

MONTHLY MONITORING REPORT

World Trade Center Port Authority Trans-Hudson Terminal
PORT AUTHORITY OF NEW YORK AND NEW JERSEY
New York, New York

October 2012

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THIRD-PARTY DISCLAIMER

This report and all subsidiary reports are prepared solely for the Federal Transit Administration (FTA). This report should not be relied upon by any party, except FTA or the project sponsor, in accordance with the purposes as described below.

For projects funded through FTA's Lower Manhattan Recovery program, FTA and its Project Management Oversight Contractor (PMOC) use a risk-based assessment process to review and validate a project sponsor's budget and schedule. This risk-based assessment process is a tool for analyzing project development and management. Moreover, the assessment process is iterative in nature; any results of an FTA or PMOC risk-based assessment represent a "snapshot in time" for a particular project under the conditions known at that same point in time. The status of any assessment may be altered at any time by new information, changes in circumstances, or further developments in the project, including any specific measures a sponsor may take to mitigate the risks to project costs, budget, and schedule, or the strategy a sponsor may develop for project execution.

Therefore, the information in the monthly reports may change from month to month, based on relevant factors for the month and/or previous months.

REPORT FORMAT AND FOCUS

This monthly report is submitted in compliance with the terms of the Federal Transit Administration (FTA) Contract No. DTFT60-09-D-00008, Task Order No. 002. Its purpose is to provide information and data to assist the FTA in continually monitoring the grantee's technical capability and capacity to execute a project efficiently and effectively, and hence, whether or not the grantee continues to receive federal funds for project development.

This report covers the project management activities on the Permanent World Trade Center (WTC) Port Authority Trans-Hudson (PATH) Terminal (Hub) project, conducted by the Port Authority of New York and New Jersey (PANYNJ) as grantee and financed by the FTA's Lower Manhattan Recovery Office (LMRO).

EXECUTIVE SUMMARY

Hurricane Sandy caused significant impacts to the PATH Hub project northeast. In Lower Manhattan, subway and vehicular tunnels were flooded along with building basements and other subgrade structures. WTC estimates that the World Trade Center site was inundated with over 125 million gallons of water, including brackish river water, street runoff, storm, and sanitary waters. Assessment teams were assembled to develop a plan to remove the water and assess impacts.

At the end of October 2012, the main activity underway was pumping water from the site, to be followed by a preliminary impact assessment of equipment, systems and finishes.

The flooding extended to all subgrade areas. The PATH Hall was flooded to approximately two feet above platform level. Service spaces such as the north and south fan plants below the 1 Line subway were flooded. Additionally, service spaces in other areas of the WTC project that house PATH Hub equipment such as the electrical distribution equipment in Tower 1 were flooded.

In the opinion of the PMOC, the damage is extensive to the new PATH Hub construction. Much of the equipment and systems have been submerged and will need extensive rehabilitation or replacement, including large, long lead time equipment, like the emergency smoke purge fans and the electrical power distribution centers. The project schedule, cost and budget will be impacted to extents that can only be determined after a detailed assessment.

[REDACTED]

Project Description

The PATH Hub facility is an intermodal terminal serving the PATH electrified rail transit system in Lower Manhattan. The PATH Hub is an extensive underground complex of pedestrian corridors and train station facilities that will replace the original WTC PATH Terminal destroyed by terrorist attack on September 11, 2001.

Construction Agreement (CA)

The CA was signed by the LMRO on April 25, 2006. A Revised and Restated Construction Agreement (RRCA) was executed on September 18, 2012. The RRCA establishes a Required Completion Date (RCD) of December 17, 2015 and commits \$2.872 billion in federal funding to the PATH Hub. The RRCA includes an FTA allowable amount not to exceed of \$3.995 billion.

Quarterly Progress Review Meeting (QPRM)

The QPRM for the third quarter of 2012 will be re-scheduled.

Design Activity

The designer continued to provide post-award design support services.

