of the Métro's busiest lines.

Line 14 will get even busier still, as it continues to grow in the coming years. An additional extension to the north by 0.9 miles from Mairie de Saint-Ouen to Saint-Denis Pleyel is anticipated to open in 2022. Saint-Denis Pleyel will be a major hub of the Grand Paris Express network, with interchange to the future Lines 15, 16, and 17. This will be followed by a significant extension to the south, as hinted previously, from Olympiades to Orly Airport. This 8.6-mile extension is currently under

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construction and will most likely be completed in two phases, first to Villejuif Institut Gustave-Roussy in 2023 and then on to Orly the following year. With the completion of all the extensions, Line 14 will reach a total length of 18.4 miles. (***Metro Report International*** December 14, 2020 web post; TransportParis December 14, 2020 blog post; and Île-de-France Mobilités and RATP websites and Facebook pages with additional research conducted by Subutay Musluoglu and confirmed by Julian Pepinster, RATP)

As Line 14 is fully automatic with driverless trains, the absence of a cab offers railfans the best view imaginable. Onboard a southbound train, an oncoming MP89CA is headed northbound to the new terminal.
Julian Pepinster photograph

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RAIL NEWS IN REVIEW
by Jeff Erlitz and Ron Yee

NEW YORK METROPOLITAN AREA

METROPOLITAN TRANSPORTATION AUTHORITY

The Presidents of the Long Island Rail Road and Metro-North Railroad announced on November 18 that roll-out of Positive Train Control (PTC) was nearly completed at both railroads and was expected to be completed on time by the end of the year, despite the unprecedented and catastrophic impacts of the COVID-19 pandemic on the finances of the railroads' parent organization, the Metropolitan Transportation Authority (MTA).

East of the Hudson River, Metro-North's installation of PTC equipment along the wayside is complete and all trains on the Harlem Line, Hudson Line and Danbury Branch of the New Haven Line are operating with Positive Train Control. On the New Haven Line's Main Line and New Canaan Branch, the railroad has completed testing the PTC software for the line's M-8 electric cars and was obtaining the safety certification that would allow M-8 trains to enter PTC operations at the end of December, 2020.

The Waterbury Branch in Connecticut is exempt from the federal PTC mandate due to the small number of trains. Nevertheless, the State of Connecticut has opted to have a new cab signal system installed on the branch to improve overall safety, and PTC will be implemented as an overlay to the new signal system by the end of 2021.

West of the Hudson River, the Pascack Valley Line began PTC operations in September, and the railroad expects the Port Jervis Line to begin PTC operations by early December.

The Long Island Rail Road implemented PTC through Jamaica in October, 2020 and the system is now operating on 98% of the railroad's 305 route miles. The remaining segment to be implemented is the complex of switches in Sunnyside, Queens, known as Harold Interlocking, where Amtrak and LIRR trains merge to reach Penn Station. All testing required for this location has been completed. The LIRR expects to implement PTC at this location as soon as Amtrak finalizes its PTC in the adjacent rail lines they control. *(Editor's Note by Jeff Erlitz: PTC was placed in service between Penn Station and Harold Interlocking on December 5, 2020.)*

About Positive Train Control

Positive Train Control enhances train safety behind the scenes by reducing the potential for human error to contribute to train-to-train collisions, trains traveling into zones where railroad employees are working on tracks, or derailments caused by a train traveling too fast into a curve or into a misaligned switch.

The system uses a network of computers on board trains and along the tracks that are in communication with a central control hub, sharing data on rail conditions in real time. More information about how Positive Train Control works on the MTA network can be found at the three-minute video at this link: https://www.youtube.com/watch?v=bIX9wWIY_wg (MTA press release, November 16, 2020)

MTA NEW YORK CITY TRANSIT

The subway cars of the future are running with delays.

A pandemic-driven supply-chain slowdown will keep the MTA from receiving the first of hundreds of new redesigned subway cars until next year, ***THE CITY*** has learned.

Delivery of an initial batch of test cars from a $1.4 bil-

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Rail News in Review

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lion purchase of 535 subway and Staten Island Railway cars had been targeted for 2020, but an MTA spokesperson confirmed the new trains are now not expected to begin arriving until the first quarter of next year.

The purchase from Kawasaki Rail Car Incorporated includes 20 cars with the so-called open gangway design, which replaces the doors at the ends of train cars with accordion-like connectors that increase capacity and passenger mobility, allowing more room for social distancing.

Options in the MTA's 2018 contract to buy up to 1,077 more of the R-211 subway cars from Kawasaki — including 640 more of the open-gangway variety — are jeopardized by the agency's financial crisis.

The MTA has, for months, been pressing the federal government for $12 billion in emergency relief to plug massive deficits created by a collapse in ridership and revenue due to the pandemic.

The fallout extends to the MTA's plans to improve the transit system, with the agency's proposed $51 billion five-year capital program put on hold over the summer.

The new cars are assembled and tried out at Kawasaki plants in Lincoln, Nebraska and Yonkers before being put to the test in the subway system. But temporary shutdowns at the plants because of the pandemic have contributed to delays, along with COVID-related production issues with the manufacturing giant's suppliers.

Kawasaki did not respond to requests for comment from ***THE CITY***.

MTA data shows that Kawasaki's most recent additions to the MTA fleet, which began running on the 7 line in 2013, are among the most reliable of the dozen different car classes in the subway. Newer subway cars from another manufacturer, meanwhile, were twice temporarily taken out of service this year by the MTA over safety concerns.

In December, 2017, the MTA put an R-211 prototype on the sprawling mezzanine level of the 34th Street-Hudson Yards station, inviting commuters to check out the new look.

The cars include security cameras and expanded doorways that widen entrances from 50 to 58 inches, a feature designed to cut into the amount of time trains spend at stops. While most of the new cars will run on the lettered lines, 75 of them are supposed to eventually replace the decades-old fleet on the Staten Island Railway.

The delays in getting the first of the R-211 cars into the subway system for testing came as a disappointment to subway aficionados who have been awaiting their arrival.

Some riders worry that the MTA's pandemic-driven financial crisis could translate into trouble for eventual efforts to modernize the subway fleet with even more open-ended trains.

But an MTA Board member said delays to subway projects are, in many cases, unavoidable because of the pandemic. The transit agency is already contending with COVID-related slips in schedule for awarding contracts on 26 major capital projects, as ***THE CITY*** reported earlier this month.

