



Metropolitan Transportation Authority

Capital Program Oversight Committee Meeting

January 2020

Committee Members

P. Foye, Chair
N. Zuckerman, Vice Chair
A. Albert
N. Brown
S. Feinberg
D. Jones
L. Lacewell
R. Linn
D. Mack
S. Metzger
J. Samuelsen
V. Tessitore

Capital Program Oversight Committee Meeting

2 Broadway, 20th Floor Board Room

New York, NY 10004

Tuesday, 1/21/2020

2:30 - 3:30 PM ET

1. PUBLIC COMMENTS PERIOD

2. APPROVAL OF MINUTES DECEMBER 16, 2019

- *Minutes from December '19 - Page 3*

3. COMMITTEE WORK PLAN

- *2020-2021 CPOC Committee Work Plan - Page 7*

4. C&D CAPITAL PROGRAM UPDATE

- *Update on 42 St Connection Project - Page 9*

5. NYCT CAPITAL PROGRAM UPDATE

- *Update on Signals & Train Control Projects - Page 22*
- *IEC Project Review of Signals & Train Control Division - Page 56*
- *Update on Subway Car Program - Page 64*
- *IEC Project Review on R179 & R211 Railcar Procurements - Page 81*
- *Update on Bus Procurement - Page 87*
- *IEC Project Review on Bus Procurement - Page 116*
- *Update on Systems and Security Projects - Page 120*
- *IEC Project Review on Bus Radio System - Page 141*
- *IEC Bus Radio System Appendix - Page 145*

6. CAPITAL PROGRAM STATUS

- *Commitments, Completions, and Funding Report - Page 146*

**MINUTES OF MEETING
MTA CAPITAL PROGRAM OVERSIGHT COMMITTEE
December 16, 2019
New York, New York
2:30 P.M.**

CPOC members present:

Hon. Patrick Foye
Hon. Andrew Albert
Hon. Robert Linn
Hon. Susan Metzger
Hon. Neal Zuckerman

CPOC members not present:

Hon. Norman Brown
Hon. Sarah Feinberg
Hon. David Jones
Hon. David Mack
Hon. John Samuelsen
Hon. Vincent Tessitore, Jr.

Board members present:

Hon. Rhonda Herman
Hon. Kevin Law

MTA staff present:

Janno Lieber
Tom Savio
Don Spero

MTACC staff present:

Tim Gianfrancesco
Eve Michel
Rob Troup

Independent Engineering Consultant staff present:

Joe Devito
Kent Haggas
Mohammad Mohammadinia
Dianne Rinaldi
Darlene Rivera

* * *

Chairman Foye called the December 16, 2019 meeting of the Capital Program Oversight Committee to order at 3:28 P.M.

Public Comments Period

There were three public speakers in the public comments portion of the meeting: Lisa Daglian; Jason Pineiro; and Omar Vera.

Meeting Minutes

The minutes to the meeting held on November 12, 2019 were approved pending a grammatical correction, as noted by Commissioner Albert.

Committee Work Plan

Mr. Spero announced that there was one change to the Work Plan: the Times Sq. Shuttle Reconstruction Project, along with the overall progress of the 42nd Street Connector Project, will be presented in an upcoming CPOC.

East Side Access Project Update

Mr. Troup opened his presentation by reaffirming the project's commitment to meeting the 2022 Revenue Service Date (RSD). He then highlighted the vast scale of the project itself, as well as project's many benefits to the region. Following a review of progress photos, Mr. Troup then cited project risks and mitigations, detailed schedule milestones, and -- as the work has shifted from being largely civil in nature to systems-oriented work -- he cited key points concerning integrated system testing, concourse systems and backbone communications. Mr. Troup concluded his presentation by providing updates on the JP Morgan Chase devolvement (and its implications to the project), issues related to Amtrak and the Harold Interlocking, as well the project's continued role as facilitator of the Amtrak regional project schedule. In its oral remarks, the IEC stated that its analysis indicates that the \$11.13B estimate at completion forecasted in April 2018 remains adequate to support the December 2022 RSD. With respect to schedule, the IEC noted that it continues to forecast 6 months of program schedule contingency remaining until the December 2022 RSD. With respect to project risks, the IEC agrees with the major risks as cited by the project team. The IEC then stated that it remains concerned that installation and local testing delays are impacting the start of Integrated Systems Testing (IST) which, if not mitigated, could result in the consumption of 2 additional months of program schedule contingency. According to the IEC, the project team continues to develop systems installation and testing tools to facilitate monitoring and reporting (including a database, master submittal log and testing schedule), which need to be completed to validate the 16-month IST duration. Finally, as the project team moves forward in its efforts to accelerate systems installation and testing, the IEC recommends the following: 1) provide additional resources to strengthen project management and quality control, particularly Quality Control/Accurance and Inspection staff; and 2) identify a Phase Lead/Manager for all tunnel installation and testing work, including track, signal and traction power. Further details of the presentations, and Committee Members' comments and questions with respect thereto, are included in the video recording of the meeting maintained in MTA's records.

LIRR Expansion Project Update

Mr. Lieber began his overview by reporting that the project remains on budget and on schedule. He then noted that the project has exercised close management of change orders, resulting in very few change orders relative to earlier mega-projects. Risks, including newly identified ones, are being addressed aggressively and proactively, including risks associated with long-lead items. With respect to Key Performance Indicators (KPI), Mr. Lieber noted that each KPI has an individual responsible for that particular indicator. Among the 2020 Milestones that Mr. Lieber cited, Nassau 1 Interlocking is seen as the linchpin to the entire schedule. In addition, the project will continue emphasizing the importance of keeping community commitments and generally maintaining a good-neighbor policy, which has contributed to the project's ability to avoid potential delays. Mr. Lieber then concluded his remarks by citing the LIRR Expansion Project as the prototype for the new approach within the Construction & Development Organization, including the use of bundling and employing the Project CEO concept, in which accountability is the watchword. In its oral remarks regarding the project budget, the IEC stated that it performed a cost analysis on the design, construction, soft cost, and contingency to evaluate the project's estimate at completion, and that based on this analysis, the IEC verifies that the project EAC remains within budget. Further, the IEC stated that the percent complete to date compares favorably to planned expenditures, remaining contingency and overall budget, which has not changed. The IEC's schedule review verifies that the project remains on schedule, with the longest path running through the design, procurement and installation of Nassau 3 interlocking signal system. The IEC further noted that the project has either met or exceeded all 2019 milestones, and is positioned well to meet the upcoming milestones. The IEC then stated that it agrees with top risks identified by the project and that based on field observations, schedule and risk reviews, and participation in risk workshops, in the opinion of IEC, the agency is taking appropriate steps to mitigate risks. Further details of the presentations, and Committee Members' comments and questions with respect thereto, are included in the video recording of the meeting maintained in MTA's records.

Second Avenue Subway Phase 2 Update

Mr. Gianfrancesco enumerated the benefits of the project, including providing service to a transit-dependent community, as well as reducing crowding along the Lexington Avenue Line, and providing a connection to Metro-North Railroad. He then outlined the status of federal funding (including the scheduled submission of a request for a Full Funding Grant Agreement in April 2020) and noted the key elements of the project's Cost Containment initiative, citing current reduction in project cost by up to \$1 billion, with the potential additional savings of \$50 million - \$200 million. Mr. Gianfrancesco finished his presentation by citing progress to date in design, as well as public outreach efforts. In its oral remarks, the IEC noted that the project team remains on track for obtaining a Federal Funding Agreement by the 4th Quarter of 2020, and that the start of Final Design and Construction will depend upon that agreement as well as the forthcoming approval of the 2020-2024 Capital Program. The IEC then commented that, based on its observations, cost containment and reduction remains a major activity of the project team as evidenced by the results of the Value Engineering and NYCT working groups. The IEC contributed to the Risk and Readiness workshops and reviewed the draft FTA report on the Project's Risk and Contingency outlook, and the results indicate that the top project risks include the following: current market conditions for large Design-Build contracts; unanticipated geotechnical conditions; and systems integration & testing issues. The IEC then noted that the project team is developing appropriate mitigation strategies in response to these risks. Further details of the presentations, and Committee Members' comments and questions with respect thereto, are included in the video recording of the meeting maintained in MTA's records.

Penn Station Access Project Update

Ms. Michel outlined the project benefits, including time savings from various points of origin to destinations. She then provided overviews of Environmental Assessment, Design, Procurement, and Pre-construction efforts to date. Ms. Michel then outlined various project risks and corresponding mitigations, and concluded her presentation by citing the project's next steps, including selecting the Design-Builder and providing Notice to Proceed in the fourth quarter 2020. In its oral remarks, the IEC commented that the Advanced Conceptual Design for the project is completed and the design team is now developing bid documents for the RFP. The IEC then noted that to maintain schedule commitments, design is proceeding at risk with Amtrak's preferred alignment over the objections of a tenant railway to Amtrak on the Hell Gate Line. In addition, the IEC stated that with the release of a Request for Qualifications to interested Design-Build teams, the procurement phase has begun concurrent with design, and that anticipated issuance of the contract by late next year is dependent on completion of the Environmental Review process, and CPRB approval of the MTA Capital Program. Further details of the presentations, and Committee Members' comments and questions with respect thereto, are included in the video recording of the meeting maintained in MTA's records.

MTA Capital Program Commitments & Completions and Funding

Mr. Spero reported that in 2019 agencies plan to commit a total of \$5.6 billion dollars, including 36 major commitments that are being tracked throughout the year. The MTA made 10 major commitments through November and by year end, the MTA forecasts making 8 more major commitments and meeting 88% its overall 2019 commitments goal. With respect to completions, in 2019, agencies plan to complete a total of \$3.4 billion, including 24 major completions that are being tracked throughout the year. The MTA made 17 major completions through November and by year end, the MTA forecasts meeting its 2019 completions goal.

Capital Program Traffic Light Reports

Mr. Spero noted that in the Capital Core Program Traffic Light Report for the third quarter of 2019 a total of 285 projects were reviewed: 48 in design and 237 in construction. Two-thirds were designated green, 18% were yellow and 16% were red. With respect to Sandy Program projects, a total of 59 projects were reviewed: 4 in design, 10 in post-design to construction, and 45 in construction. Sixty-four percent were designated green, 24% were yellow and 12% were red.

Adjournment

Upon motion duly made and seconded, Chairman Foye adjourned the December 16, 2019 meeting of the MTA Capital Program Oversight Committee at 4:18 PM.

Respectfully submitted,
Michael Jew-Geralds
Office of Construction Oversight



2020 - 2021 CPOC Committee Work Plan

I. Recurring Agenda Items

Approval of the Minutes
Committee Work Plan
Commitments/Completions and Funding Report

II. Specific Agenda Items

February

B&T Capital Program Update

- Henry Hudson Bridge Program
- Verrazano-Narrows Program
- Throgs Neck Bridge Program
- Harlem River Drive Connector Ramp at the RFK Bridge
- Overall Design-Build Program

LIRR and MNR Update on Positive Train Control (PTC)

Update on Capital Program Security Projects (in Executive Session)

March

NYCT Capital Program Update

- Sandy Recovery and Resiliency Division
- Stations Division

Quarterly Traffic Light Reports

April

C&D Integrated Projects Update

- East Side Access
- Second Avenue Subway, Phase 2
- Penn Station Access
- LIRR Expansion Project
- 42nd Street Connection Project

Quarterly Traffic Light Reports

May

LIRR Capital Program Update

MNR Capital Program Update

LIRR and MNR Update on Positive Train Control (PTC)

Update on OMNY Program

Update on Minority, Women and Disadvantaged Business Participation

June

NYCT Capital Program Update
Quarterly Traffic Light Reports

July

C&D Integrated Projects Update

September

NYCT Capital Program Update
Quarterly Traffic Light Reports
Update on Capital Program Security Projects (in Executive Session)

October

LIRR Capital Program Update
MNR Capital Program Update
LIRR and MNR Joint Update on Rolling Stock
LIRR and MNR Update on Positive Train Control (PTC)

November

NYCT Capital Program Update
Update on OMNY Program
Update on Minority, Women and Disadvantaged Business Participation
Update on Small Business Development Program

December

C&D Integrated Projects Update

January

NYCT Capital Program Update
NYCT Rolling Stock Procurement Program



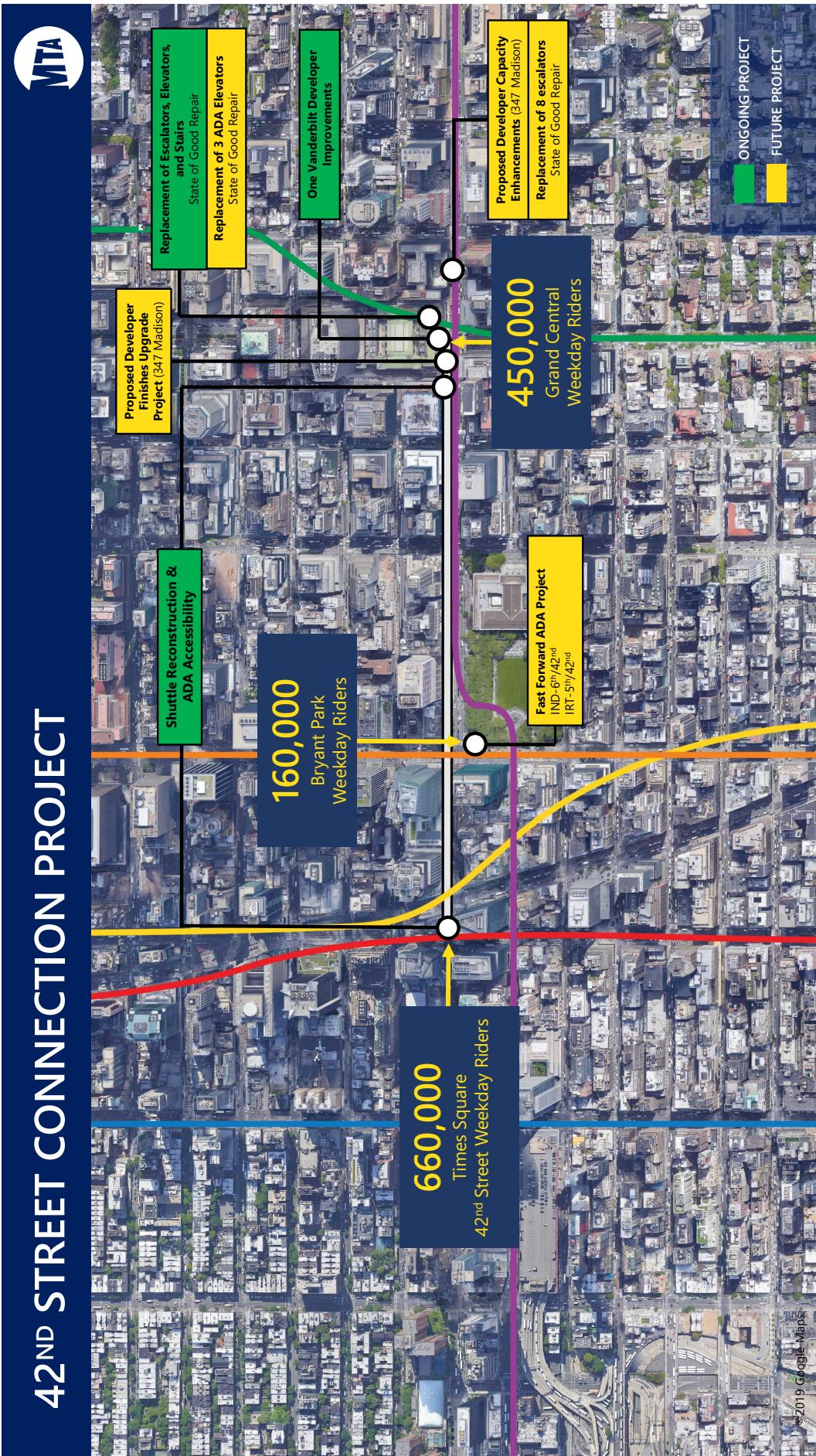
42 ST CONNECTION PROJECT

Capacity, Accessibility, Reliability Program



©2019 Google Maps

42ND STREET CONNECTION PROJECT



NEW APPROACH



BETTER CUSTOMER EXPERIENCE

- Customer experience is the priority
- Maintain service
- Deploy MTA personnel for crowd management and wayfinding

INTEGRATED PROJECT MANAGEMENT MEANS BETTER RESULTS

- One leader
- One team
- One plan

PROCUREMENT STRATEGIES THAT SAVE TIME AND MONEY

- Project bundling
- Design-Build
- Modern construction techniques

42ND STREET SHUTTLE

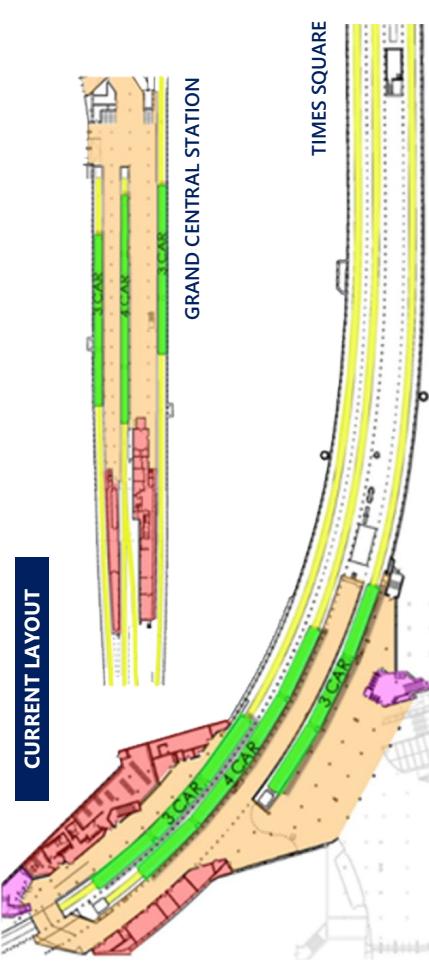


PLAN IMPROVEMENTS

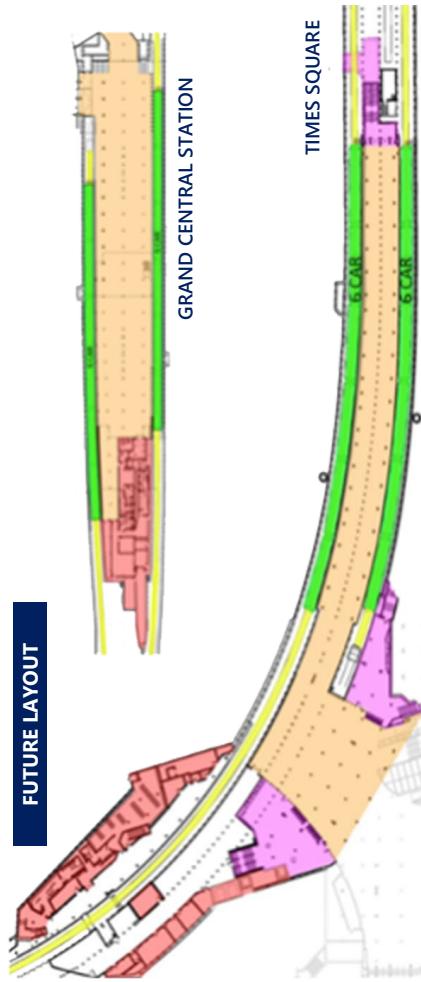
- Reduce construction schedule by 25%
49 months to 36 months
- Improve subway service schedule during construction
- Re-engineer high risk project scope to minimize potential cost overruns
- Negotiated private developer funding
- Created open communication with local community stakeholders and MTA customers

BUDGET: \$253M

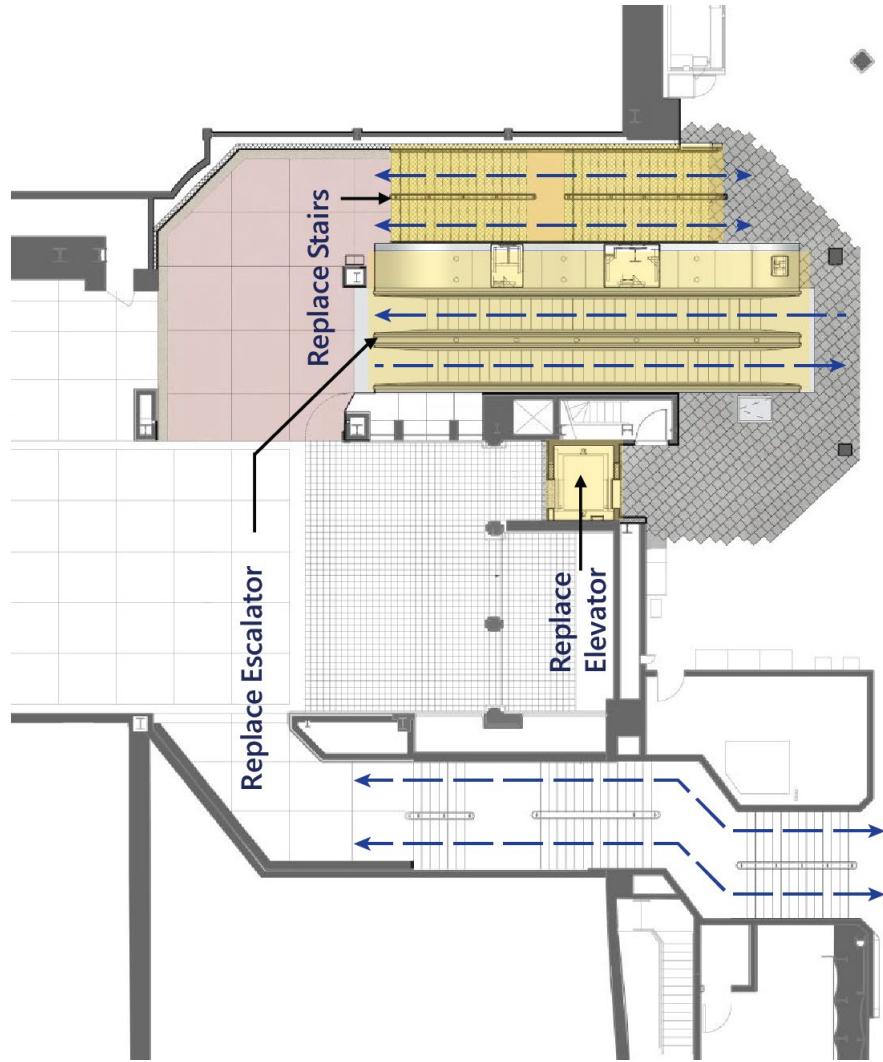
CURRENT LAYOUT



FUTURE LAYOUT



42ND STREET PASSAGEWAY SUBWAY ENTRANCE



PLAN IMPROVEMENTS

- Re-phased project to improve customer experience and reduce duration of closures during escalator and elevator replacements
- **Reduced construction schedule** from 26 months to 19 months
- **Rebuilt stairs in 7 weeks instead of 8 months** and reopened for customer use sooner
- **Reduced escalator outage** from 14 months to 8 months