Procurement Activity

WTCC has completed all planned procurements. *It is likely that WTCC will require additional procurements to support its Hurricane Sandy recovery efforts.*

Construction Activity

The following summarizes PATH Hub construction progress prior to the October 28, 2012 suspension of normal construction activity due to Hurricane Sandy.

At the PATH Hall, the structural steel contractor continued with welding, application of intumescent paint, and installation of precast ductwork above Tracks 1 and 2. The contractor continued Mechanical, Electrical, and Plumbing (MEP) installations at Platform A. The general contractor completed prepared for Track 1 rail installation to the north end of Platform A. The general contractor continued stone installation and painting in the East-West Connector.

At the Transit Hall, the structural steel contractor continued welding of the east end arch and completed additional sections of metal deck installation at grade level. The superstructure concrete contractor continued placement of reinforcing steel and concrete for grade level slabs. Fabrication of Oculus steel continued during the month of October 2012 for the structural elements needed for the start of steel erection later in 2012.

During October 2012, the three MEP contractors and the fire protection contractor continued with initial activities in the Central Fan Plant, located at elevation 229 in the East Bathtub.

The vertical circulation contractor continued with installation of the escalators for the East-West Connector. Escalator trusses were set for Platform A.

Schedule

In October 2012, WTCC released Integrated Master Schedule (IMS) 64, [REDACTED] [REDACTED] The release of IMS 65 is expected in December 2012. Due to damages by Hurricane Sandy, potential impacts to construction progress are anticipated and accordingly cause delays to the scheduled completion date. WTCC is assessing and quantifying the impacts.

Cost Data

WTCC submitted its Cost Model Revision 14 on October 25, 2012. Based on the contract awards and estimates through September 30, 2012, WTCC's Estimate at Completion (EAC) for the federally funded PATH Hub project is over \$3.7 billion. WTCC is reporting the PATH Hub expenditures through September 30, 2012, at over \$2.3 billion.

WTCC is assessing the damages caused by Hurricane Sandy and will provide an update in November 2012.

Risk Management

The PMOC conducted a contingency update workshop in August 2011. To provide an improved project risk tool, the FTA, the Project Management Oversight Contractor (PMOC), and WTCC completed the Project Execution Plan (PEP), in conjunction with the execution of the RRCA on September 18, 2012. *It is expected that risks associated with the recovery from Hurricane Sandy will be identified and quantified as information becomes available.*

Technical Capacity and Capability Review (TCCR)

An update to the TCCR and resulting TCCR Spot Report are anticipated in the second quarter of 2013.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan, Force Account Plan and its Operations Management Plan, which are all PMP sub-plans.

Project Quality Assurance

During October 2012, the WTCC and CM QA performed two Quality Assurance (QA) activity audits. Due to other project activities, the PMOC did not provide oversight of the activities.

Site Safety and Security Review

From the start of the year through the end of September 2012, there have been 26 lost-time injuries and 76 recordable injuries on the WTC PATH Hub project and 1,422,358 total hours worked. The resultant year-to-date Lost-Time Incident Rate (LTIR) for the WTC PATH Hub project is 3.65, which compares unfavorably to the national average of 2.10. The corresponding Total Case Incident Rate (TCIR) for the same period is 10.68, which is above the national average of 5.10.

Issues/Problems/Suggestions

The overall completion of the PATH Hub project is expected to slip as the effects of Hurricane Sandy are remediated. [REDACTED]

[REDACTED] *Similarly, the cost is expected to increase significantly as WTCC remediates and mitigates the effects of Hurricane Sandy. The adequacy of current budget and schedule contingency will be evaluated as information becomes available.*

MONITORING REPORT

A Project Description

The PATH Hub facility is an intermodal terminal serving the PATH electrified heavy rail transit system, which has a total of 13 PATH stations in New York and New Jersey. When completed, the PATH Hub will connect to 11 New York City Transit (NYCT) subway lines in Lower Manhattan. The PATH Hub will include a platform level, associated mezzanine and concourse levels called the PATH Hall, and a terminal building called the Oculus, or Transit Hall, with north-south and east-west pedestrian connections to the NYCT subways, the World Financial Center, and WTC above-grade site development. It will be a permanent replacement of the original WTC PATH Terminal complex destroyed by terrorist attack on September 11, 2001.

