

SYSTRA provided various design and analytical services to the Project. SYSTRA's design services provided included track alignments, traction power, train control, and communications. These designs followed NJ TRANSIT and Amtrak standards, as appropriate. SYSTRA also provided the project's Integration and Interface Team, which developed and implemented an Integration Management Plan (IMP) to formalize and monitor the systems integration process. The IMP used a SYSTRA-developed Interface Management Database that has been used with great success on previous rail and transit projects to identify and track interfaces between systems and facilities. Analytical services provided by SYSTRA included rail operations simulations, signal control line identification, and traction power load flow analysis. All of these analyses were performed using RAILSIM®, SYSTRA's proprietary rail simulation software.



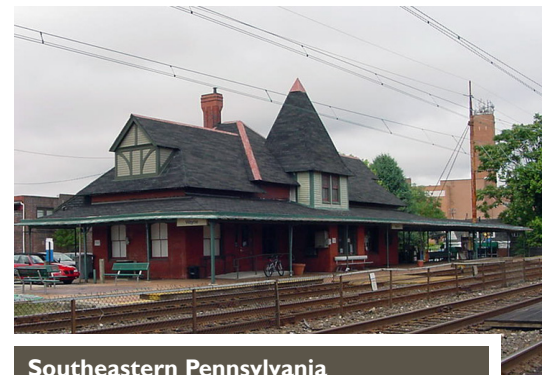
Long Island Rail Road (LIRR) East Side Access Operational Readiness, Testing and Commissioning; Asset Management

Year Complete: Ongoing
 Cost of Work: \$687M
 SYSTRA Services: Development of Operational Readiness Plan, Integration of Testing and Commissioning, Asset Management

SYSTRA was responsible for the development and execution of strategies for the integration of all testing and commissioning and asset management activities required to ensure the ESA is posted and prepared for service on opening day.

Using systems engineering methods and processes, SYSTRA developed a comprehensive approach that captured requirements of all programs and stakeholders. During this first phase, SYSTRA developed the ESA Master Project Testing Plan, Asset Management Plan, Commissioning Plan, System Transition and Turnover Plan, Master Training Plan, Operational Readiness Program Plan, Operational Readiness Responsibility Matrix, and Operational Readiness Master Schedule. All deliverables

met or exceeded industry standards, were in conformance with FRA and FTA regulations, and conformed to LIRR operating rules, policies, procedures, and labor agreements.



Southeastern Pennsylvania Transportation Authority (SEPTA) Wayne Station Improvements Project

Year Complete: 2008
 Cost of Work: \$1.1M
 SYSTRA Services: Project Management, Civil, Architectural, Electrical, Mechanical

SYSTRA was the prime consultant responsible for the design of new high-level platforms and canopies on the inbound and outbound sides, accessible ramps to the platforms, existing pedestrian tunnel and parking lots, and tunnel floor and drainage improvements. The team also performed rehabilitation and restoration of the station building, landscaping and passenger amenities improvements, lighting, signage, and AVPA system upgrades, and plumbing and HVAC modifications, including adding an ADA bathroom within the station.

Design services included architectural restoration of the existing historic station building and shelter, architectural design of an ADA-compliant accessible path, civil design of new site drainage including the pedestrian tunnel, structural restoration of the existing building structures and site retaining walls, new mechanical systems in the station building including plumbing and HVAC, new electrical systems including station and platform lighting, constructability and construction phasing, and access coordination with Amtrak, the owner of the station site and operator of the four-track Harrisburg Line.

MORE INFORMATION:

Sample projects are included in the following pages. Please do not hesitate to contact us for more information on our experience and expert services:

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SYSTRA Commuter Rail Overview

SYSTRA, headquartered in Little Falls, NJ, is a premier public transportation consulting firm. SYSTRA has provided the full range of consulting services to commuter railroads throughout the United States. We have planned new commuter rail routes and route extensions, provided operations analysis and system optimization services, designed track, systems, stations and facilities and provided program and construction management services for capital projects. Our planners and engineers, many with years of experience at commuter rail agencies, provide state-of-the-art plans and designs to commuter rail agencies.



