

MONTHLY MONITORING REPORT

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

December 2013



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TABLE OF CONTENTS

TABLE OF CONTENTS	2
DISCLAIMER.....	3
REPORT FORMAT AND FOCUS	4
EXECUTIVE SUMMARY	4
Project Description.....	4
Construction Agreement (CA)	4
Quarterly Progress Review Meeting (QPRM)	4
Design Activity	4
Procurement Activity	5
Construction Activity	5
Schedule	5
Cost Data.....	5
Risk Management	5
Technical Capacity and Capability Review (TCCR)	6
Project Management Plan (PMP).....	6
Project Quality Assurance.....	6
Site Safety and Security Review	6
Major Issues/Problems	6
MONITORING REPORT	6
A Project Description	7
B Project Status.....	7
C Schedule	11
D Cost Data	11
E Risk Management.....	12
F Technical Capacity and Capability Review	12
G Site Safety and Security Review	13
H Major Issues/Problems	13
I Action Items	13
APPENDIX A – LIST OF ACRONYMS.....	15

Cover: View of the mezzanine level above Platform A, looking south in the PATH Hall. A temporary partition wall to separate public users from the work area is being erected at left in preparation for the opening of Platform A.

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 funded by the FTA's Lower Manhattan Recovery Office (LMRO).

EXECUTIVE SUMMARY

During *December*, the project *remained focused on* the next imminent *major* schedule milestone event—the opening of Platform A, *including* adjacent Track 1 *and the mezzanine level directly above the platform*. Multiple support spaces and systems are necessary to accomplish the opening of Platform A, and during the month resources *remained* dedicated to *advancing* those elements towards completion. Also during *December*, *oculus steel erection continued to prove more difficult than initially expected, and its progress again lagged behind forecast*.

Project Description

The WTC PATH Hub Terminal serves 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 establishes a not-to-exceed amount of \$3.995 billion for the project.

Quarterly Progress Review Meeting (QPRM)

The QPRM for the third quarter of 2013 *was held on* 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

While progress was made during the month of December 2013, the planned opening of Platform A and adjacent Track 1 to revenue service was not achieved. WTCC's expected opening date was re-projected to occur in mid-February. Work to make the mezzanine level above Platform A ready to accept passenger traffic from and to the platform is critical to the opening of the platform, as is work at various back-of-house support spaces, including those for the life safety, power, signal, and communications systems. None of these elements is yet ready to accept passengers, although some had entered the testing phase by the end of the month.

At the Transit Hall in the east bathtub, limited progress was made in erection of the oculus steel as geometry control issues continued to lengthen the duration of the oculus steel erection. Weather impacts and holidays also caused the loss of multiple workdays during the month, because handling of oculus steel pieces and welding activities could not be performed due to wind and precipitation.

Schedule

In November 2013, WTCC released Integrated Master Schedule (IMS) 70, (b) (4)



Cost Data

WTCC submitted its cost model revision on *December 31, 2013*. Based on the contract awards and estimates through *November 30, 2013*, WTCC's Estimate at Completion (EAC) for the federally funded PATH Hub project is just over \$3.7 billion, *which is unchanged from the previous month's model*. WTCC is reporting the PATH Hub expenditures through *November 30, 2013*, to be more than \$2.71 billion, or approximately 72.8 percent of the EAC. This amount represents a \$26.4 million increase in PATH Hub expenditures since the *October 31, 2013* report, but falls short of the required average monthly burn rate of *approximately \$40 million* that is necessary to complete the project by the forecast date of December 2015.

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 from the storm. During the intervening

period, the PMOC then reconciled the results of the workshops with WTCC, and the outcome of this effort was used to update the PEP. A final draft of the revised PEP showing all of the proposed changes was provided to WTCC during November 2013, *and it remained under review by WTCC during December.*

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 during the first quarter of 2014.

Project Management Plan (PMP)

The grantee provided an update to its Project Quality Assurance Plan, a PMP sub-plan, at the end of October 2013, and the PMOC is currently reviewing it. An update to the grantee's 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 December 2013, WTCC Quality Assurance (QA) completed nine quality assurance oversight audits. For the QA audits completed in December 2013, no corrective actions were identified. In addition, WTCC QA is also in the process of completing three audits related to: an outsized transition arch, the process for replacing equipment impacted by Hurricane Sandy, and the design certification process. The December 2013 audit totals reflect the audit reports issued at the time this report was drafted.