"In this age of COVID, all kinds of delays have, unfortunately, become common," said Andrew Albert, who represents the New York City Transit Riders Council on the MTA Board. (***THE CITY***, December 5, 2020)

Exterior of one of the R-211 mock-ups at 34th Street-Hudson Yards station on December 5, 2017.
Jeff Erlitz photograph

View of the interior of one of the R-211 mockups with an open gangway at the far end.
Jeff Erlitz photograph

MTA Long Island Rail Road

The Long Island Rail Road has spending issues that relate to both time and money. According to a New York State audit, several infrastructure projects over the past decade or so have been over budget and slow to get completed.

The audit looked at 11 projects from the LIRR's capital programs covering a ten-year span from 2010 to 2019. Ten of those jobs were finished late, ranging from a few

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Rail News in Review

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months to a few years, while eight of the 11 projects ran over budget for a total cost overrun of almost $70 million.

The Metropolitan Transportation Authority's Capital Construction & Development agency has taken over the management of capital projects in order to speed capital project delivery and reduce cost. MTA spokesperson Aaron Donovan noted the LIRR's Third Track project, which has been under the agency's oversight and should be finished a year ahead of schedule. Donovan said the MTA Construction & Development would review the practices and procedures that the Comptroller has commented upon and will determine which can be improved as part of the transformation being accomplished.

The audit also found that LIRR project managers would violate their own written procedures. Project plans and kickoff meetings would not take place and budgets were not properly developed.

The report also revealed that projects routinely were underfunded because the LIRR's Estimating Unit was not always involved in the budget process and the MTA did not allow the agency to account for inflation when preparing project budgets.

The audit contained recommendations moving forward, including adopting MTA standards to strengthen project management procedures.

Some of the recommendations have been accepted by the LIRR, while others have not. (***Railway Track & Structures***, December 16, 2020)

MTA Metro-North Railroad

The Metropolitan Transportation Authority Board voted on December 16, 2020 to approve a $334.9 million contract to Siemens to build 27 dual-mode locomotives for the Metro-North Railroad to enable the replacement of 27 P32AC-DM locomotives built by General Electric between 1995 and 2004 that are nearing or exceeding their projected 25-year lifespan. The order is for 19 locomotives in the original order plus the immediate exercise of an initial option for eight additional units, bringing the total to 27 new dual-mode locomotives. Based upon the Siemens Charger design, they will be equipped with a dual-mode capability utilizing 700 volts d.c. underrunning third rail. This order is being funded by a Federal Transit Administration grant, and includes options for up to 144 additional locomotives for Metro-North, the Long Island Rail Road, Connecticut Department of Transportation and the New York State Department of Transportation (Amtrak's Empire Corridor). The first of these would be delivered in 2025 with the eight option locomotives delivered by early 2027. These options could potentially bring the total order for dual mode locomotives up to 32 additional for Metro-North, up to 66 for the LIRR, up to 20 for Connecticut Department of Transportation and up to 26 for the NYS Department of Transportation. It should be noted that the internal mechanical design of the Siemens Charger is based upon the "Vectron" locomotive which ply the rails in Germany by the hundreds. (***LIRR Today***, December 13)

CTRAIL

Improvements have been made to the CTrail eTix mobile app, which provides CTrail Hartford Line and Shore Line East riders with the ability to purchase tickets using smartphone devices.

The Connecticut Department of Transportation (CTDOT) says the app is a more convenient way to pay rail fares without needing to carry and display a paper ticket. The app now accepts both Apple Pay and Google Pay, and allows users to log in using Face ID/Touch ID (Apple) or fingerprint (Android).

The app login experience has been enhanced by adding biometric security — the option to turn on Face ID or Touch ID in Apple's iOS or fingerprint authentication on Android devices. Previously, users needed to manually enter their password to ensure the security of their ticket purchases from within the app.

With CTrail eTix, customers can now purchase tickets using Google Pay or Apple Pay in addition to a credit or debit card and store them electronically on their device. When ready to use a mobile ticket, the customer simply opens the CTrail eTix app and presses a button to activate the mobile ticket. After the ticket is activated, customers then show their smartphone screen to their train conductor.

The app can be used to purchase Shore Line East and Hartford Line tickets, with optional connecting service on New Haven Line (Metro-North Railroad) trains using a single device for one transaction. In addition, customers utilizing the stations in Berlin and Wallingford have the ability to purchase parking through the app. (***Mass Transit***, December 9, 2020)

NJ Transit

Rendering of the new Portal Bridge.
NJ Transit rendering

Construction of a new Portal North Bridge has taken a big step forward following NJ Transit's approval of a Full Funding Grant Agreement (FFGA) with the Federal Transit Administration. The new span will replace a 110-year-old swing bridge that has been at the center of train delays due to mechanical failures over the years.

The FFGA is the last stage of the Capital Investment

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Grant process to fund the $1.8 billion new fixed span that will cross the Hackensack River.

"I'm thrilled by the Board's decision to green light this agreement, which moves us one step closer to replacing this unreliable, century-old bridge that has threatened to grind the Northeast Corridor to a halt and been a source of untold stress for thousands of riders who rely on it," said New Jersey Gov. Phil Murphy. "New Jersey has put our skin in the game with more than our fair share of funding, and I look forward to working with the Federal Transit Administration to get this shovel-ready project started."

NJ Transit, along with Amtrak, will be able to construct the new bridge as well as operate and maintain the structure. Designs for the new Portal North Bridge have been finalized and construction has been fully permitted for years. The new bridge will be high enough to allow marine traffic to pass underneath without requiring any movement from the span. It will take about five years to build the bridge.

The FTA will supply a little over $766 million for the project, with the Federal Highway Administration providing another $57.1 million. New Jersey and Amtrak will fund the remaining amount. (***Railway Track & Structures***, December 9, 2020)

Newark Penn Station - Renovations include a deep clean of the limestone exterior to once again showcase the architecturally significant façade.
NJ Transit photograph

A total of $190 million has been committed for renovations and upgrades at Newark Penn Station, announced New Jersey Governor Phil Murphy on December 9.

The Governor was joined at an event announcing the renovations by Lt. Gov. Sheila Oliver, Newark Mayor Ras J. Baraka, NJ Transit President & CEO Kevin S. Corbett, State Sen. Teresa Ruiz (D-29), Assemblywoman Eliana Pintor Marin and General Chairman of SMART-TD Local 60 Jerome Johnson.

