MONTHLY MONITORING REPORT -

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

November 2013

PMOC Contract Number: DTFT60-09-D-00008
Task Order Number: T09002, Project Number: RV-43-0001, Work Order No. 005
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PMOC Length of Time: David Evans and Associates, Inc. October 2008

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Cover: *View of north-south concourse looking south from the main floor level of the Transit Hall.*

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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

During November, following the opening of the East-West Connector in late October, the project focus shifted to the next imminent schedule milestone event –the opening of Platform A and adjacent Track 1. Multiple support spaces and systems are necessary to accomplish the opening of Platform A, and resources were marshaled during the month to move those elements towards the degree of completion needed to secure a temporary permit to occupy them for public use. Also during November, the 480-volt sides of spot networks SN-TS and SN-TN were energized, thereby providing the project with increased capability to distribute permanent electrical power.

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 not-to-exceed amount of $3.995 billion. Damage from the October 2012 hurricane is expected to delay the project by as much as one year.

Quarterly Progress Review Meeting (QPRM)

The QPRM for the third quarter of 2013 is scheduled for December 5, 2013.

Design Activity

The designer continues to provide construction support services, including the review of contractor shop drawings and other submittals.

Procurement Activity

World Trade Center Construction (WTCC) has completed all planned procurements for the PATH Hub project.

Construction Activity

During November, the focus of the Hub project shifted from the East-West Connector, which opened at the end of October 2013, to the impending milestone of opening Platform A and Track 1 to revenue service, which WTCC is forecasting to occur by the end of the year, although that goal is more likely to occur later in the first quarter of 2014. Before a temporary permit to occupy can be secured for Platform A, many project elements need to be completed and tested, including life safety systems, primary and emergency egress paths, power and communication requirements, vertical circulation elements, and train operational elements such as signals, track and third rail. Coordination of some of these activities with the ongoing construction of New York City Transit's #1 Line Cortlandt Street Station is also required.

At the Transit Hall in the east bathtub, the oculus steel contractor *reached the mid-point in the number of upper portals and transition arches erected but also* continued to encounter difficulties in staying within prescribed tolerances for the locations of erected oculus steel elements, thus slowing the work. *Half of the total quantity of 110 of each of these two oculus elements had been set in place by the end of November 2013*.

Also during *November*, the *480-volt* sides of spot networks SN-TN and SN-TS were energized, thereby providing the project with increased capability to distribute permanent electrical power.

Schedule

In *November* 2013, WTCC released Integrated Master Schedule (IMS) 70, (b) (4) [redacted]

Cost Data

WTCC submitted its cost model revision on *November 29*, 2013. Based on the contract awards and estimates through *October 31*, 2013, WTCC's Estimate at Completion (EAC) for the federally funded PATH Hub project is just over $3.7 billion. WTCC is reporting the PATH Hub expenditures through September 30, 2013, to be more than $*2.68* billion, or approximately *72.1* percent of the EAC. This represents a $*20.1* million increase in PATH Hub expenditures since the *September 30*, 2013 report.

Risk Management

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. As information on the impacts of Hurricane Sandy became available, the PMOC conducted PEP workshops in June 2013 to

discuss and quantify the impacts to cost and schedule. During the intervening period, the PMOC - *reconciled* the results with WTCC. The outcome of this effort *was* utilized to update the PEP. *A draft of the revised PEP showing all of the proposed changes was provided to WTCC during November 2013*.

Technical Capacity and Capability Review (TCCR) -

An update to the TCCR will be performed in conjunction with the update of the PEP and is - anticipated to be completed later in 2013. -

Project Management Plan (PMP) -

The grantee provided an update to its Project Quality Assurance Plan *at the end of October* 2013, *and it is currently under review by the PMOC*. An update to its Operations Management Plan, which is another PMP sub-plan, remains outstanding. The grantee has provided a draft - construction phase Force Account Plan and Justification, and the PMOC is currently - reviewing it.