Massachusetts Bay Transportation Authority (MBTA) Wilmington Commuter Rail Station Improvements

Year Complete: 2003
 Cost of Work: \$1M
 SYSTRA Services: Station Design, Architecture, High-Level Platforms, Pedestrian Track Crossing, Station Lighting, Signage

The Wilmington Commuter Rail Station Improvements Project was a multifaceted endeavor to redevelop a three-acre site as a fully accessible MBTA commuter rail station and 200-car commuter parking lot. Although Wilmington had a MBTA station stop, existing passenger facilities were limited to a single wooden boarding platform without canopy coverage or other amenities. New facilities included two low-level boarding platforms, two accessible mini

high-level platforms with ramps and stairs, new platform canopies, an accessible pedestrian track-crossing, new station lighting, new benches, new signage, and other amenities. The improved facility provides an inviting and safe environment for MBTA customers.

From an urban design perspective, the station created an “activity node” in the town center of Wilmington. It was designed for a greater physical and visual presence along the main streetscape in order to contribute to a redefinition of the town’s civic infrastructure, acting as a catalyst for increased transit-oriented and commercial development. Expansion of the commuter parking facilities tapped the potential ridership market previously unable to find parking.

In conjunction with the new architectural design, the existing tracks and signals of the Lowell Line and Wildcat Branch were realigned through the station. Existing Wildcat Branch grade crossing signals were reconfigured to provide preemption to a new traffic signal located at the new parking lot accessway.

As the prime consultant, SYSTRA provided project management, track, signals and communications, architectural, site engineering, and security review services, which had extended from preliminary design through final design and construction phase services.



Southern California Regional Rail Authority (SCRR) Metrolink Commuter Rail Strategic Assessment

Year Complete: 2005
 Cost of Work: \$150,000
 SYSTRA Services: Evaluation Criteria, O&M Costing, Alternatives Screening, Service & Phasing Plan, Project Management Support

To provide improved service on the Metrolink system, the SYSTRA team performed a strategic assessment of commuter rail improvements on the seven lines that serve the five counties of Los Angeles, Orange, Riverside, San Bernadino, and Ventura. The study addressed numerous topics, including appropriate levels of future

service, solutions to bottlenecks, the provision of sufficient support services, and the costs involved with expanded service and phased the improvements.

The study was implemented in five tasks: project management, definition of service alternatives, service alternatives modeling and forecasting, initial screening, and service and phasing plan development. SYSTRA assisted with project management and coordination, developed service alternatives evaluation criteria and operations and maintenance costs of the various alternatives, developed and applied a screening methodology, and contributed to the development of a service and phasing plan.



Southeastern Pennsylvania Transportation Authority (SEPTA) MFSE 69th Street Retail Shop and Yard Improvements

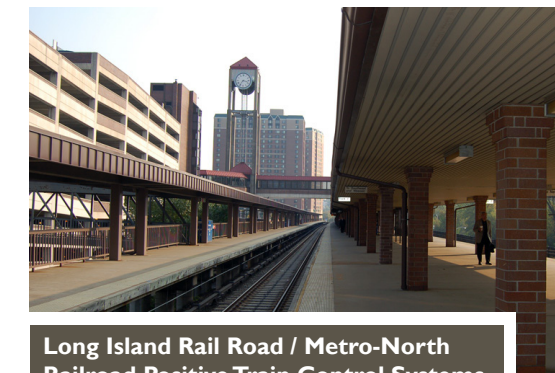
Year Complete: 1999 (Design), 2004 (Construction)
 Cost of Work: \$35M
 SYSTRA Services: Project Management, Industrial Design, Architecture/Engineering, ROW/Track, Traction Power, Construction Support Services

The MFSE Line is SEPTA’s busiest mass transit rail line. It consists of a 13.2-mile, two-track high speed heavy rail transit line, part in subway and part on elevated structure. There are two shops and yards, the 69th Street Complex at the west end and the Bridge Street Complex on the east end. The 69th Street facility dates back to the early 1900s and the Bridge Street facility to the 1920s. The role of the 69th and Bridge Street Complexes is to maintain the 230 35-year old M-3 Budd car fleet for the MFSE Line.

Because the maintenance facilities were old and modern facilities were needed to handle the maintenance of 220 new M-4 rapid transit cars, SEPTA selected SYSTRA to perform the conceptual planning, operational analyses, engineering, and final design for a new replacement shop and yard for the 69th Street Complex. SYSTRA also performed support services to SEPTA’s construction management staff during the construction phase.

