New York Police Academy

28-11 28th Avenue, Queens, New York

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http://www.engr.psu.edu/ae/thesis/portfolios/2011/sus264/index.html

Project Overview

Owner: NYC Department of Design and Construction, NYC Police Department
Construction Manager: Turner Construction and SVT Construction
Size: 720,000 SF
Occupancy: B, Business
Start/End: 10/2011 to 01/2014

Architecture

New York Police Academy design is focused around the conjuration of the five separate facilities currently being used to train the NYPD force into one centralized facility. Exterior façade is a combination of metal panels, precast concrete, and glazed glass designed in a unique way.

Structural

Foundation: Pile cap design ranging from 100 to 180 tons in capacity with piles being sixteen inches in diameter.
Superstructure: Steel system consisting of rigid and braced frame design, with composite decking for floor and roof support.

Construction

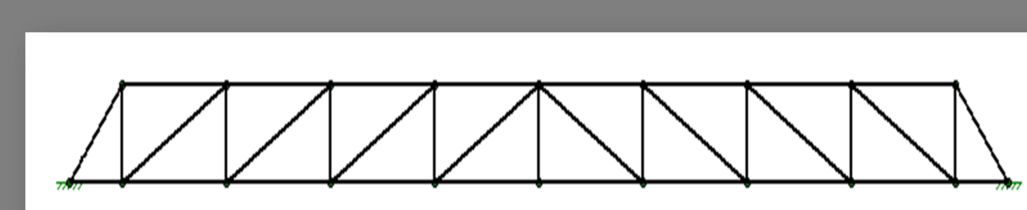
The project is being constructed under a modified fast track construction style, due to local law requirements, with intentions to obtain a LEED Silver Rating as well. A portion of the site is on an old landfill, causing extra precautions in soil testing and foundation design. This however allows for onsite parking and storage, a rarity in New York.

Electrical

Administration is supplied by (1)3000A/460V 3-Phase, and (1)2500A/460V 3-Phase Switchboard. The Central Plant will be supplied by (2)4000A/460V 3-Phase Switchboards, and (2)2.5MW Diesel Generators for emergency power.

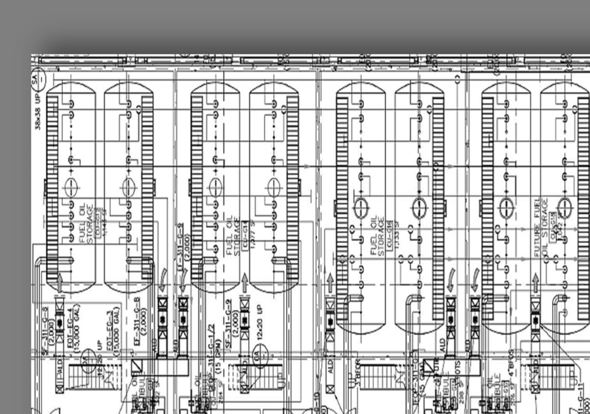
Analysis 1: Cellular Beam Redesign

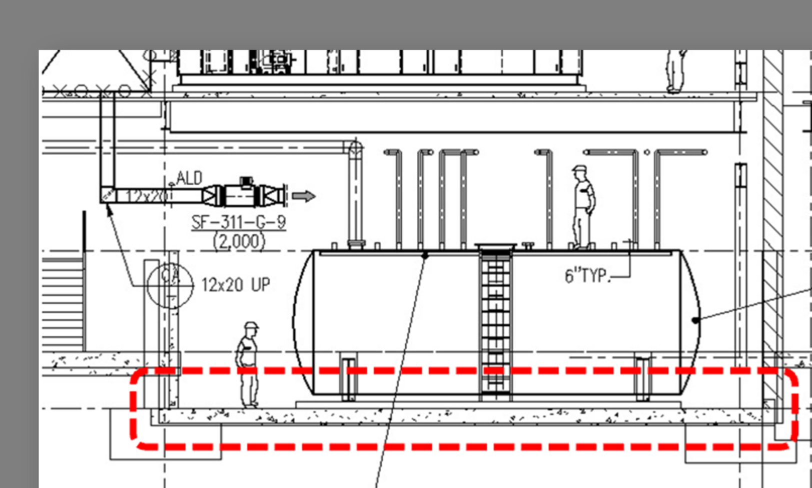
Problem: Over the 180′ span of the indoor track system is a composite beam constructed of three (3) cellular beams connected end-on-end with 8″ steel pipes filled with concrete attached to the bottom flange to help meet strength requirements. This increases overall project cost and assembly of the facility.
Solution: Replace the composite cellular beams with a structural steel truss system. This allows for a more reasonable erection process and overall reduction in project cost.
Outcome: After performing research in sizing and designing a suitable structural steel truss replacement, it was determined that a possible savings of approximately *$4 Million* could be obtained but will result in an increase project schedule by *45 days* due to increase in exterior façade.



Analysis 2: Fuel Room Re-Sequencing

Problem: Original sequencing consisted of the concrete subcontractor placing a second structural matt slab during the erection of the steel system overhead. This allows a higher risk of safety injury to occur on-site.
Solution: To re-sequence the concrete subcontractor to return at a later time or perform work during the second shift for the placement of the matt slab.
Outcome: If work is to be performed on the second shift, an increase in project cost of *$8,000* will occur; however if the work would be contracted to be performed at a later time, no increase to project cost will occur, as well as an *increase in job site safety*.





Analysis 3: Photovoltaic System Integration

Problem: NYPA consumes a large amount of electricity from the city's power grid. A photovoltaic system will help reduce the overall consumption of electricity and greatly aid in the goal of achieving LEED Silver.
Solution: To incorporate a building integrated photovoltaic system to allow not major changes to the southern façade.
Outcome: After research PV design with building Integrated photovoltaic panels, the design used for this analysis proved to be highly inefficient. Overall the system will cost *$470,000* with only saving *$4,300 annually* causing a payback period of roughly *108 years*.