



BULLETIN

Volume 65, Number 8 | August 2022

MTA's 2020-24 Capital Program Amended

On July 25, the Metropolitan Transportation Authority (MTA) detailed an update to the Authority's 2020-24 Capital Program that adjusts mass transportation needs for a post-COVID world. In a presentation to the MTA Board's Capital Program Committee, MTA Construction & Development President Jamie Torres-Springer put forward a proposed capital program amendment that allows them to move projects along at a faster pace, offers support for megaproject expansions and rebalances priorities while accounting for the pandemic's impact on external factors such as inflation, supply chain and labor market issues.

The proposed amendment builds on the accelerated pace at which projects have been completed during the pandemic, when it took advantage of low ridership to complete accessibility and signal modernization projects. Among the projects included are acceleration of accessibility upgrades at eight LIRR stations; modernization of the signal system on the **A** **C** and **F** lines in Brooklyn and Manhattan; Track Trespassing initiatives including the Platform Screen Doors pilot, cameras, and other technologies; bike and pedestrian accessibility at bridge and tunnel crossings; and renewal of Metro-North Railroad's viaduct along Park Avenue in East Harlem.

Implementation of the program resumed following a

pause at the start of the pandemic. In 2021, the Authority initiated over \$8 billion in projects, with another \$8 billion set for 2022. The MTA has been able to contain costs in the early stages of the program, with the median contract for projects coming in 8% lower than expected cost. In 2020 and 2021 accessibility projects were completed at the fastest pace in agency history, with 23 subway stations brought online in the two-year span. Progress was also made on signal modernization efforts with the installation of Communications Based Train Controlled (CBTC) signaling on a major portion of the IND Queens Line.

Elements of the proposed 2020-24 Capital Plan amendment include:

1. Adapting to Changing Conditions and Needs

Prioritizing Reliability and Equity in Signal Modernization

A rebalanced approach puts the focus on reliability and equity in the signal modernization plan. The plan amendment will replace all remaining 80-plus year-old signal equipment and mechanical interlockings, delivering major reliability benefits. It also prioritizes lines serving essential workers in communities that rely on transit most.

Work will now focus on the newly added Sixth Avenue Line (**B** **D** **F** **M**), an extended Fulton Street Line (continued on page 3)



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In This Issue

- Worldwide Electric Railway, Metro and Tramway Openings 4
- Rail News in Review 4
- Farewell to Vienna's Classic Trams 19
- Travels with Jack May 20

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Meeting

There is no meeting in August.

Trips

On Saturday, September 17, the Metropolitan New York Bus Association is having a trip to the New Jersey Bus Festival and Philadelphia. A stop will be made at SEPTA's Frankford Depot and Transportation Center. For details point your browser to <https://erausa.org/regional-trips/2022/09/>

Cover Photo

Washington Railway and Electric Company's double-truck motor car 602 (J. G. Brill, 1912) is seen on F & 14th Streets NW in circa 1924. In 1933, this car became Capital Transit 836 when the WR&EC was merged with its main competitor, the Capital Traction Company, to form the Capital Transit Company. Detroit Publishing Company photo

(Below) Keeping with the Washington theme from the front cover, Capital Traction Company 679 (Jewett Car, 1910-12) is seen heading to Georgetown in this view east at Pennsylvania Avenue & 7th Street NW on June 28, 1919. Harris & Ewing Collection, Library of Congress photo





(A C), Queens Line East (E F), and the Crosstown Line (G). Each line will be outfitted with modern CBTC signaling to replace 80-plus year-old signals. The A C and F rank among the least reliable subway lines in the system by wait time assessment, the amount of time a passenger spends on a platform waiting for the train.

Shifts in ridership patterns and availability of new train cars have allowed a shift in the Authority’s prioritization on signal modernization to focus on reliability and equity as peak capacity needs are lessened in the immediate term. The original program focused on peak capacity lines like the IRT Lexington Avenue Line and BMT Astoria Line, which will be deferred to a future capital program. *(Editor’s Note: Though hardly new, the BMT Astoria Line’s signal system was placed into service between June and October of 1990. The IRT Lexington Avenue Line’s signal system dates from the early 1960s. There are, however, certain signal heads on the Lex that date from the time the local tracks were first signaled in the 1930s!)*

2. New Projects and Acceleration

Track Trespassing Initiatives

Following the release of the Track Trespassing Task Force report, which detailed a host of actions the agency is taking to address track trespassing and provided new data on the incidence and cause of track intrusion.

In the proposed amendment the MTA will move forward on a series of the Task Force’s recommendations including Track Intrusion Detection technology including camera system expansion, the Platform Screen Door Pilot and continued work with City and State partners.

The Platform Screen Door pilot program is moving forward with procurement beginning this year.

Enhancing Micromobility

In May, a strategic action plan was announced to enhance bicycle, pedestrian, and micromobility access to MTA facilities and services. As part of this plan, improvements will be made to bicycle, pedestrian, and micromobility access to subway stations, bus stops and on MTA bridges.

Under the proposed amendment, the Authority will start at the Henry Hudson Bridge, with a project to create a shared use path.

Accessibility Upgrade at LIRR Stations

Under the proposed amendment, accessibility projects will be accelerated at:

- Amityville
- Cold Spring Harbor
- Douglaston
- Forest Hills
- Hollis
- Laurelton

- Lindenhurst
- Massapequa Park

By the completion of the program, only five LIRR stations will not be fully accessible.

Metro-North Railroad Park Avenue Viaduct

Metro-North’s Park Avenue Viaduct project is being accelerated to extend from the north side of East 115th Street to the south side of East 123rd Street in East Harlem and replace or repair major segments of the viaduct.

The elevated steel structure carries four tracks along Park Avenue between East 110th Street and the Harlem River Lift Bridge that services the Hudson, Harlem and New Haven lines. On a typical weekday, approximately 750 trains and hundreds of thousands of passengers travel on the viaduct. Nearly half of the viaduct was constructed in the 1890s.

3. Expansion Projects

While more than 82% of the Capital Program is dedicated to the existing core infrastructure, expansion projects are being pursued. These projects are the key to meeting new needs and addressing historic transportation inequities.

Metro-North Railroad Penn Station Access

Penn Station Access will connect Metro-North’s New Haven Line with Amtrak’s existing Hell Gate Line to Penn Station and bring four new accessible stations to the East Bronx at Hunts Point, Morris Park, Co-op City, and Parkchester/Van Nest.

The proposed amendment adds funding for the New Rochelle Yard, which is critical to the project’s operations, and portions of its rolling stock need that have long lead-times and need to get procurement underway soonest. The eventual need for this funding was noted when an amendment was advanced in December 2021 and does not represent a cost increase.

Penn Reconstruction Needs

In November 2021, Governor Hochul unveiled a new plan to transform Penn Station into a first-class, commuter-first transit hub and revitalize the surrounding area. The plan calls for replacing the current cramped Penn Station with a 250,000-square-foot, single-level facility. It will be easier to navigate and have more room for passenger circulation.

Penn Station Reconstruction is advancing, offering an opportunity to transform the busiest train station. The proposed amendment includes funding to advance preliminary design of the new station

MTA PRESS RELEASE, JULY 25

Rail News in Review

New York Metropolitan Area

METROPOLITAN TRANSPORTATION AUTHORITY (MTA)

New York State, City Agree on Penn Station Funding Framework

The state and city of New York have agreed on a plan to help cover reconstruction costs and future expansion of Penn Station as well as revitalization of the surrounding area.

New York Governor Kathy Hochul on November 3, 2021 unveiled the Penn Station project that is slated to prioritize and expedite reconstruction of the existing station, 60% of whose users are New York City Transit subway and Long Island Rail Road riders.

In June, the project entered the design phase, and MTA, Amtrak and New Jersey Transit launched a request for proposals from architecture and engineering firms; submissions are due later this month and awards are slated to be announced in the fall. While no date has been set to start the project, it is estimated to take 5–6 years to complete and come with a price tag of \$6 billion–\$7 billion.

The funding framework now agreed to by the state and city of New York will ensure “that the city maintains a current and consistent level of property tax revenue while requiring that funding for the station, vibrant open space, and public realm improvements, comes in part from private development,” according to a July 18 announcement by Governor Hochul and New York City Mayor Eric Adams. It is also said to affirm “the state’s ongoing commitment to rebuilding Penn Station without raising taxes on New Yorkers or fares for transit riders.”

As part of the agreement, the city and state also committed

to establishing a “city–state governance entity” to oversee public realm improvements and to ensure coordinated planning and implementation.



Rendering of Penn Station entrance from West 33rd Street.

According to the Governor’s Office, funds from privately financed development will help pay for a reconstructed Penn Station; the potential future expansion of Penn Station; and improvements to the surrounding area that the city–state governance entity will oversee, such as street and sidewalk improvements, creation of new public spaces in the area around the station, and construction of “more seamless transit connections between Penn and nearby subway stations.”

The Office reported that the state “will sell development rights to private developers and collect payments-in-lieu-of-taxes (or PILOTs) on newly constructed, modern, and environmentally friendly office and residential buildings. The amount of PILOT payments collected in excess of existing property taxes, in addition to revenues from the sale of additional development rights, will help to fund the project.”

Worldwide Electric Railway, Metro and Tramway Openings in July

Date	Country	City	Segment	Distance (miles)	Rail/ Metro/ Tram
7/2	Turkey	Bursa	Line T2: Kent Meydani to Terminal	5.1	T
7/3	Egypt	Cairo	Capital Train: Adly Mansour to Arts & Culture City	40.4	R
			Capital Train: Adly Mansour to Knowledge City	5.3	R
7/6	France	Paris	Line T13: St-Cyr to St-Germain-en-Laye	11.7	T
7/12	Calcutta	India	Line 2: Phoolbagan to Sealdah	1.3	M
7/17	Birmingham	England	Library/Centenary Sq – Edgbaston Village	0.7	T
7/18	London	England	Overground: Barking to Barking Riverside	2.8	R



The state and city will allow PILOTs to pay for up to:

- 100% of improvements to streets, sidewalks, public spaces and other elements of the public realm.
- 50% of improvements to transit infrastructure including underground concourses and subway entrances in the neighborhood.
- 12.5% of the cost of the reconstruction and potential expansion of Penn Station.