Project Quality Assurance -

During *Novem*ber 2013, WTCC Quality Assurance (QA) performed three quality assurance - oversight audits on both field construction and QA program activities, including reviews of - Construction Manager (CM) QA field activities and the ongoing installation of oculus steel. For - the QA audits completed in *November* 2013, no corrective actions were identified. WTCC QA is - in the process of completing an audit of the oculus steel contractor to review an outsized - transition arch and any related quality process issues. The results of this audit will be - documented in an audit report.

Site Safety and Security Review -

The PATH Hub project's year-to-date safety performance *through September* 2013 remained - relatively stable. The year-to-date (through *September* 2013) Total Case Incident Rate (TCIR) - *increased* slightly, *but it still* compared favorably with the national average of 5.10. The year-to-date Lost-Time Incident Rate (LTIR) *remained essentially the same* and was below the national - average of 2.10. WTCC has continued its active role in managing worker safety. *October* 2013 - safety data for the project was not fully available at the time this report was drafted. -

Issues/Problems/Suggestions -

The widespread regional damage caused by Hurricane Sandy in late October of 2012 represents a - potential delay to the completion of the PATH Hub project. (b) (4) [redacted]

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 CA was signed on April 25, 2006. An RRCA was executed on September 18, 2012. The RRCA establishes an RCD of December 17, 2015, and commits $2.872 billion in federal funding to the PATH Hub project. It also includes an FTA-allowable not-to-exceed amount of $3.995 billion.

Quarterly Progress Review Meeting

The QPRM for the third quarter of 2013 is scheduled for December 5, 2013.

WTC Site Master Plan

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

Environmental Compliance

(Reported on separately by FTA's LMRO.)

Design Support during Construction

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

Construction Status

Transit Hall Concrete: During *November*, the concrete contractor continued placement of miscellaneous concrete items and concrete wall sections located at the lower levels of the Transit Hall. Current work includes the removal of formwork material and the filling of openings in concrete walls and floor slabs that were omitted during larger concrete pours and that provided temporary construction access openings.

Oculus Steel: Fabrication, shipment, and erection of oculus steel continued during *November* 2013. The current fabrication metrics, based on status reports issued by the fabrication subcontractor, are: 100 percent completion for sub-portals, 100 percent completion for lower portals, 100 percent completion for upper portals, 100 percent completion for abutments, 75 percent completion for abutment outer shells, 100 percent completion for arches, 100 percent completion for transitions, and 82 percent completion for rafters. *The seventh shipment of fabricated oculus elements, formally identified as shipment 7A, arrived at the contractor's receiving location in Brooklyn on November 27, 2013. Shipment 7A consisted of 8 upper portals, 12 arch transitions, and 26 rafters. Only Shipment 7B remains after this shipment*. Difficulties encountered in remaining within the required tolerances for the installed location during field erection of upper portals and transition arches have created delays to the contractor's erection schedule, setting that work behind plan by approximately three months. *The contractor recovered some of the lost time in the schedule during November; however, erection difficulties remain due to the complexities of the bolted connections and the additional steel falsework and field retrofit required*. Of the total quantity of 110 upper portals and *110* arch transitions, approximately *60* upper portals have now been set in position, and approximately *54* arch transitions have also been set. No rafters have yet been erected.

Oculus Glass: Of the required quantity of glass panels, 80 percent has been received from the contractor's fabrication subcontractor, and the remaining 20 percent is *being shipped in individual cargo container loads; ten containers remain to be shipped to complete the delivery of required glass panels*. Upon receipt, the final glass panels will be transported to the contractor's storage location in Harrison, New Jersey, with the other oculus glass that was previously received. The glass panels will be retained at that location until the oculus structure has advanced to a point where their installation can begin. This point is currently anticipated to be reached in the second quarter of 2014. *Also during November, multiple field inspections of the two full-scale mock-ups of the oculus glass panels were conducted at the site. The designers identified a number of concerns with the mock-ups, but the contractor thus far is responding to those observations by citing its compliance with the requirements of the governing contract specifications. Resolution of the designers' comments is underway, although the need for any associated rework has not yet been determined*.