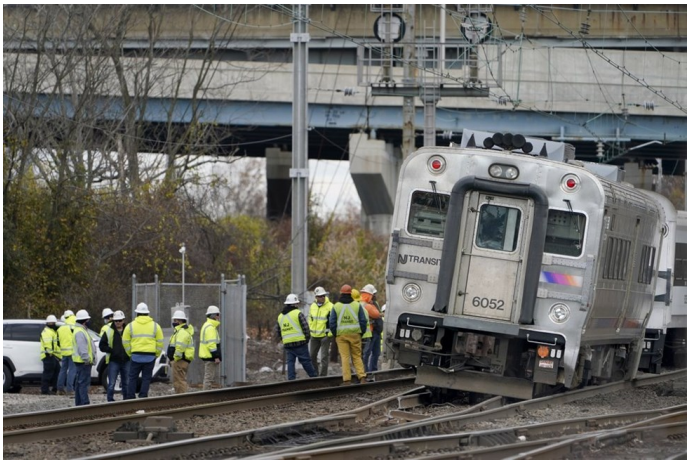
The work is slated to begin immediately with $30 million in renovations and restorations, with additional upgrades scheduled over the next five years totaling $160 million. The upgrades will be funded by the state.

The first phase of renovations will focus on aesthetics such as restoration of the classic benches in the waiting room, installation of brighter lighting, updating of the bathrooms, improved HVAC and air-handling, fresh paint and tile and a deep clean of the limestone exterior to once again showcase the architecturally significant façade. In the bus lanes, new lighting and improved drainage will improve the rider experience. And improved directional and way-finding signage will help make sense of this station's labyrinth of platforms and hallways.

Longer-term enhancements will focus on improving the station's openness, light and overall commuter and visitor experience. A future goal is to make Newark Penn Station more of a destination, with added dining and shopping in the concourse.

Newark Penn Station is the seventh busiest rail station in North America and one of the busiest stations in the region. The station is served by NJ Transit commuter trains, Newark Light Rail, PATH and Amtrak's Northeast Corridor services. The station also serves as Newark's main bus terminal.

Opened in 1935, Newark Penn Station is listed on both the State and National Registers of Historic Places. The station was originally designed and still operates as an intermodal facility serving pedestrian, taxi, bus and private vehicle traffic generated by the more than 50,000 transit customers who use the station each day. (***Mass Transit***, December 10)



Train #4625 is seen here on November 24, 2020 in Wood Interlocking, not quite one mile north of the station in Perth Amboy. Note the broken left hand switch point.
Seth Wenig/Associated Press photograph

On Tuesday, November 24, 2020, at about 12:20 AM, North Jersey Coast Line train #3292 derailed in Wood Interlocking, less than a mile north of the Perth Amboy station. Led by ALP-46 4625 and pulling eight passenger coaches, it had departed Long Branch at 11:32 PM. Five passengers and three crew members were on board, and there were no injuries. The locomotive did not derail while the eight coaches derailed all wheels with the equipment upright and in-line. Train #3292 was proceeding eastbound on Track 2 at an estimated 57 mph (60 mph limit here) on tangent track with normal

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routing through Wood interlocking when the derailment occurred. Initial findings by the Federal Railroad Administration (FRA) indicated that the point of derailment was an Engine Burn Fracture (EBF) on the left hand point of the left hand facing point switch in the interlocking.

Through service on the North Jersey Coast Line was shut down with trains operating between South Amboy and Bay Head. Limited service resumed the following weekend.

FRA Inspectors were on site reconstructing the rail pieces involved in the derailment. Periodic ultrasonic testing was performed on this segment on November 5, 2020 and will be reviewed by FRA as well as other pertinent items in the accident investigation. (Associated Press, November 24, 2020)

AMTRAK

Amtrak customers have new digital payment options on the Amtrak mobile app and Amtrak website, including Apple Pay, Google Pay and PayPal.

Apple Pay, Google Pay and PayPal are now available when checking out on the Amtrak mobile app and website, offering users an alternative to traditional credit and debit card payments. Customers can leverage all three payment solutions to purchase tickets and more. Once logged in, customers can save their preferred digital payment method as a default payment option in their profile, providing a quicker time to purchase. For each of the three new payment methods, customers can purchase tickets and modify reservations originally paid with one of the digital payment solutions.

Amtrak says it is committed to continually improving and expanding the website and mobile platforms. Previous updates include:

Seamless gate service: To reduce crowds at departure boards, Amtrak app users can receive gate and track information via push notifications at select stations. The home screen also includes gate and track information for applicable reservations (when published).

Contact-free travel: Customers can book, board, check train status and access information from the convenience and safety of a mobile device. Amtrak encourages boarding with eTickets, which Conductors scan from the Amtrak app. (***Mass Transit***, December 9, 2020)

OTHER SYSTEMS

BOSTON, MASSACHUSETTS

As the COVID-19 virus continues its relentless march across the nation and around the world, U.S. transit is quickly becoming one of its casualties. The picture will probably get worse as the $24.9 billion that transit got from the CARES Act runs out next year.

Legacy rail transit systems in places like Boston, New York City, Philadelphia and Washington, D.C. are now considering service cuts of unprecedented severity. So are other transit providers. The looming disaster has already hit San Francisco, where Muni runs only a small number of bus routes and no rail transit at all, BART continues to operate sharply reduced service, and voters recently pulled the Caltrain commuter line back from the edge of the grave.

Observers of the transit scene already know this, but now the word is out. A comprehensive report by Christine Goldbaum and Will Wright in the December 6, 2020 edition of ***The New York Times*** sets the scene: "Across the United States, public transportation systems are confronting an extraordinary financial crisis set off by the pandemic, which has starved transit agencies of huge amounts of revenue and threatens to cripple service for years."

It is easy to express the cause of the woes now suffered by transit providers, but a remedy for those woes will be far more difficult, if not impossible, to find. Because of the shutdowns resulting from fear that the virus will spread if public events are held and businesses are allowed to stay open fully, there are not many places to go, so not many people are going anywhere. (Motorists are encouraged to avoid transit, and many do.) Farebox revenues plunged with ridership, so transit must operate without much of that revenue but with the additional cost of intensive cleaning to kill the virus.

Among the remaining riders are some "essential workers" who depend on transit because they do not have access to an automobile. Now in Boston and other places, their transit is on the chopping block.