BUDGET: \$36M



GRAND CENTRAL STATION LEXINGTON AVENUE LINE

CAPACITY & ACCESSIBILITY IMPROVEMENTS – PACKAGE 1

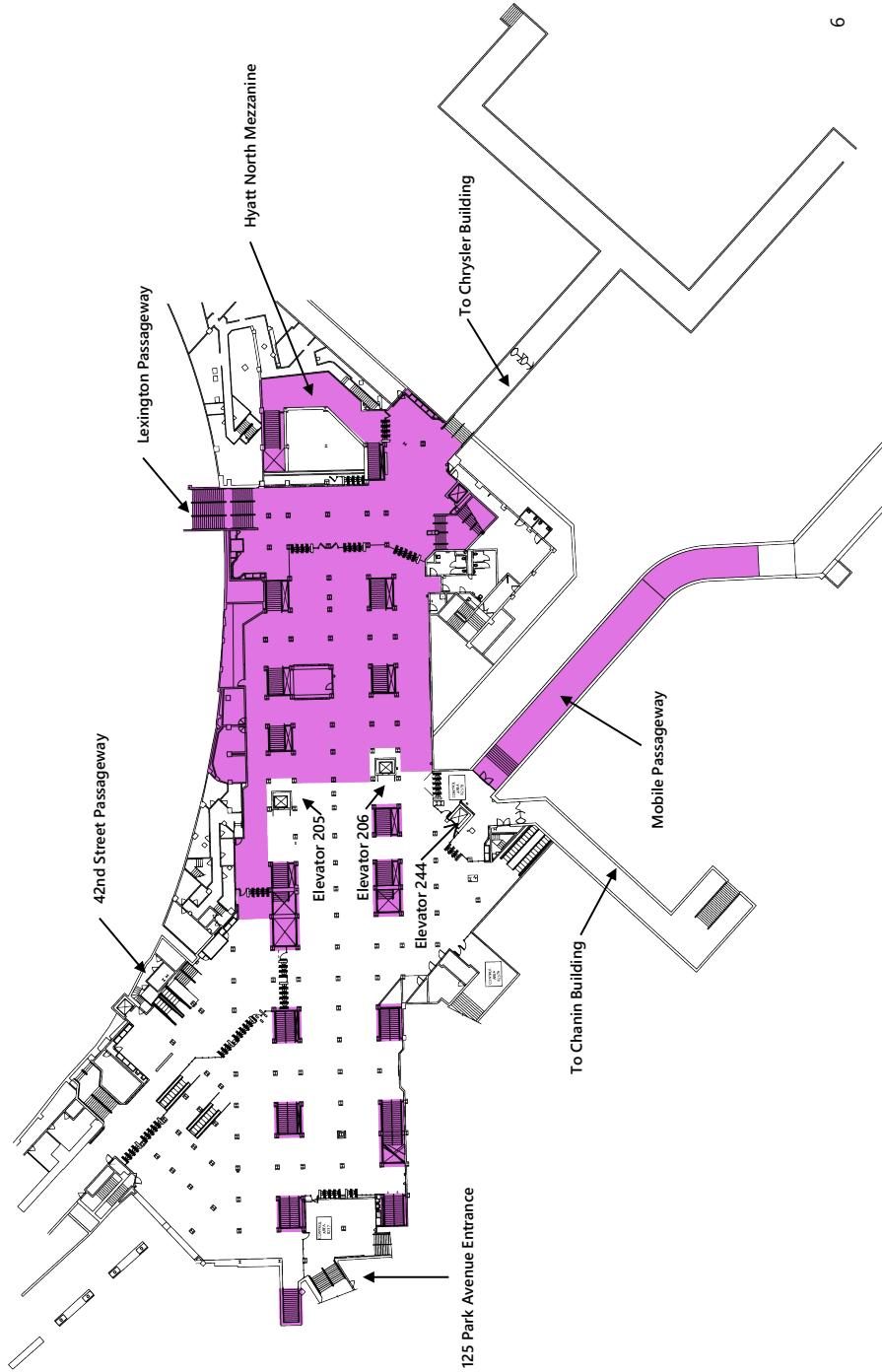
PLAN IMPROVEMENTS

- Streamlined contractor design review and approval process
- Utilized alternative products to reduce contractor installation time
- Implemented strategic construction phasing
- Reduced schedule by two months
- Restored station areas faster

EAST MIDTOWN REZONING

- Enabling private developer funding for transit-oriented development
- More developer projects on the horizon

BUDGET: \$150M – developer-funded





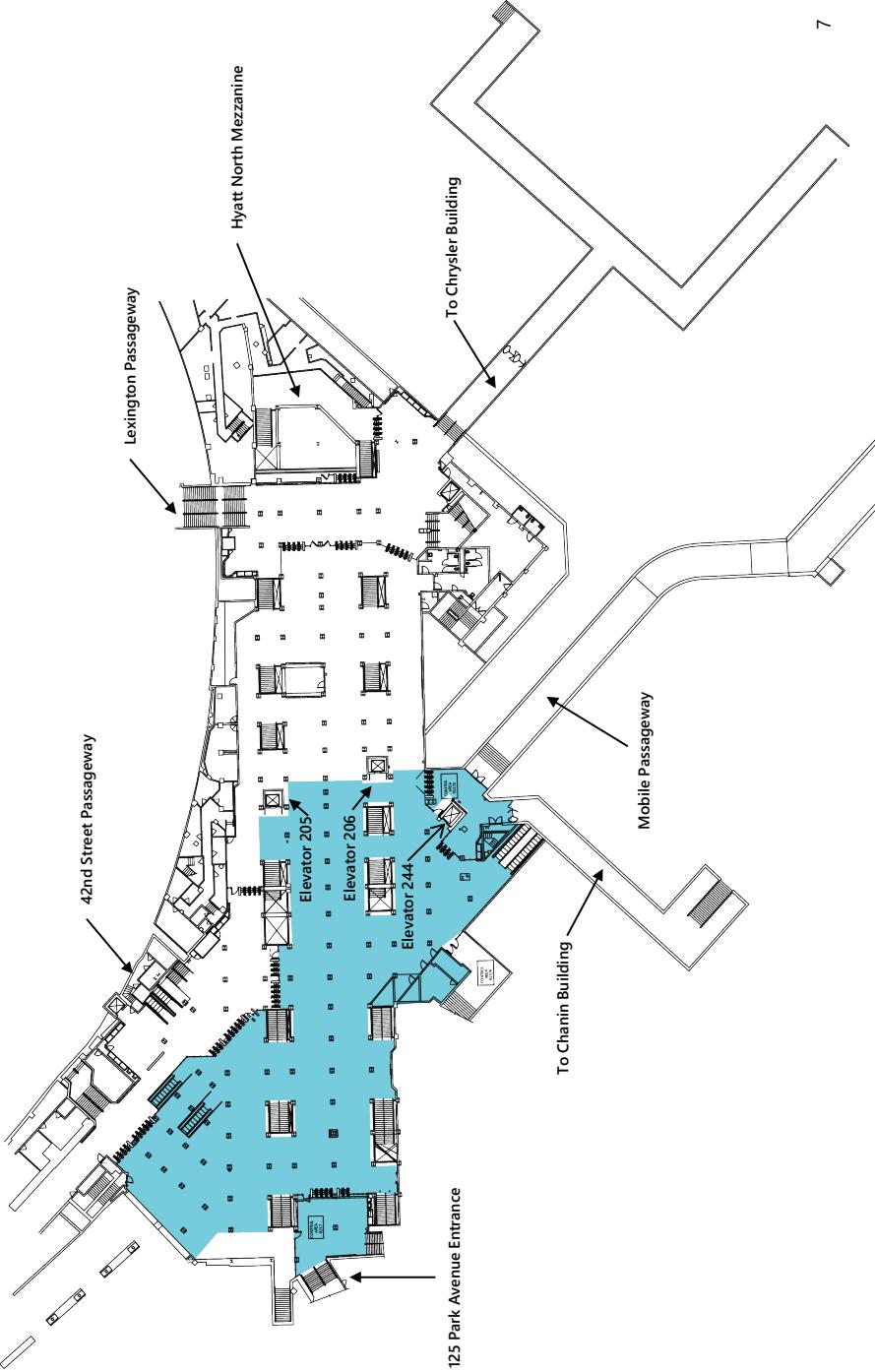
GRAND CENTRAL STATION: LEXINGTON AVENUE LINE

CAPACITY & ACCESSIBILITY IMPROVEMENTS – PACKAGE 2

PLAN IMPROVEMENTS

- Start column, floor and wall finish work early for improved customer experience
- Consolidate and bundle projects with other MTA work
- Strategic construction phasing to minimize customer impacts
- Design-Build procurement

SCHEDULE: 2020 - 2022





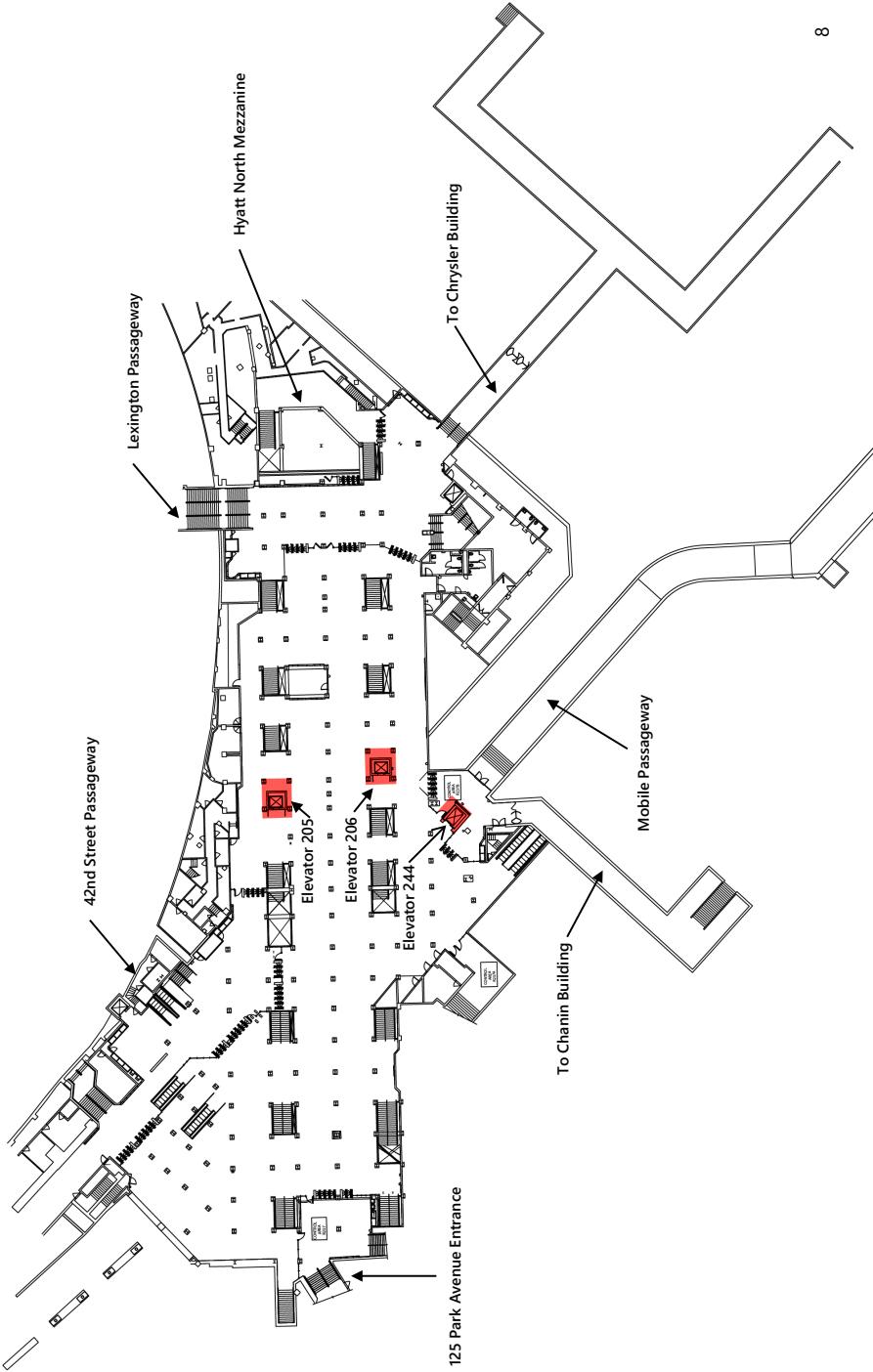
GRAND CENTRAL STATION: LEXINGTON/FLUSHING LINES

ELEVATOR REPLACEMENT

PLAN IMPROVEMENTS

- Design-Build procurement
- Schedule reduction
33 months to 20 months

SCHEDULE: 2020 - 2022



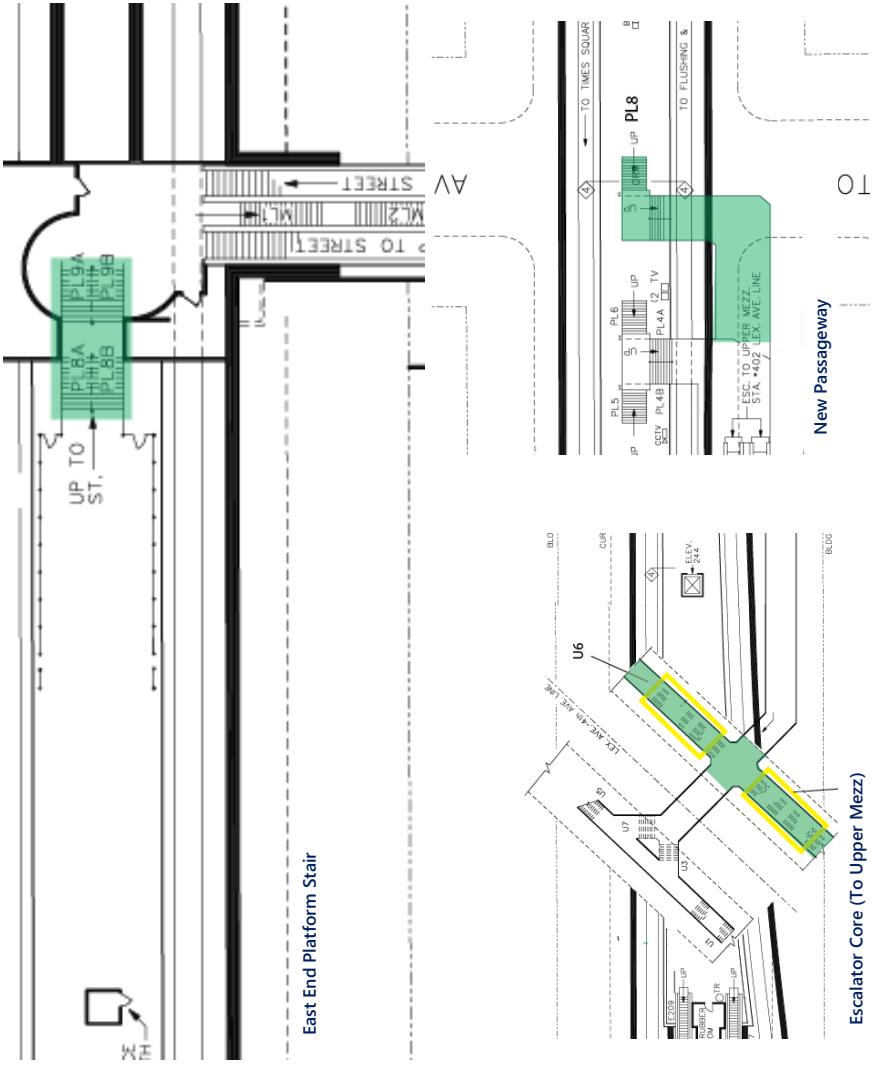


GRAND CENTRAL STATION: FLUSHING LINE

FUTURE DEVELOPER IMPROVEMENTS

PLAN IMPROVEMENTS

- Consolidate and bundle projects with escalator replacement
- Strategic construction phasing reduces customer impacts
- Reduces overall schedule at 42nd St Station/Flushing Line by as much as 50%
- Design-Build procurement



SCHEDULE: October 2021 –
June 2024



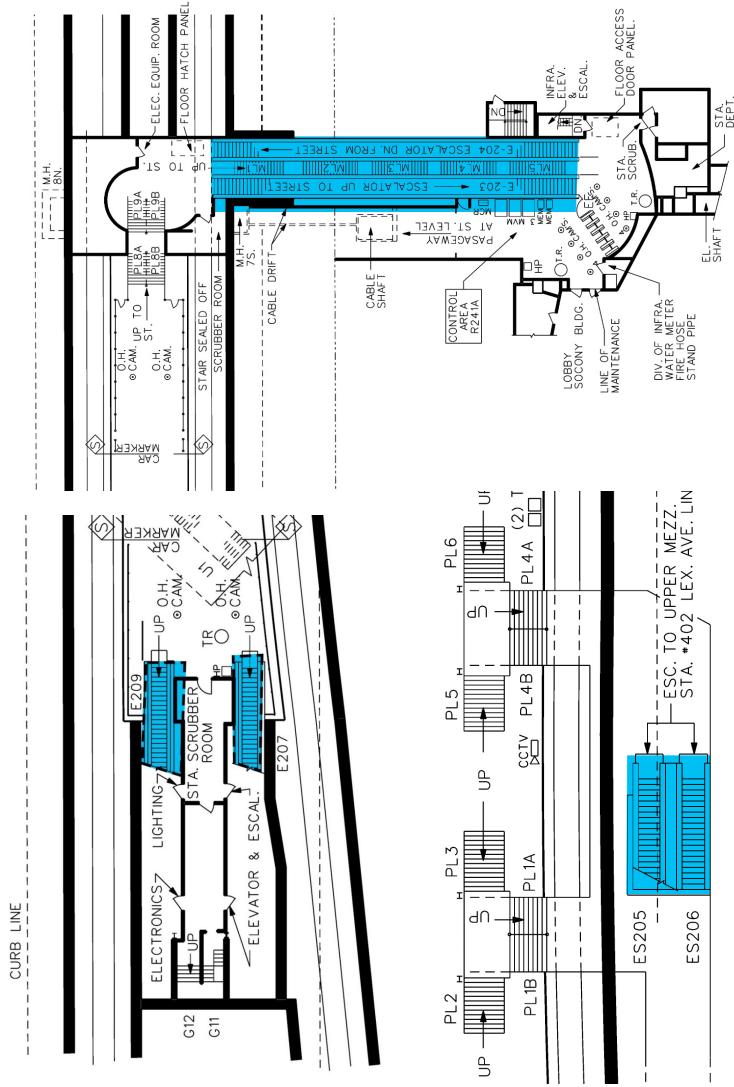
GRAND CENTRAL STATION: FLUSHING LINE

REPLACEMENT OF 8 ESCALATORS

PLAN IMPROVEMENTS

- Consolidate and bundle projects with developer improvements

SCHEDULE: October 2021 -
June 2024



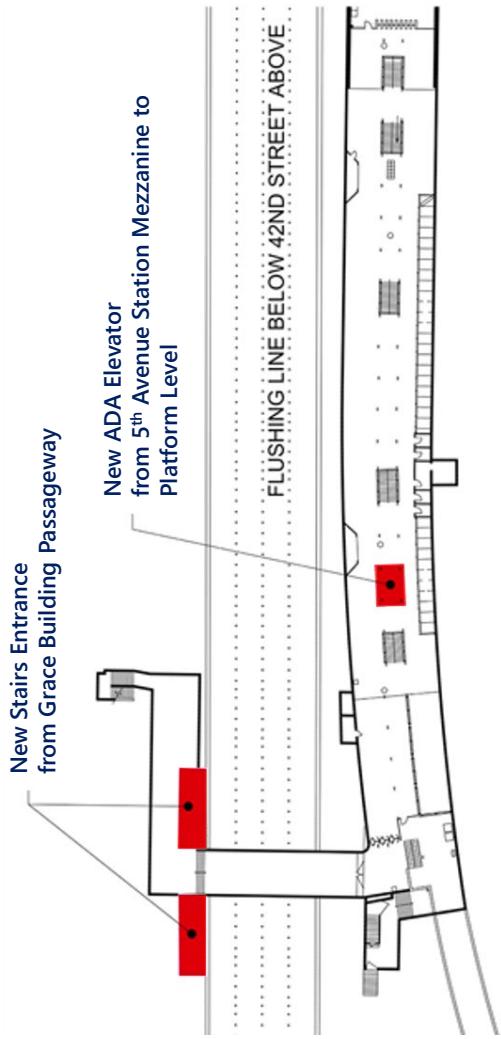


42ND STREET & 5TH/6TH AVE STATION COMPLEX

FAST FORWARD ADA UPGRADE

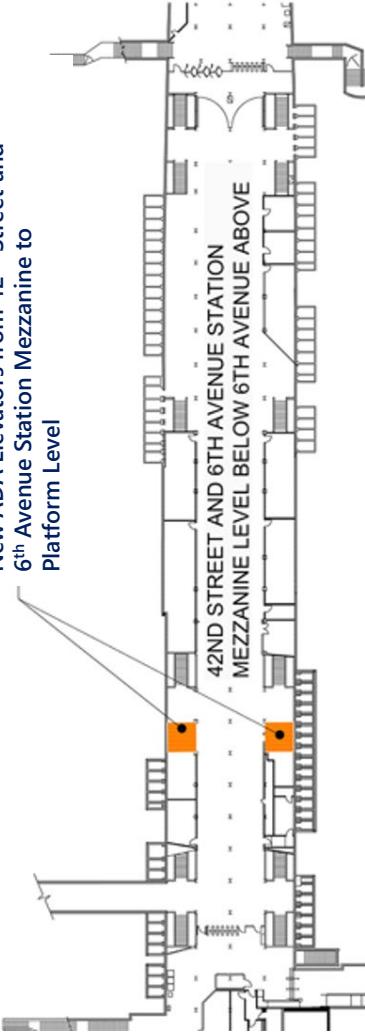
PLAN IMPROVEMENTS

- Consolidate and bundle projects with developer and **escalator improvements** at Grand Central Station
- **Strategic construction** reduces overall management and TA labor costs
- Design-Build procurement