B Project Status

Construction Agreement

The original CA was signed on April 25, 2006. A Revised and Restated Construction Agreement (RRCA) was executed on September 18, 2012. The RRCA establishes a Required Completion Date (RCD) of December 17, 2015 and commits \$2.872 billion in federal funding to the PATH Hub. The RRCA includes an FTA allowable amount not to exceed of \$3.995 billion.

Quarterly Progress Review Meeting

The QPRM for the third quarter of 2012 will be re-scheduled.

WTC Site Master Plan

WTCC's current site master plan is Master Plan Version 10, released October 1, 2010.

Environmental Compliance

(Reported by FTA's LMRO.)

Preliminary Engineering (PE) and Final Design (FD)

The designer continued providing post-award design support services for the PATH Hub construction, including responding to contractor Requests for Information and certifications of completion of elements of construction.

Procurement and Contracting Activities

WTCC has completed all planned procurements for the PATH Hub project. *It is likely that WTCC will require additional procurements to support its Hurricane Sandy recovery efforts.*

WTCC and its Construction Manager (CM) provided the PMOC with the construction and professional services Change Order (CO) logs and updates to the procurement schedule.

Construction Status

Hurricane Sandy caused significant impacts to the PATH Hub project and the impacts of Hurricane Sandy were extensive in the Northeast. In Lower Manhattan, subway and vehicular tunnels were flooded along with building basements and other subgrade structures. The World Trade Center was not spared from the tremendous devastation caused by Hurricane Sandy. WTCC estimates that the site was inundated with over 125 million gallons of water. Assessment teams were put together to come up with a plan to remove this water. The water that infiltrated the site is a mixture of the Hudson River, street runoff, storm and sanitary waste water. PATH and other World Trade Center projects were flooded with several feet of water, halting normal construction activity and damaging electrical and other systems equipment at the lower levels as well as finishes.

In anticipation of the approaching storm, NYC halted all out door construction activity as of Sunday, October 28, 2012. WTCC redirected the efforts of some on-site contractors to prepare the site to the extent possible. On Wednesday, October 31, 2012, WTCC and its contractors began storm recovery operations. The main activity was pumping the water from the site followed by assessment of damage.

At this time, much of the site has been pumped out and assessment is underway. So far it is known that electrical distribution centers and mechanical installations were flooded. The extent of the impact of the flood waters on this vital, sensitive equipment remains to be assessed.

PATH Hub Platform A: The platforms in the west bathtub and Tracks 1 and 2 were flooded. Watermarks were visible on the platform columns approximately two feet above the platform slab. The fans at the north and south fan plants below the 1 Line subway were flooded and will have to be replaced. PATH tunnels to and from New Jersey were flooded as well. The PATH underpass slab and the utility tunnel were under water. The watermark on the wall appeared to be approximately at elevation 255. A spot network located south of the PATH was completely flooded.

Area 3 in the east bathtub where the Transit Hall and Oculus are under construction was also flooded. From the opening in the elevation 274 slab, standing water was visible approximately eight feet below the slab at elevation 264. Contractor crews installed temporary pumping systems through the site:

At Tower 1, where some PATH Hub equipment is housed, the B4 level was completely submerged. There was water from slab to ceiling. The PDC rooms took on about 2 feet of water, submerging the bottom portion of the switchgear with watermarks visible on the equipment and the walls. WTCC will switch back to the temporary power from the NTA in order to repair/replace the permanent equipment.

Figures 1 and 2 below show the before and after flooding conditions in the PATH Underpass area between the PATH Hall and Transit Hall, known as the PATH Underpass. Note the height to which the flooding extended.



Figure 1



Figure 2

Figure 3 below shows the flooding in the electrical distribution room in Tower 1 that supplies power to the PATH Hub.