Transit providers, riders and their advocates are pinning their hopes on another relief package from Congress. The American Public Transportation Association (APTA) advocates for management and said in a statement on December 3, 2020: "The bipartisan, bicameral proposal of a new $908 billion COVID-19 aid package that includes $15 billion for public transit emergency relief is a starting point for negotiations, and immediate action needs to be taken to address a ravaged public transportation industry that continues to serve Americans every day. We urge Congress and the Administration to provide at least $32 billion in emergency funding to ensure that public transit agencies can survive and help our communities and nation recover from the economic fallout of the pandemic. The public transportation industry's very survival is at stake. We urge both Congressional leaders and the Administration to enact COVID-19 emergency transit funding legislation before Congress adjourns for the year."

APTA requested about 30% more than the CARES Act provided for transit earlier in 2020. It is unclear if APTA's request would tide the industry over until the eventual success of a vaccine allows riders to return to transit while feeling safe about doing so. Also unclear is when those riders will return, and in what numbers.

How much funding Congress would be willing to give transit providers to limit service cuts is unknown. A purportedly bi-partisan proposal would give transit $15 billion, while the Republican leadership in the Senate (who will remain in power during the Biden administration, unless Georgia voters decide otherwise in January) has

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not offered anything for transit. So, the prognosis for transit seems to range from merely grim to exceedingly grim.

Against this backdrop, the Massachusetts Bay Transportation Authority (MBTA, known locally as the "T") has proposed drastic reductions in service, but is now delaying implementation. The region's legacy commuter rail system, with trains on both the South Side and the North Side of the region, may eliminate all trains on weekends and after 9 PM on weeknights. Ferry service on its three routes would end, too, as would 25 bus routes. The level of service on local rail transit would be sharply reduced, including shutting down by midnight, about an hour earlier than currently.

MBTA ridership now stands at about 25% of pre-pandemic levels, according to a December 7, 2020 ***Boston Globe*** article by Adam Vaccaro, Travis Andersen and Danny McDonald: "After an outcry from riders, transit advocates and political leaders, the Massachusetts Bay Transportation Authority indicated Monday it may substantially scale back a host of planned cuts across the system meant to help bridge a severe budget deficit."

Local rail transit service would end one hour earlier than now, with an average of 25% less service on each line. The "E" Line branch of the Green Line (light rail) would terminate at Brigham Circle, eliminating five stops along 0.8 mile of street running along Huntington Avenue. Overall, service would be reduced to 70% of its current level. On the bus side, 85% of current service would be maintained, with "essential" routes losing 5% of service, "non-essential" routes losing 20%, and 25 routes eliminated.

The proposed cuts on MBTA's commuter rail system, operated under contract by Keolis, are even more severe, with all trains that run after 9 PM on weeknights and all weekend service eliminated, a 35% cut. Peak-hour and midday service would be cut from 544 trains to 430. An expected 31,000 riders would lose their trains. In addition, all ferry service would be eliminated.

The MBTA called its service reduction plan "Forging Ahead," and the hearing notice on its website billed it as "the Authority's plan to preserve transit access and quality of service available to transit-critical customers"—a title that did not make it clear that draconian cuts could be coming soon. "Virtual" hearings were held on November 19, 2020 and a comment period followed. The proposed cuts are severe. (***Railway Age***, December 9, 2020)

Philadelphia, Pennsylvania

SEPTA indefinitely closed its overnight service of the trolley tunnel, spanning 13th to 40th Streets, beginning Monday, December 14, citing little early-morning ridership during the COVID-19 pandemic.

While research has shown that intensive cleaning of surfaces is not as necessary as thought during the early months of the pandemic, SEPTA will shut down the tunnel to allow for deep cleaning at stations as well as maintenance. SEPTA's "trolley blitz," an annual effort to avoid sporadic shutdowns throughout the year by closing the tunnel for multiple days for crews to perform predictable maintenance, took place in July and cost $1 million.

The closure, between midnight and 5 AM and lasting seven days a week, will continue "until further notice," SEPTA announced on December 9. Routes 10, 11, 13, 34 and 36 riders will need to transfer between the Market-Frankford Line or overnight Owl buses at 40th Street to continue their trips.

It is the second COVID-19-related service disruption in recent months for SEPTA. In November, the authority cut overnight weekend rail service on the Market-Frankford and Broad Street Lines, similarly offering bus service in lieu.

The trolley tunnel typically sees 65,000 riders daily. Ridership is down about 65% from pre-pandemic levels. SEPTA decided to move forward with the closure "to take advantage" of the "very low ridership during those overnight hours." The authority's last ridership count between midnight and 5 AM on December 3 showed 173 total passengers on 40 trolley trips in the tunnel. The figures "are consistent with ridership levels in recent months," according to the authority. The decision was not a cost-saving measure, Busch said.

Like other major transit agencies across the country, SEPTA's finances have been hobbled without riders to pay fares. Coupled with long-term funding challenges SEPTA faced before the pandemic, the authority said it will need to consider service cuts, layoffs and fare increases without additional relief. The agencies are asking for an additional $32 billion in federal funding to bridge gaps created by COVID-19.

SEPTA is continuing to plan ahead, with its Board recently approving a $5.7 million land deal that is a small but significant step forward for trolley modernization, a $1.55 billion project to replace its current fleet with modern light rail vehicles. (***Philadelphia Inquirer***, December 9, 2020 via ***Mass Transit***)

Baltimore, Maryland

Operations for the Purple Line project in Maryland will soon be back to normal. The Maryland Department of Transportation reached a $250 million settlement with three companies connected to the public-private partnership.

Two of the firms, Meridiam and Star America, will stay on the 16-mile-long project, but Fluor will no longer be associated with Purple Line Transit Partners (PLTP).

The state and PLTP had been at odds for months, and the dispute led to the group of builders to leave the site. The conflict centered on time delays and $800 million in cost overruns.

Meridiam and Star America are now looking for another contractor. Fluor formed Purple Line Transit Constructors and also was part of Purple Line Transit Operators. The agreement still needs to be approved by Maryland's Board of Public Works.

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The Maryland Department of Transportation and the Maryland Transportation Authority will still oversee hundreds of contracts and purchase orders. (***Railway Track & Structures***, November 25, 2020)

Tampa, Florida

A rendering of a modern streetcar in Centro Ybor.
City of Tampa rendering

The Florida Department of Transportation (FDOT) has awarded the city of Tampa $67.3 million for the Tampa Streetcar Extension Project.