SCHEDULE: October 2021 -
October 2023

New ADA Elevators from 42nd Street and
6th Avenue Station Mezzanine to
Platform Level



CUSTOMER EXPERIENCE



Unified customer experience and project brand deployed in January, including:

- Integrated customer wayfinding and project information in stations
- Online and in-person information creates a 360-degree experience catered to when and how customers want to receive information
- Ongoing MTA staff presence to inform and guide customers



42 ST CONNECTION PROJECT

Quick tips

Getting around Grand Central during rush hour

There's a lot going on in Grand Central. Here's a quick guide to getting around while we work.



new.mta.info/42ndStreet
#42ndStreet





42 ST CONNECTION PROJECT
is the new model and approach for
upcoming programs

© 2019 Google Maps

Signals & Train Control Projects

Signals and Train Control Engineering
Pete Tomlin
Vice President



Signals & Train Control Projects

2020-2024 Capital Plan - CBTC Overview

Construction Phase

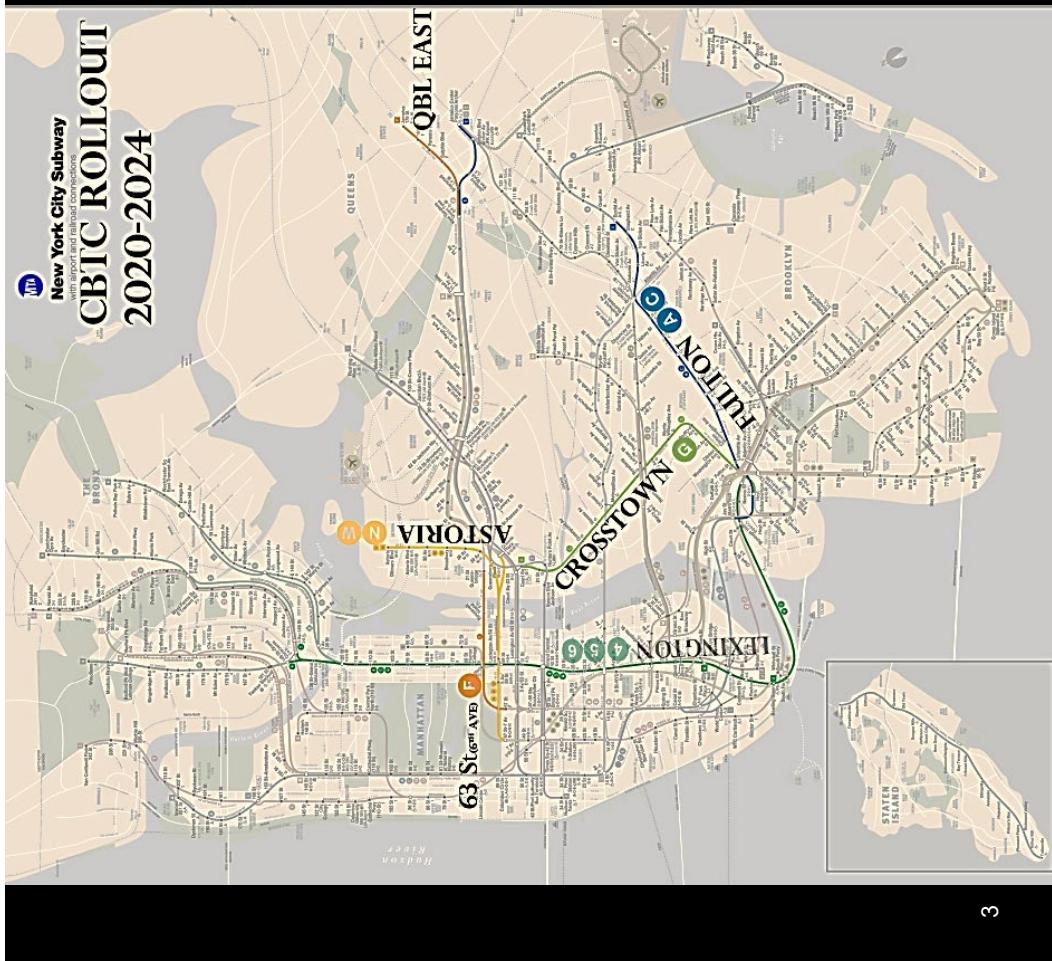
- 8th Ave
- Queens Blvd Line
- Culver Line
- Third Supplier
- Flushing Line - CBTC
- Kings Highway Interlocking/Culver Line
- 34th Street - Interlocking
- West 4th Street - Interlocking
- Module 3 – RCC Large Display
- Module 3A – RCC South Side Wall

Ultra-Wideband Pilot Project Summary

Captured Lessons Learned

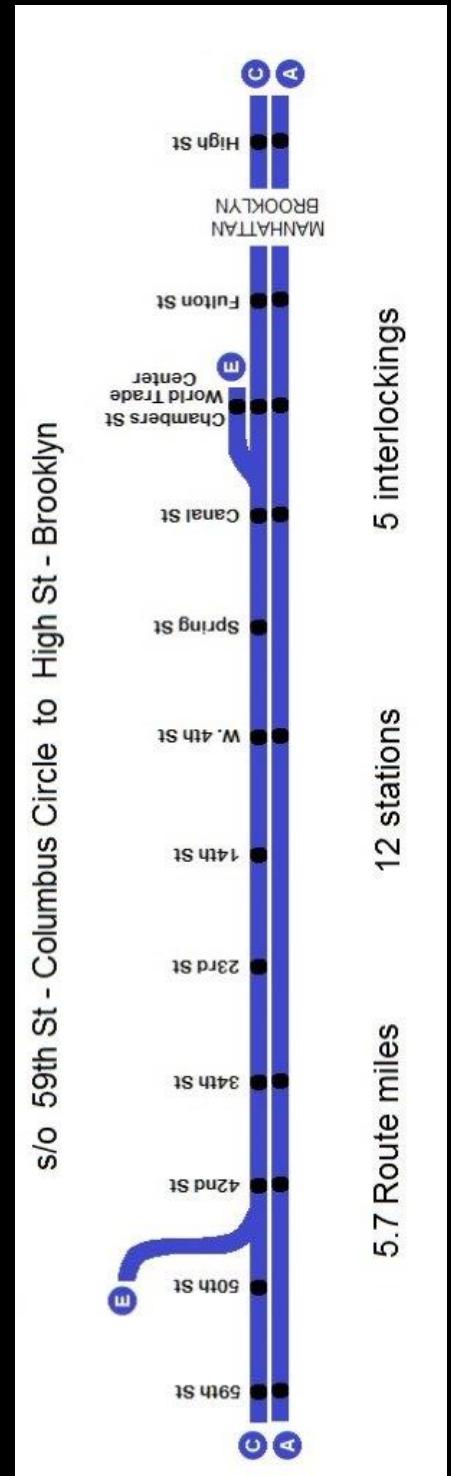
Overview - CBTC Projects

- 1) QBL East
North of Union Turnpike to 179th Street & Jamaica Center Parsons-Archer
- 2) Crosstown
Court Square to Hoyt-Schermerhorn
- 3) Lexington Avenue
Neivins Street to 149th Street Grand Concourse and 3rd Avenue 149th Street
- 4) Fulton
Jay Street to Euclid Avenue
- 5) Astoria
Ditmars Blvd. to 57th Street
- 6) 6th Ave./63rd St.
21 St - Queensbridge to 57th Street



8 Av & 2 Interlockings – 30th St & 42nd St

Project Award	January 2020
Project Description	Modernize 30th St and 42nd St Interlockings Overlay 8th Ave with CBT C from 59th St - Columbus Circle to High St. First NYCT project using axle counters.



8 Av & 2 Interlockings – 30th St & 42nd St



Overall Status

Schedule Design Completed: November 2018

Bids opened on 11/19/2019

Project awarded to LK Comstock January 11, 2020

Project Duration: 60 Months

Cost

Total Project Budget: \$608M

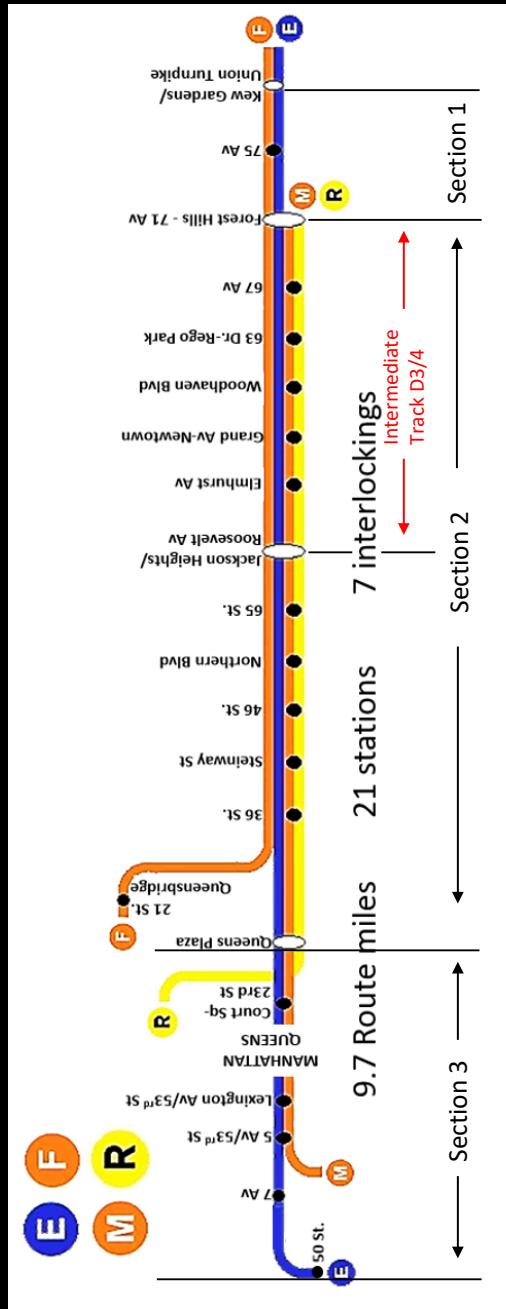
CBTC Queens Blvd. Line

Project Award

Siemens – Aug 2015
Thales – Aug 2015
LK Comstock – Dec 2016

Project Description

CBTC Overlay from Union Turnpike (Queens) to 50th St – 8th Ave (Manhattan)



CBTC Queens Blvd. Line

Overall Status
Schedule CBTC – 67% complete Substantial Completion March 2021 Installation – 53% complete Substantial Completion July 2022
Cost CBTC – Current budget \$239M* Installation – Current budget \$424M*

*The projected budget shortfall due to additional services, is currently under review.



CBTC Queens Blvd. Line

Progress

Completed since June 2019 CPOC

- All activities forecast in June CPOC lookahead were completed
- Delivery of all wayside equipment for Intermediate area & Section 1
- Installation and testing of DCS for Intermediate area & Section 1
- Installation of wayside equipment, including power rooms
- All field testing for CBTC in intermediate area
- Cable installation for entire project
- Simulators delivered to locations October 2019, training commenced November 2019
- 120 Train Operators trained to date
- 261 R160 units are retrofitted and tested, 100 units required for Intermediate area service
- 200+ R160 units safety certified ready for service



CBTC Queens Blvd. Line

Ongoing progress

- Installation of wayside equipment in Sections 2 and 3 – 65% complete
- Carborne installation & testing of remaining 48 of 309 units
- DCS radio installation – 80% complete
- CBTC equipped revenue trains being monitored for reliability



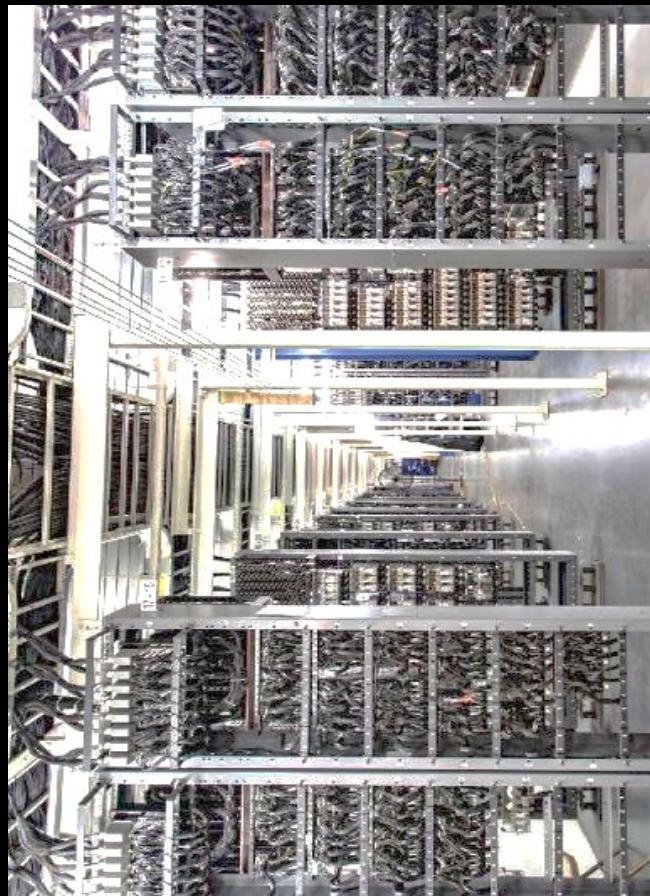
CBTC Queens Blvd. Line

180-Day Look Ahead

- Place in service express tracks D3/D4 from 71st St to Roosevelt Ave (Intermediate Section)
- Place in service most of Section 1
- Complete CBTC database survey
- Complete all installation and testing of carborne equipment
- Complete installation of CBTC and AWS equipment Sections 2 & 3
- Commence testing of CBTC wayside equipment Sections 2 & 3
- Commence AWS testing for Section 3



CBTC Queens Blvd. Line



CBTC Relay Room



RCC-console

11

CBTC Queens Blvd. Line



Antenna and Signal Box

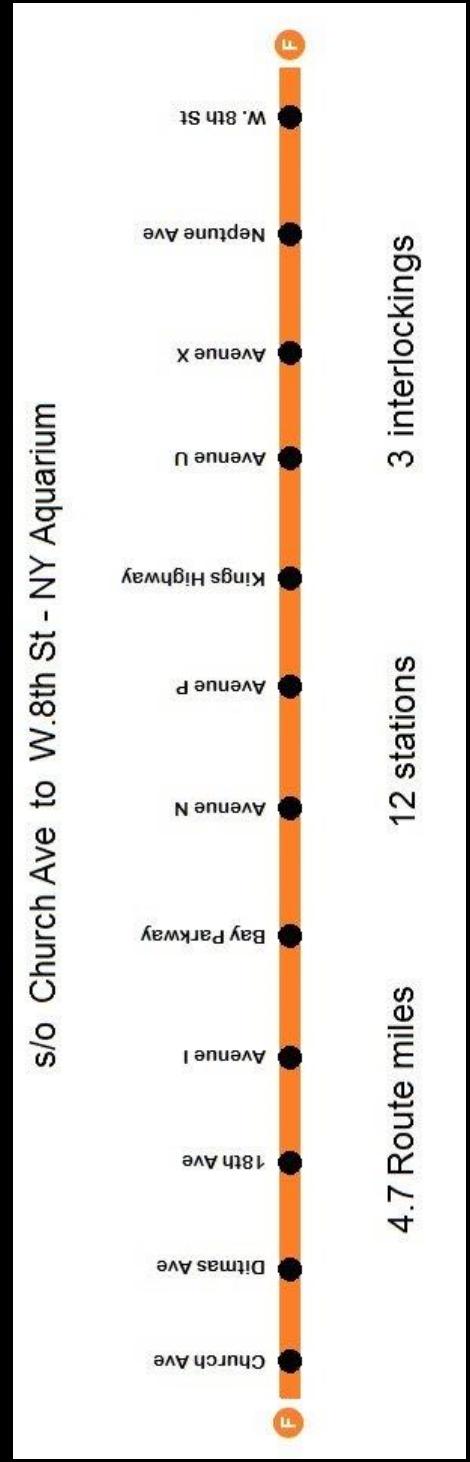


R160



CBTC Culver Line

Project Award	February 2019
Contractor	Tutor Perini Corp
Project Description	Modernize Ave X and Ditmas Ave Interlockings Overlay Culver Line with CBTC from Church Ave to W. 8th St.