The remaining costs, the Office said, would be funded through the federal government, New York, New Jersey, Amtrak and other public funding sources.

MASS TRANSIT, JULY 19

Congestion Pricing Moves Forward

MTA Chair and CEO Janno Lieber, on behalf of the MTA, New York State Department of Transportation and New York City Department of Transportation, announced on July 27 two significant steps toward the implementation of congestion pricing, known formally as the Central Business District Tolling Program. Lieber announced the empaneling of the program's Traffic Mobility Review Board (TMRB) with the appointment of five members. He also announced an anticipated timeframe for the release of the program's Environmental Assessment, which must be approved by the Federal Highway Administration (FHWA) for the program to proceed. The document is anticipated to be released on or about August 10, with agencies to hold a series of six virtual public hearings seeking public feedback beginning on August 25, and concluding on August 31.

The agencies will begin collecting public feedback on the Environmental Assessment on or about August 10. Comments will be accepted online as well as email, mail, voicemail, fax and via a series of six hearings, which will be held online and accessible via <https://new.mta.info/project/CBDTP> at the dates and times listed below. Comments at these sessions will also become part of the formal record.

- Thursday, August 25, 5 PM to 8 PM
- Saturday, August 27, 10 AM to 1 PM
- Sunday, August 28, 1 PM to 4 PM
- Monday, August 29, 1 PM to 4 PM
- Tuesday, August 30, 5 PM to 8 PM
- Wednesday, August 31, 10 AM to 1 PM

Role and Composition of Traffic Mobility Review Board

Should congestion pricing be approved by the Federal Highway Administration, the TMRB would develop recommendations for toll rates, as well as any credits, discounts, or exemptions and then present the recommendations to the MTA Board for consideration before the program is implemented. Appointing the TMRB members prior to the release of the Environmental Assessment will allow them to benefit directly from the public comment period, reviewing feedback as they learn and understand information provided by the CBDTP Team.

The TMRB will take into consideration traffic patterns, traffic mitigation measures, operating costs, vehicle types,

public impact, public safety, peak and off-peak rates and environmental impacts. Accompanying their recommendations, the TMRB will provide a report on the review and analysis behind its recommendations. Ultimately, the MTA Board (which is also the Board of MTA Bridges and Tunnels, known legally as the Triborough Bridge and Tunnel Authority) will determine the final toll structure after the TMRB's recommendations.

The recommendations must ensure collection of annual net revenues and fees necessary to fund at least \$15 billion for the MTA's 2020 to 2024 capital program.

The Board consists of one appointee recommended by the Mayor of the City of New York, one resident in the Metro-North Railroad region, and one resident in the Long Island Rail Road region. All members have experience in one or more of the following areas: public finance, transportation, mass transit or management.

The MTA announced the appointment of the chair of the Traffic Mobility Review Board and four members. The chair is Carl Weisbrod and the members are John H. Banks, Scott Rechler, Elizabeth Velez and Kathryn Wylde. A sixth member will be recommended by New York City Mayor Eric Adams. MTA PRESS RELEASE, JULY 27

Budgetary Fiscal Cliff Approaching

The MTA released its preliminary 2023 budget and four-year financial plan, including a reforecast of ridership recovery conducted by McKinsey & Company. The documents project the MTA fiscal cliff presented in February 2022 will occur in 2025, one year earlier than previously forecasted, with federal COVID-19 relief aid largely exhausted by 2024.

While MTA Bridges and Tunnels toll revenues remain near the best-case scenario laid out in McKinsey's previous forecast, a slower-than-expected return to the office for many employers, fewer non-work trips, and customer sentiment on issues including safety have seen transit and railroad ridership lag the 2020 forecast. The updated McKinsey forecast for New York City Transit and commuter railroads has been revised, with ridership projected to reach 80% of pre-pandemic levels by 2026. This revision represents a \$500 million decline in anticipated annual farebox revenues in 2026 compared to the prior forecast and a \$1.8 billion decline compared to pre-pandemic forecasts.

MTA Chief Financial Officer Kevin Willens presented to the Board an alternative scenario to lower the looming fiscal cliff by \$1 billion. Rather than spending down the entirety of federal funds on the 2023 and 2024 deficits, those funds could be spread to decrease the medium-term cost structure and avoid costly borrowing. To do so, new revenue sources are required in 2023. The MTA is engaged with stakeholders to identify new sources of funding needed to avoid large future fare increases and service reductions. In addition, the Authority will continue to seek operating efficiencies.

The revised financial plan projects annual structural deficits of \$2.5 billion within two years, rising to \$2.75 billion in 2028. Based largely on the projected declines to farebox

revenues, the five-year financial outlook (2022-2026) in the July Plan vs. the February Plan includes a cumulative net decline of \$2.693 billion to the MTA's bottom line.

The reforecast of ridership from McKinsey and Company created two models: a "high case" and a "low case" of future projected ridership for New York City Transit, Long Island Rail Road, and Metro-North Railroad. In developing these projections, major factors considered included the future of office work, a reduction in non-work trips, consumer sentiment on issues such as safety and reliability, fare evasion, the impact of Congestion Pricing on transit ridership, mode shifts to biking and walking, ridership changes resulting from network expansion, employment levels, and population growth. The two models were averaged to create a midpoint projection, which forecasts ridership to be at 69% of pre-pandemic levels in 2023, and 80% of pre-pandemic ridership by the end of 2026. This midpoint projection was used in developing the July Financial Plan's farebox revenue assumptions.

MTA PRESS RELEASE, JULY 27

NEW YORK CITY TRANSIT (NYCT)

R-32s Going Up the River

It's about being in the right spot at the right time.

Photographer Tiffany Morley just happened to be in Fort Montgomery, NY, back on June 28 near the Bear Mountain Bridge, scouting out photo locations for a future trip to CSX's ex-New York Central River Line, when manifest freight M434 (Oak Island to Selkirk) entered the scene.



CSX train #M434 heads up the Hudson River by the Bear Mountain Bridge with R-32s in tow. Tiffany Morley photo

That day, this train was carrying several flat cars with R-32s mounted on them, on their way to Frontier Metals (a scrap dealer) in Findlay, OH.

She carefully composed the scene and snapped the above picture of the R-32s going by with the bridge in the background. Brava to Tiffany!

Subway Suffers From Flooding

Hundreds of subway workers were out in the system Monday evening, July 18, responding to heavy rainfall during the rush hour commute. Crews worked through the night, clearing tracks of high water, to ensure Tuesday morning's commute would run smoothly.

Subway service in Washington Heights and the Bronx was affected by flooding conditions from a substantial amount of water in a short time, which caused a suspension on the **A** line. On the **5** line, service was interrupted due to a downed tree just north of the Gun Hill Road station. Crews in the Concourse Yard, which affects **B** **D** service, acted quickly to preserve switches after seeing water enter the yard.



The IND's Concourse Yard under water on July 18. MTA photo

Normal service was fully restored in time for the morning commute, although trains on the **1** line bypassed 181 Street station in Washington Heights Tuesday morning due to an elevator outage caused by flash flooding from the rain.

MTA PRESS RELEASE, JULY 19

Overnight Work on Brighton Line

Weekend overnight service changes began last month between Atlantic Av-Barclays Ctr and Prospect Park, as crews perform track and signal upgrades to improve service reliability and track resiliency.

For five consecutive weekends, beginning Friday, July 15 to Monday, August 15, weekend work will take place from 11:45 PM to 5 AM. Service changes are as follows:

- Coney Island-bound **Q** trains operate via the **N** line between Atlantic Av-Barclays Ctr and Stillwell Av, non-stop between 59 St and Stillwell Av
- Manhattan-bound **Q** trains will operate via the **D** line (continued on page 8)
- from Stillwell Av to Atlantic Av-Barclays Ctr, making stops at Bay Pkwy, 62 St-New Utrecht Av, 9 Av and 36 St
- **Q** shuttle trains operate between Prospect Park and Stillwell Av

**Recent Capital Program Project Awards**

Since our last chart in the March *Bulletin*, the following subway construction projects have been awarded:

