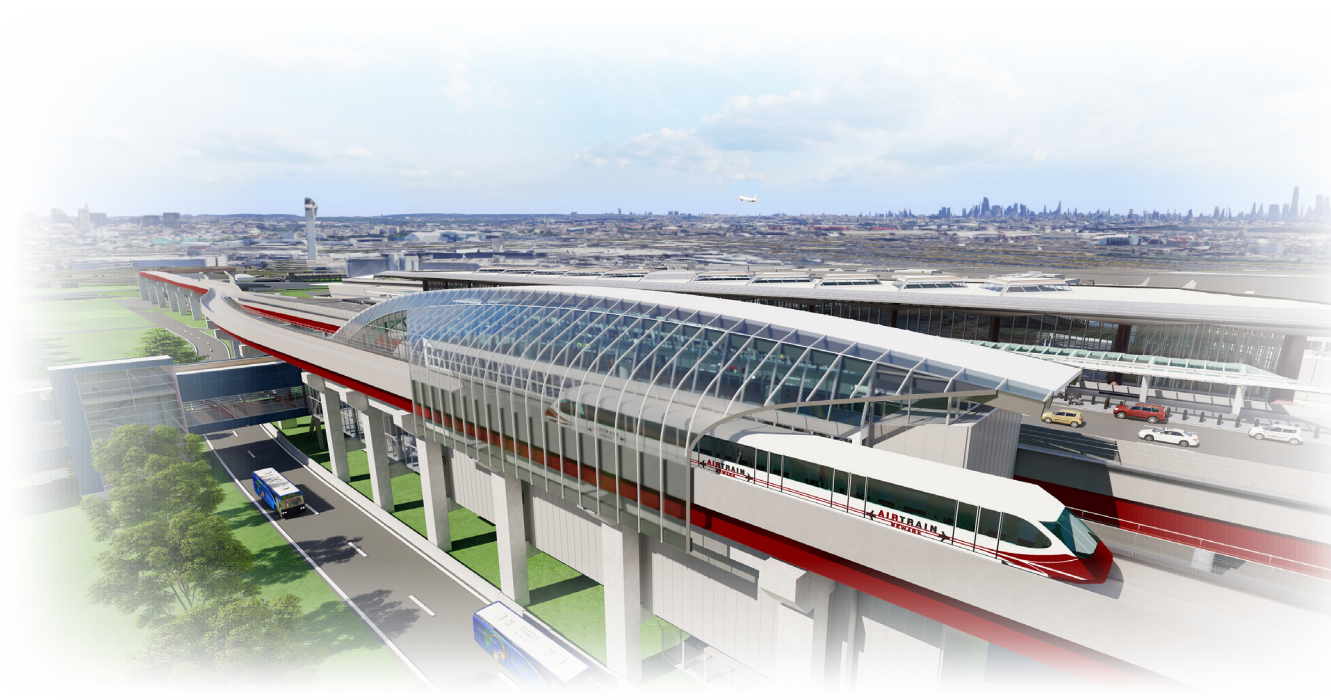


EWR



AIRTRAIN EWR REPLACEMENT PROGRAM

PROGRAM BRIEFING BOOK

Contents >

1	Program Overview	1
1.1	Purpose of the Program Briefing Book	2
1.2	Background	2
1.3	AirTrain Program	4
1.4	Program Objectives	4
1.5	Program Components	5
1.6	AirTrain Ridership and Estimated Growth	5
2	Existing AirTrain	6
2.1	Existing AirTrain Facilities	7
2.2	Existing AirTrain Operations	8
2.3	Previous Upgrades/Capital Asset Replacement Program (CARP)	10
3	Replacement AirTrain	11
3.1	Elements to Be Provided	12 & 14
3.2	Available ROW	16
4	Replacement AirTrain Operations & Maintenance	17
4.1	Scope Elements	18
4.2	Hours Of Operation	18
4.3	Customer Experience	18
5	Existing AirTrain System Decommissioning	19
5.1	Demolition Included in Program	20
6	Anticipated Program Delivery & Timeline	22
6.1	Procurement and Contracting Strategy	23

Figures >

Figure 1: Existing AirTrain EWR	3
Figure 2: Existing AirTrain EWR	9
Figure 3: AirTrain EWR Replacement Program	13
Figure 4: AirTrain EWR Replacement Program Early Action Foundations	15
Figure 5: AirTrain EWR Replacement Program Demolition Plan	21

Tables >

Table 1: Projected Airline & AirTrain Passenger Usage	5
Table 2: Existing AirTrain EWR Schedule	8
Table 3: Hours of Operation	19
Table 4: Preliminary Timeline	23

General Information

The information contained in this Program Briefing Book has been provided as general information only. The Port Authority makes no representation, warranty or guarantee that the information contained in this document is accurate, complete or timely or that it accurately represents conditions that would be encountered at Newark Liberty International Airport, now or in the future. The Port Authority shall not be responsible for the accuracy, completeness or pertinence of the information contained in this document and will not be responsible for any inferences or conclusions drawn from it. The furnishing of this information by the Port Authority does not create or should be deemed to create any obligation or liability upon the Port Authority for any reason whatsoever.



PROGRAM OVERVIEW

1.1 | PURPOSE OF THE PROGRAM BRIEFING BOOK

The Port Authority of New York & New Jersey (“PANYNJ” or “the Port Authority”) has prepared this Program Briefing Book to provide an overview of the AirTrain EWR Replacement Program (“AirTrain Program”) at Newark Liberty International Airport. This document provides information on the AirTrain Program, its various component projects, and the preliminary conceptual planning work as currently envisioned by the Port Authority.