CBTC Culver Line

Overall Status

Schedule 17% complete. Substantial Completion August 2022

Cost Total project budget: \$481M



CBTC Culver Line

- | Progress | • Completed steel and concrete floor installation at Ditmas Ave Signal Facility
• Completed steel installation at Bay Parkway Communication Interface Room
• Poured concrete floor on both levels
• Completed piling and grade beam installation at Ave X Signal Facility
• Completed clipboard survey/layout
• CBTC equipment layout survey is in progress |
|----------|--|
|----------|--|

- | 180 day look ahead | • Complete the construction of Signal Facilities at Ditmas Ave, Bay Parkway, and Ave X
• Complete the installation of messenger brackets and messenger cable
• Commence the installation of signal cables
• Commence installation of CBTC wayside equipment platforms
• Commence delivery of CBTC Wayside Radio Equipment |
|--------------------|---|
|--------------------|---|



CBTC Culver Line

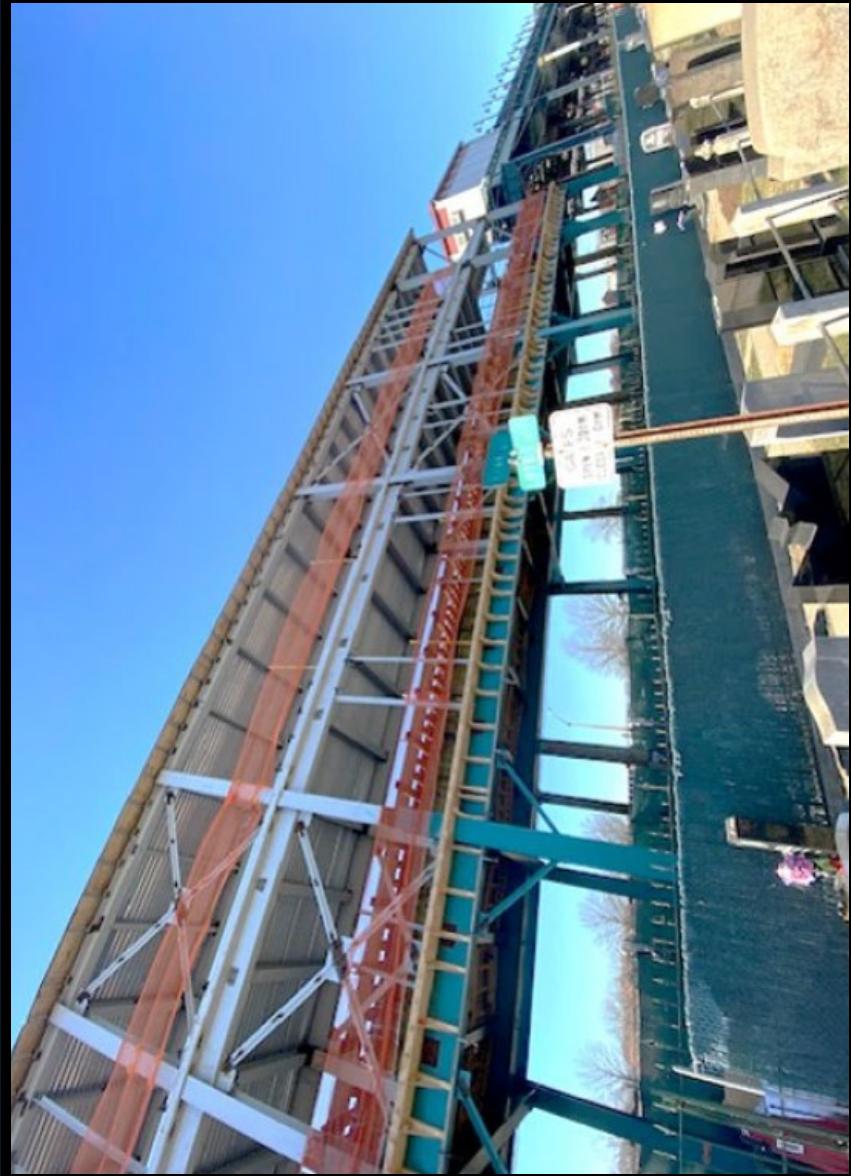


Ditmas Avenue Signal Rooms



Avenue X Signal Rooms

CBTC Culver Line



Bay Parkway CIR

Ultra-Wideband (UWB)- Pilot Program

Project Award	Canarsie Line Siemens – March 2019 Flushing Line Thales – March 2019
Project Description	Testing and safety certification evaluation of UWB as a positioning system for CBTC
Schedule	Substantial Completion December 2019
Cost	Total project budget - \$56M



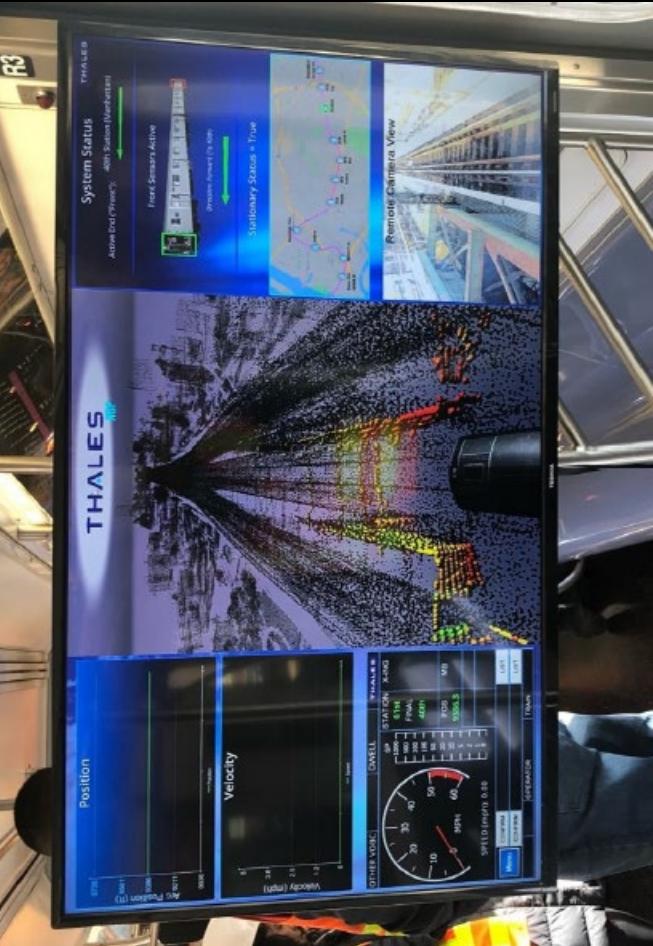
Ultra-Wideband (UWB)- Pilot Program

Highlights – Siemens and Thales since June 2019 CPOC

- | | |
|----------------------------------|---|
| <p>Progress</p> | <ul style="list-style-type: none">• Completed Factory Acceptance Testing (FAT)• Completed wayside and train installation, began shadow mode data collection• Completed integrated functional testing• Issued Substantial Completion December 2019 |
| <p>180 Day Look Ahead</p> | <ul style="list-style-type: none">• Complete Shadow Mode data collection• Complete demonstration of options exercised in contract |

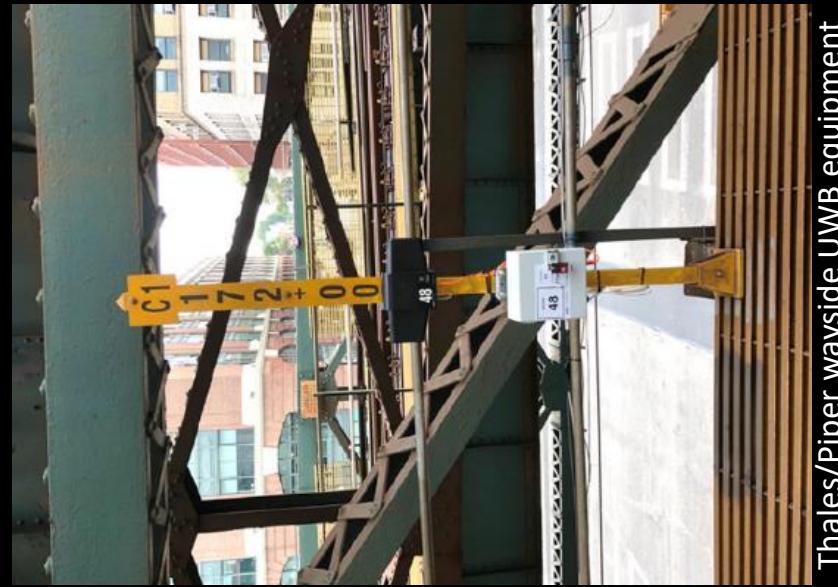


Ultra-Wideband (UWB)- Pilot Program



Executive demonstration of UWB
UWB additional features demonstrated

Ultra-Wideband (UWB)- Pilot Program



Thales/Piper wayside UWB equipment



Siemens/Humatics wayside UWB equipment

Third CBTC Supplier Qualification - Mitsubishi

Project Award	September 2015
Contractor	Mitsubishi Electrical Power Products
Project Description	Develop and safety certify an interoperable CBTC system to meet NYCT's I2S standards and become the third qualified CBTC supplier
Schedule	83% complete Conditional Approval January 2020 Substantial Completion April 2020
Cost	Within current budget of \$20M



Third CBTC Supplier Qualification - Mitsubishi

Highlights

Progress

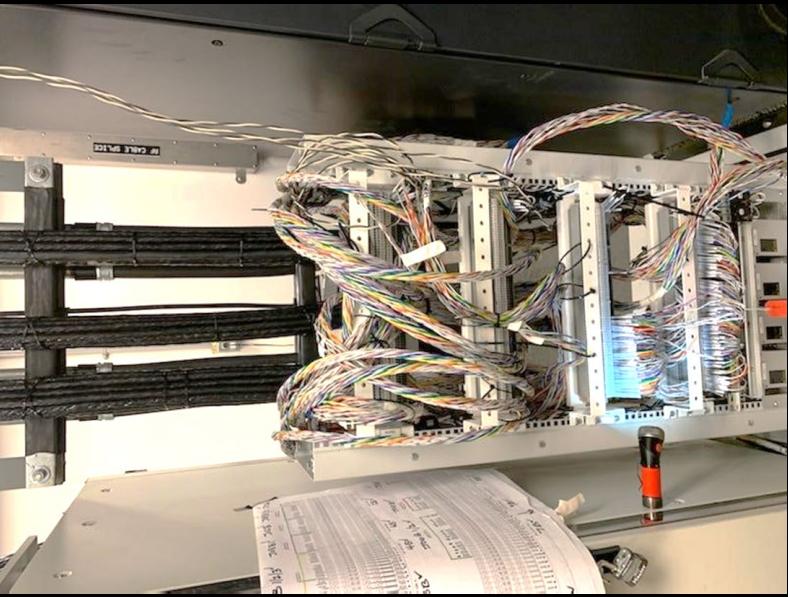
- Final design documents completed
- Performed carborne control interoperability demonstration at Culver Test Track
- **NYCT granted full qualification for carborne controller**
- **NYCT granted conditional qualification for zone controller**

180 Day Look Ahead

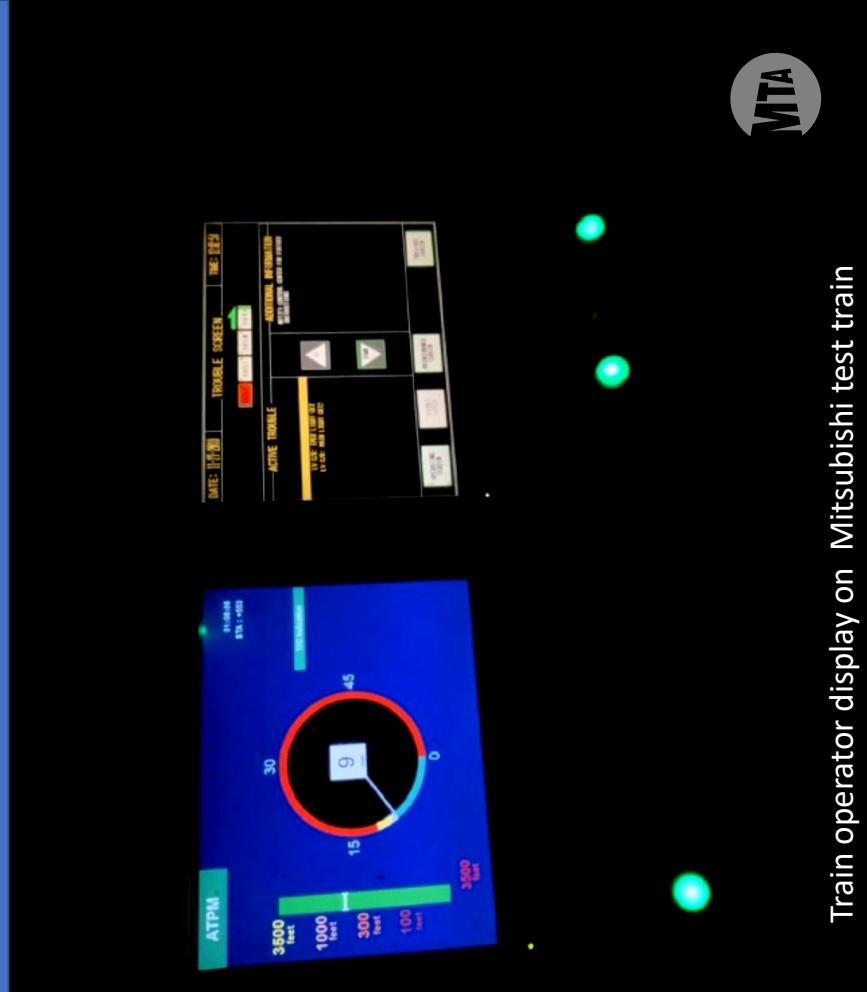
- Final zone controller interoperability demonstration of Culver Test track
- Final safety report for CBTC qualification
- Closeout



Third CBTC Supplier Qualification - Mitsubishi



Wiring of Mitsubishi Signal Converter Unit



Train operator display on Mitsubishi test train

CBTC Program : Lessons Learned & Best Practice

June 2019 CPOC, Chairman requested we operationalize lessons learned from Flushing. This is also linked to 2020 – 2024 Program

Background

CBTC Projects are large, complex and long

- **Areas for Improvement:** Errors/Omissions, scope changes, field conditions, dealing with obsolescence
- **Good Practices:** Repeatable, well-communicated, consolidated
- **Sources:** Canarsie, Interlocking Projects, Flushing, Risk Reviews, Ongoing Projects, IEC Recommendations, Peer Agencies/Industry and signaling conferences/conventions



Lessons Learned

Process

- Budget estimates
- Formalize Working Group Roles/ Responsibilities
- Actively Maintain Project Risk Register
- Monitor Contractor activities
- Detailed Formal agreement with user groups

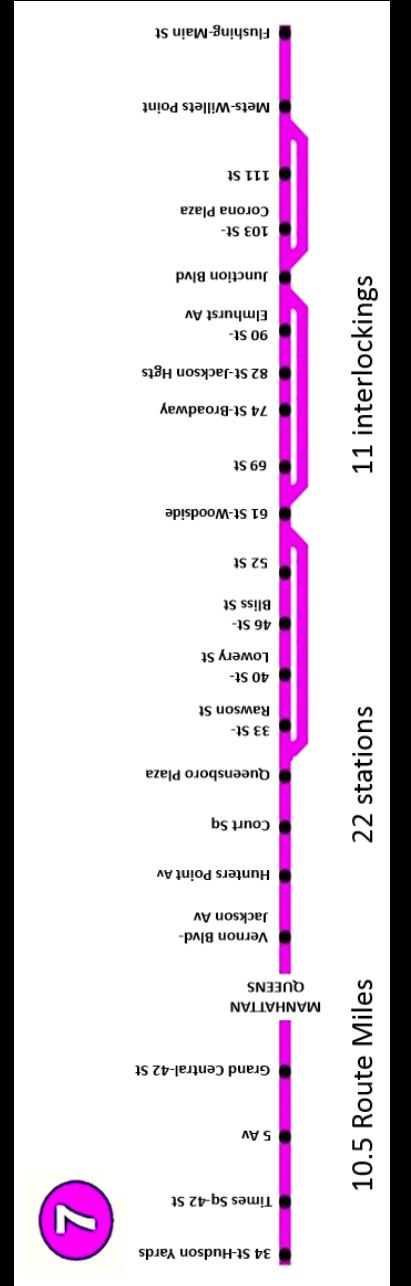
Technical

- Radio - conduct RF survey as soon as possible
- Car Interface - Special attention on mechanical/electrical/network tolerances



CBTC Flushing Line In Closeout

Project Award	June 2010
Contractor	Thales
Project Description	Overlay CBTC on Flushing Line Main St to 34th St./Hudson Yards. Modernize 1st Ave. and Times Square Interlockings and equip fleet with CBTC carborne equipment.



CBTC Flushing Line In Closeout

Overall Status	Substantial Completion declared March 7, 2019.
Schedule	
Cost	Current budget is \$603M.
Progress	<ul style="list-style-type: none">• All spare parts delivered to NYCT• Completion of training courses• Stable revenue service in Automatic Train Operation• On-time performance for the Flushing Line is consistently above 90%
180 Day Look Ahead	<ul style="list-style-type: none">• Complete punch list work• Implement remaining software releases for known bugs• Complete removals of obsolete signaling equipment





Appendix

Interlockings

Phase	Contract No.	Description	Schedule	Notes
Construction	S-32176	Kings Highway	Substantial Completion May 2021	Budget: \$176M
Closeout	S-32764	34 th Street	February 2020	Budget: \$197M
Closeout	S-32765	West 4 th Street	April 2020	Budget: \$179M



ISIM-B Module 3: Large Display at RCC and Data Warehouse

Project Award	July 2018
Contractor	ARINC INC
Project Description	Furnish and install large display at RCC and develop data warehouse. Provide the RCC with 26 B-Division workstations
Schedule	28% complete. Substantial Completion December 2022
Cost	Total project budget - \$103M
Status	On track, no issues



ISIM-B Module 3: Large Display at RCCC and Data Warehouse

Progress

- Data Warehouse delivery (Oracle ExaData System) to Rail Control Center
- Designed and developed 22 source system interfaces of data modelling for Data Warehouse system
- Development of symbol catalog for track map rendering on large screen display
- Submitted all architectural drawings and power drawings
- Continued survey of field locations
- Wired field locations to capture additional field indications

180 Day Look Ahead

- Complete installation of Data Warehouse Development System
- Complete Final Acceptance Test for large screen display
- Complete Final Acceptance Test for Data Warehouse



lSIM-B Module 3A: Build-out of South Side of Operating Theater at RCC

Project Award	March 2019
Contractor	PJS Electric, INC
Project Description	Build-out south side of RCC operating theater for installation of large display under lSIM-B Module 3 contract.
Schedule	17% complete. Substantial Completion June 2021
Cost	Total project budget - \$25M
Status	On track, no issues



ISIM-B Module 3A: Build-out of South Side of Operating Theater at RCC

Highlights

- | | |
|--------------------|--|
| Progress | <ul style="list-style-type: none">Completed delivery of structural steelElectrical conduit installation work ongoingDelivered hollow metal framing for the ceiling workShop drawing approvals ongoing |
| 180 Day Look Ahead | <ul style="list-style-type: none">Commencement of structural steelStart hollow metal framing ceiling workStart HVAC duct workStart Electrical work |



January 2020 CPOC Independent Engineering Consultant Project Review

CBTC NYCT Signals & Train Control Division



IEC Project Review of NYCT Signals & Train Control Division

- ❑ Communications Based Train Control (CBTC) Queens Blvd.
Line (QBL)-Design, Furnish & Install
- ❑ CBTC Culver Line
- ❑ CBTC Equipment Supplier Interoperability



CBTC-QBL Design, Furnish & Install Program

- ❑ **Budget:** The current EAC does not reflect cost increases for additional TA services needed to support the required testing and commissioning activities.
- ❑ The IEC will review the project teams budget modification request once available.
- ❑ Current project contingencies are sufficient to cover approved AWO's. However, the project team is evaluating a number of changes, which may require additional funding.



MTA Independent Engineering Consultant

CBTC-QBL Design, Furnish and Install Program

- ❑ **Schedule:** Full CBTC in-service is currently forecast for March 2021.
 - ❑ The project team was able to recover early project delays in design & installation and is aggressively managing the testing and commissioning activities to achieve full CBTC operation by March 2021, which in the IEC opinion will be challenging.



MTA Independent Engineering Consultant

CBTC-QBL Design, Furnish & Install Program

Observations

- ❑ Multiple testing iterations in the Integrated Test Facility (ITF) between CBTC suppliers was necessary due to software modifications, which delayed the start of field testing.

Concerns

- ❑ Performance metrics defined with thresholds are needed to allow commissioning to move from one section to the next.
- ❑ Adequate testing and commissioning duration is necessary to resolve potential interoperability issues and to stabilize CBTC system performance prior to placing the system into service.

Project Risks:

- ❑ Hardware and Software defects affecting the availability and reliability of Carborne Systems.



MTA Independent Engineering Consultant

CBTC Culver Line Project

- ❑ **Budget:** Based on the IEC review of the TA Services, soft costs, expenditure and contingency we find the project remains within the current budget.
- ❑ **Schedule:** The project is proceeding in accordance with the baseline CPM Schedule with preliminary installation of structures for the Signal Relay Rooms and completion of CBTC surveys.



MTA Independent Engineering Consultant

CBTC Equipment Supplier Interoperability Project

- ❑ **Budget:** Based on review of the TA Services, expenditures and contingency, the IEC finds that the project EAC remains within the current budget.
- ❑ **Schedule:** The IEC verifies that the project is on track to achieve April 2020 for system safety certification.



MTA Independent Engineering Consultant

IEC CBTC Program Observation

- ❑ Once the entire B Division fleet is equipped with CBTC, NYCT will have an opportunity to evaluate utilizing the on-board CBTC intelligence to enhance performance, including increased operating speeds on non CBTC lines of the B Division.