Contract	Description	Contractor	Date	Amount
A-37352	Repair of Subway Street Stair S4, 79th Street Station	Veterans Contracting LLC	12/7/2021	\$787,964
C-43056	Upgrade Communication Room #404, 28th St. Station, Lex Line	Lawrence's Contractor Inc	12/9/2021	\$472,000
A-37129	14th Street Complex ADA Project	Citnalta/Forte JV	12/10/2021	\$192,972,000
C-43054	Upgrade Communication Room #446B, Morris Park Station	Shaheen Construction Corp	12/10/2021	\$447,495
A-37156	Repair of Subway Street Stairs S2, S4, & S6 at the 59th Street Station, 4th Avenue Line	KSR Construction Corp	12/13/2021	\$1,490,400
W-47020	Connection-Oriented Ethernet (COE) at 265 Stations	ExterNetworks Inc	12/15/2021	\$6,983,563
C-48704	Line Structure Component Repair, Ventilator Repair and Antenna Cable Replacement, Concourse Line	J Track-TC Electric JV	12/17/2021	\$68,188,000
A-37691	Station Circulation Enhancements – Main Street/Flushing	ECCO III Enterprises, Inc	12/21/2021	\$30,381,000
E-30643	Escalator Replacement at Yankee Stadium and Dekalb Av	Forte Construction Corp	12/22/2021	\$28,420,000
W-47013	Upgrade Asynchronous Fiber Optic Network to Current SONET Technology on the F Ring at Locations in Brooklyn and Manhattan	ExterNetworks, Inc	12/22/2021	\$14,638,823
A-36164	ADA: 68 St-Hunter College	Forte/Citnalta JV	12/23/2021	\$101,750,000
C-52159	Passenger Identification (PID) CCTV System at 28th Street Station	I.S.M Electric, Inc	12/23/2021	\$624,680
A-37135	Design/Build for Accessibility Upgrades – Stations Package 2	MLJ TC JV	12/27/2021	\$242,400,000
A-37679	Grand Central: Main Mezzanine Finishes	Citnalta/Forte JV	12/27/2021	\$72,272,272
C-30539	Wellpoint Rehabilitation- Lenox Avenue Line	RMSK Contracting Corp	12/27/2021	\$7,830,000
C-52160	Passenger Identification (PID) CCTV System at Prince Street Station	Urban Electrical Corp	12/27/2021	\$599,000
E-40201	Fan Plant SCADA Head-End Upgrade in the Boroughs of Brooklyn, Manhattan and Queens	CRC Associates, Inc	12/27/2021	\$13,333,000
M-44146	Mainline Track Replacement – 63rd Street Line	Railworks Transit Inc	12/28/2021	\$92,739,500
M-44147	Mainline Track Replacement – Jamaica and Myrtle Avenue Lines	“	“	“
A-37356	Repair of Subway Street Stairs S1 & S4 at the Elmhurst Avenue Station	Empower Contracting, Inc	12/29/2021	\$644,416
C-34712	Roof Repair at Tiffany Iron Shop North	Saheet Construction Corp	12/29/2021	\$1,478,600
C-43062	Upgrade Communication Room MR #170 at the Chambers Street Station, 8th Avenue Lin	NYCMC Corp	12/29/2021	\$560,625
C-52161	Passenger Identification (PID) CCTV System at 49th and 8th St. Stations, Broadway Line	Static Electric Corp	12/29/2021	\$1,750,000
C-52162	Passenger Identification (PID) System at 23rd St. and Rector St	Narula Development Corp	12/29/2021	\$1,815,000
C-43058	Upgrade Communication Room MR #203 Rockaway-Beach 116th (IND), Rockaway Line	Leading Construction Corp	12/30/2021	\$720,000
C-43063	Upgrade Communication Room MR #166 at 14th Street (IND) 8th Avenue Line	PE and Consultants, New York LLC	12/30/2021	\$380,000
S-32156	Sandy Repairs 200-207th Street –Signals, Track & Switches	J Track-TC Electric JV	12/30/2021	\$78,258,000
S-48010	Installation of CBTC equipment supplied in Contract S-48017 for QBL East	E-J Electric Installation Co	12/30/2021	\$262,481,306
S-48017	CBTC equipment supplier contract for QBL East	Mitsubishi	12/30/2021	\$62,653,936
C-43060	Upgrade Communication Room MR #355 at the Winthrop Street Station, Nostrand Av. Line	10 November, LLC	1/5/2022	\$698,653
C-81439	Relocation Consultant Services for the Second Avenue Subway Phase 2 Project as well as Services for Additional Relocation Projects	O.R. Colan Associates, LLC	2/17/2022	\$11,052,964
C-33941	Flood Mitigation and Roof Replacement at Tiffany Central Warehouse	FOS Development Corp	3/31/2022	\$54,115,555
C-52072	Passenger ID CCTV at 88 Stations	TAP Electrical Contracting Service, Inc	3/31/2022	\$50,277,000
P-36491	Replace Negative Cables 36th Street Station to Atlantic Avenue/Barclays Center Station on the 4th Avenue Line	TC Electric, LLC	3/31/2022	\$26,553,855

[MTA CONSTRUCTION & DEVELOPMENT WEBSITE, JULY 31](#)

• Buses will operate between Atlantic Av and Prospect Park
Free shuttle buses will continue to replace trains between Atlantic Av–Barclays Ctr and Prospect Park every weeknight (Monday through Friday), through August 26 from 11:45 PM to 5 AM.

The section of tunnel where the work is taking place is under Prospect Park and the Brooklyn Botanical Garden. Along with signal and track-related improvements such as track replacement, LED light installation, and third rail protection board replacement, further grouting efforts will reinforce resiliency to water infiltration.
MTA PRESS RELEASE, JULY 11

Additional Wireless Service Coming

A public-private partnership was announced to provide mobile phone coverage throughout all 418 track miles of subway tunnels, along with an expansion of Wi-Fi service to all 191 above-ground subway and 21 Staten Island Railway stations. Transit riders currently use cellular and Wi-Fi service at all 281 underground subway stations through Transit Wireless, a BAI Communications Company. A proposed expansion would transform the subway system into a fully digitally connected transit network that gives riders the ability to use their mobile devices throughout the entire subway system.

The proposed agreement would expand the existing service to provide connectivity in the tunnels between stations and in above-ground stations. Further, it will enable Transit Wireless to improve the existing MTA communication system and generate revenue by marketing unused fiber to private customers. Transit Wireless would design, build and operate a neutral-host network that provides every subway tunnel in the system with a wireless communication connection.

In recent years, significant strides were made improving connectivity which included partnering with Transit Wireless to bring cell service and Wi-Fi to all underground subway stations in 2017, and in 2020, bringing cellular coverage and data connectivity to the 14th Street Tubes. The connection between Brooklyn and Manhattan on the **L** line became the first tunnel in the New York City subway system to have full connectivity, for AT&T, Verizon and T-Mobile users.

Overall, the project is expected to result in over \$1 billion in benefit for the MTA and its riders over the life of the agreement in terms of service provided, additional revenue and cost savings. Work on the project will begin immediately and be completed in ten years. Riders will be able to use the new services as each section is completed.

Transit Wireless will build out the necessary infrastructure, an investment likely to be over \$600 million. This build leverages the company's existing infrastructure located throughout New York City. As the system is built out, the MTA will share in the revenues Transit Wireless receives from cell providers and other commercial customers, adding to the revenue from the station agreement. Further, the MTA will phase out the payments it currently makes to Transit Wireless for additional communication services such as leased fiber, real-time train

arrival information and Help Points, the communication system that offers immediate access to 911 assistance and information with the touch of a button.

Between the increase in revenue from the extension of agreement with Transit Wireless and elimination of annual payments for additional communication services, the MTA will see a combined advantage worth \$410 million.
MTA PRESS RELEASE, JULY 26

Car Notes

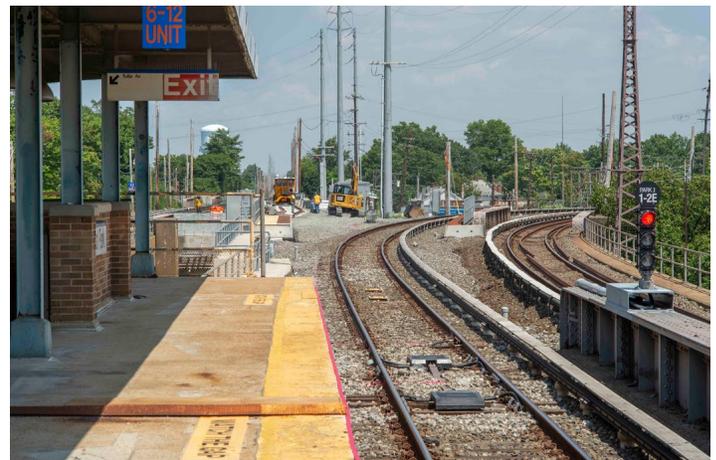
The following 30 R-32s, from the revenue pool of 222, left NYCT property between February and June of this year: 3354, 3355, 3396, 3397, 3406, 3407, 3432, 3433, 3452, 3453, 3454, 3455, 3471, 3514, 3515, 3518, 3519, 3522, 3523, 3574, 3575, 3658, 3698*, 3699*, 3878, 3879, 3896, 3897, 3928, 3929. The two cars marked with an asterisk wound up somewhere in Florida by flatbed trailer.

These 10 retired R-32 Work Motors (since October 2010) were also removed: 3494, 3495, 3552, 3553, 3642, 3643, 3694, 3695, 3786, 3787. They were all replaced in work service by (50?) retired Morrison-Knudsen R-42s.

LONG ISLAND RAIL ROAD (LIRR)

Main Line Third Track Update

Over the weekend of July 16-17, the railroad and its contractor partners placed into service the new Park Interlocking at Floral Park on the Hempstead Branch.



A scene that lasted but one week, the signals at Park 1 Interlocking are in service but the switch for which they are intended had not yet been installed. That occurred the following weekend. View east on July 19.

Jeff Erlitz photo

Park is composed of two separate interlockings, Park 1 and Park 2, both remotely-controlled from Jamaica Central Control.

Park 1 is located right at the east end of Floral Park station and is quite simple, one switch and two home signals protecting that switch. In actuality, that one switch, connecting the existing Hempstead Branch Track 1 with the

future Main Line Track 2 (the new third track), was not placed into service, only the home signals. The switch was installed and placed into service the following weekend, July 23-24.



One week later and the new switch, connecting the existing westbound Hempstead Branch Track 1 (curving off to the right) with the new Main Line Track 2 (heading straight into the distance), was in place. View east on July 24. Jeff Erlitz photo

Park 2 is located a little over one half mile east of the east end of the platforms at Floral Park. It is a “standard” two-track “universal” interlocking, with two separate crossovers and four home signals protecting them. The crossovers are #20 switches good for 40 mph maximum speeds when trains make crossover moves.