1.2 | BACKGROUND

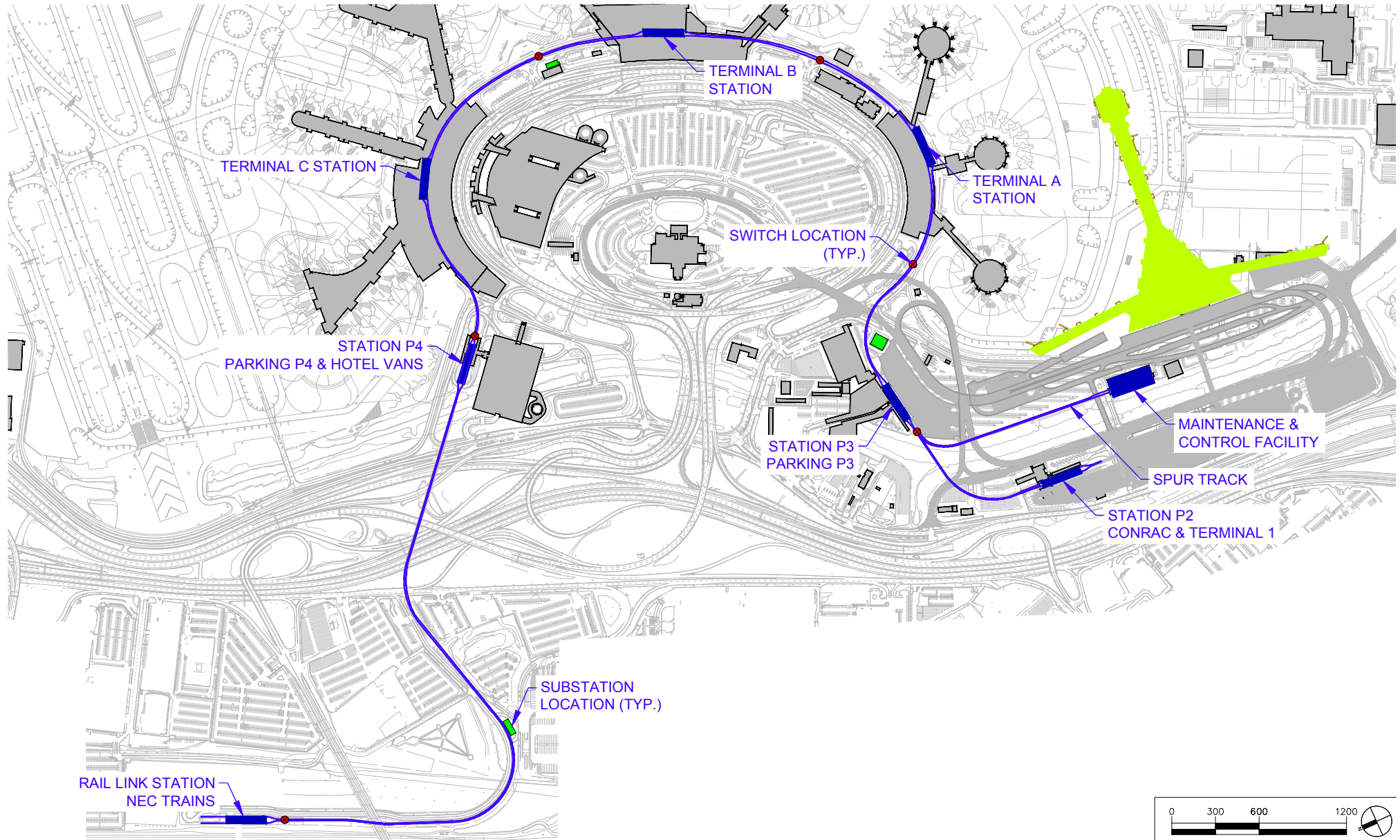
Newark Liberty International Airport (“Airport” or “EWR”) is operated by the Port Authority and located in the southeastern portion of the City of Newark in Essex County and the northeastern section of the City of Elizabeth in Union County, adjacent to Newark Bay. The Airport is 12 miles from Lower Manhattan, New York by highway.

In 1973, the Airport’s original Central Terminal Area (CTA) opened, housing Terminals A, B and C. With ever-increasing passenger and air cargo demand, the Airport expanded over the years to accommodate its first international flights in the 1970s, the arrival of Virgin Atlantic Airways offering flights to London in 1984, Federal Express (FedEx) opened its second air cargo hub in 1986, and the expanded operations resulting from the 1987 People Express-Continental Airlines merger. To accommodate the fast-paced expansion of services, a steady progression of infrastructure and terminal upgrades has occurred over the years.

Opening in 1996, AirTrain EWR services the terminals, the Rent-A-Car facility, and parking lots at EWR. In 2001, service was extended to the “Rail Link Station,” on the Northeast Corridor Line connecting with Amtrak and NJ Transit service. Today, the system serves seven stations, operates 24/7/365 (with one overnight maintenance shutdown on a monthly basis) and averages 33,000 passengers daily. The infrastructure includes nearly three miles of dual-lane elevated steel box-beam guideway as shown in **Figure 1**.

Over the last 15 years, the Port Authority has made significant efforts to modernize and redevelop the passenger terminals at EWR to respond to the evolving needs of airlines and passengers. Currently, the Port Authority is replacing Terminal A with the construction of Terminal One and a consolidated rental car and parking facility (ConRAC). Until the replacement AirTrain is complete, the existing AirTrain will continue to provide service to terminals, ConRAC, parking lots, and Rail Link Station. The future replacement AirTrain will be developed in recognition of a revised airport configuration.