Oculus Skylight: During *November*, testing of a full-size mock-up of a typical section of the oculus skylight *continued* at the contractor's testing facility. *Testing* includes air infiltration, static water penetration, dynamic water penetration, thermal cycling, soft body impacts, hard body impacts, breakage, and roof cycling at various temperatures. *Several representatives from the project team are scheduled to visit the testing facility in eastern Pennsylvania in early December to assess the testing and the test results to dat*e.

Transit Hall Interior Stone: Under this contract, stone floor and wall finishes are to be furnished and installed throughout the Transit Hall side of the project, including at both of the grand staircases, the oculus floors at elevations 274 and 296, both levels of the north-south concourse, and various other associated stairs, passageways, and entryways. Phase 1 installation, consisting of the stone flooring at the southern end of the lower level of the north-south concourse, commenced during October *and advanced during November, working from south to north*. *Fabrication of the stone for the upper level of the north-south concourse, and the stone for the grand stairs at the west end of the transit hall, commenced during November, 2013.* Stone installation is expected to continue on an uninterrupted basis through all ten phases of the Transit

Hall stone contract, *with the* second phase *of installation* currently forecast to start in March of 2014.

PATH Hall Construction (PHC): During *November*, the PHC contractor continued the demolition and excavation work on the closed portions of Platform B at the north end and east section of the station. The PHC contractor has constructed multiple concrete sections of the east portion of Platform B. The mechanical trades continued installing the overhead mechanical work under the PATH Hall roof. *The metal panel contractor began installation of the ceiling metal panel system of the PATH Hall roof above the mezzanine level of Platform A*. The stone contractor *continued* the stone installation at the mezzanine level above Platform A. WTCC continues to forecast that Platform A will be placed into service by the end of the fourth quarter of 2013.

Structural Steel to Grade (SSTG): During *November*, the SSTG contractor continued erecting structural steel members *and installing the precast concrete box girders that also serve as ductwork over Track 2* at the north end *section* of Platform B in the PATH station.

East Bathtub Mechanical, Electrical, Plumbing and Fire Protection Work: Work by these four contractors continued during October in several locations, including Spot Networks SN-TS, SN-TN, SN-PN, and SN-NW, along with work at the Central Fan Plant. *Following energization of* the high tension sides of spot networks SN-TS and SN-TN *in late October, the 480-volt sides of both facilities* were energized *during November*. *Work at Spot Networks SN-PN and SN-NW continued during November. These two spot networks are the last two of a total of six spot networks being provided to serve the electrical needs of most of the site including the PATH Hub project. Energization of these last two spot networks should occur in the first quarter of 2014*.

Emergency Generator Plant and Emergency Chiller Plant: During *November*, installation of the emergency generator equipment and emergency chiller equipment advanced. However, work to repair factory defects in emergency diesel generators 7 and 8 did not start, *because it was awaiting the construction of partitions around the work area to limit the encroachment of foreign substances during the repair work*. Additionally, one of the four emergency air-cooled chillers that were brought to the site and rigged to the fifth floor of Tower 3 during June sustained damage in handling. The mechanical contractor has indicated that it intends to replace that chiller unit and is *now* forecasting delivery of the new unit by mid-*December* 2013. Work is also ongoing to complete the fuel delivery system that will supply diesel fuel from the fuel tanks located at the 240' elevation of Tower 3 up to the fourth floor location of the emergency generators. *Some of this work is being performed for the Hub project by the Tower 3 contractor*.