In another scene that lasted only one week, the first phase of the reconfiguration of Nassau 2 Interlocking has been completed in this view east from the Mineola Boulevard bridge. This was done over the weekend of July 30-31. The Oyster Bay Branch curves off to the left. Jeff Erlitz photo

Your editor was very pleased to see that the name “Park” was used for this new interlocking. Park was the name of the tower and interlocking that used to be located in this same spot, the junction of the Main Line and Hempstead Branch, until it was removed from service on December 15, 1960. On

that date, the temporary shoo-fly tracks were placed into service for the Floral Park grade crossing elimination project and the junction was relocated west to Queens Interlocking, just east of Queens Village station.

Over the weekend of July 30-31, crews replaced the switch connecting the normally-westbound Oyster Bay Branch Track 1 to Main Line Track 3, just east of Mineola station. This is within the confines of Nassau 2 Interlocking. The new switch is a #15 whereas the one it replaced was a #10. This will enable an increase in speed from 15 to 30 mph for trains entering or leaving the branch on Track 1, a decent improvement. None of the new signals associated with this first phase of the reconfiguration of Nassau 2 Interlocking were placed into service on this weekend.



Friday, July 29 was the last of operation for the temporary eastbound platform at Merillon Avenue station on the Main Line. M7 7620 (Bombardier Transportation, 3/2006) leads train #1250 (Penn Station-Hicksville) to a stop in this view west. Jeff Erlitz photo



By the afternoon of Saturday, July 30, the temporary platform was completely gone. The supports for the bridge plates were in place and the 12 bridge plates were lined up on the permanent eastbound platform, ready to be used. These bridge plates should be used for only two weeks and then the new third track (Track 2, on the right) will be placed into operation. Jeff Erlitz photo

On this same weekend, the temporary eastbound platform

that had been in service since October 12, 2020 at the Merillon Avenue station was removed. Starting on Monday, August 1, 12 bridge plates began being used so eastbound trains stopping here could access the permanent platform, south of the new third track (Track 2). See below for other changes that will be done for the commissioning of this first section (Block 1) of the new Main Line third track.

On Monday, August 1, the Denton Avenue underpass, between the New Hyde Park and Merillon Avenue stations on the border of the villages of Garden City (to the south) and Garden City Park (to the north) was re-opened to traffic. It had closed to all traffic back on January 3, during which time the entire bridge structure was replaced. This was the last of the new three-track bridges placed into service for the Main Line Third Track project.



On Friday, July 29, this was the view looking north at the Denton Avenue bridge in Garden City on the Main Line. The road striping still needed to be applied and a small crew was doing some last-minute work on the bridge lighting. Jeff Erlitz photo

Sadly, the Village of Garden City insisted that the new bridge be built with space for only one lane, as the original bridge had been. The original bridge abutments, dating from 1888, were built of stone and after demolition of the old structure, these stones were sliced and used as facing material on the new bridge structure, a very nice and historic touch. The original bridge deck had been replaced in 1944. The new underpass does have a pedestrian sidewalk, for the first time.

Main Line Third Track Commissioning Service Plans

On July 22, the railroad announced detailed plans for the placing in service of the first major segment of new third track, known as Block 1, from Floral Park to west of Mineola.

At New Hyde Park and Merillon Avenue stations, the following changes will be taking place:

Monday, August 1 through Friday, August 5

Eastbound passengers going to Merillon Avenue must be in the first six cars to exit the train (using bridge plates), except overnight from 11 PM to 5 AM, when all trains will run on Track 3, the normally-westbound local track.

The 4:59 PM train from Hunterspoint Avenue to Oyster Bay will not stop at Merillon Avenue or New Hyde Park. Instead, the 5:01 PM from Penn Station to Ronkonkoma will make these stops.

Monday, August 8 through Friday, August 12

Every day from 5 AM to 3:30 PM, all eastbound trains will bypass New Hyde Park and Merillon Avenue.

- A bus at Mineola will provide service back to Merillon Avenue and New Hyde Park. For service to those stations, stay on until Mineola and board the bus.
- For trips beginning at New Hyde Park or Merillon Avenue, passengers can take the bus to Mineola, which will depart up to 30 minutes earlier than the normal schedule.
- To avoid busing, passengers can use the Hempstead Branch at nearby Stewart Manor or Nassau Boulevard stations.

From 3:30 PM to 11 PM, eastbound trains will make stops, but passengers need to be in the first six cars (using the bridge plates) in order to exit. During the evening rush hour, there will also be changes to which trains stop at these stations.

From 11 PM to 5 AM, trains will run on their regular schedules but will arrive on Track 3 in both directions.

At Mineola, the following changes will be taking place:

Starting Monday, August 8

All eastbound trains to Oyster Bay will depart from Track 3 on the north side of the station. This is a permanent change as the railroad brings the tracks and switches just east of the station into their final layout.

The 8:06 AM train from Jamaica to Oyster Bay will no longer run. Buses will connect with the 7:37 AM train from Penn Station to Ronkonkoma at Mineola for service to all stations along the branch.

Friday, August 26 and Monday, August 29

On both days, trains will stop on Track 3. This will require schedule changes in both directions for many trains.

METRO-NORTH RAILROAD (MNR)

Torrential Rains Disrupt Service

The subway was not the only metro area service affected by the heavy rains on Monday, July 18. The Hudson, Harlem and New Haven Lines dealt with high-water conditions in the Bronx and Westchester County that affected service into Grand Central Terminal.

On the Upper Harlem Line, crews worked to remove a downed tree across the tracks near Croton Falls that suspended service between Goldens Bridge and Southeast in the early afternoon. A downed tree also caused a temporary suspension of service on the New Canaan Branch.

MTA PRESS RELEASE, JULY 19

NJ TRANSIT (NJT)

Newark Light Rail Modernization Study

NJ Transit is the recipient of a \$519,750 federal grant from



the U.S. Department of Transportation’s Federal Transit Administration (FTA) to conduct a modernization study for Newark Light Rail that will examine options for improving station design as well as making four stations accessible to people with disabilities. The four stations are the only stations that are not accessible to people with disabilities in the Newark Light Rail system. This study was one of 40 projects from 32 states and two territories selected to share \$16.2 million to help reassess, redesign, and improve transportation services in marginalized communities across the country.

This study will look to make Military Park, Warren Street/NJIT, Norfolk Street and Park Avenue stations accessible to people with disabilities as well as identify other passenger improvements.

The grant is provided through the FTA’s Areas of Persistent Poverty (AoPP) program. FTA grants the awards on a competitive basis to state and local governments, transit agencies and nonprofit organizations to create better transit for residents who have limited or no transportation options. AoPP grants are awarded for planning, engineering and technical studies or financial plans to improve transit in Census-defined low-income areas. The program also supports coordinated human service transportation planning to improve transit service or provide new services, including paratransit.

NJ TRANSIT PRESS RELEASE, JULY 12

New Schedules

On Sunday, July 24, new NJT Rail schedules took effect:

Northeast Corridor/North Jersey Coast

- Due to an Amtrak tie replacement project scheduled to begin the weekend of July 22–25, customers boarding eastbound (to Newark/New York) trains at Rahway and Linden, as well as customers boarding westbound (to Trenton/Long Branch/Bay Head) trains at Linden, will be required to use platform extensions and/or low-level boarding during certain portions of the project. A separate advisory will provide details.
- All weekday trains serving Rahway and Linden have had schedules adjusted to account for required boarding changes. As a result, additional trains have also had schedule and stop adjustments.
- Due to the number of trains that changed in support of the tie replacement project, all customers are urged to check their schedules carefully.

Morris & Essex/Montclair-Boonton

- Trains 6606 and 6320 will no longer stop at Secaucus, while Train 6651 will add a Secaucus stop.
- Train 871 will add a Mount Tabor stop.
- Weekday midday busing continues on the Gladstone Branch until Friday, September 2. The M&E timetable includes information for both substitute busing and regular train service, which resumes on Tuesday, September 6.

Main Line-Bergen County

- Train 1214 (currently the 9:52 a.m. departure from Waldwick) will instead originate at Suffern and be

renumbered as 1110.

- Train 1164 (currently the 10:04 a.m. departure from Suffern) will instead originate at Waldwick and be renumbered as 1264.
- Train 1216 (currently the 10:50 a.m. departure from Waldwick) will instead originate at Suffern and be renumbered as 1112.
- Train 1166 (currently the 11:04 a.m. departure from Suffern) will instead originate at Waldwick and be renumbered as 1264.
- Train 1205 (currently the 8:33 a.m. departure from Hoboken) will be extended to Suffern and be renumbered as 1109.
- Train 1149 (currently the 8:52 a.m. departure from Hoboken) will now terminate in Waldwick and be renumbered as 1249.
- Train 45, the 9:47 a.m. departure from Hoboken, will now stop at Wesmont and Plauderville but will no longer stop at Hohokus and Waldwick.
- Train 1309 (currently the 10:29 a.m. departure from Hoboken) will be extended to Suffern and be renumbered as 1111.
- Train 1151 (currently the 10:39 a.m. departure from Hoboken) will now terminate at Ridgewood and be renumbered as 1351.
- Train 1109 (currently the 11:29 a.m. departure from Hoboken) will be extended to Suffern and renumbered as 1113.
- Train 1153 (currently the 11:39 a.m. departure from Hoboken) will now terminate at Ridgewood and be renumbered as 1353.
- Train 1113 (currently the 2:46 p.m. departure from Hoboken) will be renumbered as 1115 with no change in times.

NJ TRANSIT SERVICE ADVISORY, JULY 19

Other US Systems

BOSTON

“Frightening” Orange Line Fire

An Orange Line train that first entered service in the 1980s caught fire on the morning of July 21 after metal siding located on the bottom of the car made contact with the third rail, leading passengers to jump out of windows in what the head of the MBTA described as a “frightening incident.”

The latest chaotic safety incident at the MBTA follows a string of derailments, crashes, the April death of Robinson Lalin, and occurs only days after state lawmakers questioned MBTA General Manager Steve Poftak and Transportation Secretary Jamey Tesler about safety at the public transit agency.