FIGURE 1: Existing AirTrain EWR



1.3 | AIRTRAIN PROGRAM

The AirTrain Replacement Program (“**AirTrain Program**”) will position the Airport to meet the projected demands of passengers in the 21st century. The AirTrain Program will replace the existing AirTrain with a new automated people mover system (“**APM System**”) that includes the construction of guideway infrastructure, passenger stations, vehicles, and a maintenance and control facility. (For the purposes of this Briefing Book, the term “APM” is generic and may encompass any automated system providing mass transit services, and all other infrastructure to provide a full, functional APM).

The existing AirTrain system will remain operational throughout construction of the replacement system. The AirTrain Program includes the operation and maintenance (O&M) of the existing AirTrain for a period of time during construction until the new replacement system is complete and begins revenue service.

In 2018, the Airport handled more than 46 million Annual Air Passengers (MAAP) with AirTrain providing service to 33,000 average daily passengers and as many as 39,000 on a peak day. The Port Authority anticipates that by 2030 the ridership will exceed 41,000 average daily passengers increasing to 50,000 by 2040 representing over 50 percent growth. The AirTrain program will be coordinated and designed to accommodate future airport development and reconfiguration.

1.4 | PROGRAM OBJECTIVES

The Port Authority’s overarching objectives for the AirTrain Program are to provide world-class facilities and infrastructure that are efficient and scalable, enabling the Port Authority to continue to meet the demands of air travel, increasing access to the region and spurring economic growth through the coming decades. To that end, the following Program objectives include:

Replace existing AirTrain System: Replace aging system and associated infrastructure that is at or near the end of its useful life.

Accommodate future passenger demand: Accommodate projected passenger demand that will exceed the capacity of the existing system by 2025.

Accommodate future airport development: Accommodate long-term planning and configuration of future terminals, parking and rental car facilities at the Airport.

Provide a “Best-in-Class” passenger experience: Maximize opportunities for the use of interactive wayfinding, kiosk technologies, and internet connectivity to provide order and clarity to the customer experience. Exhibit local artistry and cultural offerings to enrich and engage passengers in stations and pedestrian links. Provide for smooth passenger flow and easy transitions between stations and destinations. Deliver a stress-free, seamless and engaging environment for a memorable passenger journey.

Increase passenger level of service: Improve reliability and passenger comfort with service-proven technology. Provide world-class customer experiences throughout the passenger’s journey.

Maintain Existing AirTrain operations: Maintain passenger service on the existing system and minimize disruptions to airport operations during the implementation and transition from the existing AirTrain to the new APM System.

1.5 | PROGRAM COMPONENTS

The AirTrain Program currently includes the following Program components:

- A new robust, fully automated, service-proven, operating system that exceeds the projected ridership demands.
- A dedicated, grade-separated Right-of-Way (ROW) that accommodates existing EWR infrastructure and long-term airport redevelopment plans.
- Climate-controlled passenger stations with world-class amenities that complement a 21st century airport.
- System that provides seamless accessibility to existing or future Terminals, the Rail Link Station, and the ConRAC, with capability of future expansion.
- Supporting infrastructure including power substations, maintenance and control facilities (MCF) and all other infrastructure to satisfy normal and failure management operations.
- Interim elevated and climate-controlled Pedestrian Connectors to Terminals B, C, and P4 Parking Garage.
- O&M of the existing AirTrain system during construction.
- O&M service for the APM system in its entirety, including all infrastructure.

1.6 | AIRTRAIN RIDERSHIP AND ESTIMATED GROWTH

The existing AirTrain handles 33,000 average daily riders and 12 million riders annually. This represents 26 percent of the air passengers at the Airport in 2018. Air passenger demand is estimated to increase by 28 percent from 2018 to 2030. The existing AirTrain system handles up to 1,200 passengers per hour per direction and demand is anticipated to grow with air passenger volumes. **Table 1** represents the estimated airport and AirTrain passenger volumes through 2040.

Table 1: Estimated Airline & AirTrain Passenger Usage

YEAR	MILLION ANNUAL AIR PASSENGERS	ANNUAL AIRTRAIN PASSENGERS	AVERAGE DAILY PASSENGERS
2018 (Actual)	46 M	12 Million	33,000
2030	59 M	15 Million	41,000
2040	72 M	18.5 Million	50,000



EXISTING AIRTRAIN

2.1 | EXISTING AIRTRAIN FACILITIES

The AirTrain EWR system was commissioned in May 1996 to provide landside passenger service on-airport. The system was extended off-airport to the North East Corridor Station in 2001 to provide a mass transit connection to New Jersey Transit and Amtrak regional rail service. This is a fully automated, driverless system, operating on a dedicated, grade separated, elevated guideway.

The system includes the following elements:

- 2.85 miles of dual elevated guideway, steel box-beam construction that varies from five ft to 45 ft above grade
- Seven passenger stations (P2, P3, P4, Terminal A, Terminal B, Terminal C, and Rail Link)
- 22 rotary switches (18 on-airport and four off-airport)
- A maintenance & control facility
- Seven power substations (five within the CTA and two outside the CTA)
- 15 six-car trains consisting of Von Roll Mk III Monorail type vehicles

All stations offer single ended access, with center platforms featuring seven automatic platform screen doors on each platform side. Additionally, each station is equipped with guideway access and emergency access panel doors. All screen doors and access panel doors are monitored by the Automatic Train Control (ATC) system to detect unauthorized guideway access. Vertical circulation is provided by two escalators and one elevator in each station. Station door headers are supplied by Stanley Access Control Technology.

The fleet consists of Von Roll Mk III Monorail type vehicles supported on a straddle-beam guideway, using a six-car, permanently coupled configuration. Each train is supported by seven bogies on pneumatic tires. Propulsion power is provided by four ABB AC drives running on 600 VAC, supplied via side-mounted inverted current collector shoes.