MTA Independent Engineering Consultant

NYCT Subway Car Program

John Santamaria, P.E.
Vice President & Chief Mechanical Officer
Department of Subways



R179 318 New B-Division Cars

Current Status



R179 318 New B-Division Cars

Maintaining State of Good Repair

Replaces 55-year old R32 and 50-year old R42 fleet

Supporting Modernized Signals

Provides CBTC-ready fleet to support 8 Av ACE line

Expanding the Fleet

Increases B-Division fleet by 46 cars

R179 318 New B-Division Cars

Project Details

- Awarded to Bombardier in 2012
- Originally 300 cars; expanded to 318 cars as a result of settlement agreement

Progress

- 318th and final car delivered in December 2019



NYCT Subway Car Program Goals

Maintaining State of Good Repair

Ensuring a safe, reliable, twenty-first century fleet

Supporting Modernized Signals

Incorporating latest signal technology in subway car design

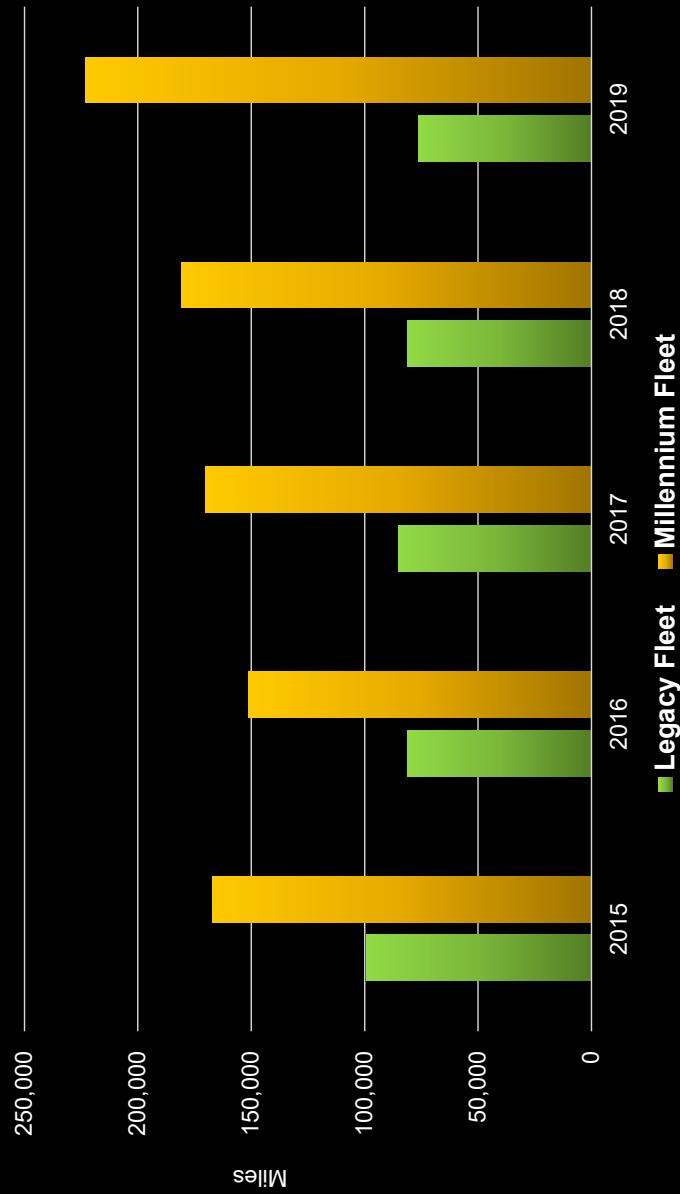
Expanding the Fleet

Enabling service growth and standardizing our fleet

NYCT Subway Car Program

Maintaining State of Good Repair

Annual Mean Distance Between Failure

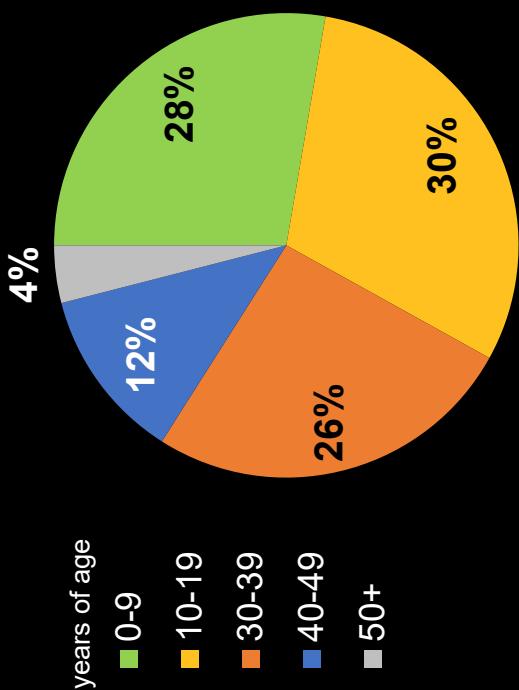


Millennium fleet (cars purchased since 2000) approximately **3 times** as reliable as Legacy fleet

NYCT Subway Car Program

Maintaining State of Good Repair

Current Composition of Fleet, by Age



Average Fleet Age
Today: **23 years**

August 2023 (projected): **22 years**
- R42 (-50 cars)
- R32 (-222 cars)
+ R211 (+535 cars)
- R46 (-240 cars)

December 2024 (projected): **20.5 years**
+ R211 (+650 cars)
- R46 (-512 cars)

NYCT Subway Car Program

Supporting Modernized Signals

Composition of Fleet: CBTC vs. Non-CBTC



75% of fleet will
be CBTC-equipped
following completion
of projects in 2020-
24 Program

R211

Up to 1,612 New B-Division Cars

Maintaining State of Good Repair

Replaces 40+ year old NYCT R46 and SIR R44 fleets

Supporting Modernized Signals

Provides CBTC-equipped fleet for 8 Av A C E, Crosstown G, and Astoria N W lines,
plus modern cab signalling on SIR fleet

Expanding the Fleet

Includes up to 597 cars for Second Avenue Subway and future service growth

R211

Up to 1,612 New B-Division Cars

Project Details

- Awarded to Kawasaki in February 2018
- Base Order (535 cars):
 - 440 Standard 'R211A' cars
 - 75 Staten Island Railway 'R211S' cars
 - 20 Open Gangway Test 'R211T' cars
- Contract Options included in 2020-24 Capital Program:
 - Option 1: 640 cars
 - Option 2: up to 437 cars



R211

Up to 1,612 New B-Division Cars

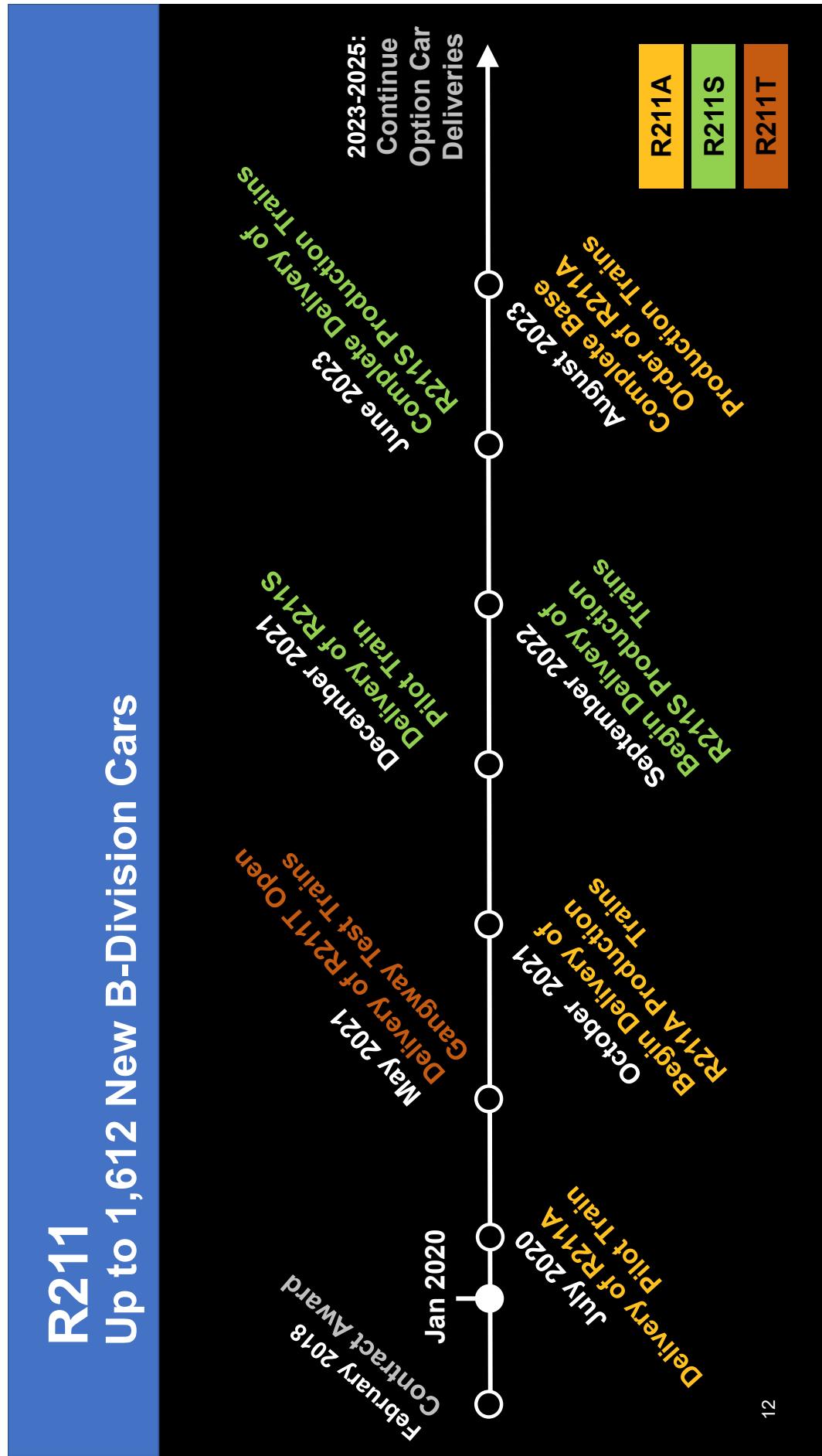
Progress

- Critical Design Reviews completed
- Sub-system Qualification Tests ongoing
- R211A pilot train production under way in Nebraska
 - On schedule for July 2020 delivery to NYCT
- R211T open gangway mock-up completed in Japan



R211

Up to 1,612 New B-Division Cars

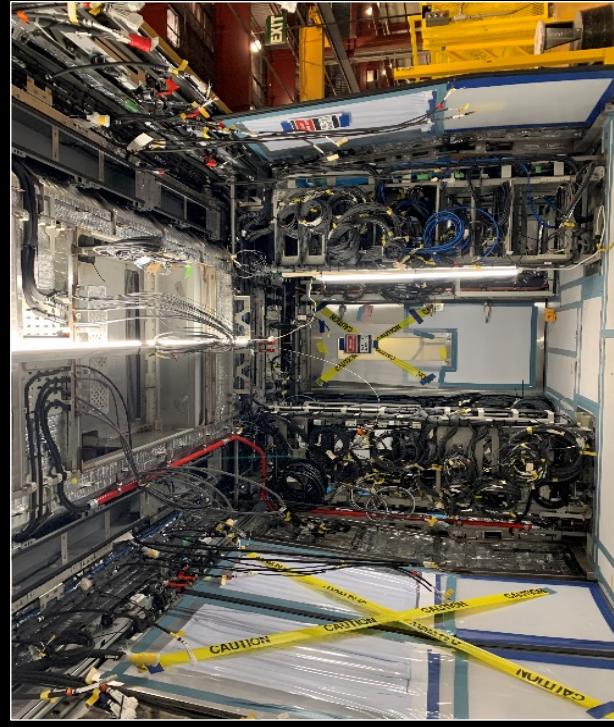


R211

Up to 1,612 New B-Division Cars

DRAFT

Production in Lincoln, Nebraska



CBTC & Communication system wiring



Air duct installation

R211

Up to 1,612 New B-Division Cars

DRAFT

Production in Lincoln, Nebraska



Pilot car exterior



Pilot car interior

R262 Over 1,360 New A-Division Cars

Maintaining State of Good Repair

Replaces R62/R62A fleet from mid-1980s

Supporting Modernized Signals

Provides CBTC-equipped fleet for Lexington Av ④⑤⑥ line

Expanding the Fleet

Includes up to 225 cars for service growth

R262 Over 1,360 New A-Division Cars

Project Details

- Base and Option order included in 2020-24 Capital Program
- Issuance of RFP anticipated in Q1 2020
- Award of contract anticipated in Q1 2021



R142/R142A

Upgrade & CBTC Conversion of up to 1,250 A-Division Cars

Maintaining State of Good Repair

Upgrades systems and replaces components to improve performance and increase reliability

Supporting Modernized Signals

Provides CBTC-equipped fleet for Seventh Avenue ①②③ line

January 2020 CPOC Independent Engineering Consultant Project Review

NYCT R179 & R211 Railcar Procurements



MTA Independent Engineering Consultant

R179 Budget Review

- ❑ After reviewing the project expenditures, change orders and contingency the IEC finds the Estimate At Completion remains within the budget of \$744M which is unchanged since last report.



R179 Schedule Review

- ❑ The IEC verified that fleet delivery was completed in December 2019, 3 months later than last report.
 - ❑ Quality, production, technical issues and part shortages all contributed to the schedule slip.



R179 Observation

- ❑ Between Dec. 2019 and Jan. 2020 two vehicles experienced door problems while in service. NYCT has taken appropriate steps and removed the R179 fleet from service, and a root cause analysis is underway. The IEC will review this report once available.

R211 Budget Review

- ❑ The R211 project has a base order budget of \$1.75B which includes a contingency of \$21.7M.
- ❑ Based on a project cost review, there have been no changes to the budget since the original EAC was established. However, the project is in its early stages and contingency consumption should be expected as design, testing, and production progress.



R211 Schedule Review

- ❑ The R211 project was awarded in February 2018 including contract options which can be exercised in the 2020-24 capital program.
 - ❑ The delivery of the first ten R211A pilot cars is planned for July 2020.
 - ❑ IEC finds achieving the July 2020 pilot car delivery completion will be a challenge primarily due to sub-supplier part shortages which Kawasaki is taking steps to mitigate.



MTA Independent Engineering Consultant

Bus Procurement Update

Bus Operations
Frank Annicaro
Acting Vice President Maintenance



Strategic Vision

Improved Service

Safety

Environmental Sustainability

Customer Amenities

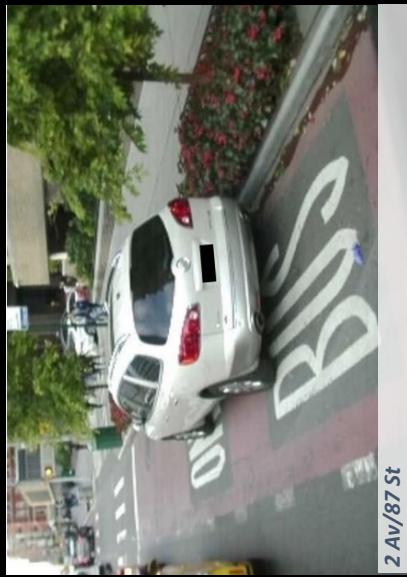
Accessibility

Improved Service: Automatic Bus Lane Enforcement (ABLE)

**2019 legislation allows for expanded use
of camera enforcement**

Partnership with NYC DOT and NYCDOT

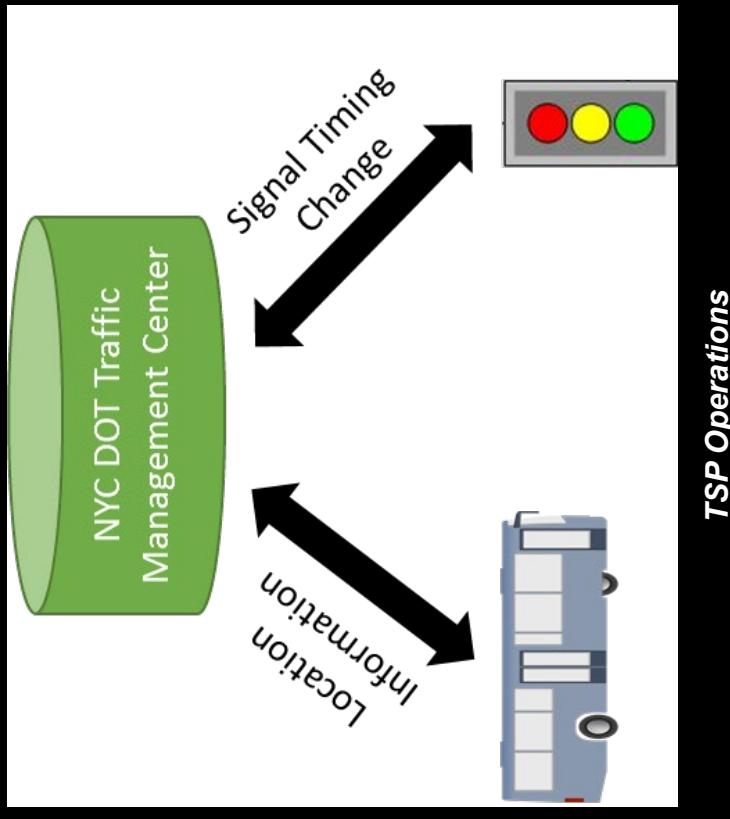
Over 100 buses operating on 3 routes



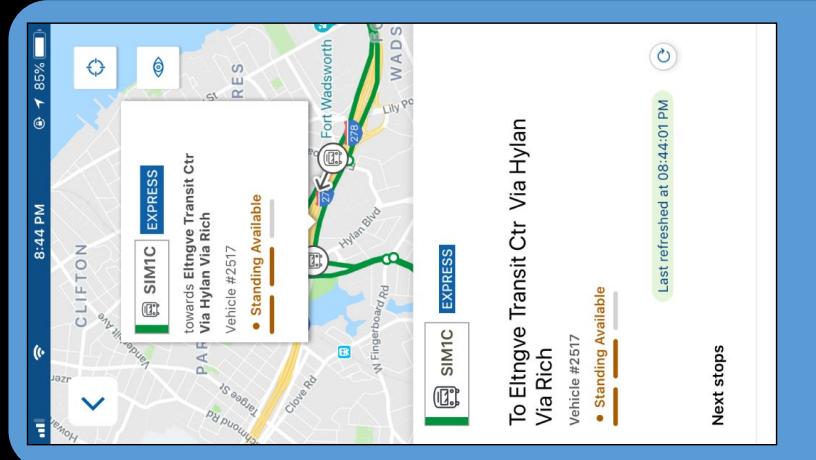
Improved Service: Technology

Transit Signal Priority (TSP)

- Communicates with NYC traffic center to shorten red or extend green lights
- Installed on 1,200 buses, operating on 17 routes and ~900 intersections
- All new bus deliveries are TSP-equipped



Improved Service: Technology



Automatic Passenger Counting

- Boarding and alighting counts using sensors at each door
- Installed on 2,100 buses
- Included in all new bus deliveries

Real-Time Seat Availability

Safety: Technology

Advanced Camera Systems

- Improves situational awareness for incident investigations
- Interior cameras installed on over 4,100 buses
- Exterior cameras installed on over 900 buses



Safety: Technology

Back-Up Cameras

- Provide added visibility and safety for operators while backing up
- Included on the current deliveries of 15 New Flyer AEB Artics and 53 New Flyer Artics



Safety: Technology

Pedestrian Turn Warning

- Audible announcement outside the bus when the bus makes a turn
- Installed on over 1,200 buses



Safety: Driver Visibility Improvements



Old Design

Structural changes reduce obscuration by ~50%

- New Buses: 1,300 new buses and on all future new bus deliveries
- Retrofits: 1,570 total retrofits by the end of 2023 (300 buses to date)



New Design

Environmental Sustainability: All-Electric Fleet By 2040

- 10 bus pilot – leased standard AEBs (5 New Flyer and 5 Proterra)
- 15 articulated AEB purchase (New Flyer) – delivery complete in Q1 2020
- 45 standard AEB purchase – Award expected in 2020
- 2020-2024 Capital Program – Purchase 500 AEB



Customer Amenities

Digital Information Screens

- Installed on 2,700 buses



Free Wi-Fi

- Installed on 3,400 buses

USB Charging Ports

- Installed on 2,400 buses

Accessibility Enhancements



Improved seating configuration

- Additional flip seats for flexible seating options (e.g., walkers, strollers)



Hearing induction loops

- Enhances announcements
- Pairs with digital information screens

Customer Outreach

Disability Awareness Day -- July 26, 2019

- Recent bus models on display at M. J. Quill Depot
- Participants gave feedback on accessibility features -- ramp/lift and seating configurations

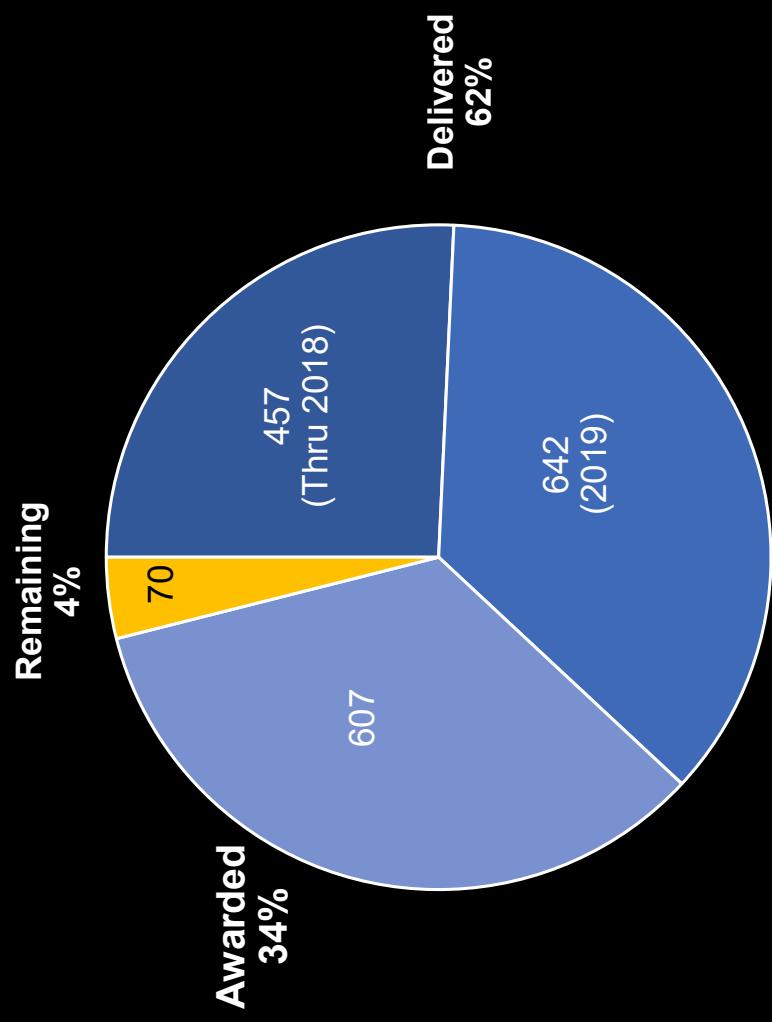
Advisory Committee on Transit Accessibility

- 18-member group looking at accessibility issues across our system
- Bus issues considered -- priority and courtesy seating on buses
- Message -- more seating options and clearer policies

MTA Safety Symposium 2016

- Collaboration between bus operators, unions, equipment providers, safety experts, and the MTA
- Identified changes to equipment and standards including high-visibility windows

2015-2019 Capital Plan Update



- 2019 Highlights:**
- Completed 5 contracts
 - Awarded contracts:
 - 307 over-the-road express buses
 - 275 hybrid standards