The chaotic scenes of passengers scrambling onto a bridge over the Mystic River and the lead car of the Orange Line train smoking and on fire were broadcast across social

media. One video posted to Twitter depicted passengers climbing out of a train car window onto the bridge.

Poftak said a metal sill, or the siding on the bottom of the train car, measuring one foot by six feet came loose and connected with the third rail. The contact resulted in “sparking, smoke, and some fire and limited ignition on the underside of the vehicle,” Poftak said.

The train was heading southbound and was approaching Assembly Station when the lead car started smoking, the Massachusetts Department of Transportation said. Power to the third rail was turned off between Wellington and Assembly stations in under two minutes, Poftak said, and the Somerville and Medford fire departments responded to the incidents.



Aftermath of the fire that occurred on a southbound Orange Line train on the bridge over the Mystic River, between the Wellington and Assembly stops on July 21. The car, #01251, was built by Hawker-Siddeley between 1979 and 1981. MBTA photo

Public safety personnel picked up a person who had jumped into the water after exiting the train. The person declined medical attention, MassDOT said. The incident train was brought to the Wellington rail yard for an investigation.

The train arrived at Wellington carhouse just after 8:10 AM, and all Orange Line vehicles have since been inspected for any issues with their sills. Poftak said employees do participate in a “number of drills” at the agency’s emergency center, where they practice evacuating trains.

Speaking on WGBH News, Governor Charlie Baker called the situation “unacceptable” before launching into statistics about on-time performance for the MBTA and Commuter Rail. He said the MBTA has done “a lot of work” to “dramatically improve its performance and invest in modernizing its infrastructure over the past eight years.”

Baker said during a radio interview that he welcomes the Federal Transit Administration’s (FTA) investigation into safety and operations of the T.

The FTA started a safety management inspection into the

MBTA in April, a move the federal agency has only taken one other time in 2015 when they started to inspect the Washington Metropolitan Area Transit Authority.

Several months after the inspection into the MBTA was made public, FTA officials released four safety directives that focused on what they described as issues that required immediate attention ahead of the release of a final report later in August.

The federal government focused on delayed track maintenance, moving disabled train cars, employee certifications, and staffing at a department that coordinates train movements across the entire system. Each of those directives required the MBTA to respond with corrective action plans at the risk of losing 25% of financial assistance.

Poftak said the MBTA notified both the FTA and the Department of Public Utilities, which serves as a safety oversight agency, of the Orange Line train fire.

State lawmakers are also holding a series of oversight hearings on safety, management, and spending decisions at the MBTA. The Transportation Committee met for the first time on July 18, where legislators spent hours questioning Poftak and Tesler, focusing in particular on transparency at the agency.

In a statement released on July 18, Transportation Committee Co-Chairs Senator Brendan Crighton and Representative Bill Straus said the Orange Line fire and on-track evacuations of passengers are “dramatic illustration of the public safety threats posed by the current state of affairs at the MBTA and further evidence of the need for the oversight hearings.”

The committee plans to hold two more hearings, one in August to hear from “frontline witnesses” who have experienced safety incidents at the MBTA and another in the fall after the FTA releases its final report.

During the hearing, Straus suggested that the MBTA could fold itself into MassDOT, or instead, could focus on train operations, while another entity manages capital projects. MASSLIVE.COM, JULY 22

PHILADELPHIA

Southwest Connection Improvement Program Continues

SEPTA will further efforts to rebuild a critical portion of Regional Rail infrastructure in the University City area as part of the Southwest Connection Improvement Program (SCIP). Work and related service adjustments started July 9-10.

SCIP will require major service adjustments that will impact passengers who use the Airport, Media/Elwyn and Wilmington/Newark Lines. The work is scheduled to take place on select weekends in July and August, as well as one full week in August:

- July 9-10, 16-17 and 23-24
- August 6-7, 13-14 and 20
- August 15 through 19

SCIP will rebuild the mainline infrastructure on the Media/Elwyn Line between 30th Street Station and the Arsenal Interlocking, just below Penn Medicine Station, portions of which date more than 80 years. This track area also supports Wilmington/Newark and Airport Line services, making it a critical rail connection for Southwest Philadelphia, Center City, Delaware County, and the economic vitality of the region.

Upcoming work highlights include:

- Set interlocking houses
- Run new cables and conduit to support houses
- Erect signal masts and support catenary masts
- Clear vegetation

Media/Elwyn Line

- Train service will operate between Elwyn and 49th Street Stations following a special construction timetable
- Shuttle buses will substitute for train service between 49th Street Station and 33rd & Spruce St. (Penn Medicine Station area) and 30th Street Station

Wilmington/Newark Line

- Train service will operate between Newark and 30th Street Stations following a special construction timetable
- No direct service to or from Suburban, Jefferson, or Temple University Stations
- All trains will arrive/depart 30th Street from Amtrak Main Terminal lower-level platform

Airport Line

- Train service will operate hourly between Airport Terminals, Eastwick, and 30th Street Station
- No direct service to or from Suburban, Jefferson, or Temple University Stations
- All trains will arrive/depart 30th Street from Amtrak Main Terminal lower-level platform

SCIP helps with SEPTA's overall efforts to improve Regional Rail service for passengers and preserve it for future generations. Since 2018, the project has been broken up into phases during the summer months in an effort to minimize the disruption to passengers.

SEPTA PRESS RELEASE, JULY 7

SAN FRANCISCO**Central Subway Delayed**

San Francisco's decades-in-the-works Central Subway extension has been delayed once again, this time by about two months, the Municipal Transportation Agency said on July 19.

A June 20 fire in the subway's Yerba Buena/Moscone Station is expected to delay completion of the Central Subway by six to eight weeks, Jonathan Rewers, SFMTA's acting chief financial officer, told the agency's Board of Directors. The fire didn't result in any injuries or damage to trains, though it

temporarily halted testing inside the Central Subway, one of the final steps toward the project's completion.

A surge arrester ignited a fire inside a circuit breaker cubicle and damaged two other cubicles — all three of which need to be replaced, Rewers said.

While the SFMTA said last year that it projected the Central Subway would open in October, agency officials later broadened the timeline to sometime in the fall and have been hesitant to announce a firm opening date.



The Yerba Buena/Moscone Station on the Central Subway in a recent view. SFMTA photo

The Yerba Buena/Moscone Station where the blaze happened is one of four new stations that will serve South of Market, Union Square and Chinatown. Once it opens for service, the T-Third Street rail line, which merged with the K-Ingleside line during the pandemic, will no longer take riders into the Market Street subway.

Instead, the T line will take riders to the four new stations from the stop at Fourth and King streets. The Central Subway's Union Square/Market Street station will connect to Muni and BART's Powell Station via an underground concourse.

Originally scheduled to open in late 2018, the Central Subway will tentatively open four years behind schedule.

The subway project's completion will signal the beginning of a transit expansion lull in San Francisco. No major transit projects are under way following the opening of the Central Subway and the delayed but popular Van Ness Bus Rapid Transit project.

City planners are studying expanding rail transit, possibly BART, westward on Geary Boulevard and 19th Avenue. Tunnels inside the Central Subway extend to North Beach and planners have studied potentially extending the subway line north to Fisherman's Wharf.

SAN FRANCISCO CHRONICLE, JULY 20

Caltrain's First Electric Trainset Tests Clearance Along Corridor

Caltrain's first electric trainset underwent clearance testing the weekend of July 16-17 along the corridor between Santa Clara and Tamien Stations.

The test is to ensure that the trains meet all clearance requirements to operate safely along the corridor.

The train was outfitted with foam rubber padding to simulate the dynamic envelope of the trains as it traveled along the corridor at five miles per hour, pulled by a diesel locomotive. No major problems arose over the course of testing, and further clearance testing will be conducted throughout the rest of the corridor in the near future.

The next test for the new electric trains is expected to take place later this year, when the train will operate under its own power via the Overhead Catenary System (OCS).

Electric trains will offer a better service to Caltrain riders. Each trainset will have seven cars, as opposed to the current five or six. These vehicles accelerate and decelerate faster than diesel trains, as eight motors are distributed throughout the train, while older cars must be pulled by a locomotive. These electric motors also generate much less noise than their diesel equivalent, making the trip more enjoyable both for riders and residents that live near Caltrain tracks.

The new trains also offer enhanced amenities, including new digital onboard displays, power outlets at each forward-facing seat, a new seat color palette selected by the public, energy-efficient lighting, coat hooks, security cameras and expanded storage under the cantilevered seats.

The Caltrain Electrification project is a key component of the Caltrain Modernization Program that will electrify the corridor from the San Francisco Station at 4th and King Streets to approximately the Tamien Station in San Jose, replacing diesel-hauled trains with electric trains. Electrification will improve Caltrain's system performance, enable more frequent and/or faster train service and minimize long-term environmental impact by reducing noise, improving regional air quality and decreasing greenhouse gas emissions.

[MASS TRANSIT, JULY 19](#)

ST. LOUIS

Loop Trolley Resumes

Daily test runs of Loop Trolley cars began July 27 in advance of the long-dormant operation's scheduled resumption of service on August 4.

The trolley's new operator, the Bi-State Development Agency, says the trial runs between noon and 5 PM will include safety testing.

When that's concluded, officials with Bi-State, state transportation officials and the trolley's taxing district will review results and make adjustments if needed. Bi-State's Metro Transit agency also will be involved.

Bi-State said that people will be able to ride free of charge when service begins next month.

The trolley, which previously charged a fare, shut down regular service at the end of 2019 after only about a year of operations amid continued financial and operational problems.

In February, Bi-State, which runs MetroLink and the Metro

bus system, agreed to run trolley operations on a contract basis.

Plans call for the 2.2-mile line, which runs from the western end of the Delmar Loop in University City to the Missouri History Museum in Forest Park, to operate from 11 AM to 7 PM Thursdays through Sundays.