The Power Distribution System (PDS) consists of two primary 27 KV feeders supplied by PSE&G. The 27 KV is stepped down to 13.2 KV in the Central Substation and then distributed to seven substations. The 13.2 KV feeder cable is routed from substation to substation via the guideway infrastructure. At each substation, the 13.2 KV is converted to 600 VAC for propulsion and 480 VAC for back of house/guideway heating power. Four substations are located in stations and three are housed in separate buildings along the ROW. The PDS is monitored and controlled by a Supervisory Control and Data Acquisition (SCADA) control system.

The ATC is based on the Thales Low Density Communication Base Train Control system (CBTC), that is overlaid on a traditional track circuit signaling system. This is a redundant, fail-safe design to ensure safety and reliability. The ATC includes the Automatic Train Protection, Automatic Train Operation and Automatic Train Supervision subsystems installed on-board, in the stations and in Central Control. Each vehicle is equipped with two independent on-board controllers in the lead cars. The Wayside Control Unit also contains redundant controllers to ensure system availability and reliability.

2.2 | EXISTING AIRTRAIN OPERATIONS

The existing AirTrain EWR provides passenger service 24/7/365 days per year (except for one overnight maintenance shutdown on a monthly basis). The fleet consists of 15 six-car monorail type vehicles, powered by a 600 VAC power distribution system.

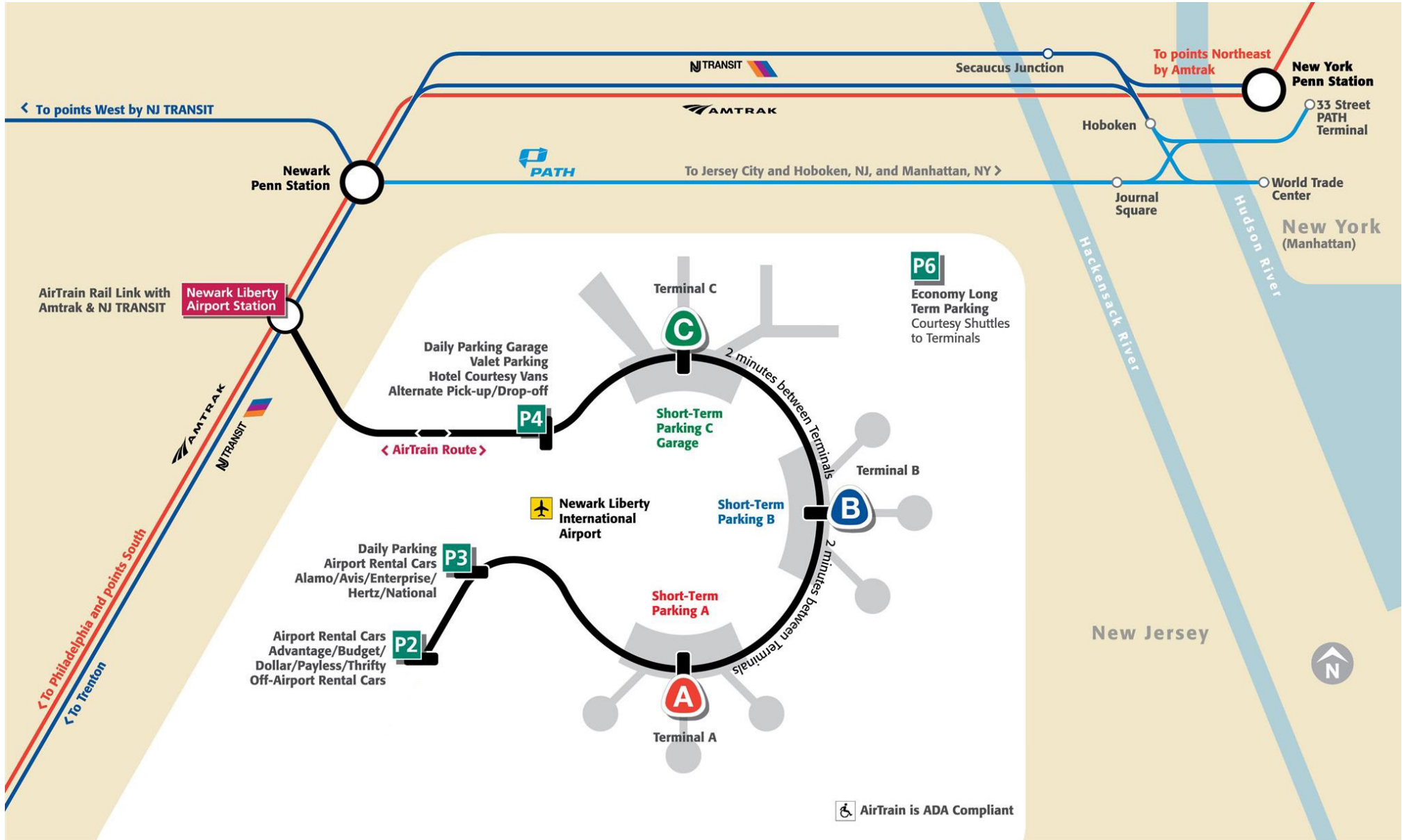
The driverless system operates 24/7 and services seven stations as shown in **Figure 2**. The AirTrain connects terminals A, B and C, Parking lots P2, P3 and P4 and the off-airport Rail Link Station. The system was previously supported by a fleet of 18 monorail vehicles. In July 2019, the system was reconfigured to remove Station P1, to facilitate construction of the ConRAC facility. At that time the fleet size was also reduced from 18 to 15 vehicles.

Trains operate in a Pinched Loop configuration, turning back at the terminus stations P2 and Rail Link Station. The system operates on four-minute headways with nine trains from 5 a.m.–midnight, and three trains in shuttle mode from midnight–5 a.m. (as shown in **Table 2**). The three-train shuttle mode is programmed to service all the stations. Wayside maintenance is scheduled during the overnight shuttle mode. Full system shutdown is scheduled one Saturday every month, from 10 p.m.–7 a.m., to facilitate extended maintenance activities.