The funding is through the state's New Starts Transit Program, which aids Florida municipalities in developing fixed-route transit projects to accommodate growth. FDOT Secretary David Gwynn noted the grant is the largest awarded to the Tampa Bay region.

The city explains the TECO Streetcar was built to invoke the historic Ybor City, but the system has potential to be a viable transportation option for residents to travel to and from downtown and the surrounding neighborhoods.

The project calls for the modernization of the existing 2.7-mile TECO Streetcar line and a 1.3-mile fixed guideway extension. The Hillsborough Area Regional Transit Authority (HART) says the project support's Tampa's vision for "a livable, connected and competitive downtown."

The heritage streetcar vehicles currently in use on the system would be replaced with modern and faster vehicles. Additional modernization work would include constructing level boarding at platforms, reconstructing tight turns, upgrading traction power and expanding the streetcar barn.

The proposed system extension would be built north on Florida Avenue to Palm Avenue where it would turn and then head south on Tampa Street.

Project stakeholders believe the new modern, expanded streetcar system will serve as a convenient and reliable commuter option to residents, workers and visitors in Tampa's greater downtown area.

Future connectivity is key, and this project will position the streetcar system to be ready for future expansions as Tampa continues to grow. Future connections include north up to the University of Southern Florida, east to East Tampa neighborhoods and west to Westshore and the airport.

The project was accepted into the Federal Transit Administration's (FTA) Small Starts Project Development in June, 2018. Tampa's website says the city, in coordination with HART, had planned to submit a project ratings request to the FTA in August, 2020. (***Mass Transit***, December 9, 2020)

New Orleans, Louisiana

RTA photograph

Three streetcars equipped with wheelchair lifts at the front and rear of each car to comply with Americans with Disabilities Act accessibility requirements entered service on the St. Charles Line. These cars formerly operated on the Riverfront Line but have been repainted inside and out to match the historic Perley Thomas cars of the St. Charles Line in almost every way. To help riders identify the ADA-compliant streetcars, the new cars are differentiated from the Perley Thomas streetcars by being marked with the universal accessibility icon on the front and side indicating ADA accessibility. The project also included the modification of 12 St. Charles Line stops, six inbound and six outbound. These stops were rebuilt to feature platforms wide enough for streetcar operators to safely deploy the accessible streetcars' Limited Mobility (ADA) Ramps, installation of yellow tactile warning strips, installation of protective bollards, and re-grading to provide level ADA-compliant surfaces. The project was jointly funded by RTA and the City of New Orleans with $160,000 for engineering and construction administrative services and $400,000 for engineering costs. (New Orleans RTA press release, December 2020)

Chicago, Illinois

The South Shore Line Double Track project is advancing as planned. The Northern Indiana Commuter Transportation District Board of Trustees approved a contract on November 30, 2020 for demolition work in Michigan City.

Green Demolition of Chicago won the $2.7 million project, which consists of prep work for the double track project. The board also OK'd $1.2 million for the manufacture of railroad turnouts needed to advance the project. The turnout work is expected to begin in the sum-

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mer of 2021. Voestalpine Railway Systems will be supplying the turnouts. Final design work is currently being completed, and a construction contract is expected to be awarded soon.

Officials are waiting on a New Starts grant from the Federal Transit Administration that would pay for about 38 percent of project. The hope is the money will come during the first quarter of 2021. South Shore President Michael Noland says if the funding arrives in the next couple of months, construction of the double track project should begin the following summer.

NICTD's West Lake Corridor project also is expected to start next summer. The project will extend commuter rail service south through Hammond and Munster. (***Railway Track & Structures***, December 1, 2020)

Sacramento, California

The Sacramento Regional Transportation District (SacRT) will receive $35.47 million from the California Transportation Commission (CTC) to continue work on its $610 million light rail modernization project to improve capacity.

The funding is part of CTC's recent approval of $2 billion for 56 state projects that will reduce traffic, improve goods movement and increase transit service, among other measures. Project funding is split among three programs: the Solutions for Congested Corridor Program, the Trade Corridor Enhancement Program and the Local Partnership Competitive Program.

SacRT will receive $33.87 million as part of the Placer-Sacramento Gateway Corridor project, which was awarded $67 million under the Solutions for Congested Corridor Program.

It will help fund Blue Line improvements, including the purchase of eight new low-floor light rail vehicles to replace older, high-floor vehicles; four station platform conversions on the line's North Eastern Corridor to allow for automatic ramp deployment from the new LRVs (eight additional stations on the corridor will need similar work); and improvements to the Watt/I-80 light rail and bus station.

SacRT will receive another $1.6 million from the Local Partnership Competitive Program for Gold Line improvements.

SacRT was previously awarded $184.5 million in state and federal funding for its light rail modernization project. SacRT has tapped Siemens Mobility to manufacture up to 76 new S700s. A notice to proceed on the first 20 was signed in April, with delivery expected to start in early 2023. (***Railway Age***, December 8, 2020)

San Francisco, California

Attention was centered on the Twin Peaks Tunnel in San Francisco once again on November 30. The tube has had issues since it re-opened two years ago.

In late November, crews started replacing the splice connections and lines overhead, upgrading switch machine and subway lights, making trackway adjustments and performing critical maintenance to infrastructure. The most important task was removing poor ballast that was never addressed during reconstruction. Due to high amounts of heavy metal in the rock, the San Francisco Municipal Transportation Agency and the contractor decided to leave the ballast in place that has been part of the tunnel since original construction back in 1918.

Work is expected to run through February, 2021 and takes place six days a week from 7:30 AM to 8 PM.

Muni still has not revealed how much it will cost to replace the ballast, and a majority of the work will take place on the Eureka Curve, which is the connector between downtown San Francisco and the West Portal.

The Twin Peaks Tunnel project is part of Muni's Subway Renewal Program, designed to target critical subway systems and infrastructure for strategic overhauls to improve reliability, resilience and longevity of the system once it reopens. (***Railway Track & Structures***, November 24, 2020)

Railway Track & Structures photograph

All Bay Area Rapid Transit (BART) stations now offer *Clipper* as the only fare product available for purchase.