Figure 3

Transit Hall Concrete: The contractor continued placement of multiple sections of the Transit Hall concrete slabs at the street and plaza levels. As the MEP contractors complete the installation of embedded inserts and sleeves on completed sections of metal deck and formed deck, the installation of reinforcing steel continues. The Transit Hall concrete slabs at elevation 320 are expected to be substantially completed by the end of December 2012.

Transit Hall Waterproofing and Site Work: The contractor continued installation of the waterproofing system on the Transit Hall structural concrete slab sections at elevation 320.

Structural Steel to Grade (SSTG) – Area 3: Structural Steel to Grade work in Area 3 continued during October with a diminished work force as the structural steel work in this area winds down. The contractor relocated its west tower crane to a central position within Area 3 and began the breakdown and removal of its east tower crane. The heavy structural steel elements that comprise the east stair were erected and are currently being welded. The grand stair structural steel erection on the west side of Area 3 is underway and expected to be completed by the end of November 2012, with the welding of that element continuing into January 2013. That welding will essentially complete the SSTG contractor's work in Area 3.

Oculus Steel: Fabrication of oculus steel continued during October 2012. The current metrics issued by the fabrication subcontractor are: 100 percent completion for sub-portals, 100 percent completion for lower portals, 28 percent completion for upper portals, 38 percent completion for abutments, 4 percent completion for arches, and 12 percent completion for transitions. All of the 48 sub-portals and all of the 50 lower portals are being transported in the first of seven planned shipments. That first shipment departed on October 22, 2012 and is expected to arrive in New York City no later than November 16, 2012. Mobilization of the oculus steel contractor's high capacity assist crane was accomplished on October 27, 2012, which was the Saturday directly prior to the start of Hurricane Sandy on October 29, 2012. The start of the assembly of the assist crane was delayed in the aftermath of the storm but resumed on November 5, 2012. The assist crane will be used to assemble the first of two high capacity tower cranes by the oculus steel contractor. The delivery of that crane is reportedly being delayed by the recently established NYCDOT moratorium on the issuance of street permits as a result of the storm. The forecast start of oculus steel erection is currently set for December 12, 2012.

Oculus Glass: During October, performance testing of the glass panel mock-up and metal panel mock-up continued at the Pennsylvania test facility. Following initial unsatisfactory results on some of the required tests, modifications to the mock-ups were implemented and re-testing performed. At present, all tests have been successfully completed with the exception of the soft body test on the metal panel mock-up. Fabrication of the glass at the subcontractor's facility in Europe continued in October following the designer's approval of glass control samples on September 13, 2012.

Transit Hall Interior Stone: Mobilization is underway. This contract will provide the installation of stone flooring and other stone treatments at various Transit Hall locations, including the interior of the Transit Hall, the North-South Connector, and other areas in PATH Hub.

PATH Hall Construction (PHC): The PHC contractor has completed the excavation and the installation of the waterproofing system of the utility tunnel located in the PATH Underpass below the ILine box. The contractor continued to make progress on Platform A, and track work installation for Platform A Track 1 continued during October 2012. The PHC contractor also

made progress on the extensive MEP installation and architectural construction for the operational support areas on elevations 266 and 284 in the South Mezzanine, Platform A, south and north ventilation plants, PATH substation No. 3, and level 4 in Tower 4. The PHC contractor continued interior fit-out work at the East-West Connector and has made progress with the installation of the marble stone along the East-West Connector south wall.

Structural Steel to Grade (SSTG): The SSTG contractor continued installation of the precast concrete box girders which also serve as ductwork over Tracks 1 and 2 at Platform A, and made progress erecting structural steel north of the East Box Girder (EBG). The contractor continued applying the intumescent paint coating to the structural steel at the East-West Connector and the PATH Hall roof. The contractor continued performing punch list work on the 1 Line box steel support structure and the PATH Hall roof ribs.

MEP and Fire Protection Work: During October 2012, the three MEP contractors and the fire protection contractor continued with initial activities in the Central Fan Plant, located at elevation 229 in the East Bathtub.

Permanent Electric Power System: Work in Spot Network SN-TS, located in Tower 3, continued during October 2012.