TABLE 2: Existing AirTrain EWR Schedule

HOURS OF OPERATION	HEADWAY	MODE	# OF TRAINS IN SERVICE
Midnight–5 a.m.	15 minutes	Shuttle	3
5 a.m.–Midnight	4 minutes	Pinched Loop	9

FIGURE 2: Existing AirTrain EWR



2.3 | PREVIOUS UPGRADES/CARP

The existing AirTrain system underwent several upgrades and overhaul efforts since it was commissioned. The Base System, commissioned in 1996, included the stations and section of guideway between station P2 and P4, with twelve vehicles initially. The NEC extension, which was commissioned in 2001, includes the section of guideway from P4 to Rail Link Station, and added six vehicles to the system. Overhauls were performed based on the original equipment manufacturers' recommendations and industry best practice. In 2012, the Port Authority undertook a major Capital Asset Replacement Program (CARP) on the AirTrain system. The CARP included replacement of major subsystems and overhauling all subsystems on the vehicles, communication systems, power distribution system, wayside and fixed facilities (i.e. car wash, traverser, bay door operators, etc.).

Overhaul efforts since 1996:

- Base Vehicle Subsystem and Stations 2002–2003.
- Base System Control, Communications, Power and Signal Rail 2005–2008.
- NEC Vehicle Bodies, Vehicle Subsystems, and NEC Stations 2006–2009.
- NEC Control and Communications Equipment and Power and Signal Rails 2009–2012.
- Replacement and Upgrade of AirTrain Car HVAC Systems 2011–2017.
- CARP–Upgrade, Overhaul and Replacement of major subsystem 2013–2019. (Major subsystems replaced/overhauled under CARP include: Propulsion, Vehicle and Platform doors, Communication, Data transmission, Power Distribution, gearbox, Guideway switches, etc.)



REPLACEMENT AIRTRAIN

3.1 | ELEMENTS TO BE PROVIDED

AirTrain ROW and Stations

The AirTrain Program will provide reliable, time-certain access to the CTA, Rail Link, ConRAC and parking facilities for passengers, employees, and other users. It is to be a fully automated, grade-separated system, consisting of an elevated ROW with stations serving the key elements of the CTA and connection to the Rail Link Station. The ROW under consideration is shown in **Figure 3** below.

The AirTrain Program will operate multiple vehicles that depart passenger stations at required headways and turn back at or beyond the two termini stations—Proposed Station 1 (located at Terminal One) and the Rail Link Station.

The AirTrain Program is expected to provide:

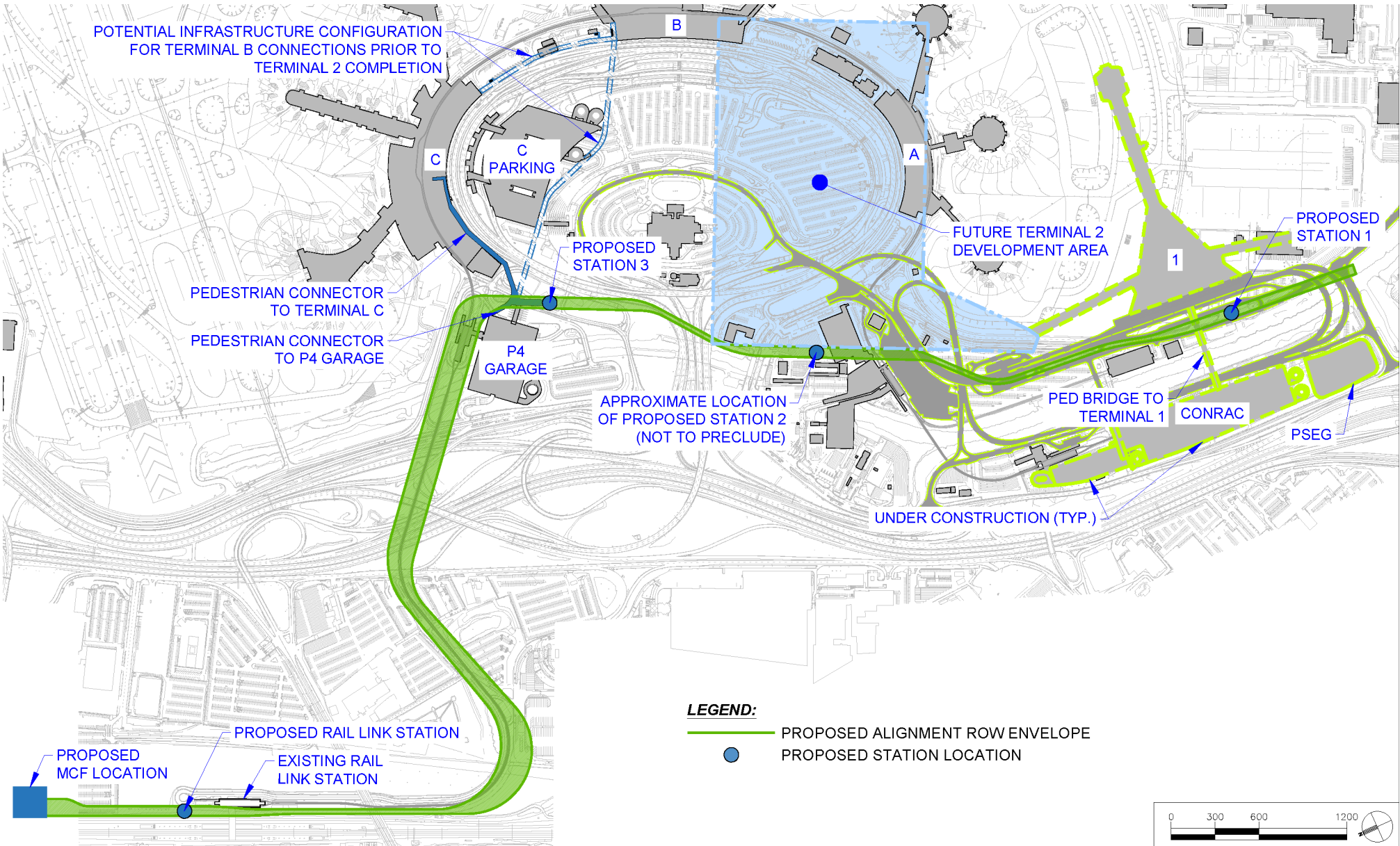
- Service-proven, high reliability, year-round operations in climate conditions experienced at EWR
- Energy efficiency
- Operating headways sufficient to move 2,000–3,500 passengers per hour per direction (PPHPD), but no greater than two to three minutes, for passenger convenience
- Dedicated, grade-separated ROW with varying elevations that will likely range from five to 70 feet above grade to accommodate existing and planned EWR infrastructure
- Sufficient infrastructure to support normal and failure management operations
- Appropriate infrastructure to support maintenance personnel access and emergency evacuation of passengers
- AirTrain operation and maintenance during inclement weather, including accumulations of snow and ice