BART has been eliminating the sales of paper tickets since August of 2019 when a four-station pilot program was launched. The conversion was accelerated during the pandemic with one or more stations transitioned each week throughout 2020. Systemwide conversion was fully completed the week of December 7. This effort is part of BART's 15-Step Plan to welcome riders back to a more contactless experience in the era of COVID-19.

Touchless Experience

BART says it is working to prevent the spread of COVID-19. Using *Clipper* helps this effort by allowing riders to avoid direct contact with fare gates, as the card only needs to be held over the fare gate card reader without touching. Riders can further protect themselves from contact with fare machines by loading funds onto their *Clipper* card online, allowing up to one day for the balance to post. For registered users, the autoload feature will automatically replenish their *Clipper* balance.

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While paper tickets will no longer be available for purchase at these stations, riders are still be able to use paper tickets to enter or exit through fare gates. Riders are also able to add enough fare to a paper ticket to exit the station using add fare machines located inside the paid area.

***Clipper* benefits**

BART has moved to a *Clipper*-only fare payment system because the region has prioritized the use of *Clipper* as the Bay Area's all-in-one transit card administered by the Metropolitan Transportation Commission. In addition to being contactless, *Clipper* has many advantages over paper tickets:

- *Clipper* saves money. Adult paper tickets have a 50-cent surcharge on every trip, which equals $1.00 per round trip. With a one-time acquisition fee of $3.00 for a *Clipper* card, it pays for itself in three roundtrips.\
- *Clipper* is reusable and long-lasting, unlike paper tickets that get worn and tattered
- *Clipper* is accepted by nearly all transit agencies in the region. Many other agencies offer discounted fares when using *Clipper*
- Riders can set up their *Clipper* card account to reload automatically
- The loaded value on the *Clipper* card is secure when it's registered. If the card is lost, the balance can be replaced for a nominal fee
- The tag in and out system allows *Clipper* card users to move through fare gates faster
- *Clipper* cards can be purchased at every BART station and at many retail outlets throughout the region
- Paper tickets can jam fare gates, so *Clipper* usage means more open fare gates, shorter lines and less fare gate maintenance
- *Clipper* usage reduces the paper waste of the magstripe tickets in the BART system
- Customers can use *Clipper* anonymously. *Clipper* cards do not require registration. Registration is required for added benefits such as autoload and balance protection

Paper Ticket Refunds

Customers can claim a refund for a paper ticket with a remaining value greater than $1. A station agent will help process a ticket refund request. Tickets can also be mailed along with the reason for the refund request. (***Mass Transit***, December 15, 2020)

Montréal, Quebec, Canada

The first cars to be supplied by Alstom for the Réseau Express Métropolitain automated metro network in Montréal were formally unveiled by Groupe PMM on November 16, 2020.

Alstom is supplying 106 two-car trainsets from its Metropolis family, and four cars have so far been delivered to Montréal from its Sri City factory in India. The driverless trains are similar to those already in use on the Sydney metro, but adapted for Canadian winter conditions. The front end has been specifically shaped to prevent snow accumulation, and the cars have heated door thresholds, floors, and autocouplers, as well as ice protection equipment, heated windscreens and ice scrapers on the pantographs.

According to the manufacturer, the trains are designed "to perfectly fuse with the green spaces of the city," offering passengers "breathtaking views" through the large windows. The green and white livery selected by the public is inspired by the new Samuel De Champlain Bridge, with the headlights "directly recalling" the stays of the bridge.

When complete, the 41.6-mile REM serving 26 stations will be one of the world's largest automated metro networks. It will connect the south shore suburbs in the east with the city center, while the western branches will run to the airport, Sainte-Anne-de-Bellevue and Deux-Montagnes. Opening of the first section is planned for mid-2021.

In April 2018 project promoter CDPQ Infra awarded the C$5 billion infrastructure engineering, procurement and construction contract to the Groupe NouvLR consortium of SNC-Lavalin Grands Projets, Dragados Canada, Groupe Aecon Québec, Pomerleau, EBC and AECOM. The Groupe PMM consortium of Alstom Transport Canada and SNC-Lavalin is responsible for supply of the rolling stock and railway systems as well as operations and maintenance. (***Metro Report International***, November 17, 2020)

Metro Report International photograph

London, England

The Mayor of London, Sadiq Khan, Transport for London (TfL), the Department for Transport (DfT) and the British treasury have agreed on a funding and financing package for the final phase of the Crossrail project, allowing work on the troubled line to continue "at pace."

Crossrail Ltd announced in August, 2020 that the 13-mile central underground section of the new Elizabeth Line between Paddington, Stratford and Abbey Wood would cost an additional £450 million to complete, and would not be ready to open until the first half of 2022.

TfL announced on December 1, 2020 that the shortfall will initially be covered by the Greater London Authority (GLA) borrowing up to £825 million from the DfT. GLA will then give the funding to TfL as a grant and will repay the TfL loan using Business Rate Supplement (BRS)

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and Mayoral Community Infrastructure Levy (MCIL) revenues.

The funding comes just over a week after London Transport Commissioner Andy Byford wrote to the permanent secretary at the DfT seeking £80 million of immediate support to keep the project on track.

"If agreement is not reached this week, we will have no option but to mothball the project and to seek alternative governance for its eventual completion," Byford's letter said, according to Sky News.

Crossrail Ltd says it is continuing to work hard to reduce its funding shortfall, and TfL is ensuring that further independent analysis of costs is carried out.

"I have been very clear that it is my priority to get the railway open as soon as possible and all those working on the Crossrail project are focused on that too," Byford said following the announcement of the new funding. "Confirming this financing is an essential step in ensuring the team can fully concentrate on safely delivering the Elizabeth Line, which is so vital for boosting rail capacity and supporting the economy."

Crossrail started a second blockade on November 21, 2020, which was due to run for 11 days, in order to get the railway ready for systems integration dynamic testing (SIDT) which was due to begin on December 3.

The blockade follows a successful six week blockade over the summer, during which 96% of the tasks scheduled during the closure were completed.

Governance of Crossrail transferred directly to TfL in October, in order to simplify responsibilities and ensure decision-making is seamless and fully aligned. A special purpose committee of the TfL Board, the Elizabeth Line Committee, is providing high-level oversight of the project, with the first meeting taking place the last week of November, 2020.

The project remains a jointly sponsored by TfL and the DfT and an independent DfT representative will attend the committee meetings.

When fully open, the Elizabeth Line will have capacity for more than half a million passengers per day and will support new journeys through central London out to Essex and Berkshire.