Bi-State, which previously had said the line would shut down October 15, announced on July 28 a new end date of October 30. The news release referred to the planned reopening as a "three-month trial program."



Replica double-truck motor cars 002 and 001 (Gomaco, 1992 and 1991, respectively) are seen on Delmar Boulevard, just west of the Hamilton Avenue stop and the Loop Trolley's maintenance center. Both of these cars came secondhand from Portland, OR in September 2014. In Portland they were numbers 512 and 511, respectively. Loop Trolley photo

Bi-State's president and CEO, Taulby Roach, has said that the line likely would crank up again next April.

The line plans to run at first using accrued and ongoing revenue from the trolley district's sales tax collected along and near the trolley route.

The regional East-West Gateway Council of Governments is expected to decide next month on a proposed \$1.26 million federal grant that Roach has said is needed for the trolley line's long-term financial viability. The council rejected a similar request last year.

[ST. LOUIS POST-DISPATCH, JULY 26](#)

International News

AUSTRIA

Brenner Base Tunnel Progress

Austria is well known for its mountain ranges, which presents quite the challenge when it comes to railway construction. Like Switzerland, Austria has a proud tradition of tunneling to traverse formidable geologic obstacles with railways. In recent years, Switzerland inaugurated the Lötschberg and Gotthard Base Tunnels, the latter which is the world's longest railway tunnel at 35.4 miles. Now it's Austria's turn, as it works towards building its own set of

tunnels under the Austrian Alps, including the 40-mile-long Brenner Tunnel, which upon completion will surpass the Gotthard to become the world's longest record holder.

The Brenner Base Tunnel links Innsbruck, Austria with Fortezza, Italy and is a critical key component of the overall Scandinavian-Mediterranean corridor of the Trans-European Transport Network. The tunnel is being built using a combination of methods, including Tunnel Boring Machines (TBM) and drill and blast, and is being engineered for the operation of 155 mph passenger trains and 100 mph freight trains.

In recent months key milestones have been reached on this gargantuan project. On May 19, a breakthrough was achieved on the Italian side of the border, creating a continuous section almost 15 miles in length. The removal of a plug marked the linking of two sections being built by Webuild and a joint venture of Webuild and Ghella.

Then in early July work began on the Gola del Sill-Pfons section, also being built by Webuild of Italy together with its Swiss subsidiary CSC Costruzioni, along with 50:50 joint-venture partner Implenia. Under a €651 million contract signed in November, two 4.5-mile-long parallel tunnels will be built using traditional excavation methods, including two auxiliary tunnels, along with two 10¼ mile tunnels using two 32.8 foot diameter (TBMs). The work includes lining the tunnel walls; the creation of an underground emergency station at Innsbruck; miscellaneous access, exploratory and secondary tunnels; as well as the building of a bridge over the A13 highway.

As impressive as the main tunnels are, it should be mentioned that an additional network of 143 miles of ancillary tunnels and miscellaneous spaces are being excavated, which include pilot tunnels for construction access, cross-passages between the main bores, future emergency exits and ventilation shafts, and caverns for enabling future operational and maintenance functions. Over 94 miles of these tunnels have been bored so far. Overall, the deepest point of the entire network will be 5577 feet below the mountain peaks. Completion of the Brenner Base Tunnel is anticipated for 2028, and allowing for risk management and escalated for inflation, the final cost is estimated to be over €8.3 billion.

INTERNATIONAL RAILWAY JOURNAL, [MAY 20 & JULY 12](#)

Semmering Base Tunnel delays

Meanwhile, another key route under the Alps, the Semmering Base Tunnel is being delayed by a number of geological and engineering issues. Construction of the 17-mile long double bore tunnel began in 2012, and was originally scheduled for completion in 2024. More recently, it seemed on track for 2026, and with this news, it's now more likely to open in 2030.

The original Semmeringbahn is considered to be one of the world's groundbreaking railways, constructed between 1848 and 1854 as the first railway to be built across the Alps. The line carries over 70,000 passenger and freight trains

annually, and Austrian Federal Railways (ÖBB) has long sought a more direct route to save time and expand capacity on Austria's Südbahn corridor. This will be realized in combination with the even longer Koralm Tunnel (20 miles), presently also under construction.

The issues with the new Semmering Base Tunnel are centered around its location in the Grassberg fault zone, an extremely complicated geological structure with multiple layers of varying rock types. The estimated cost of the tunnel has increased from €3.5 billion to €3.9 billion. As of April, over 14 miles have been bored, and 4.3 miles have been lined with concrete. Engineered for speeds over 150 mph, upon the line's completion travel times between Vienna and Graz will be shortened from 2.5 hours to 1 hour, 50 minutes.

[RAILWAY GAZETTE INTERNATIONAL, APRIL 26](#)

LONDON

Barking Riverside Extension Opens

The 2.8-mile Barking Riverside extension of the London Overground network opened on July 18.

London Overground concessionaire Arriva Rail London is now operating four trains per hour as an extension of its Gospel Oak – Barking route, offering a seven-minute journey time between Barking and the Riverside redevelopment area compared to 25 minutes by bus.

Transport for London began public consultation on the project in 2014. Legal powers were granted in August 2017, when it was envisaged that construction could begin in late 2017 for opening in 2021.



An Overground train is seen in this view northeast entering the new terminal station at Barking Riverside. TfL photo

A joint venture of Morgan Sindall Infrastructure and VolkerFitzpatrick was awarded the construction contract in December 2018, and major works began in February 2019.

The route runs alongside the existing Fenchurch Street – Tilbury line from Barking station past the site of the former Ripple Lane marshalling yard, then turns south on a new

viaduct to Barking Riverside.

The viaduct and track slab were completed in October 2021, and the signalling commissioned in March 2022, enabling driver training to begin in May.

Transport for London said the opening ahead of the revised autumn completion date was the result of good progress with driver training and support from Network Rail.

RAIL BUSINESS UK, JULY 19

MISSISSAUGA, ONTARIO

LRT Guideway Construction Underway

Metrolinx crews are working on guideway construction along Hurontario Street, marking an important step for the light-rail transit (LRT) line, which will extend from Mississauga to Brampton.

The team's current task is to construct the bed of the tracks, also known as guideway construction. This step is in preparation for track installation. Work will progress from south to north, beginning between Matheson Boulevard to Britannia Road.

Key areas where guideway construction is up and running include along Hurontario Street from Bristol Road to Britannia Road – which is currently being excavated – and at the operations, maintenance and storage facility (OMSF), where there has been more than 49 feet of track laid in the yard to date.

At these locations, track work is happening on the roadway between intersections (also known as mid-blocks) before progressing to the intersections. Mid-block work has minimal impact on pedestrians and traffic flows at intersections, so it's business as usual. Once work begins at intersections, there will be east-west road closures and detours for motorists and transit.

MASS TRANSIT, JULY 19

NETHERLANDS

NS Unveils its Intercity Next Generation Trainset

The Intercity Next Generation trainset was officially unveiled by Acting President of national passenger operator NS Bert Groenewegen and Alstom CEO Henri Poupart-Lafarge at Rotterdam Centraal station on July 2, ahead of entry into service later this year.

NS said the trains would become an iconic image in the Dutch landscape for the next 30 years. They will be introduced on Amsterdam — Rotterdam — Breda services, followed by Den Haag — Rotterdam — Eindhoven and on the high speed line from Amsterdam and Rotterdam to Antwerpen and Brussels. Services from Rotterdam to Amsterdam, Zwolle, Leeuwarden and Groningen will then follow.

In 2016 Alstom beat Bombardier Transportation, Siemens and Stadler to win a €800 million contract to supply 49 five-car Series 3100 and 30 eight-car Series 3200 ICNG units,

able to operate using the 1.5 kV DC electrification on the conventional network and at up to 200 km/h using the 25 kV 50 Hz overhead on the HSL-Zuid high speed line.



The Intercity Next Generation trainset was at Rotterdam Centraal station on July 2. NS photo

NS subsequently ordered a total of 20 eight-car Series 3300 (ICNGB) sets to replace locomotive-hauled stock on the Amsterdam — Brussels international route. These will be equipped to use 3 kV DC overhead and interface with the TBL train protection system in Belgium.

The Managing Director of Alstom Benelux said the Coradia Stream offers “highly reliable, energy efficient, safe and comfortable transport,” with an availability rate of over 97% and easy maintenance.

Alstom has now received orders for almost 900 Coradia Stream trainsets from Denmark, Germany, Italy, Luxembourg, Romania, Spain and the Netherlands, and said the Dutch trains would launch a new era for the travelling public.

The ICNG sets feature spacious and well-lit interiors with air-conditioning, wi-fi, charging points at every seat, LED reading lamps and space for bicycles. There is level boarding at Dutch platforms, with dedicated wheelchair spaces and accessible toilets. The five-car sets have 256 seats and the domestic eight-car versions 417. One car includes first class seating arranged 2+1 with a quiet zone and a lounge area with inward-facing bench seats. Second class seating is mostly 2+2 seating, but there are also fold-down and inward-facing bench seats. The ICNGB sets will have additional luggage space and one extra toilet, reducing the number of seats to 410.

The EMUs have a maximum speed of 200 km/h, and are equipped for regenerative braking and fitted with ETCS.

The aerodynamics and components including the trucks with pneumatic suspension are intended to reduce noise internally and externally. Production is being undertaken at Alstom's Katowice plant in Poland. Entry into service had been planned for 2021, but is behind schedule because the Covid-19 pandemic disrupted the global supply chains involved.

RAILWAY GAZETTE INTERNATIONAL, JULY 4

PARIS

Work Starts to Renovate T1 Tramway

A major program of renewal and renovation has begun on the T1 tramway which runs through the suburbs north of Paris. First opened in 1992 and subsequently extended at both ends, the 10.6-mile T1 was the first modern light rail route in Paris. Today it carries up to 215,000 passengers per day between Noisy-le-Sec and Asnières-Quatre-Routes.