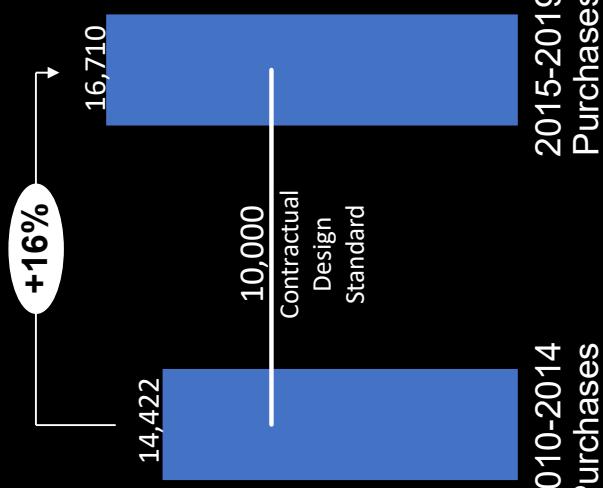
2015-2019 Capital Program Deliveries Since Last CPOC Presentation

Fleet	Type	Agency	Total Order	Delivered to Date	2020 Expected Deliveries	Status
New Flyer XN-60 CNG	Articulated	NYCT	110	110	0	Complete
New Flyer XD-40 Clean Diesel / Hybrid	Standard	NYCT	377	377	0	Complete
Nova LFS-40 Clean Diesel	Standard	NYCT	251	251	0	Complete
Nova LFS-60 Clean Diesel	Articulated	NYCT	72	72	0	Complete
New Flyer XD-60 Clean Diesel	Articulated	NYCT	108	108	0	Complete
New Flyer XD-60 Clean Diesel	Articulated	MTA Bus	53	39	14	In Production
New Flyer All Electric Bus	Articulated	NYCT	15	4	11	In Production
Total			986	961	25	

15

Bus Reliability Improvements in the 2015-2019 Capital Program

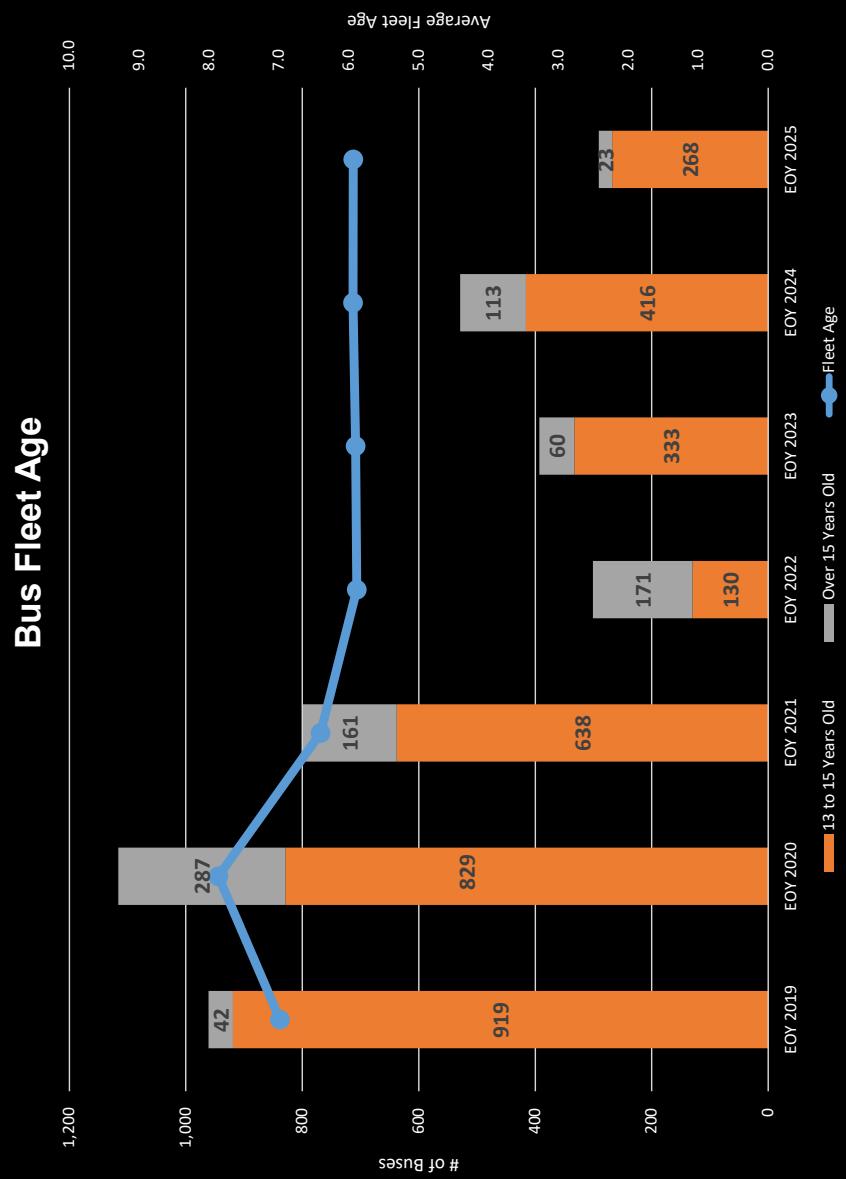
Mean Distance Between Failure (MDBF) (1st year of operation)



Focus on reliability

- Continual engagement with manufacturers
- Refinements to bus specifications
- Evaluate and test new strategies

Fleet Dynamics



17

Highlights of 2020 – 2024 Capital Program

\$3.5B for 2,422 new buses

- Replaces the oldest buses throughout the network
- 45% of planned purchases include alternative fuel vehicles

Accelerates transition to a zero-emission fleet

- Includes 500 new All-Electric Buses
- Depot infrastructure upgrades to support All-Electric Buses
- Deployment of AEBs across all five boroughs
- Avoids over 39,000 tons of CO₂

APPENDIX

Current Fleet

	NYCT DOB	MTA Bus	Total
Standard 40'	2,950	678	3,628
Diesel	1,649	45	1,694
CNG	410	216	626
Hybrid	881	417	1,298
All Electric*	10	0	10
Articulated 60'	1,010	133	1,143
Diesel	896	133	1,029
CNG	110	0	110
All Electric	4	0	4
Express 45'	497	516	1,013
TOTAL	4,457	1,327	5,784

* Leased buses

Above figures based on Winter 2020 Bus Assignment (without Congestion Pricing)

Remaining Procurements for 2015-2019 Capital Program

Fleet	Type	Agency	Total Order	Status
Prevost 45-ft Coach	Express	MTA Bus	257	Awarded November 2019
Prevost 45-ft Coach	Express	NYCT	50	Awarded November 2019
40-ft Hybrid	Standard	NYCT	275	Awarded December 2019
40-ft All-Electric Bus	Standard	NYCT	45	In Procurement Stage
40-ft Clean Diesel	Standard	MTA Bus	25	In Development
Total			652	

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2015-2019 Capital Program Deliveries Since Last CPOC Presentation

Fleet	Agency	Total Order	Delivered to Date	2020 Expected Deliveries	Status	Contract	Delivery Schedule Completion Date	Actual Completion Date	Budget Estimate at Advertisement (\$million)	Current Budget (\$million)	Savings / Overage (\$million)
New Flyer XN-60 CNG Artic	NYCT	110	110	0	Complete	B40671	12/28/2018*	2/13/2019	\$109.90	\$106.30	\$3.60
New Flyer XD-40 Clean Diesel / Hybrid Standard	NYCT	377	377	0	Complete	B40656-2 Mod 3	8/19/2019*	8/13/2019	\$253.57	\$235.70	\$17.87
Nova LFS-40 Clean Diesel Standard	NYCT	251	251	0	Complete	B40656-1 Mod 3	7/19/2019	9/3/2019	\$168.83	\$161.00	\$7.83
Nova LFS-60 Clean Diesel Artic	NYCT	72	72	0	Complete	B40660-1 Mod 2	3/22/2019	4/30/2019	\$77.96	\$65.80	\$12.16
New Flyer XD-60 Clean Diesel Artic	NYCT	108	108	0	Complete	B40660-2 Mod 2	10/25/2019*	11/4/2019	\$116.94	\$98.80	\$18.14
New Flyer XD-60 Clean Diesel Artic	MTA Bus	53	39	14	In Production	B40669	In Process	Ahead of schedule	\$54.80	\$50.20	\$4.60
New Flyer All Electric Bus Artic	NYCT	15	4	11	In Production	B40640	In Process	Behind schedule	\$29.20	\$34.20	(\$5.00)
Total		986	961	25					\$811.20	\$752.00	\$59.20

* Revised schedule

Data as of 12/31/19

Completed Bus Deliveries **110 New Flyer 60-ft CNG Artics (NYCT-DOB)**

- Deliveries completed February 2019
- \$106.3 million budget

Highlights:

- First articulated CNG Bus
- Operating in Brooklyn and the Bronx
- Replaced end-of-life 2004 CNG Buses
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, and hi-vis windows



Completed Bus Deliveries

367 New Flyer Clean Diesel & 10 Hybrid 40-ft Standards (NYCT-DOB)

- Hybrid deliveries completed April 2019
- Diesel deliveries completed August 2019
- \$235.7 million budget

Highlights:

- Replaced end-of-life Nova 1999 diesels and Orion 2004 hybrids
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, and hi-vis windows



Completed Bus Deliveries
251 Nova Clean Diesel 40-ft Standards (NYCT-DOB)

- Deliveries completed September 2019
- \$161.0 million budget

Highlights:

- Replaced end-of-life Nova 1999 diesels and Orion 2004 hybrids
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, and hi-vis windows (phase 2)



Completed Bus Deliveries
108 New Flyer Clean Diesel 60-ft Artics (NYCT-DOB)

- Deliveries completed November 2019
- \$98.8 million budget

Highlights:

- Replaced 2003 New Flyer artics and other fleets
- Buses operate in Manhattan and Brooklyn on SBS routes
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, hi-vis windows, and ABLE



Completed Bus Deliveries 72 Nova Clean Diesel 60-ft Artics (NYCT-DOB)

- Deliveries completed April 2019
- \$65.8 million budget



Highlights:

- Replaced 2003 New Flyer artics
- Buses operate in Manhattan and the Bronx on SBS routes
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, and hi-vis windows (phase 2)



Completed Bus Deliveries
53 New Flyer Clean Diesel 60-ft Artics (MTA Bus)

- Awarded June 2018
- Deliveries began October 2019
- Completion expected by February 2020
- \$50.2 million budget

Highlights:

- Being used in SBS and expanded artic service in Queens
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, hi-vis windows, and back-up cameras



Completed Bus Deliveries **15 New Flyer All Electric 60-ft Artics (NYCT-DOB)**

- Awarded December 2018
- Deliveries began October 2019
- Completion expected by end of Q1 2020
- \$34.2 million budget

Highlights:

- First all-electric 60-foot buses in the fleet
- Uses new universal charging standard; compatible with existing on-route chargers
- 16 depot chargers being installed at MJQ
- Equipped with USB chargers, WiFi, digital information screens, automatic passenger counters, pedestrian turn warning, advanced camera system, hi-vis windows, and back-up cameras



January 2020 CPOC Independent Engineering Consultant Project Review

Bus Procurements



Budget Review

- ❑ Based on review of the expenditures, change orders and program contingency, the IEC finds the bus procurement program EAC remains within the \$1.6B budget.



Schedule Review

- ❑ The IEC has verified that all 961 articulated and standard vehicles planned for 2019 were successfully delivered.
- ❑ The contract for fifteen 60 ft. New Flyer All Electric Buses (AEB) is currently in the manufacturing phase. The forecasted completion is scheduled for March 2020.
 - ❑ The delivery was extended from January 2020 to March 2020 due to commissioning challenges. Primarily Software and FAI issues.



MTA Independent Engineering Consultant

Observation

- ❑ The MTA is planning to invest \$1.1B in the upcoming capital program to start migration to zero emissions fleet. This will require significant additional investments in later programs to allow complete transition to AEB by the 2040 timeframe. As cited by the agency the environmental benefits could be significant.
- ❑ The IEC suggests a comprehensive performance and cost analysis be conducted to properly assess the program and its future transition.

Systems and Security Projects

Mark Bienstock
Program Executive



Systems and Security Projects

Construction Phase

- Bus Radio System
- PBX Upgrades
- Emergency Booth Communications System
- Digital Customer Information Centers & Advertising Screens
- Connection Oriented Ethernet Expansion
- Kronos Biometric Time Clocks
- Fire Alarm & Fire Suppression Systems
- Electronic Security Systems

Closeout Phase

- Flushing Public Address System
- Bus Command Center

Bus Radio System

Project Award	March 2, 2016 Parsons Transportation Group
Project Description	This project is designing and installing a new digital radio system for NYCT and MTA Bus.
Schedule	Substantial Completion: January 2021 40% Complete
Cost	Total Project Budget: \$279.4M



Bus Radio System

Highlights

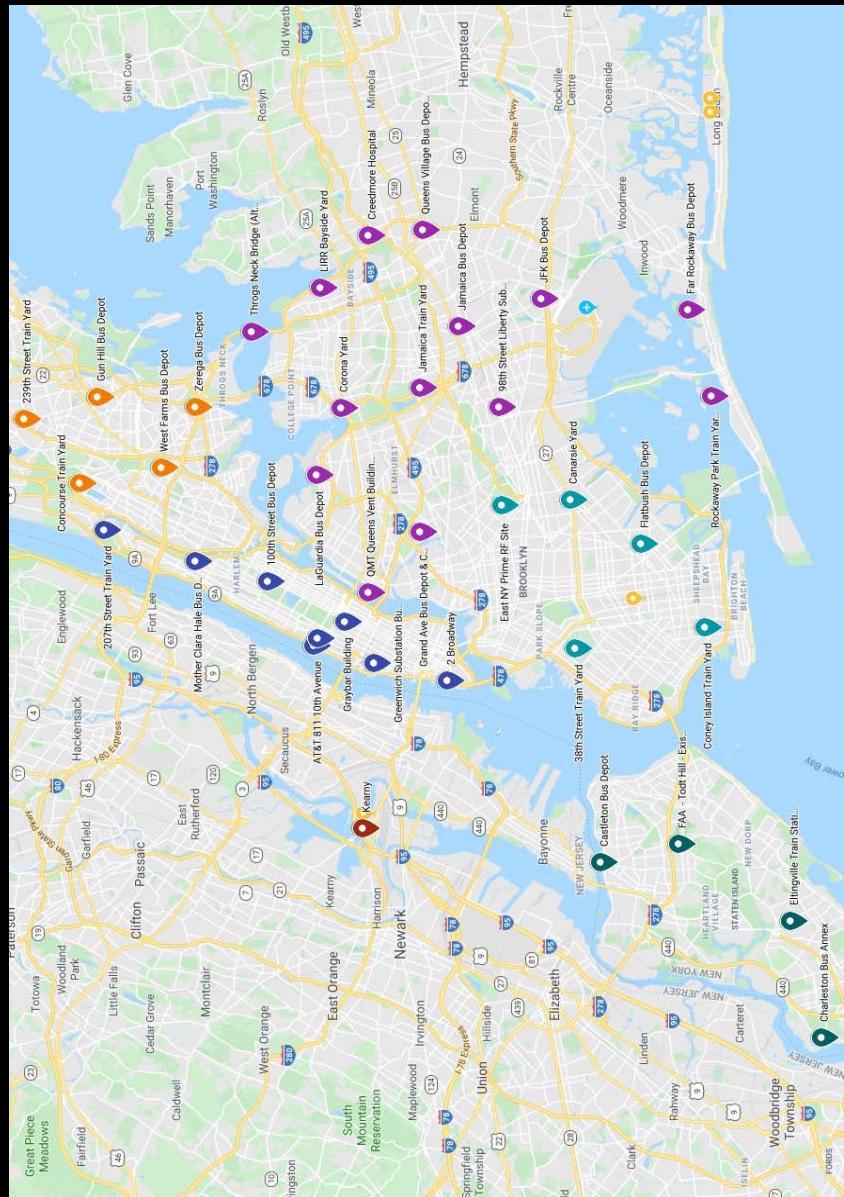
- | | |
|-------------------------------------|--|
| Staten Island Pilot Progress | <ul style="list-style-type: none">• All base stations needed to support the Staten Island Pilot are in service.• The Contractor is currently retrofitting local buses with the new radio system.• The pilot will officially start once 200 buses are retrofitted. |
| Progress | <ul style="list-style-type: none">• Site Design:<ul style="list-style-type: none">• 16 sites - design complete• 10 sites - design in-progress• 9 sites - layouts complete• 1 site - on hold (Yonkers)• Site Construction:<ul style="list-style-type: none">• 6 constructed• 8 under construction• 2 pending award• 20 to be constructed• Phase 1 installation completed on more than 200 buses |



Bus Radio System – Radio Base Station Sites

Legend

- Pilot - Staten Island
- Brooklyn
- Manhattan
- The Bronx
- Queens
- Kearny, NJ



Bus Radio System

Status	Activity	Milestones	Issues
● Green	Retrofit and Testing of 200 Buses for Staten Island Pilot	January 2020	The Staten Island Pilot is in progress and the Contractor is retrofitting the buses
● Yellow	Retrofit All Remaining Buses	December 2020	Contractor has to retrofit ~5,700 buses with new radio equipment. A two phased installation approach is being implemented. Close coordination with DOB is required.
● Yellow	Substantial Completion	January 2021	Contractor submitted a recovery schedule to mitigate delays and is working towards a January 2021 substantial completion. Meeting this date will be challenging given the work remaining to be completed in the next 12 months.

● Red	Significant impacts with potential impacts on Revenue Service Date, Cost, or Customer Benefit Milestones.
● Yellow	Impacts which can lead to cost increases or schedule delays on individual milestones or contracts.

● Green	No Near Term Impact for Design, Procurement & Construction. Successful management of major activity to stay on schedule or budget.
---------	--



Bus Radio System

Challenges/Issues:

Todt Hill Base Station

FAA approval is pending to build new radio tower. FAA requested radio interference testing for the interim monopole was done on December 19. No interference with FAA communications was identified.

Yonkers Base Station

The City of Yonkers withdrew approval of the base station site. NYCT is looking for alternate sites.

East New York Tower

Adjacent property owner constructed a new building impacting our tower and base station construction. The Contractor has submitted a mitigation plan.

Monthly Schedule Updates

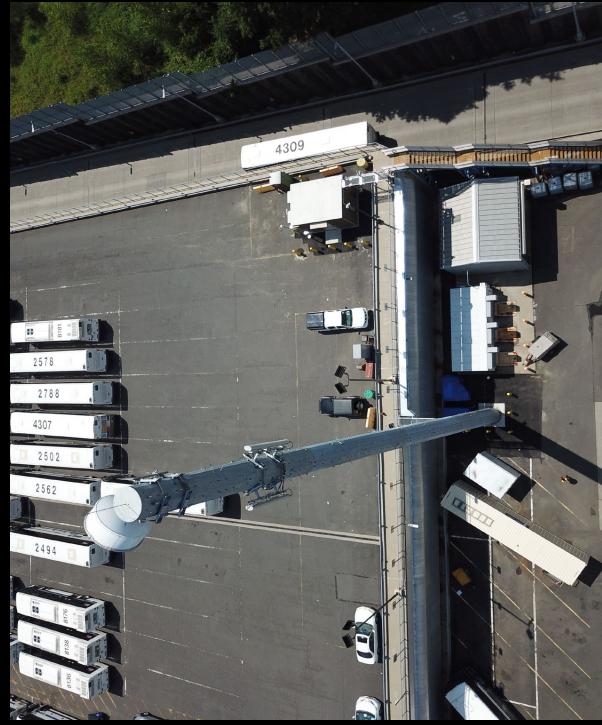
The Contractor has not been submitting regular monthly schedule updates. We are meeting with the contractor on a weekly basis to monitor progress and expect a detailed schedule update shortly.

Project Management

We recently hired a CCM to supplement the in-house project management team and aggressively work with the Contractor to progress the remaining work activities. Additional funding needs are being evaluated.