The new railway is expected to support thousands of new homes and new jobs and will boost the UK economy by £42 billion. (***International Railway Journal***, December 1, 2020)

Luxembourg City, Luxembourg

An extension of the city of Luxembourg's tramway 1.25 mile south from Place de l'Etoile to the mainline interchange at Gare Centrale opened on December 13, 2020.

There are intermediate stops at Hamilius in the historic center, and at Place de Metz and Place de Paris along Avenue de la Liberté to the station.

The extension is entirely catenary-free, trams being powered by CAF Power & Automation's Greentech Freedrive supercapacitors which are recharged at stops by ground-level equipment.

The tramway now has 2.25 miles of catenary-free route, minimizing the visual impact of the extension on the west side of the historic center and the Pont Adolphe.

The first wire-free segment opened on July 27, 2018, running from Rout Bréck-Pafendall across the Pont Grande-Duchesse Charlotte viaduct over the River Alzette and west via Limpertsberg, Theater to Place de l'Etoile.

The tramway's first five-mile section opened on December 10, 2017 between Luxexpo and Pafendall-Rout Bréck. The rest of the ten-mile route comprising extensions south from the station to Cloche d'Or and east from Luxexpo to Luxembourg Airport is expected to be open in 2022-23.

CAF is supplying a further 12 Urbos 3 trams to strengthen the fleet of 21 already in service. (***Metro Report International***, December 15, 2020)

Urbos 3 tram 110 (CAF, 2019) in front of the Gare Centrale.
City of Luxembourg photograph

VIENNA-BRATISLAVA-UKRAINE
by Jack May
(Continued from December, 2020 issue)
(Photographs by the author, except where noted)

Tuesday, June 13

It was a relatively short ride on the 207 bus from the Vosendorf-Siebenhirten stop of the Badner Bahn to the Siebenhirten terminal of Vienna's U6 line. At an earlier time in my life I would have walked it, but it was rather hot in the bright sun, and I had been up for at least 24 hours by then.

Vienna's U-bahn system consists of 5 lines. Four are traditional rapid transit lines (U1 to U4) in that they are served by heavy metro cars taking power from third rails and stopping at stations with high-level platforms. The U6 however, is different, as the equipment is lighter, gets its power from overhead wire and its stations have low-level platforms, just like the trolley subways of Boston and Philadelphia. Originally the G/Gurtel line of Vienna's Stadtbahn, a former steam railway that was electrified in 1925, it operated trains of single-truck streetcar-like cars (up to 9 units) along a grade-separated right-of-way.* Most of the G line ran over an elevated structure and rather than tear it down and replace it with a subway, the operators decided to restore it, but update its electrical system and signaling, while preserving the stations' original Otto Wagner architecture (although changing from left-hand operation to right-hand). [The alignment of line U4 follows the other Stadbahn line while the inner portion of the U2 was formerly a trolley subway.] It became what could be best described as a Light Metro and continues to use overhead power. It also was extended at both ends, and the southern portion, which I was about to ride and photograph, literally took over the right-of-way of former tram route 64, which had been built as an express line in 1979.

* Three of the Stadtbahn cars, which operated into the 1980s, are preserved at the San Diego Electric Railway Association's museum in National City, California.

The U6 reached Siebenhurten in 1989. At that time single-ended articulated cars, similar in design to Wiener Linien's E-class motors and C-class trailers, but with doors on both sides, were operated back-to-back on the totally segregated line. They were gradually replaced by 70-percent low-floor T and T1 units starting in 1992. Once delivered service began to be provided by a combination of high-floor Es and low-floor Ts coupled together, to make at least a portion of each train wheelchair accessible. The Es were retired at the end of 2008 and the line has been an all low-floor operation since.

I photographed the U6 at Siebenhirten and then rode it to Tschertteg (5 stops), where I walked to the WLB at its almost adjacent Schöpfwerk station for more photos.

That accomplished, I rode the interurban back to its Oper (Opera) terminal, where I changed to a D car to take me back to the hotel — but of course, not before I used my camera again. The D and the O are the only two lettered routes left on Vienna's tramway network. When I first came to Vienna in 1960 there were a large number of lettered routes, as originally the routes that traveled along the Ring were identified by letter, while numbers were used for the radial and outer lines. The A and B, for example, each traversed the entire Ring before turning off to separate terminals. But that system is gone now and the O line no longer even touches the inner boulevards.

The D continues past the grounds of the Belvedere, home to some of Vienna's finest palaces and museums (which Clare visited on Wednesday), and then cuts under the OBB tracks at the eastern entrance of the Hauptbahnhof. After stopping at the railway station it continues for one more stop along Karl-Popper-Straße, and then loops at Alfred-Adler-Straße. Interestingly, Vienna now pays homage to both Popper and Adler, who both converted to Christianity from Judaism, but saw the writing on the wall anyway, and emigrated to Britain prior to the 1938 Anschluss. Not so good for Popper's relatives who stayed behind, as they all perished. Popper was a leading philosopher who once worked for Adler, a famous psychotherapist and one of Sigmund Freud's collaborators. The late National Public Radio correspondent, Margot Adler, was his granddaughter.

Upon arriving back at the hotel, I found Clare had rested and was ready to go out to eat. I was pretty tired, but knew the faster we ate the faster I could succumb to a good night's sleep. We had passed a local restaurant while rolling our luggage to the hotel, and we headed back there--and had delicious dinners of Austria's version of Nouvelle cuisine. I was asleep a nanosecond after I closed my eyes.

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Vienna-Bratislava-Ukraine

(Continued from page 17)

Two views of the southern terminal of the U6 at Siebenhirten. With the retirement of the E6/C6 high-floor cars all service on the 11-mile line is now provided by the T and T1 class. 78 T cars, painted in white, began being delivered in 1992, while the last batch of equipment, 66 T1s in a light grey livery, started to arrive in 2007. In addition to the slight color difference, the T1s have air-conditioning. The left photo shows a train of T1s reversing on the tail tracks beyond the terminal. Before the U6 was extended here in 1989, this area was part of the turnaround loop for the single-ended cars of Vienna's route 64 rapid tramway. The right photo shows a train of T-cars in the Siebenhirten station boarding passengers for its northbound run.