The AirTrain Program will include a sufficient number of stations to service existing terminals, future terminals and a reconfigured Rail Link Station. The stations will provide passenger access to existing Terminals 1, B and C, future Terminal 2, as well as the ConRAC facility. The off-airport station will provide passenger connection to NJT/Amtrak Northeast Corridor service.

The AirTrain Stations will feature attributes such as:

- Center platforms of adequate size to allow for boarding and alighting from both platform sides for peak passenger demand.
- Platform elevations that are anticipated to vary from 10 to 75 feet above ground level based on existing and planned EWR infrastructure.
- Vertical circulation consisting of elevators, escalators, and stairs providing passenger access to the mezzanine levels, pedestrian connectors, and grade.
- Climate-controlled platforms with platform edge barrier walls containing automatic platform screen doors and ROW access and emergency egress doors and roofing system.
- Customer amenities commensurate with world-class airports including fully integrated information systems, wayfinding, WiFi, and flexibility to accommodate ticketing for NJT/PATH Service.

FIGURE 3: AirTrain EWR Replacement Program



Early Action Foundations

While the remainder of the ROW is yet to be finalized, 37 foundations for the AirTrain Program are under construction in the southernmost portion of the alignment in order to minimize future impact to the Terminal One roadway operations. The foundations consist of steel pipe piles or drilled shafts and concrete caps. These foundations are expected to support the AirTrain ROW and station adjacent to Terminal One. The replacement AirTrain must respect the Terminal One configuration and roadways (currently under construction) as a fixed existing condition, as shown in **Figure 4**.

AirTrain Maintenance & Control Facility

To support the operations and maintenance of the AirTrain system, it is anticipated that the MCF will be located at the northern terminus of the system as shown in **Figure 3**. The MCF will provide for the inspection, service, testing, repair and storage of the AirTrain vehicles and other system and facility equipment. The central control room will also be located within the MCF. The MCF will have the following attributes to support the complete AirTrain Program:

- Sufficient number and length of maintenance tracks for vehicle light and heavy maintenance, storage, cleaning and washing
- Sufficient maintenance and repair shop areas, parts and supply storage and employee locker and break rooms
- Sufficient service roads, loading docks and employee/visitor parking

- Sufficient office space, conference rooms and central control room
- Maintenance Yard sufficiently sized to accommodate arrival and departure tracks, switchyard and vehicle storage