Primary Distribution Center (PDC) at Tower 1: *Four of the eight line-ups at the Tower 1 PDC have been energized as of the end of October 2013. However, energization of the next set of line-ups, line-ups E and F, has been delayed based on Con Edison requirements for additional testing and will likely occur during the first quarter of 2014. Additionally, although line-ups A, B, C, and D are live, they are not yet feeding any of the Hub project elements that they will serve in the future. Instead, the Temporary Primary Distribution Center at the North Temporary Access continues to supply the Hub project electrical requirements. Migration from the Temporary Primary Distribution Center source to the PDC source will likely begin in the first quarter of 2014 with completion of those electrical load transfers required during the second quarter to allow for the planned demolition of the NTA. The PDC power supply is currently being utilized by some of the other WTC site stakeholders, including Tower 1.*

Vertical Circulation: During *November*, *the* contractor continued installing the escalator components at Platform A and the escalator components located in the Transit Hall at elevations 274 *and 286*. The contractor also continued to work on the Platform A elevator cabs and the escalators located in Tower 4.

Architectural Trades: The contractor continued erecting multiple architectural steel columns at elevation 296 of the Transit Hall. The architectural steel members in the Transit Hall at elevation 274 were completed in *November* 2013. *The storefront contractor began installation of m*ultiple sections of the storefronts at elevation 274.

North Projection Structural Rehabilitation: During the month of *November* 2013, the contractor continued cleaning areas and performing punch list work.

Commissioning: The current focus is the commissioning of systems required for the Platform A temporary permit to occupy, which is scheduled for December 31, 2013. The areas to be turned over are Track 1, Platform A, and the mezzanine level above Platform A. The emphasis is on the commissioning of all low voltage systems, specifically the life safety system, the fire alarm system, and the Building Automation Temperature Control system necessary to support operation of Platform A.

Construction Logistics

The WTCC Office of Program Logistics (OPL) continued biweekly logistics and coordination meetings to facilitate construction progress and the sharing of access, egress, and work zones among all contractors on-site. Fulton Street in the area of the oculus steel construction remains a heavily congested area due to the number of construction activities and ongoing steel erection. The PMOC has recommended that WTCC provide a single point of contact for all work in this highly congested area. OPL is currently coordinating the planned fourth quarter partial openings of *Greenwich and Liberty Street* sections to limited traffic. Gate 3C will be relocated with additional security provided in areas where public access is permitted, *adjacent to Tower 4*.

Commissioning of Mechanical, Electrical, and Plumbing (MEP) and Fire Protection systems in Tower 4 continues. Tower 4 is being prepared for turnover and occupancy. A ribbon cutting ceremony in the building lobby *was* held on November 13, 2013, for the turnover of Tower 4. Potential impacts to PATH Hub construction are being assessed. *Vehicle Security Center (VSC) equipment testing will start in mid-December. Temporary occupancy is planned for yearend. North and South Fan Plant testing is in progress and will be ongoing. A PATH weekend shutdown occurred during two weeks of November to perform storm repair work in the tunnel tubes. The PATH Hall contractor took advantage of these outages to perform Hub project work within the station.*

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.

Community Relations

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

C. Schedule

WTCC released IMS *70* in *November* 2013. This IMS, with a data date of *October* 1, 2013, (b) (4) [redacted] WTCC continues to assess opportunities for workarounds, in particular for platform construction. *IMS 70 continues to show the opening of Platform A on December 31, 2013, but it changes the forecasts for some of the oculus steel erection milestones to later dates*.

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

Significant Activity	**Action by**
Platform A Mezzanine Structure	WTCC
Platform A Operational	WTCC
Mobilization of Oculus Glazing	WTCC
Erection/Bolt/Weld Oculus Steel Upper Portals and Transitions	WTCC

D. Cost Data

WTCC submitted its cost model revision on *November 29*, 2013. Based on the contract awards and estimates through *October 31*, 2013, WTCC's EAC for the federally funded PATH Hub project is slightly more than $3.7 billion. WTCC is reporting the PATH Hub expenditures through *October 31*, 2013, to be over $*2.68* billion, or approximately *72.1* percent of the EAC. This represents a $*20* million increase in PATH Hub expenditures since the *October 31*, 2013 report.

On October 18, 2012, the Port Authority Board re-authorized the WTC PATH Hub project, at an estimated total project cost range of $3.74 billion to $3.995 billion. This authorization provided for an increase in the budget from approximately $3.4 billion to slightly more than $3.7 billion.