This project included demolition; track replacement, including third rail traction power; new building construction; staging, including temporary support and office facilities; site grading and drainage; relocation of existing/ installation of new utilities, new mechanical and electrical systems and new equipment. The new equipment included upgrades/replacement of overhead bridge and jib cranes, truck and body hoists, and turntables and shop equipment.

The new building provides SEPTA with a depressed floor inspection shop with a catwalk system, house cleaning platforms, in-floor car hoist systems and inspection pits in the repair areas. A new car washing facility, a new AC substation, new low voltage distribution systems, and a new DC traction power distribution system for the shop and yard were provided. The work also included modern office and support facilities. The team revised the yard tracks to increase the number of through tracks in the inspection shop. SYSTRA developed intricate construction phasing to allow normal revenue service to occur while the cars were delivered; we ensured that the line remained a safe, reliable, and functional part of the SEPTA system.



Long Island Rail Road / Metro-North Railroad Positive Train Control Systems

Year Complete: 2015
 Cost of Work: \$10M
 SYSTRA Services: Signals

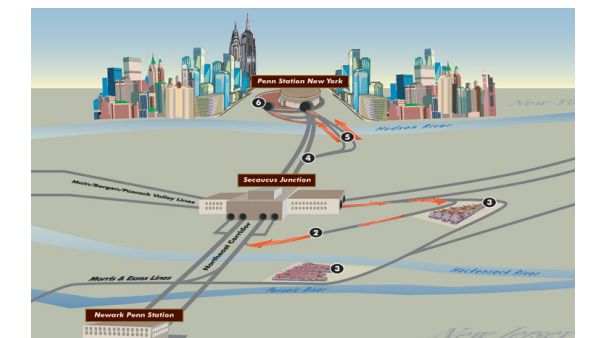
A major component of the Rail Safety Act of 2008 requires commuter railroads to implement a Positive Train Control (PTC) system. Under this new law, Long Island Rail Road (LIRR) and Metro-North are required to comply with the Rail Safety Act and the PTC Regulations. These require each railroad to submit a PTC Implementation Plan (PTCIP) and PTC Development Plan (PTCDP) by April 2010, and submit a PTC Safety Plan (PTCSP) and other documents and complete the installation of a PTC System by December 31, 2015.

Positive Train Control System means a system designed to prevent train-to-train collisions, over-speed derailments, incursions into established

work zone limits, and the movement of a train through a switch left in the wrong position.

SYSTRA is part of a joint venture to support the full implementation of the PTC system. Our team is providing the railroads with engineering services to assist in preparing documents and ultimately system designs that meet the intent of the FRA regulations pertaining to PTC.

The tasks include designing PTC systems that are similar in type to, and compatible and interoperable with, Amtrak’s Advance Civil Speed Restriction System (ACSES II) to a level required to complete the PTCIP and PTCDP.



NJ TRANSIT THE Preliminary Engineering

Year Complete: 2008
 Cost of Work: \$2.7M
 SYSTRA Services: Systems Design, Integration Management, Rail Operations Analysis

SYSTRA performed preliminary engineering of NJ TRANSIT’s \$6 billion Trans-Hudson Express (THE) Project. The fundamental goal of THE Project was to double the train operating capacity from New Jersey into midtown Manhattan. A secondary goal was to provide one-seat ride capability from all branches of the NJ TRANSIT commuter rail system into midtown Manhattan. Preliminary engineering for THE Project began in August 2006 and was completed in February 2008. THE Tunnel and the NY Penn Station Expansion were scheduled to open for revenue service in 2016.

NJ TRANSIT’s passenger forecasts indicate doubling ridership to midtown Manhattan by year 2030. An Alternatives Analysis and Environmental Impact Statement led by SYSTRA identified that a new bored tunnel running from the west side of the New Jersey Palisades, under the Hudson river, and terminating at a new, deep-level expansion of New York Penn Station under 34th Street provided the required additional train capacity. The one-seat ride capability provides a new loop track from the Main and Passaic Valley line tracks on the Lower Level of Secaucus Transfer station to the Northeast Corridor tracks on the upper level.