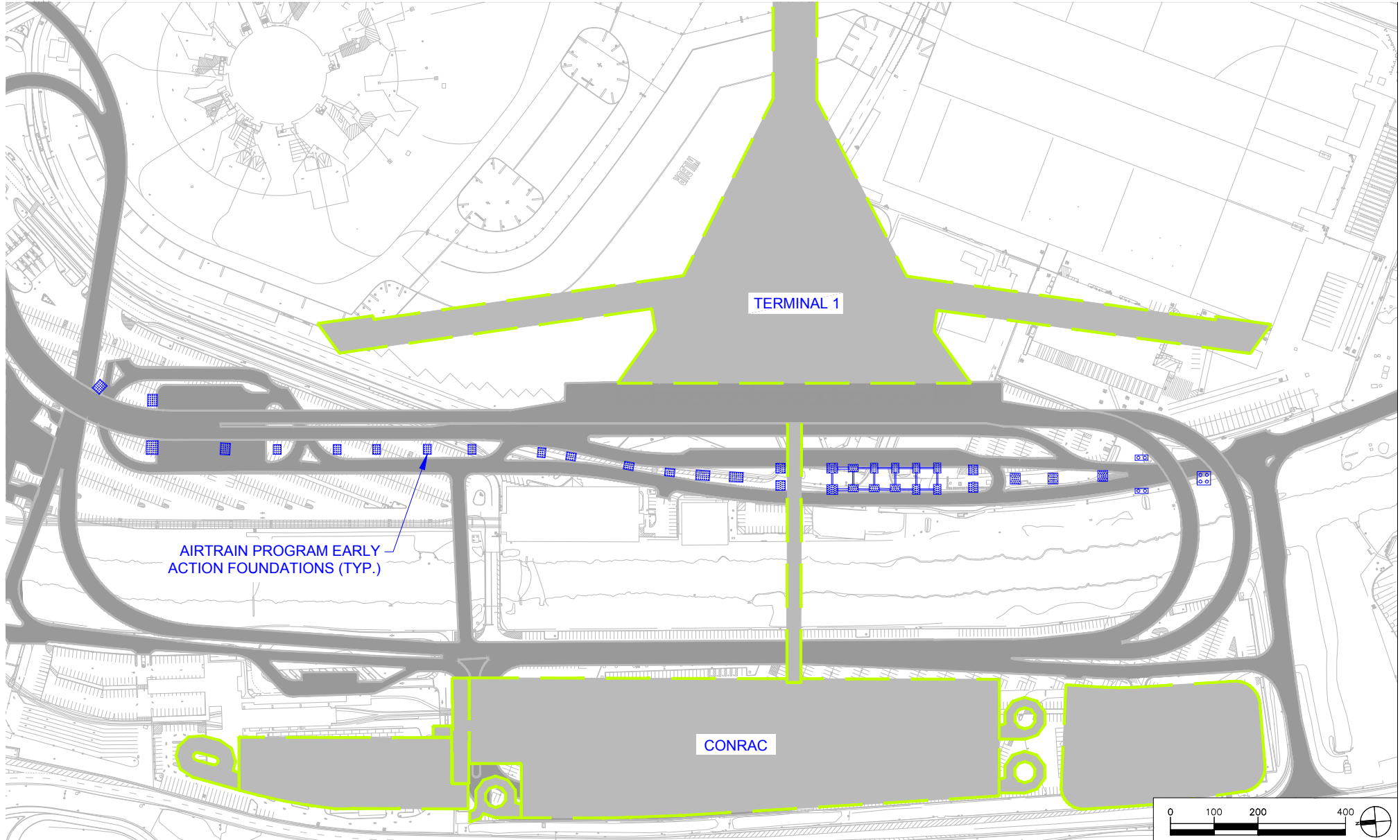
Power Substations

The AirTrain Program will include a sufficient number of power substations to power the AirTrain system. Transformers, rectifiers (as required) and switchgear are to be installed in these power substations to supply power to the buildings and vehicles (as applicable).

Additional AirTrain Program Elements include:

- Modifications to existing passenger Terminals C and B and P4 Parking Garage to support any necessary AirTrain pedestrian connectors or other connections, including vertical circulation cores to the terminals' arrival, concourse and departure levels.
- Construction of interim elevated pedestrian walkways connecting Terminals B and C and connecting AirTrain station to Terminal C, Terminal B and P4 Parking Garage.
- Utilities infrastructure, both new and modified, as needed.
- Decommissioning and demolition of portions of the existing AirTrain system guideway, stations, and MCF.
- Demolition of portions of other existing structures, as required, to facilitate the future AirTrain.

FIGURE 4: AirTrain EWR Replacement Program Early Action Foundations



3.2 | AVAILABLE ROW

The AirTrain replacement construction will impact the airport in the area of the CTA, Terminal One, the South Area, Routes 1/9, and the properties west of the airport near the Rail Link station. Vehicular movement will be the biggest challenge and roadway closures should be minimized. Construction is expected to have little to no impact on airside operations.

Existing AirTrain infrastructure should not be impacted. Construction activities adjacent to, or that cross the existing AirTrain, must allow for its continuous operation with minimal scheduled closures.

CTA structures that will remain for long term include Terminal C, Parking Garage C, Control Tower, P4 Parking Garage, Marriott Hotel and the existing AirTrain Rail Link Station. The replacement AirTrain must respect the Terminal One configuration and roadways (currently under construction) as a fixed existing condition.

The existing AirTrain guideway alignment is on Port Authority property even beyond the CTA boundary. The Port Authority would like to explore options to build the replacement AirTrain on the existing guideway ROW and minimize additional property acquisitions and/or leases while still providing acceptable customer service to AirTrain customers.



REPLACEMENT AIRTRAIN OPERATIONS & MAINTENANCE

4.1 | SCOPE ELEMENTS

Existing AirTrain System

Provide operations and maintenance of the existing AirTrain as necessary for a period of time during completion of construction to continue passenger service until replacement AirTrain System is operational for passenger service. The replacement system provider will provide the same level of operation and maintenance service as the current O&M provider.

From initial construction of the AirTrain Program to the start of its revenue service, the replacement system provider shall maintain service of the existing AirTrain system and minimize disruptions to the greatest extent practicable.

Replacement AirTrain System

The vendor must be prepared to provide for a total of 30 years of operations and maintenance for the replacement AirTrain system. The O&M contract will include all aspects of the AirTrain systems, infrastructure and customer interfaces.

4.2 | HOURS OF OPERATION

The replacement AirTrain hours of operation will be determined based on Airline flight schedules and employee ridership demand. However, similar to the existing AirTrain, the future system will operate on a 24/7 basis 365 days per year. The schedule will be designed to support peak and off-peak hour demand differences while providing the required level of service to all stations. During peak periods, the APM should provide approximate two-minute headways. The current anticipated peak and off-peak times are listed below in **Table 3**.

TABLE 3: Hours of Operation

HOURS OF OPERATION	SERVICE HOURS
Midnight–5:00 a.m.	Off-Peak
5:00 a.m.–11:00 a.m.	a.m. Off-Peak
11:00 a.m.–8:00 p.m.	Peak
8:00 p.m.–Midnight	p.m. Off-Peak

4.3 | CUSTOMER EXPERIENCE

Provide best-in-class amenities and services that improve the comfort and convenience of passengers traveling through the Airport. The station platforms and vehicles will be designed to provide a safe, convenient and comfortable experience. Additionally, new facilities will be compliant with the Americans with Disabilities Act (ADA).

Stations will be programmed with state-of-the-art wayfinding and signage to direct passengers to their destination with real-time information. Wayfinding and signage will support streaming content to advise passengers of available services, media broadcasts, local attractions and entertainment. Station design will incorporate seating for passengers and restrooms will be provided at remote stations. The communication system will provide wireless internet and charging stations at all stations.