The $3.7 billion budget reflects the updated engineer's estimates for all packages in the completed procurement plan and includes the Hub project's share of the common infrastructure projects, such as Retail, the Central Chiller Plant, the Common Electrical System, and site-wide operational support elements. WTCC continues to update the cost allocations that are assigned to the Hub project.

The following table summarizes the latest available EAC (WTCC's forecast) and expenditures as of September 30, 2013:

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	$2,825	$2,076
Program Management and Design	682	608
Contingency	(b)	(
Total	(b) (4)	(b) (4)

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

Although it was the opinion of the PMOC that the budget established after the October 18, 2012 project re-authorization by the Port Authority Board would not provide WTCC with adequate funding to complete the project given the impacts of Hurricane Sandy, WTCC has advised that the costs related to Hurricane Sandy are being funded from a separate operating account set up by PANYNJ for Hurricane Sandy and will not impact WTCC's current EAC of $3.7 billion.

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 PMOC, and WTCC completed the PEP in conjunction with the execution of the RRCA on September 18, 2012.

As information on the impacts of Hurricane Sandy became available, the PMOC conducted PEP workshops in June 2013 to discuss and quantify the impacts on cost and schedule. *During the intervening period, the PMOC reconciled the workshop results with WTCC. The outcome of this effort was utilized to update the PEP. A draft of the revised PEP showing all of the proposed changes was provided to WTCC during November 2013.*

F. Technical Capacity and Capability Review

An update to the TCCR and a new TCCR Spot Report are anticipated to be completed later in 2013. The FTA will use the PEP to measure WTCC's capability and capacity.

Project Management Plan (PMP)

The grantee provided an update to its Project Quality Assurance Plan on October 31, 2013, *and it is currently under review by the PMOC*. An update to its Operations Management Plan, which is another PMP sub-plan, remains outstanding. The grantee previously provided a draft construction phase Force Account Plan and Justification, and the PMOC is currently reviewing it.

Project Organization

WTCC continues to update consultant and contractor staff assignments across project areas to address staffing needs as the project advances.

Project Quality Assurance

During *Novem*ber 2013, WTCC QA performed *three* quality assurance oversight audits of both field construction and QA program activities, including reviews of CM QA field observations and the ongoing installation of oculus steel. For the QA audits completed in *November* 2013, no corrective actions were identified. WTCC QA is in the process of completing an audit of the oculus steel contractor to review an outsized transition arch and any related quality process issues. The audit results will be documented in an audit report.

G. Site Safety and Security Review

The WTC PATH Hub project's safety performance *through September* 2013 remained relatively stable, varying *slightly* from the performance recorded through *August* 2013. From the start of the year through the end of *September* 2013, there have been *33* recordable injuries and *15* lost-time injuries on the project, with *1,623,339* hours worked. The resultant year-to-date LTIR for the project is *1.85*, which is below the national average of 2.10. The corresponding TCIR for the project for the same period is *4.93*, which compares favorably to the national average of 5.10. WTCC has continued its active role in managing worker safety on the site. *October 2013* safety data for the project was not fully available at the time this report was being drafted.

H. Issues/Problems/Suggestions

The widespread regional damage caused by Hurricane Sandy in late October of 2012 represents a potential delay to the completion of the PATH Hub project. (b) (4) [redacted]

I. Action Items

Key Project Action Item Checklist

Key Project Action Item	Agency	Target Completion	Status/Comments
PEP Milestone Review Point	PANYNJ/ LMRO/ PMOC	TBD	This will be delayed until the schedule impacts from the hurricane are fully recognized.

End of report. Appendices follow.

APPENDICES

APPENDIX A – LIST OF ACRONYMS

CA	Construction Agreement
CCP	Central Chiller Plant
CM	Construction Manager
EAC	Estimate at Completion
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
PDC	Primary Distribution Center
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
RCD	Required Completion Date
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.