Operator RATP has closed a long central section of the route for most of July and August for a major upgrade to facilitate the introduction of a new fleet of trams. The summer works, which are costing €60 million funded by RATP and regional organizing authority Ile-de-France Mobilités, will see platforms and shelters at stops extended and renovated, track renewed at key locations, and the control system modernized.

Several stops are to be relocated, notably in the center of Saint Denis where trams run through narrow streets. The stops at Gare-de-Saint Denis and Basilique-de-Saint Denis are being moved to allow wider platforms and better access.

After the modernization has been completed, a fleet of 37 Alstom Citadis X05 trams branded as TW20 by RATP will be introduced, with the first vehicles now expected to enter traffic in 2024.

They will be 108 feet long, just short of eight feet wide and fitted with six doors per side. They will be able to handle 15% more passengers than the current Tramway Français Standard cars which have been running on T1 since it opened.

Procurement of the Citadis cars, modification of the main maintenance depot at Bobigny and associated infrastructure work for the introduction of the fleet is costing €300 million overall. RATP has signed a contract covering up to 120 trams in total, and has placed a firm order for 37 at a cost of €130 million. The options would support the opening of various planned extensions.

According to RATP's director for the T1 extensions, the priority is an eastern route beyond Noisy-le-Sec to Val-de-Fontenay.

Work on this is expected to start later this summer at a site near Montreuil Murs-à-Pêches, and it is scheduled to open in two stages between 2026 and 2028. It will require construction of another depot.

In the west, branches from Asnières to Colombes and Rueil are planned to open by 2028-29.

When all are completed, T1 would be 24 miles long, at which point the route would be operated as three overlapping services, with drivers dedicated to one of the three: Bobigny – Asnières; Les Courtilles – Colombes/Rueil; and Val-de-Fontenay – Bobigny. Trams would be regulated at Bobigny and Les Courtilles, but through journeys would be maintained.

[METRO REPORT INTERNATIONAL, JULY 7](#)

T13 Tram-Train Route Opens

Ile-de-France tram-train line T13 opened on July 6, running 11.7 miles on an orbital route between Saint-Cyr and

Saint-Germain-en-Laye RER stations to the west of Paris. The 9.3-mile section from Saint-Cyr to Lisière-Pereire operates as a railway, with 25 kV 50 Hz electrification, a maximum speed of 62 mph and the rail network's left-hand running. The 2.4 miles from Lisière-Pereire to Saint-Germain-RER functions as a tramway, with 750 V DC electrification, a speed limit of 44 mph and the road network's right-hand running.



On July 8, a pair of Citadis Dualis (Alstom, 2021) trams pass at L'Étang-Les Sablons, near the mid-point of the new line T13. Note the left-hand running. Gilbert Lafarge photo

The €306.7 million Line T13 was funded by the national government, the Ile-de-France region and Yvelines département.

Construction required close co-operation with the heritage authorities as the line runs near to historic sites including the palaces at Versailles and Saint-Germain-en-Laye.

There are 12 stops. Five have been rebuilt from existing stations on a section of the Grande Ceinture Ouest orbital railway, part of the alignment of which has been redeployed for T13, and seven were newly built.

There are interchanges with RER Line A at Saint-Germain RER, Transilien suburban line L at Saint-Nom-La-Bretèche, and RER C and Transilien N and U at Saint-Cyr.

Transport authority Ile-de-France Mobilités funded the €68.8 million order for 11 Alstom Citadis Dualis LRVs. These are 138 feet long and 8.7 feet wide with a capacity of 250 passengers, and have information screens, 36 USB ports, air-conditioning and CCTV.

The line is operated by the Transkeo T13 joint venture of Keolis (51%) and SNCF Voyageurs (49%), which has 100 operating and maintenance staff. The depot and control center are located at Versailles-Matelots.

Services run every 10 minutes in the peaks and every 20 minutes off peak, with an end to end journey time of 30 minutes. A 6.5-mile branch from Lisière-Pereire to Poissy and Achères is under construction for opening in 2027.

[METRO REPORT INTERNATIONAL, JULY 8](#)

SPAIN

High Speed Rail Network Continues to Grow

2022 is shaping up to be a busy year for Spain's high-speed rail network (HSR). Following the December 20, 2021 opening of the final 65-mile segment of the long planned line to the Galicia region in northwest Spain, two additional lines were opened just days apart in late July. First up was on July 19 when three new segments totaling 90 miles in length were opened between Plasencia and Badajoz in western Spain, as part of an overall 120-mile upgraded section of the Extremadura Line. In the longer term, the line is intended to form part of a high-speed corridor linking Madrid with Extremadura and potentially Lisbon in Portugal.

The project was initially conceived in 1990 as a medium to long term scheme to link Madrid and Lisbon by high-speed rail. In 2003 it was hoped that a 200 mph+ passenger only line could be completed by 2010, enabling a journey time of 2 hours, 45 minutes between the two capitals. However, the plans subsequently evolved, and in 2005 Spain's Ministry of Public Works reached agreement with the Extremadura region to develop the route as a mixed-traffic line for a maximum speed of 155 mph. The target completion date was subsequently extended to 2015, which slipped further due to Spain's financial difficulties at the time.

The double-track line has been built to Iberian broad gauge (5 feet, 5.66 inches), but the ties which have been laid are designed to facilitate future conversion to standard gauge. There are 23 viaducts, of which the longest are Valdetravieso (5,236 feet), Río Tajo (4,881 feet) and Almonte (3,267 feet), as well as two tunnels, the Santa Marina (2.23 miles) and Puerto Viejo (3,264 feet). The total cost of construction was €1.7 billion.

Then just three days later, on July 22, a 47-mile-long segment of line opened from Venta de Baños, a junction on the Madrid-Valladolid-León Line, to Burgos. The new section of line is used by services from Madrid to Burgos, Vitoria-Gasteiz, Bilbao and Irún. The fastest Alta Velocidad España (AVE) trip time between Madrid and Burgos has thus been reduced by 45 minutes to 1 hour, 33 minutes.

Construction contracts were awarded in 2009 for the line and for a 2.4 mile north-to-east connecting track at Venta de Baños. The standard gauge alignment is designed solely for passenger services operating at up to 217 mph, and has short gradients of up to 2.5%. The line, which features two tunnels and several river-spanning viaducts, was built at a cost of €759 million. This was a significant overrun based on original estimates, undoubtedly due to being five years behind schedule following problems with tunnel construction, the replacement of a concrete viaduct deck, and work to mitigate subsidence on an 1,800 foot long stretch close to where the line crosses a major highway. The line is single track for now, but the plan is to add a second standard gauge track and eventually the line is destined to become part of the future high speed corridor to the French border.

Spain currently has over 4,400 miles of high speed rail lines, just ahead of France, and second only to China. RAILWAY GAZETTE INTERNATIONAL, JULY 21 & JULY 25

Third Madrid Cross-City Railway Tunnel Opened

An additional development that is critical to the long term success of the Spanish HSR system was the July 1 opening of a new double track, 4.3-mile long rail tunnel under Madrid between the main line stations at Chamartín and Atocha. Built for the exclusive use of high-speed services, it is the third main line railway tunnel under the Spanish capital, but whereas the two earlier tunnels (opened in 1967 and 2008 respectively) were built to Iberian broad gauge (5 feet, 5 21/32 inches) the new tunnel was built to the global standard gauge of 4 feet, 8 1/2 inches.

The tunnel unites the standard gauge HSR networks north and south of Madrid, connecting the lines serving northern Spain from Chamartín with those running from Atocha to Barcelona, Valencia, Alicante, Málaga and Seville. The new link will enable passengers to cross Madrid without changing trains and will reduce congestion on the approaches to the Spanish capital.

A companion project added two more tracks to the Madrid - Seville high-speed line over a length of 17.4 miles from the Atocha approaches south to Torrejón de Velasco, the junction for the high-speed lines to Valencia and Alicante. The extra tracks will be much needed to cope with the forecasted growth of traffic, especially as the Spanish HSR network is opened up to competition. An additional benefit is the integration of RENFE's Fuencarral depot into the standard gauge network, which will yield great benefits in terms of rolling stock flexibility. Together, the entire program cost over €1.07 billion.

Additional work remains, specifically the final outfitting of the four-track, double-island platform station under Atocha. A 1,700-foot long provisional tunnel will be used to bypass the future platforms until they are finished as part of a larger effort to completely remodel the overall Atocha complex at a cost of €661 million.

The project is the culmination of 14 years of construction, which came after decades of planning. This seems to be par for the course when it comes to building rail tunnels under Madrid, as we have written about previously in the January 2020 and March 2022 *Bulletins*.

INTERNATIONAL RAILWAY JOURNAL, JUNE 30
RAILWAY GAZETTE INTERNATIONAL, JULY 7
TODAY'S RAILWAYS EUROPE, AUGUST 2022

Farewell to Vienna's Type E1 Motors and c4 Trailers

Friday, July 1, saw the last day of service for Vienna's venerable but dwindling fleet of type E1 single-articulated motor cars and type c4 double-truck trailers. The E1 motors were built under license from Düwag by either Lohner-Werke (which was bought by Bombardier in 1971) or Simmering-Graz-Pauker (SGP) between 1966 and 1976. The c4 trailers were all built by Rotax between 1974 and 1977. All photos taken by Gerhard Haschke on the last day of regular service.



E1 4784 (SGP, 1972) + c4 1354 (Rotax, 1976) are laying over at the southern terminal loop in Floridsdorf before heading back north on route 30, but only as far as Gerasdorfer Straße.