EXISTING AIRTRAIN SYSTEM DECOMMISSIONING

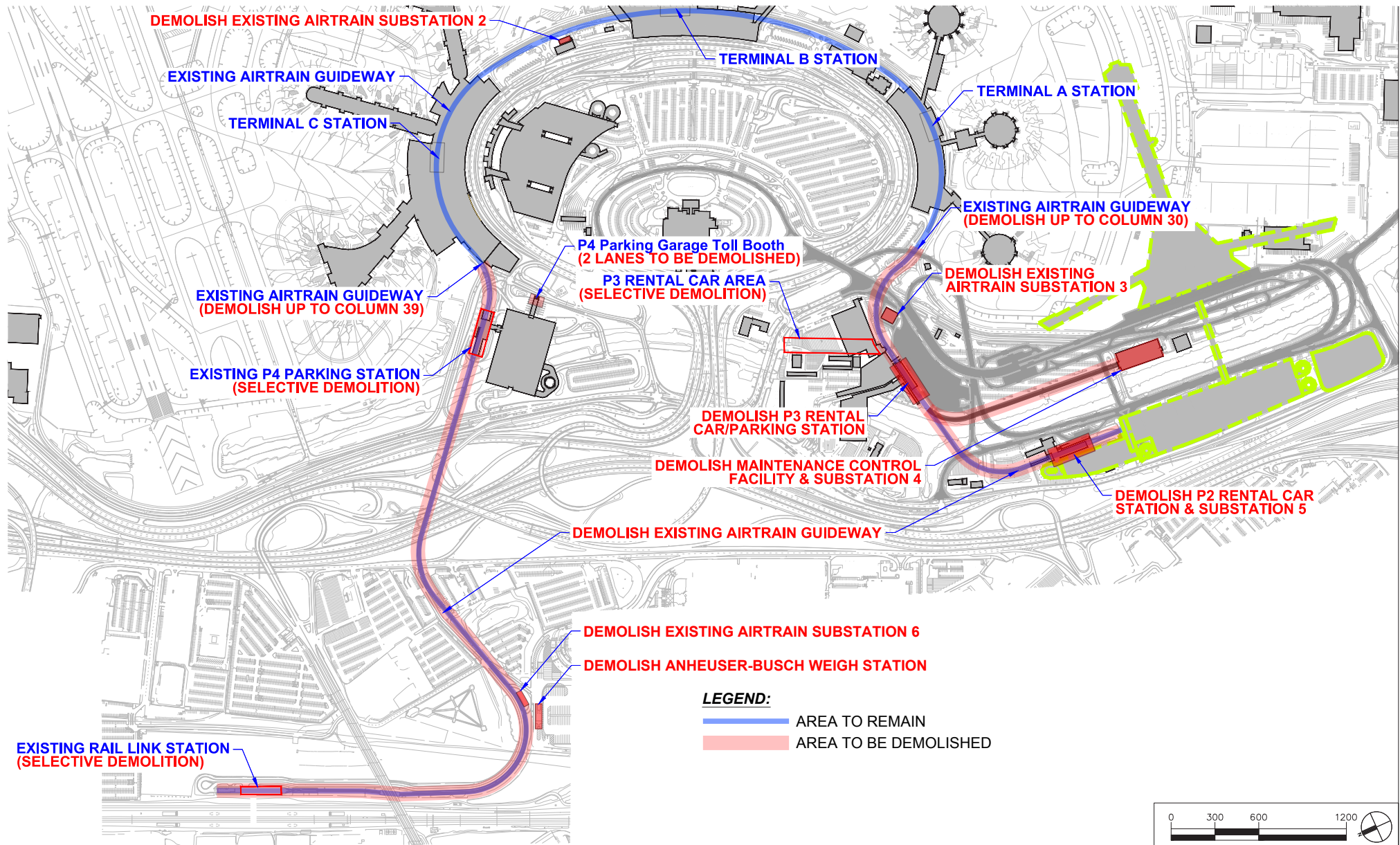
5.1 | DEMOLITION INCLUDED IN PROGRAM

After successful testing and commissioning of the replacement AirTrain and acceptance by the Port Authority for revenue service, portions of the existing AirTrain system are to be decommissioned and demolished as shown on **Figure 5** and as described below:

- Portions of the existing AirTrain guideway
- Stations P2, P3, and the MCF
- Substations 1 through 6
- Selective demolition and reconstruction of the existing P4 and Rail Link Stations to accommodate the replacement AirTrain Program

In addition, it is anticipated that demolition of several other facilities may be required, subject to determination of final alignment.

FIGURE 5: AirTrain EWR Replacement Program Demolition Plan





ANTICIPATED PROGRAM DELIVERY & TIMELINE

6.1 | PROCUREMENT AND CONTRACTING STRATEGY

The Port Authority envisions that the AirTrain Program will be delivered using a design-build-operate-maintain (DBOM) project delivery model. Various funding options are being pursued.

The Port Authority anticipates issuing procurement documents in accordance with the preliminary timeline shown in **Table 4**.

TABLE 4: Preliminary Timeline

AIRTRAIN REPLACEMENT PROGRAM MILESTONE	ANTICIPATED SCHEDULE
Request for Industry Feedback (RFIF)	Q4 2019
RFQ/RFP	Q1 2020
Issue RFP to Highest Qualified Respondents	Q2 2020
Complete Selection Process	Q1/Q2 2021
Award DBOM	Q2/Q3 2021
Full System Passenger Service	Q1 2026
Demolish Existing AirTrain Components	Q2 2026



AIRTRAIN EWR REPLACEMENT PROGRAM

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PROGRAM BRIEFING BOOK