Bus Radio System

Charleston Depot
Monopole & Shelter

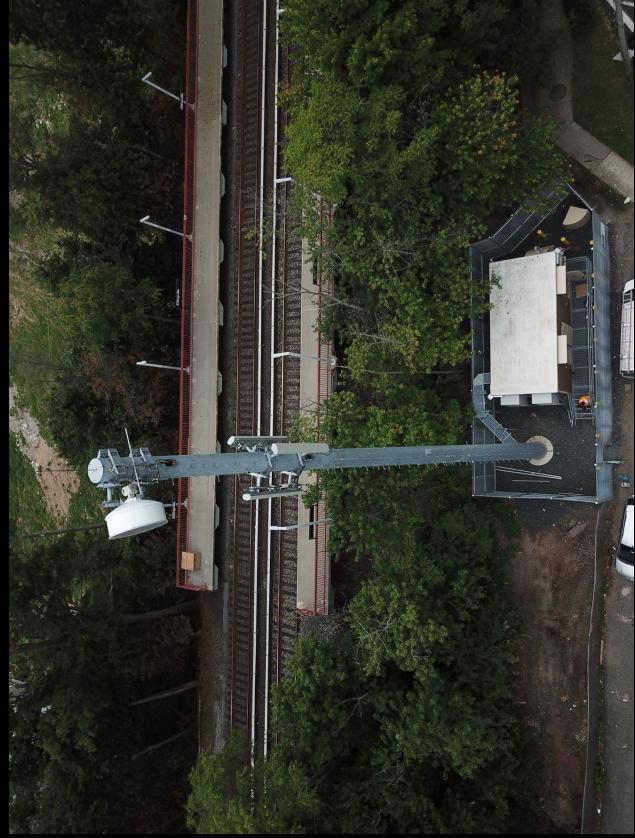


38th Street Yard
Monopole & Shelter



Bus Radio System

Eltingville Station
Monopole & Shelter



Castleton Depot
Monopole & Shelter



Bus Radio System

2 Broadway
Roof Antennae

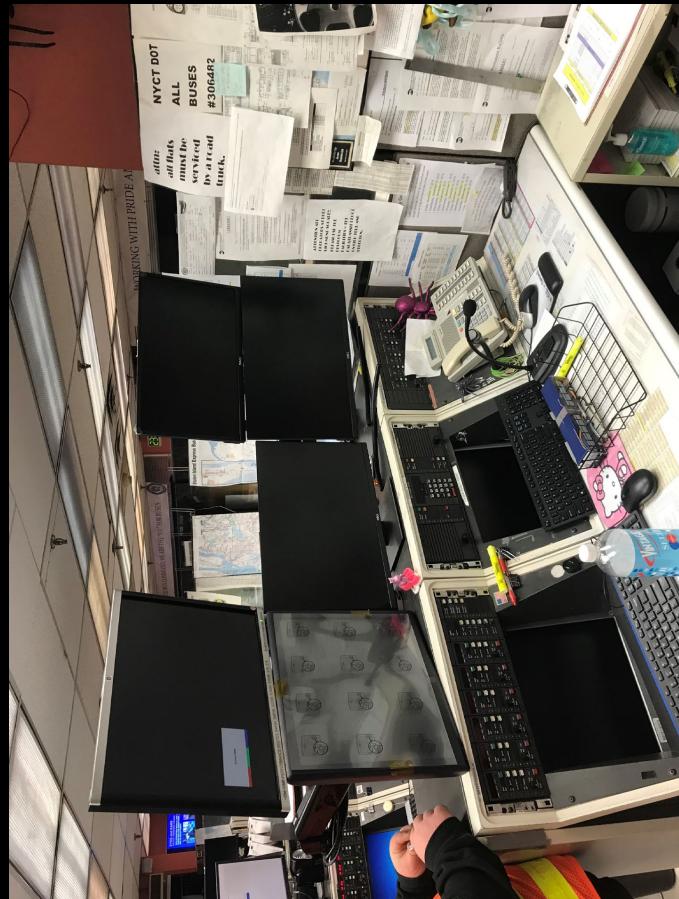


Todt Hill
Interim Monopole



Bus Radio System

Existing Bus Command Center / Transition Center



11

Bus Radio System

Video Wall in Bus Command Center Operating Theater
80% Complete



Private Branch Exchange (PBX) Upgrade

Project Award	January 4, 2017 CRC Associates Inc.
Project Description	This project will upgrade the PBX Phone system at 2 host sites and 5 remotes sites.
Schedule	Substantial Completion: February 2020 Currently in Construction
Cost	Total Project Budget: \$41.5M



PBX Upgrade

Highlights

- | | |
|------------------------------|--|
| Installation Progress | <ul style="list-style-type: none">• PBX equipment installations are 60% complete.• Completed installation of temporary DC Power at all 7 locations.• HVAC installation are 65% complete.• Installation of fire alarm & fire suppression systems at all locations is 50% complete. |
|------------------------------|--|



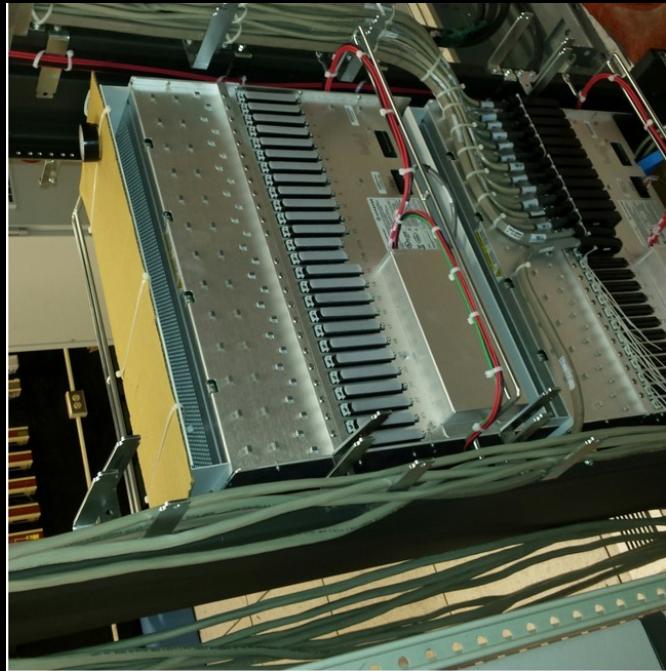
PBX Upgrade

Status	Activity	Milestones	Issues
Yellow	Factory Acceptance of PBX System	June 2018	Completed September 2018
Red	Substantial Completion	February 2020	The forecast completion date is December 2020. The delay is due to DC power issues at 7 PBX locations requiring a change in work sequence and additional bulletins. The Contractor's extension of time request is being evaluated.



PBX Upgrade

PBX Equipment



Benning Power Plant



Emergency Booth Communications System (EBCS)

Project Award	April 24, 2018 Boyce Technology	Replace the existing EBCS and Mass Call System with a modern, resilient, and reliable communications system. EBCS is a life safety system that provides communications between the Rail Control Center (RCC) and operating personnel in subway stations.
Schedule	30% complete	Substantial Completion: December 2020
Cost	Within current budget of \$78.4M This is a Sandy Resiliency Project	



EBCS Progress

Highlights

EBCS
Progress

Final Design approval - 100% complete

Cable installation from Station Agent Booths to access nodes –
100% complete

Factory Acceptance Test – February 2020 completion

Site Acceptance Testing – February 2020 start

Initial Build Out (IBO) of 6 Stations – February 2020 start



Design & Install EBCS

Status	Activity	Milestones	Issues
Green	Final Design	August 2019	Final design approved in August 2019
Yellow	Factory Acceptance Test	December 2019	Lab testing of the new system completion scheduled for January 2020. No impact to initial build out.
Green	Initial Build Out	April 2020	Installation and testing of equipment in the RCC/BRCC and 6 stations scheduled for completion in April 2020.
Yellow	Substantial Completion	December 2020	The latest schedule update currently shows a 45 day delay, which NYCT is working with the contractor to mitigate



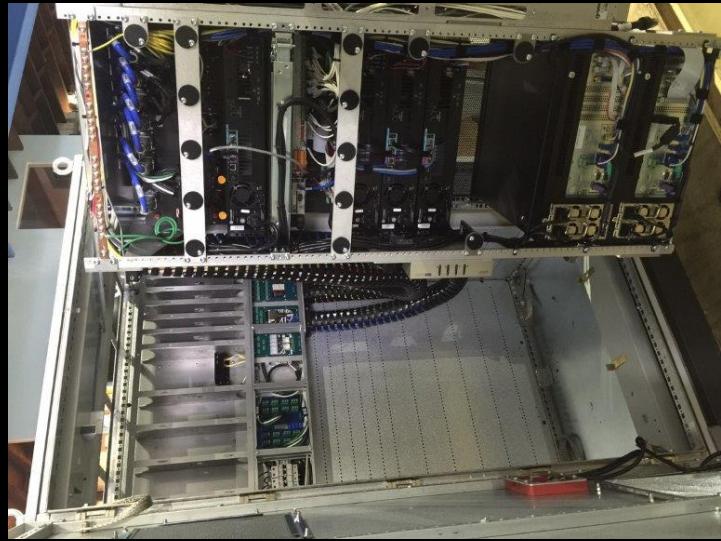
Flushing Line Public Address System

Project Award	December 30, 2016 TC Associates
Project Description	Furnish and Install new Public Address and Customer Information Screens with real time train arrival information on the Flushing Line. This project is Module 2 of the ISIM-B Program.
Schedule	Substantial Completion: 07/31/2019 Currently in Close Out Phase
Cost	Total Project Budget: \$65.2M



Flushing Line Public Address System

PA/CIS Cabinet



PA/CIS Sign



January 2020 CPOC Independent Engineering Consultant Project Review

Bus Radio System



MTA Independent Engineering Consultant

Budget and Schedule Review

- ❑ Budget
 - ❑ The IEC has verified that the budget of \$280M is sufficient to complete the project at the current Estimate at Completion (EAC); however, the EAC does not include the cost of the Consultant Construction Manager (CCM) or any potential time extension.
- ❑ Schedule
 - ❑ Field progress as reported by the agency is at 40%, however, project completion should be over 50% in order to meet Substantial Completion by January 2021.
 - ❑ The recovery plan reflects a January 2021 Substantial Completion. Based on the IEC's analysis, this is optimistic and there is a risk of a six-month delay to Substantial Completion.
 - ❑ Monthly schedule updates have not been provided.



MTA Independent Engineering Consultant

Risk Review

- ❑ Risks to project schedule include site conditions, and third party dependencies (FAA, Con Edison, National Grid, Verizon, etc.).
- ❑ Installation delays are impacting the start of Pilot testing which is critical for in-service system verification. Department of Buses has been instrumental in helping minimize the delay by providing technical support and making buses available for bus radio installation.



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Observations

- ❑ There has been noticeable recent improvement in productivity due to executive management support, effective project management, resource planning, and teamwork.
- ❑ Design of 10 sites, and construction of 20 (out of 36) base stations still remain.
- ❑ The IEC notes that a separate contract for repair of the existing East New York tower was awarded, and the work started in December 2019.
- ❑ Greater focus needs to be placed on the following:
 - ❑ Required project schedule updates must be provided every month.
 - ❑ The Pilot test procedure must be submitted and approved prior to start of 30-day pilot test.



MTA Independent Engineering Consultant

Recommendation Log

BRS – IEC Recommendations / Observations Log

Recommendation	Agency Response / Action	Status
Implement a recovery schedule to mitigate further delays to Substantial Completion.	The Contractor has produced a bar chart schedule for the remainder of the project. NYCT is working to the Contractor to have them update the CPM schedule as soon as possible.	Ongoing
Provide a master defect list to track all hardware and software variances and their dispositions.	The Contractor is being directed to maintain a master defect list tracking all hardware & software variances.	Open
Develop a plan for implementing changes to the system once it is in operational use.	The contractor states they have equipped their Newark lab to serve as BRS QA and staging environments for testing changes before systemwide implementation. A change control process for implementing changes in the live system to be developed.	Ongoing



MTA Independent Engineering Consultant

**MTA Capital Program
Commitments & Completions**

**through
December 31, 2019**

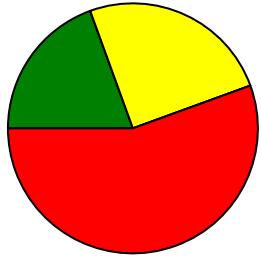


Capital Projects – Major Commitments – December 2019

In 2019, agencies have a goal of \$5.6 billion in overall commitments. 36 major commitments are included; 18 for NYCT, two for LIRR, four for Metro-North, six for B&T, one for MTACC, two for MTA Bus and three for the MTA Police Department.

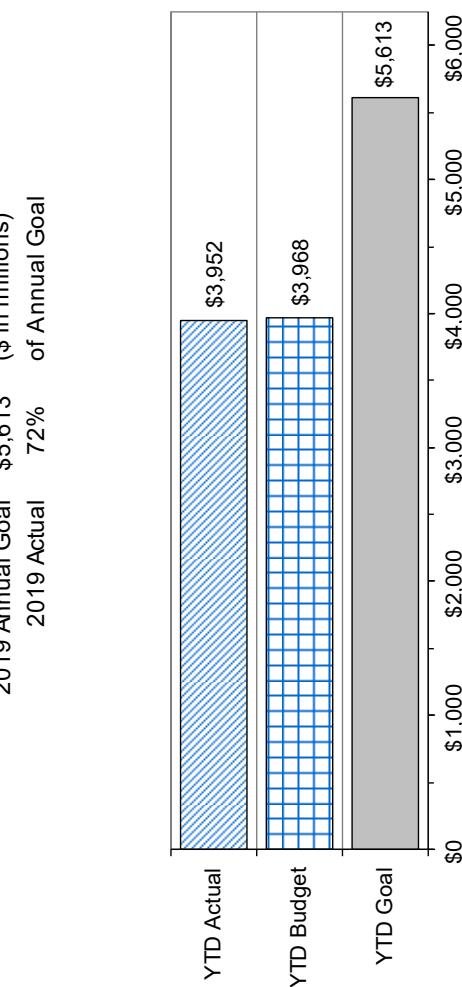
Through December, agencies have committed \$3.9 billion versus a \$5.6 billion YTD goal, including 16 major commitments. The shortfall is primarily due to slips of twenty major commitments, including 12 in NYCT, one in LIRR, and two in MNR, explained on the following page. The primary sources for delays were changes in the procurement method, coordination with other projects, and to permit more time for prospective proposers to assemble bids. The remaining shortfall is due to delays of commitments including force account and support costs related to MTACC, MTA Bus Company, and MTAPD projects.

Year-to-Date Major Commitments



	Count	Percent	Change from Prior Month
GREEN = Commitments made/forecast within Goal	7	19%	↑ 1
YELLOW = Commitments delayed beyond Goal (already achieved)	9	25%	↑ 5
RED = Commitments delayed beyond Goal (not yet achieved)	20	56%	↓ 1
	36	100%	↑ 5

Year-to-Date Agency Breakdown



Budget Analysis

2019 Annual Goal	\$5,613	(\$ in millions)
2019 Actual	72%	of Annual Goal

Capital Projects – Major Commitments – December 2019 – Schedule Variances

Project	Commitment	Goal	Forecast	Project	Commitment	Goal	Forecast
20 All-Agency Red Commitments (4 New Items)							
NYCT							
Passenger Stations							
Replace 11 Hydraulic Elevators / Various	Construction Award	Jun-19	Feb-20	8th Ave CBTC and Interlockings	Construction Award	Jun-19	Jan-20
The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration and service outages. Project cost increase reflects refined design and project complexity.	\$46.4	\$66.9	\$67.4	The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration and service outages.		\$513.7	\$493.2
Replace 8 Traction Elevators / Various	Construction Award	May-19	May-20	UHF T-Band Radio System Replacement	Construction Award	Sep-19	Dec-20
The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration and service outages. Project cost increase reflects refined design and project complexity.	\$57.9	\$57.9	\$67.4	The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration. Bids under evaluation.		\$61.2	\$55.0
ADA: 149 Street - Grand Concourse Complex	Construction Award	Nov-19	Jun-20	Life Cycle Replacement of Code Systems - Phase 1	Construction Award	Oct-19	Apr-20
The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration and service outages. Project cost increase reflects refined design and project complexity.	\$79.2	\$79.2	\$111.7	The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration.		\$31.5	\$48.2
ADA: Livonia Avenue / Canarsie	Construction Award	Oct-19	Mar-20	Life Cycle Replacement of Speed Enforcement Systems	Construction Award	Nov-19	Apr-20
The contract award date for this project was modified since originally planned to reflect a new procurement method. Project cost increase reflects refined design and project complexity.	\$64.8	\$64.8	\$76.2	The contract award date for this project was modified since originally planned to reflect a new innovative procurement method with the potential to reduce construction duration and service outages. The cost increase reflects refined design and project complexity.		\$51.2	\$61.5
ADA Enhancements: Queensboro Plaza / FLS (New Item)	Construction Award	Dec-19	Sep-20	<i>Line Structures</i>			
Project cost increase reflects project complexity and market conditions. Schedule delayed due to protracted procurement process. Project was advertised in December-2020.	\$55.0	\$80.1	\$80.1	Overcoating: 17 Bridges & East 180 Street Flyover / Dyre Av	Construction Award	Oct-19	Jul-20
Buses							
Purchase 45 Standard Electric Buses (New Item)	Construction Award	Dec-19	Dec-20	Line Structure Repairs & Vents between Stations - Bronx	Construction Award	Oct-19	Apr-21
Project cost increased due to market feedback on the purchase of the first 15 all-electric buses. Schedule delayed due to RFP being opened to solicitations for wider array of vendors.	\$53.6	\$72.4	\$72.4	Project being coordinated with the Line Structure Repairs on the Concourse Line and the change in schedule reflects the design and project complexity.		\$83.6	\$82.8

Capital Projects – Major Commitments – December 2019 – Schedule Variances

Project	Commitment	Goal	Forecast	Project	Commitment	Goal	Forecast
LIRR							
Rolling Stock							
Work Locomotives	Construction Award	Mar-19	Mar-20	MTACC East Side Access	Construction Award	Aug-19	Mar-20
		\$32.2	\$32.2	Electric Traction Catenary Work - Harold Systems		\$29.8	\$29.8
	An independent firm reviewed the procurement and recommended that work locomotives must not exceed required braking horsepower in order to deliver the cleanest locomotives. The award was rescheduled for vendors to revise their submissions.			Construction award delayed due to an extension to permit more time for prospective proposers to assemble qualified teams for bidding and the incorporation of contract modification to include additional scope.			
MNR							
Stations							
Harlem Line Station Improvements	Construction Award	Jun-19	Apr-20	MTAPD Radio Project Phase 3 - MRRS System	Construction Award	Sep-19	Mar-20
		\$79.5	\$14.7			\$6.8	\$6.5
	Construction award delayed due to limited flagging resources. The scope of work has been revised to only capture the critical elements of this project.			This construction award is delayed due to the need to coordinate work with a separate Penn Station renovation project. MTAPD is exploring the possibility of coordinating the radio system work with the renovation project's 2nd phase.			
Rolling Stock							
Locomotive Purchase	Construction Award	Sep-19	Jan-20	Public Safety Radio - Penn Station	Construction Award	Oct-19	Mar-20
		\$213.0	\$213.0			\$16.8	\$16.8
	Project delayed due to a change in funding which required re-issuance of the RFP and time to reconcile the differences between the proposal and the specification.			The delay is due to ongoing discussions with Amtrak to coordinate access to communications rooms and antenna systems in Penn Station.			
MTA Bus Company							
Buses							
Depot Rehab - College Point (New Item)	Construction Award	Dec-19	Jan-20	Radio Project Phase 3 - Cabling (New Item)	Construction Award	Dec-19	Mar-20
		\$9.5	\$9.5			\$7.5	\$7.5
	Project delayed due to specification review taking longer than expected.			The delay is due to the need to coordinate with LIRR work in tunnels 1 and 2 as well as platforms. Work will be done jointly with the LIRR in the Atlantic tunnels. This work is expected to begin in 2020.			

Capital Projects – Major Commitments – December 2019 – Schedule Variances

Actual Results Shaded

Project	Commitment	Goal	Actual	Project	Commitment	Goal	Actual
9 All-Agency Yellow Commitments (5 New Items)							
NYCT							
Passenger Stations				Bridges & Tunnels			
ADA Enhancements: 170 St / JER	Construction Award	Sep-19	Nov-19 (A)	Bronx-Whitestone Bridge	Construction Award	Sep-19	Oct-19 (A)
The construction award was delayed due to extended RFP process. The project cost increased due to additional structural repairs.	\$49.0	\$59.4		Tower and Pier/Fender Protection & Install of Fire Standpipe Connections	\$40.5	\$48.6	
Buses				Henry Hudson Bridge	Construction award delayed due to change in procurement strategy. Contract awarded in October 2019.		
Purchase 50 Express Buses	Construction Award	Sep-19	Nov-19 (A)	Structural Rehabilitation & Replacement of HHB Overcoat System (New Item)	Construction Award	Aug-19	Dec-19 (A)
Award schedule extended to November to mesh with new prioritized work plan in the new bus/procurement groups. The project cost decrease reflects favorable bids	\$38.5	\$33.5			\$40.0	\$46.8	
Shops & Yards				Verazzano-Narrows Bridge Approach Viaduct Seismic Retrofit/Structural Rehab (New Item)	Construction Award	Oct-19	Dec-19 (A)
Sandy Mitigation: Sewer Improvements at 207th Street (New Item)	Construction Award	Jul-19	Dec-19 (A)		\$180.0	\$165.5	
Advertisement issues were resolved in June. Project cost increase reflects refined design and project complexity.	\$19.3	\$142.7					
Power							
Central Substation Renewal Including New Rectifier / 6AV (New Item)	Construction Award	Oct-19	Dec-19 (A)				
Project schedule delayed due to several bid postponements requested by bidders. Bids received 10/15; project budget reflects actual bid cost.	\$44.2	\$38.3		Reconstruct of VN Approach Ramps - Phase 1 (New Item)	Construction Award	Nov-19	Dec-19 (A)
MNR					\$202.5	\$154.3	
Structures							
Overhead Bridge Program East of Hudson	Construction Award	Feb-19	Mar-19 (A)				
Award was delayed to March due to revisions made to the notice of award which resulted in a protracted approval process.	\$23.4	\$25.6					

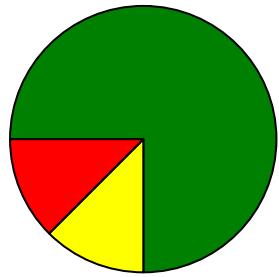
Capital Projects – Major Completions – December 2019

In 2019, agencies have a goal of \$3.4 billion in overall completions. 24 major completions are included, including 14 for NYCT, four for the LIRR, three for Metro-North, one for B&T, one for MTACC, and one for MTA Bus.

Through December, agencies have completed \$3.5 billion versus a \$3.4 billion YTD goal. Eighteen major completions have been achieved on time or early. The MTA exceeded its overall 2019 annual goal because of several 2020 completions that were completed ahead of schedule.