Vertical Circulation: The contractor continued installation of the escalators in the East-West Connector. The Platform A escalators were fitted in place during the month of October. The contractor continued installation of the Platform A elevator rails.

Architectural Trades: The storefronts are fabricated and are expected to be delivered to the job site in November 2012.

Miscellaneous Metals: During October 2012, the contractor crews continued to install steel components at many PATH Hub locations, including the spot network rooms.

North Projection Structural Rehabilitation: The contractor removed an existing temporary bridge located on a northbound lane of Route 9A, and began the installation of the secant pile wall. The contractor has substantially completed the repairs to the existing slurry wall at elevations 253, 267, and 284. The contractor began the construction of the blast slab above the PATH tracks. The contractor continued installation of Concrete Masonry Units (CMUs).

Construction Logistics

The WTCC Office of Program Logistics (OPL) continued weekly logistics and coordination meetings to facilitate construction progress and the sharing of access, egress, and work zones among all contractors on-site. Emergency restrictions on street occupancy permits by NYCDOT were implemented following Hurricane Sandy and some delay in mobilizing the first oculus steel contractor's large capacity tower crane to the site is anticipated as a result. Site handling of the individual oculus steel elements, which are expected to arrive in New York City via ship on November 16, 2012, could also be impacted by the permit restrictions. The deliveries of these oculus steel elements will be via city streets over a period of approximately 9 months, and are currently forecast to begin in December 2012. Other major street activities related to the WTC Hub project could also be impacted.

Interagency Coordination

OPL continued its coordination of site construction and logistics among the many project stakeholders, including contractors, construction managers, tenants, insurance firms, PATH operations, and the Port Authority Police Department. OPL continued logistics coordination for the delivery of Oculus structural steel to the site.

Community Relations

OPL continued to distribute construction alerts, updates, and monthly construction progress newsletters to the community and stakeholders.

C Schedule

WTCC released IMS 64 in October 2012. This latest IMS, with a data date of August 1, 2012, shows no slippage to the PATH Hub project overall completion date [REDACTED]

This projection is based on the PMOC's assessment of risk and its evaluation of the available information and current productivity trends. However, WTCC's current projected completion date of [REDACTED] is achievable if risks are properly managed. The release of IMS 65 is expected in December 2012. Due to damages by Hurricane Sandy, potential impacts to construction progress are anticipated and accordingly cause delays to the scheduled completion date. WTCC is assessing and quantifying the impacts.

The following summarizes the 90-day look-ahead for significant activities:

Significant Activity	Action by
Platform A in operation	WTCC
Mobilization of oculus steel contractor	WTCC
Start of oculus steel erection	WTCC

D Cost Data

WTCC submitted its Cost Model Revision 14 on October 25, 2012. Based on the contract awards and estimates through September 30, 2012, WTCC's Estimate at Completion (EAC) for the federally funded PATH Hub project is over \$3.7 billion. WTCC is reporting the PATH Hub expenditures through September 30, 2012, at over \$2.3 billion.

On October 18, 2012, the PA Board re-authorized the World Trade Center Transportation Hub (WTC Hub) Project, at an estimated total project cost range of approximately \$3.74 billion to \$3.995 billion. This allocation will provide for an increase in the budget, up from \$3.4 billion.

The \$3.7 billion budget reflects the updated engineer's estimates all packages in the completed procurement plan. The total cost to complete the PATH Hub project includes the EAC and the non-Hub shares of the common infrastructure projects, such as Retail, the Central Chiller Plant

(CCP), the Common Electrical System, and operational support areas. WTCC continues to update the shared cost allocations associated with the non-Hub costs.

The following chart summarizes the latest available EAC (WTCC's forecast) and expenditures as of September 30, 2012:

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	\$2,847	\$1,757
Program Management and Design	666	562
Contingency		
Total		

The RRCA commits \$2.872 billion in federal funding to the PATH Hub and includes an FTA allowable amount not to exceed of \$3.995 billion.

WTCC is assessing the damages caused by Hurricane Sandy and will provide an update in November 2012.