Two views at the Badner Bahn's Schöpfwerk station. The left photo shows the rear of a two-car interurban train running from Oper to Baden, while at right an inbound single-car rush-hour unit is shown in tripper service from Wiener Neudorf to Oper. Note the similarity between the rear car in the left photo and the equipment running on the U6 (shown in the two preceding views). Both low-floor models were built by Bombardier in roughly the same time period (the U6 cars are single ended and must run back-to-back in pairs, while the WLB units are double ended). The 100-series high-floor articulated cars (right photo) were constructed by SGP starting in 1979 under license from Siemens-Duewag.

The D line leaves the Ring and joins the 71 along Schwarzenbergplatz. The equestrian monument to the right of E2-class car 4012 (SGP, 1978) commemorates the victorious commander of the 1813 Battle of Leipzig.

(Continued on page 19)

Vienna-Bratislava-Ukraine

(Continued from page 18)

The loop at the lower end of the D line. The traffic light is at the intersection of Karl-Popper-Straße and Alfred-Adler-Straße. It looks like the middle of nowhere, but I suspect not for long, due to its proximity to the new Hauptbahnhof. Type B1 794 (Siemens, 2016) is shown in the left view, while the right photograph features 6-axle E2 4027 (SGP, 1979) pulling 4-axle c5 trailer 1427 (Bombardier, 1975) .

(Continued next issue)

SUBDIVISION "B" CAR ASSIGNMENTS

CARS REQUIRED NOVEMBER 8, 2020

LINE	AM RUSH	PM RUSH	LINE	AM RUSH	PM RUSH
A	216 R-46, 110 R-179	224 R-46, 8 R-68A, 110 R-179	L	176 R-143, 16 R-160A	176 R-143, 16 R-160A
B	48 R-68, 152 R-68A	40 R-68, 144 R-68A	M	192 R-160A	184 R-160A
C	72 R-46, 72 R-179	64 R-46, 72 R-179	N/W	160 R-46, 24 R-68, 16 R-68A, 80 R-160B-2	160 R-46, 24 R-68, 16 R-68A, 80 R-160
D	232 R-68	224 R-68	Q	168 R-46	168 R-46, 8 R-68
E	260 R-160A	260 R-160A	R	80 R-160A, 190 R-160B-1, 40 R-160B-2	80 R-160A, 190 R-160B-1, 40 R-160B-2
F	210 R-160A, 140 R-160B-1, 100 R-160B-2	210 R-160A, 140 R-160B-1, 110 R-160B-2	S (Rockaway)	12 R-46	12 R-46
G	52 R-68	52 R-68	S (Franklin)	4 R-68	4 R-68
J/Z	88 R-160A, 72 R-179	80 R-160A, 72 R-179			

Berlin and Paris—Two Major Metro Openings Within Ten Days

At the Pont Cardinet station, looking down at the platforms from the intermediate mezzanine as a northbound MP89CA departs.
Julian Pepinster photograph

NORTH AMERICAN TRANSIT PROJECT OPENINGS SCHEDULED FOR 2021
by Randy Glucksman

Eighteen projects are proposed for completion this year including five holdovers, with some going back to 2018.

DATE	AGENCY	CITY	TYPE	LINE	DETAILS	NOTES
January 1	New York State Empire Development Corporation	New York, New York	LD CR	Northeast Corridor	Moynihan Train Hall Opens	
January	Charlotte Area Transit System	Charlotte, North Carolina	LR	Gold Phase II	Charlotte Transportation Center to French Street 2.5 miles, 11 stations	
Early	Honolulu Authority for Rapid Transportation	Honolulu, Hawaii	APM	Honolulu Rail Transit Phase I	East Kapolei to Aloha Stadium 10.8 miles, 9 stations	Initially planned for 2012
Mid-year	Los Angeles Metropolitan Transportation Authority	Los Angeles, California	LR	Crenshaw/LAX Transit Corridor	Crenshaw/Expo to Westchester/Veterans 8.5 miles, 8 stations	From 2020
Mid-year	South Florida Regional Transportation Authority	Miami, Florida	CR	Tri-Rail Downtown Miami Link	Extension to Miami Central Station 9.05 miles, 1 station	From 2020
July	Washington Metropolitan Area Transportation Authority	Washington, D.C.	HR	Silver Phase II	Wiehle Avenue to Dulles International Airport 11.5 miles, 6 stations	From 2018
September	Sound Transit	Seattle, Washington	LR	Northgate	University of Washington Stadium to Northgate 4.3 miles, 3 stations	
Fall	MTA Long Island Rail Road	Elmont, New York	CR	Babylon	Elmont Station (south platform)	
Fall	Brightline	Aventura, Florida	LD	Brightline	Aventura station opens	
December	CalTrain	San Francisco, California	CR	Peninsula Corridor Electrification Project	Electrification: San Francisco to Tamien 51.6 miles, 27 stations	
December	Edmonton Transit	Edmonton, Alberta	LR	Valley Phase I	102nd Street to Mill Woods Town Center 8.07 miles, 12 stations	From 2020
December	Massachusetts Bay Transportation Authority	Boston, Massachusetts	LR	Green - Medford Branch	Lechmere to College Avenue, Medford 3.4 miles, 6 stations	
December	Massachusetts Bay Transportation Authority	Boston, Massachusetts	LR	Green - Union Square Branch	Lechmere to Union Square 0.9 miles, 1 station	
End	Southeastern Pennsylvania Transportation Authority	Philadelphia, Pennsylvania	CR	Media/Elwyn	Extension from Elwyn to Middetown (Wawa) Station \ 3.5 miles, 1 station	
Late	Edmonton Transit	Edmonton, Alberta	LR	Southeast LRT	Downtown to South Hospital 1.6 miles, 16 stations	
Late	San Diego MTD	San Diego, California	LR	Mid Coast Corridor (Blue)	Old Town to USC San Diego (La Jolla) 10.92 miles, 9 stations	
Late	Valley Metro Rail	Tempe, Arizona	SC	Tempe Streetcar	Marina Heights/Rio Salado Parkway to Dorsey Lane 3 miles, 14 stations	
Late 2021 or 2022	Sonoma-Marin Area Rail Transit	Petaluma, California	DMU	SMART	Extension from Sonoma County Airport to Windsor 3.5 miles, 1 station	

Legend:
APM: Automated People Mover
CR: Commuter Rail
DMU: Diesel Multiple Unit
HR: Heavy Rail
LD: Long Distance
LR: Light Rail
SC: Streetcar