Overall, 21 major completions were made within the year, and three were delayed beyond 2019. The delays are explained on the following page.

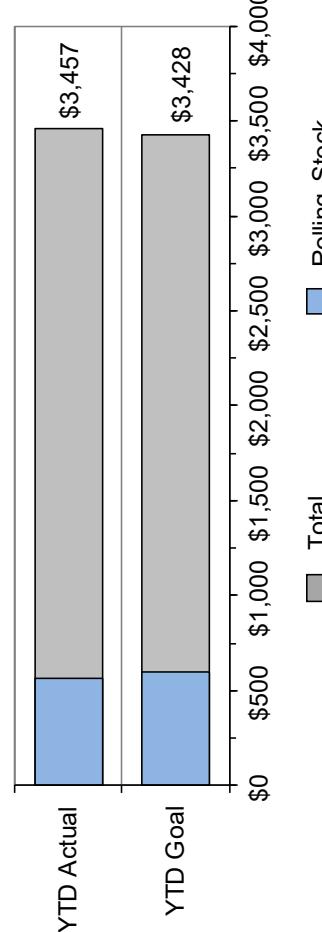
Year-to-Date Major Completions



			Change from Forecast
	Count	Percent	Prior Month
GREEN = Completions made/forecast within Goal	18	75%	↑ 4
YELLOW = Completions delayed beyond Goal (already achieved)	3	13%	-
RED = Completions delayed beyond Goal (not yet achieved)	3	13%	↑ 1
	24	100%	↑ 5

Budget Analysis

	2019 Annual Goal	\$3,428	(\$ in millions)
	2019 Actual	101%	of Annual Goal
YTD Actual	\$3,457		
YTD Goal	\$3,428		



Year-to-Date Agency Breakdown

2019 Goals	Prior month variance		
	GREEN	YELLOW	RED
New York City Transit			
10	2	2	+2 RED
Long Island Rail Road			
3	1	+2 GREEN	---
Metro-North Railroad			
2	1	+1 GREEN	+1 YELLOW -1 RED
Bridges and Tunnels			
1			---
Capital Construction Company			
1			---
MTA Bus Company			
1			---
MTA Police Department			
1			---

Capital Projects - Major Completions - December 2019 - Schedule Variances						Actual / Results Shaded		
Project	Completion	Goal	Forecast	Project	Completion	Goal	Actual	
3 All-Agency Red Completions (2 New Items)						3 All-Agency Yellow Completions (1 New Item)		
NYCT								
Track								
Additional Continuous Welded Rail (Subway Action Plan) (New Item)	Construction	Dec-19	Jan-20					
		\$53.0	\$57.5					
Project cost increase reflects actual costs. Work completed, waiting for final charges.								
Buses								
Purchase 15 Articulated Electric Buses and Depot Chargers (New Item)	Construction	Dec-19	Mar-20					
		\$32.9	\$32.9					
Project schedule delayed due to production delays.								
LIRR								
Stations								
Nostrand Ave Station Rehab	Construction	Oct-19	Jan-20					
		\$20.1	\$21.1					
Delay is due to an extension granted to contractor and ongoing legal issues.								
GCT Utilities (New Item)								
GCT Utilities (New Item)				Construction	Apr-19	Dec-19		
					\$44.7	\$51.0		
Field conditions required modification of fire pump controller cabinet.								

MTA Capital Program Commitments & Completions Quarterly Report of Prior Years' Delays



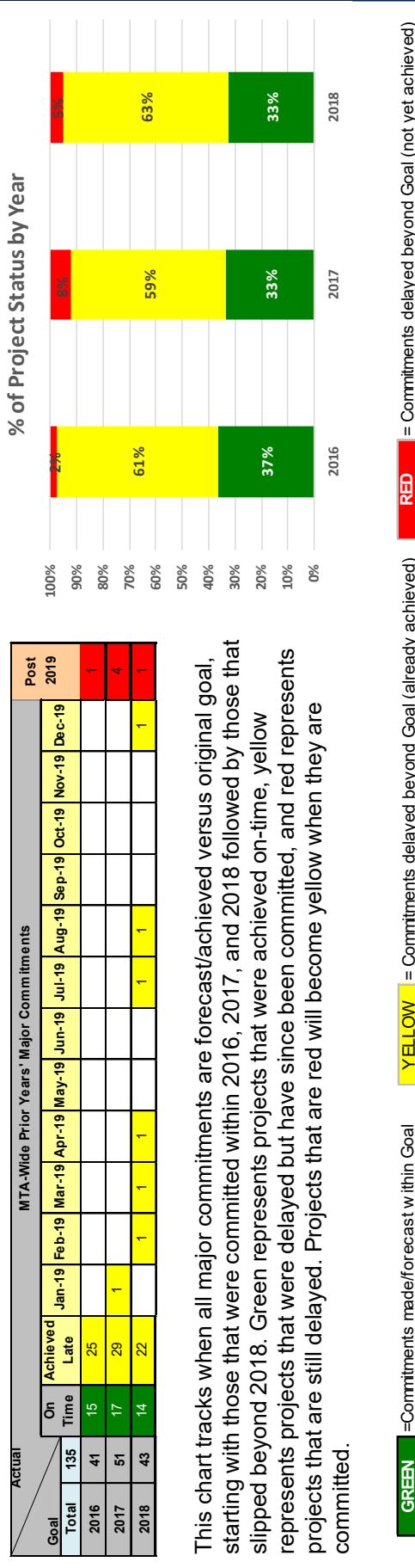
Prior Years' Major Commitments – Quarterly Update: December 2019

The status of 2016 through 2018 major commitments delayed beyond 2018 are tracked until committed and reported to CPOC quarterly.

In 2016, agencies set an overall MTA commitments goal of \$6.6 billion including 41 major commitments. In 2016, 27 major commitments and a total of \$5.0 billion were made. Of the remaining projects, one remains delayed and is forecast for award in 2020.

In 2017, agencies set an overall MTA commitments goal of \$7.3 billion including 51 major commitments. In 2017, the MTA achieved 100% of its \$7.3 billion commitments goal, including 39 major commitments. Of the remaining projects, one was awarded in the first quarter of 2019, and four are forecast for award in 2020.

In 2018, agencies set an overall MTA commitments goal of \$7.3 billion including 43 major commitments. In 2018, the MTA achieved 86% of its \$7.3 billion goal, including 36 major commitments. Of the remaining projects, six were committed in 2019 and one is forecast for award in April 2020.



Prior Year Major Commitments – December 2019 – Schedule Variances

6 All-Agency Red Commitments

Project	Commitment	Goal	Forecast	Project	Commitment	Goal	Forecast
MNR							
Sandy							
Passenger Stations							
ADA: 68 St-Hunter College / Lexington							
Construction Award	Sep- 16	Dec- 20	\$66.8M	\$119.6M	Construction Award	Nov-17	Mar-20
Award schedule delayed due to lack of consensus on ongoing license agreements with CUNY / Hunter College as well as change in procurement strategy. Project costs increased because of added architectural, structural, electrical and utility relocation work. The complexity of the utility relocation under the street work with limited space constraints requires multiple construction phasing to keep the street open to both vehicular and pedestrian traffic throughout construction.					This project is being pushed to March 2020 when more in-house resources to support the project will be available.		\$20.6M \$20.6M
MTACC							
<i>Regional/Investments</i>							
Rolling Stock Procurement M-9A Cars					Purchase Award	Dec-18	Apr-20
The request for proposals procurement was modified to maximize competition and associated negotiations have extended the procurement phase.							\$367.0M \$367.0M
Access Improvements: Grand Central: Phase 2							
Construction Award	Jul-17	Jul-20	\$66.7M	\$66.7M			
The procurement process involves multiple phases reflecting the various activities in the project. The remaining scope is expected to be awarded in 2020.							
Service Vehicles							
Purchase 35 Locomotives - and Option for up to Additional 35					Purchase Award	Dec- 17	Mar-20
Proposals received. Committees are reviewing and evaluating the proposals. Board action is required for award.							\$128.3M \$202.9M
Employee Facilities							
Livingston PIZ Electrical and Mechanical Sys Improvements					Construction Award	Dec- 17	Jun-20
The project was split into 2 parts (phase "A", the redundant Dry Coolant System for the 4th Floor Data Center awarded in July 2018, and phase "B" for the remaining scope and scheduled for award in 2020. As a result, the overall project cost was impacted. The combined project duration increased by 14 months and the administration of two separate contracts resulted in additional support costs.							\$62.7M \$82.8M

Prior Year Major Commitments – December 2019 – Schedule Variances						Actual Results Shaded		
Project	Commitment	Goal	Actual	Project	Commitment	Goal	Actual	
7 All-Agency Yellow Commitments								
<i>Bridges and Tunnels</i>								
NYCT								
<i>Passenger Stations</i>								
Times Square Reconstruction & ADA, Phase 3 - Shuttle	Construction Award	Jun-18	Mar-19	Verazanno Narrows Bridge	Construction Award	Oct-18	\$79.5M	
		\$259.3M	\$201.5M	Miscellaneous Steel Repair, Concrete Rehab, & Structural Painting		Jul-19	\$76.9M	
Award was delayed several months due to service plan reassessment regarding the shutdown. Bid opening was also postponed several times delaying the award. The budget at award reflects good bid savings.								
<i>MTA Bus Company</i>								
MTA Bus Company								
<i>Bus Company Projects</i>								
HVAC - College Point (<i>New Item</i>)				Construction Award	Dec-18	\$8.5M		
					Dec-19	\$9.5M		
Delay due to extended authorization to advertise approval. Project cost increased due to additional time needed for comments and approval.								
<i>Signals and Communications</i>								
CulverLine Interlockings & CBTC								
Mainline Track & Switch Program (6 Projects) - 3rd Qtr	Construction Award	Aug-18	Aug-19	Construction Award	Dec-18			
		\$44.0M	\$44.0M					
Delay of award due to track access issues on the Flushing line, which had delayed the last of the six planned projects for 2018 3rd quarter.								
Sandy								
Sandy Mitigation: St. George	Construction Award	Sep-18	Feb-19					
		\$424.0M	\$417.1M					
Bids postponed but were received in early December. Project cost decreased reflecting favorable bids.								
<i>MTACC</i>								
MTACC								
<i>Penn Station Access</i>								
GEC Design	Construction Award	Dec-17	Jan-19					
		\$37.0M	\$34.1M					
Delay was due to change in procurement strategy. Award was further delayed due to the need to obtain Amtrak agreement. Agreement reached with Amtrak in January 2019. Budget at award reduction reflects favorable bid.								

Prior Years' Major Completions – Quarterly Update: December 2019

The status of 2016 through 2018 major completions delayed beyond 2018 are tracked until achieved and are reported to CPOC quarterly.

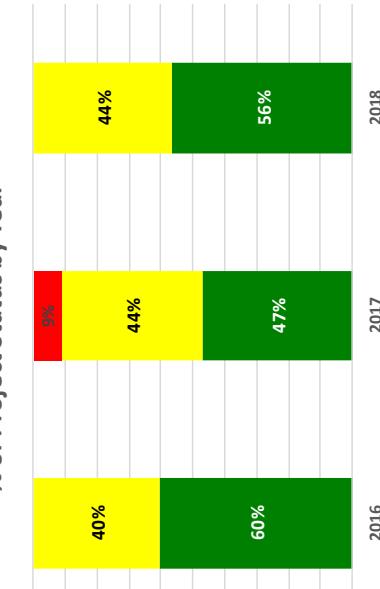
In 2016, agencies set an overall MTA completions goal of \$4.6 billion including 43 major completions. In 2016, 36 major completions were made including several MTACC contracts associated with 2nd Ave Subway Phase 1 which achieved beneficial use in December 2016. One project remained delayed, but was completed in the second quarter of 2019.

In 2017, agencies set an overall MTA completions goal of \$5.0 billion including 34 major completions. In 2017, 24 major completions were achieved. Of the remaining projects, four were completed in 2019, and three are forecast for completion in 2020.

In 2018, agencies set an overall MTA completions goal of \$6.3 billion including 39 major completions. In 2018, 32 major completions were achieved. Seven completions were delayed beyond 2018. All seven completions were achieved in 2019.

Actual Goal	MTA-Wide Prior Years' Major Completions												Post Dec-19
	On Time	Achieved Late	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	
Total	116	26	16			1							0
2016	43	16	11		1	1							3
2017	34	22	10	1	1	2						1	2
2018	39	22	10	1	1	2							

% of Project Status by Year



2018

2017

2016

GREEN = Completions made/forecast within Goal

YELLOW = Completions delayed beyond Goal (already completed)

RED = Completions delayed beyond Goal (not yet achieved)

This chart tracks when all major completions are forecast/achieved versus original goal, starting with those that were completed within 2016, 2017 and 2018 followed by those that slipped beyond 2018. Green represents projects that were achieved on-time, yellow represents projects that were delayed but have since been completed, and red represents projects that are still delayed. Projects that are red will become yellow when completed.

Prior Year Major Completions – December 2019 – Schedule Variances						
Project	Completion	Goal	Forecast	Project	Completion	Goal
3 All-Agency Red Completions						
LIRR						
Track						
Massapequa Pocket Track	Construction	Nov-17	Feb-20			
		\$19.6M	\$19.6M			
	The original delay was due to lack of available force account resources in the signals area. A track outage date has been rescheduled to February 2020 which will allow for completion.					
MNR						
Power Infrastructure Restoration - Substations	Construction Completion	Aug-17	Mar-20			
		\$43.8M	\$45.7M			
	Delay due to additional time needed for acceptance testing and coordination with the local utility company for power cutover. The forecasted completion is March 2020.					
Track & Structures						
Substation Bridge 23 - Construction	Construction	Oct-17	Jan-20			
		\$41.7M	\$41.7M			
	Based on the concerns the utility company had about the heat index and how it effects the system during power outages in summer months, the cover process was delayed which resulted in pushing back the completion date to January 2020.					
NYCT						
13 All-Agency Yellow Completions						
Subway Cars						
Purchase 300 B Division R179 Cars - (300 Cars) (<i>New Item</i>)				Procurement	Dec-18	Dec-19
					\$577.3M	\$743.6M
	As of December, all units have been accepted.					
Bus Replacement						
Purchase 110 CNG Articulated Buses				Fleet Purchase	Dec-18	Jan-19
					\$104.2M	\$107.4M
	A total of 106 of the 110 buses were received in December 2018. The remaining 4 are now received.					
Passenger Stations						
Sea Beach Contract at 6 Stations (<i>New Item</i>)				Construction	Dec-18	Oct-19
					\$278.7M	\$309.3M
	Extension was granted to contractor for additional work for Track Wall at 8th Avenue. The completion was delayed further to October 2019 due to the addition of southbound elevator at 8th Ave station to the contract. Project cost increased due to contract modification for the design of the added work related to the Southbound elevators at 8th Ave.					
Signals and Communications						
CBTC Flushing Line				Construction Completion	Dec-18	Mar-19
					\$114.1M	\$134.6M
	CBTC is in full operation for the entire Flushing line since November 2018. Substantial completion was delayed to March due to completion of the required training and tours.					
Buses						
Bus Command Center Construction - NYCT				Construction	Nov-17	Jun-19
					\$51.4M	\$60.6M
	Substantial completion was delayed for mitigation of sewer connectivity issues and testing of the sprinkler system. Cost increase due to extended project duration as well as funding additional scope items.					

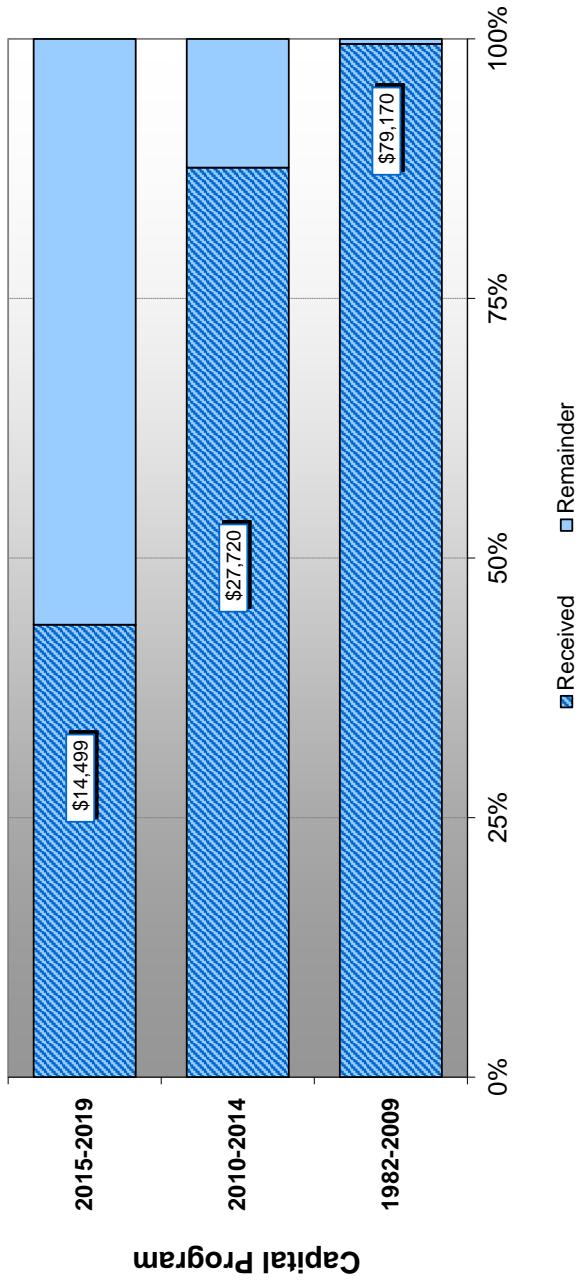
Prior Year Major Completions – December 2019 – Schedule Variances						Actual Results Shaded		
Project	Completion	Goal	Actual	Project	Completion	Goal	Actual	
LIRR								
Track								
Mainline Double Track-F/A Construction	Construction	Oct-18	Apr-19	Harmon Shop Improvements (New Item)	Construction	Jun-18	Oct-19	
		\$33.4M	\$24.7M			\$315.6M	\$315.6M	
				The design and installation of an enhanced carbon monoxide detection system at the shop/building has been determined to be needed. This additional work will further extend the current forecast for completion from July 2019 to October 2019.				
Signals & Communications								
Centralized Traffic Control	Construction	Jun-15	Mar-19	Queens/Midtown Tunnel	Construction	Jul-18	Apr-19	
		\$12.9M	\$17.9M	Tunnel Ventilation Building Electrical Upgrade & Flood Mitigation (QMT)		\$57.4M	\$57.4M	
				Extension to substantial completion was required to provide additional factory acceptance testing and additional field installation verification /testing.				
MTA Bus Company								
<i>Bus Company Projects</i>								
Bus Command Center	Construction	Dec-17	Jun-19					
		\$17.1M	\$17.8M					
				Substantial completion was delayed for mitigation of sewer connectivity issues and testing of the sprinkler system.				
MTACC								
<i>East Side Access</i>								
Plaza Substation and Structures (CQ032)	Construction Completion	Aug-16	Apr-19					
		\$250.2M	\$250.2M	A final delay for mitigation of leaks and duct bench issues was resolved and the project is now complete.				
Manhattan Northern Structures (CM006)	Construction Completion	Jun-17	Apr-19					
		\$361.6M	\$361.6M	A final delay to complete punchlist work and to resolve remaining commercial issues is now complete.				

Status of MTA Capital Program Funding



Capital Funding (December 2019)

\$ in millions



Capital Funding Detail (December 31, 2019)

\$ in millions

	Funding Plan		Receipts	
	Current	November	This month	Received to date
1992-1999 Program	18,095	18,095	-	18,095
2000-2004 Program	21,668	21,668	-	21,668
2005-2009 Program	24,409	24,016	-	24,016

	Funding Plan		Receipts	
	Current	November	This month	\$
2010-2014 Program				
Federal Formula, Flexible, Misc	\$5,853	\$5,839	\$	\$5,839
Federal High Speed Rail	295	295	-	295
Federal New Start	1,257	1,257	-	1,257
Federal Security	189	101	-	101
Federal RRIF Loan	-	-	-	-
City Capital Funds	719	608	-	608
State Assistance	770	770	-	770
MTA Bus Federal and City Match	132	112	-	112
MTA Bonds (Payroll Mobility Tax)	11,483	9,808	-	9,808
Other (Including Operating to Capital)**	1,519	1,239	(125)	1,114
B&T Bonds	2,026	1,832	154	1,986
Hurricane Sandy Recovery	6,329	5,613	-	5,613
Insurance Proceeds/Federal Reimbursement	81	81	-	81
PAYGO	758	118	-	118
Sandy Recovery MTA Bonds	230	18	-	18
Total	31,640	27,691	29	27,720

	Funding Plan		Receipts	
	Current	November	This month	\$
2015-2019 Program				
Federal Formula, Flexible, Misc	\$6,704	\$4,456	-	\$4,456
Federal Core Capacity	100	-	-	-
Federal New Start	500	-	-	-
Federal Security	3	3	-	3
State Assistance	8,640	979	-	979
City Capital Funds	2,667	790	-	790
MTA Bonds	7,968	5,459	-	5,459
Asset Sales/Leases	1,017	318	(11)	306
Pay-as-you-go (PAYGO)*	2,156	1,730	(157)	1,572
Other	592	-	36	36
B&T Bonds & PAYGO*	2,925	553	345	898
Total	33,273	14,287	212	14,499

**During this reporting month, received PAYGO/Other proceeds redistributed between the 2010-2014 and 2015-2019 capital programs.