E Risk Management

The PMOC conducted a contingency assessment workshop in August 2011 to facilitate the completion of the PEP and the RRCA. WTCC and the PMOC reviewed the results of the cost and schedule risk models. Results from this workshop and subsequent analyses were used to develop the executed RRCA and PEP. To provide an improved project risk tool, the FTA, the Project Management Oversight Contractor (PMOC), and WTCC completed the Project Execution Plan (PEP), in conjunction with the execution of the RRCA on September 18, 2012. *It is expected that risks associated with the recovery from Hurricane Sandy will be identified and quantified as information becomes available.*

F Technical Capacity and Capability Review

An update to the TCCR and a new TCCR Spot Report are anticipated in the second quarter of 2013. The PEP will be used by the FTA to measure WTCC's capability and capacity.

Project Management Plan (PMP)

The grantee is preparing updates to its Project Quality Assurance Plan, Force Account Plan and its Operations Management Plan, which are all PMP sub-plans.

Project Organization

WTCC updated consultant and contractor staff assignments across the project areas to address staffing needs as the project develops.

Project Quality Assurance

During October 2012, the WTCC and CM QA performed two Quality Assurance (QA) activity audits. Due to other project priorities, the PMOC did not provide oversight of these audit activities. The WTCC QA manager completed an evaluation of staffing and projected audits for the balance of 2012 which will be submitted to the FTA/PMOC for review.

G Site Safety and Security Review

The September 2012 year-to-date safety data trended unfavorably during the month in comparison to the WTCC's PATH Hub year-to-date safety performance year-to-date through August, 2012. From the start of the year through the end of September 2012, there have been 26 lost-time injuries and 76 recordable injuries on the WTC PATH Hub project, with 1,422,358 hours worked. The resultant year-to-date LTIR for the WTC PATH Hub project is 3.65, which compares unfavorably to the national average of 2.10. The corresponding TCIR for the project for the same period is 10.68, which is above the national average of 5.10.

[REDACTED]

H Issues/Problems/Suggestions

- *The damage is extensive to the new PATH Hub construction. Much of the equipment and systems have been submerged and will need extensive rehabilitation or replacement, including large, long lead time equipment, like the emergency smoke purge fans and the electrical power distribution centers.*
- *The overall completion of the PATH Hub project is expected to slip as the effects of Hurricane Sandy are remediated.* [REDACTED]

[REDACTED] *The adequacy of current budget and schedule consistency will be evaluated as information becomes available.*

I Action Items

Key Project Action Item Checklist

Key Project Action Item	Agency	Target Completion	Status/Comments
A risk assessment update will be conducted to support the completion of an executable RRCA.	PANYNJ/ LMRO/ PMOC	<i>First Quarter 2013</i>	Analysis completed in fourth quarter 2011. Report was finalized in September 2012. This action item is now completed.
PEP Milestone Review Point	PANYNJ/ LMRO/ PMOC	<i>First Quarter 2013</i>	

End of report. Appendices follow.

APPENDICES

APPENDIX A – LIST OF ACRONYMS

CA	Construction Agreement
CCP	Central Chiller Plant
CM	Construction Manager
CMU	Concrete Masonry Unit
CO	Change Order
EAC	Estimate at Completion
EBG	East Box Girder
FD	Final Design
FTA	Federal Transit Administration
IMS	Integrated Master Schedule
LMRO	Lower Manhattan Recovery Office
LTIR	Lost-Time Incident Rate
MEP	Mechanical, Electrical, and Plumbing
NYCT	New York City Transit
OPL	Office of Program Logistics
PANYNJ	Port Authority of New York and New Jersey
PATH	Port Authority Trans-Hudson
PE	Preliminary Engineering
PEP	Project Execution Plan
PHC	PATH Hall Construction
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
QA	Quality Assurance
QPRM	Quarterly Progress Review Meeting
RRCA	Revised and Restated Construction Agreement
SSTG	Structural Steel to Grade
TCCR	Technical Capacity and Capability Review
TCIR	Total Case Incident Rate
WTC	World Trade Center
WTCC	World Trade Center Construction

APPENDIX B – LESSONS LEARNED

No update.