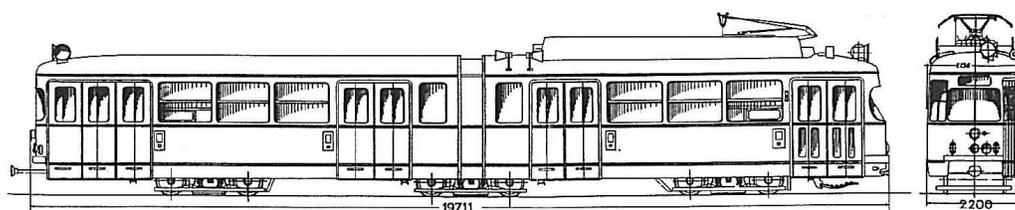
E1 4861 (SGP, 1976) + c4 1351 (Rotax, 1976) have arrived at the northern terminal of route 30 in Stammersdorf before heading back south.



E1 4862 (SGP, 1976) + c4 1360 (Rotax, 1976) are pulling in to the Stammersdorf terminal at the northern end of route 30 on the track assigned to that route. The other track is assigned to route 31.



E1 4862 (SGP, 1976) + c4 1360 (Rotax, 1976) have finished their day and have arrived at Peitlgasse, right outside the Floridsdorf depot. Thus closes the era of the E1+c4 sets in regular operation on the streets of Vienna.



Travels with Jack May

Britain and the Baltics — Part VI

by Jack May (Photographs by the author)

Thursday, August 17

My friends and I had separate agendas for the day. They were going to travel to Llandudno in Wales to ride the Great Orme Tramway, while I planned to go to Sheffield to ride that city's Supertram. After breakfast I headed over to Manchester Piccadilly in gloomy weather for my 8:20 AM TransPennine DMU, carefully avoiding a large number of puddles that had formed from the previous evening's downpour.

I obtained my prepaid ticket from a fare vending machine (after inserting my credit card and the code on my confirmation), which in this case included the optional "PlusBus" feature that added a systemwide tram and bus day ticket for an extra GBP 4 (only 20 cents cheaper than if I bought it in Sheffield). I took an empty forward facing window seat on the three-car DMU for the 48-minute scheduled express run, even though my official seat assignment was for the exact opposite, but nobody bothered me. The scheduled arrival time of 9:08 AM would give me two hours to ride the lines to Malin Bridge and Middlewood before joining John Hayward, who would be arriving from London at 11:00 AM. We planned to meet a few minutes thereafter at Fitzalan Square, one station toward the city center from the railway station and ride and photograph the remainder of the system (the most interesting part) to Meadowhall Interchange and Halfway (and the short branch to Heddings Park if we had the time). See <http://www.urbanrail.net/eu/uk/sheff/sheffield.htm> for a map.



Inbound Siemens-Düwag built No. 120 has just pulled out of the Sheffield Hallam University station, on a ledge at the end of a long passageway over the railroad tracks at Sheffield Station. The car was painted cream with blue trim upon the 50th anniversary of the abandonment of Sheffield's original tramway in 1960.

But things did not go as planned. Twenty minutes after

our departure we came to a stop in the middle of nowhere and sat. A public address announcement was made that a freight train was stalled on the tracks ahead of us. We waited. A DMU passed us going in the opposite direction. At 9:30 AM we began to back up. An announcement was made that we would be returning to Manchester, and then follow an alternate route to Sheffield. We passengers were given a complimentary pastry as recompense. We got back to the Stockport waystation at 9:52 AM and many passengers detrained. Finally we pulled into the same platform from which we first boarded the train – at about 10:00 AM – and all the remaining passengers were told to "abandon ship."



Sheffield Supertram 207, one of 7 dual-powered (750 V DC and 25 kV AC) Citylink vehicles built by Vossloh España in 2014-15, in test operation on the inbound side of the Manor Top/Elm Tree stop of the Yellow and Blue Lines. Since their construction in Spain the carbuilder was sold to Stadler, and since our visit the units themselves have been placed into service, prior to the future inauguration of the tram-train operation. The train portion of the line will run over Network Rail tracks and therefore the cars also carry the prefix 399, indicating their British Rail system class. The three-section, 100% low-floor double-ended cars have four doors on each side, but none are in the center section.

The annunciators on the platform indicated there would be a 10:20 AM train to Sheffield (which was a regularly scheduled run). I found an employee to inquire about the indication and was told that the train to Sheffield would soon pull in and it will leave on the advertised, but use a diversionary route, with arrival planned some 90 minutes after departure rather than the usual 50. And so it was, with the 10:20 AM train running via Huddersfield and a great many junctions. I left a message for John on his phone while all this was going on and we spoke at about 10:25 AM. He indicated he would

wait for me and he was right there when the train pulled in at 11:55 AM. So instead of me having two hours of free time before meeting John, it was he who had to wait for almost an hour before we could get together.



Another view at Manor Top/Elm Tree station, this time in the outbound direction, showing one of the very few Siemens-Düwag Supertram units painted in all-over advertising colors. In this case, car 111's all blue livery promotes East Midlands Trains, one of the affiliates of the tramway operator, Stagecoach.

As we got close to Sheffield the skies began to clear and for the most part we had good sunlight for the afternoon.

John reminded me that pre-Beeching there were two direct lines between Manchester and Sheffield with the Hope Valley line (Midland Railway) retained, and the shorter, faster electrified (1500 volts DC) Great Central route through the Pennines via the Woodhead tunnel abandoned! Pity it wasn't still around.

We were quite fortunate, as when we left the station and reached the Sheffield Station-Sheffield Hallam University tram stop, the first car in sight was No. 120, which is painted in the colors of Sheffield's legacy tramway, which was abandoned in October, 1960. I had the opportunity to ride it on my first trip to Europe in the summer of 1960, but foolishly I chose to concentrate on the London Underground, Blackpool and the Isle of Man instead; all are still in operation, as compared to lines like Grimsby & Immingham and Swansea & Mumbles, which are long gone (I did get to ride and photograph Glasgow's trams on the trip, however).

The South Yorkshire Supertram opened in 1994 and serves the city of Sheffield, with a population of about a half million. A very successful network, covering 18 miles and serving 48 stations, it carries up to 15 million passengers per year over its three through-routed, five-branch color-coded network. The two main routes, the Blue and the Yellow, run every 10 minutes in rush hours and every 12 during the base period, which is not as frequent as service on the tramways in the other cities I visited. However, with the two routes overlapping in places, service through the city center runs at five- and six-minute frequencies. But the short Purple

line to Herdings Park (with only two stops on the branch) operates only every 30 minutes at all times, except oddly on Sundays, when its other end is rerouted, giving it a frequency of every 20 minutes, the same as other lines. That allows Sunday service to the Meadowhall shopping mall, a major traffic generator, to run at a combined ten-minute headway. The Supertram was originally operated by local interests, but since 1998 it is under the management of Stagecoach*, which has applied its own livery to the cars. On my first visit the cars were painted in a silver color scheme, and then went through a traction white with orange, red and blue striping phase. (I haven't scanned my "silver days" photos.)

**Author's Note: Stagecoach is one of Britain's most prominent local and intercity bus operators, and can be found in other countries throughout the world as well. We know it in the United States as Coach U. S. A. and Megabus. As far as rail service is concerned it holds a stake in the management of a number of Britain's privatized train companies, including East Midlands, which I rode on this trip. Most interesting (at least for me) was the period from 1990 to 2001 when under the leadership of Bob Docherty, it restored and operated Brill four-wheelers in Sintra, Portugal.*

The rolling stock from Supertram's origin has been 25 Siemens-Düwag 40% low-floor cars. These units are now being supplemented by seven Citylink tram-train cars from Vossloh, and although the tram-train still had a while to go before its implementation, the dual-voltage cars had already been delivered and it was our hope to see some of them. And as it turned out we were lucky, as when we took our first photostop at Manor Top, we came upon one of them in test operation. We scurried across busy Ridgeway Road and were able to get a photo of No. 207 before it pulled away. We also got a photograph of a Siemens car in an all-blue advertising wrap.

The line to Halfway is my favorite and we proceeded out to the terminal with stops for photos in both directions. Its characteristics remind me of what a modernized Belgian Vicinal could have been, operating in pavement along narrow streets, as well as along sections of reserved track at the sides of roads, with some cross-country reservation thrown in too. The name, Halfway, raises an obvious question: what is it halfway to? Most people I asked did not know, but some said it is halfway between Sheffield and Worksop, and others halfway between Rotherham and Chesterfield. But there was no consensus.

On the following page are some photos of the Blue Line, shown in sequence from its outer to inner end, although some were made on our outbound trip and others on our return. All photos shown below are of Siemens Düwag cars that began coming off the assembly line in Düsseldorf in 1992, and had since been repainted into the official Supertram color scheme.

After our arrival in the city center we headed out the Yellow Line to Meadowhall Interchange. Part VII of the report will describe the remainder of my visit to Sheffield.



The rails of the Blue Line converge onto single track for the line's terminal at Halfway, adjacent to a large park-and-ride lot and an easily accomplished across-the-platform bus transfer.



Above and below: The two "Birley" stops, Birley Moor Road and Birley Lane. In the upper photo car 113 has just come off Sheffield Road to make the station stop, while below, No. 124 partially leaves the pavement of Birley Lane alongside the parking lot of the Birley Wood Golf Course. Note that one track is anchored in concrete, the other on ballasted PRW.



Above and below: Two photos near the Hackenthorpe station. In the upper view car 117 has just turned off narrow Sheffield Road and entered some attractive reservation before its stop. The lower view shows car 110 just west of the station. Auto parking, stopping and even standing are discouraged here for obvious reasons.



Lastly, the inner portion of the Blue Line, which is shared with the Purple Line. The trams climb and curve dramatically as they overcome the grade along Park Grange Road from the city to the heights of the Cutlers View, Arbourthorne and Spring Lawe neighborhoods.