Site Safety and Security Review

Safety performance for the PATH Hub project through October 2013 remained relatively stable compared to that for the previous month. For the year to date (through October 2013), both the Total Case Incident (TCIR) and Lost-Time Incident Rate (LTIR) decreased slightly and are below the established project goals of 5.00 and 2.00, respectively. WTCC has continued its active role in managing worker safety. The November 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)



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 *was held on* 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 *December*, 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 *punch list work*. *The concrete contractor is approximately 99% complete.*

Oculus Steel: Fabrication, shipment, and erection of oculus steel continued during *December* 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, 85 percent completion for abutment outer shells, 100 percent completion for arches, 100 percent completion for transitions, and 90 percent completion for rafters. The *eighth* shipment of fabricated oculus elements, formally identified as shipment 7B, is *tentatively scheduled to depart from the fabricator's facility in mid-January. However, contrary to previous projections, it will not be the final shipment. One additional shipment was identified by the contractor as being necessary, although a target date for its release has yet to be projected. The fabrication subcontractor's shops were closed for the two-week period that included Christmas Day and New Year's Day and will reopen on January 6, 2014.* Difficulties encountered in remaining within the required tolerances for the installed location during field erection of upper portals and transition arches *continued to create delays to the contractor's erection schedule, currently setting that work behind plan by approximately 90 calendar days.* Erection difficulties also exist with the complexities of the bolted connections and the additional steel falsework and field retrofit required. *Winter weather conditions are also delaying progress of erection; wind and precipitation forced the cancellation of several workdays during the month.* Of the total quantity of 110 upper portals and 110 arch transitions, approximately 62 upper portals have now been set in position, and approximately 55 arch transitions have also been set, *with the number of each erected in December tallied at 2 and 4 respectively.* No rafters have yet been erected.

Oculus Glass: *Although previously forecast to begin in the third quarter of 2013, commencement of oculus glass installation continues to await the turnover of the oculus structure. Currently, mobilization of the glass contractor is being forecast for April of 2014. All of the glass panels have been fabricated and shipped from the contractor's fabrication subcontractor, and most are being stored at the contractor's storage facility in Harrison, New Jersey. The glass contractor has applied for additional compensation as a result of the delay in starting the glass panel installation, although this issue has not been settled at present. Additionally, a number of designer comments remain open on the mock-ups of the oculus glass panels that were erected on-site in November 2013. Meetings to discuss the comments and what can be done to address them are planned for early January 2014.*

Oculus Skylight: During *December*, 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 *visited* the testing facility in eastern Pennsylvania *during* December to assess the testing and the test results to date.

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 *but has been experiencing delays. These delays are due to cold temperatures that have slowed the placement of the setting bed and finish grouting required during installation of the stone floor pavers. During December, the contractor erected temporary*

enclosures in the active installation areas and added temporary heat to allow the work to advance within the required temperature range for mixing, placing, and curing the materials. 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 *December*, 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 *continued* 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 forecasts that Platform A will be placed into *service during the first quarter of 2014*.

Structural Steel to Grade (SSTG): During *December*, 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 *December* in several locations, including Spot Networks SN-PN and SN-NW, along with work at the Central Fan Plant. 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 *December*, installation of the emergency generator equipment and emergency chiller equipment advanced. Work is also ongoing to *install* the fuel delivery system that will supply diesel fuel from the fuel tanks located at elevation 240 of Tower 3 up to the fourth floor location of the emergency generators *at elevation 386*. Some of this work is being performed for the PATH Hub project by the Tower 3 contractor. *At the end of December, the necessary connection of the three diesel fuel storage tanks at elevation 240 of Tower 3 to the PATH Hub's Emergency Diesel Generator facility at elevation 386 of Tower 3 had not been completed. This work includes the installation of fuel pumps and day tanks, and will need to be in place before testing of the overall system can begin.*

Primary Distribution Center (PDC) at Tower 1: Four of the eight line-ups at the Tower 1 PDC had been energized as of the end of October 2013. However, energization of the next set of line-ups, line-ups E and F, was 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 PATH Hub project's 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 North Temporary Access. The PDC power supply is currently being utilized by some of the other WTC site stakeholders, including Tower 1.

Vertical Circulation: During *December*, 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 *continues* erecting multiple architectural steel columns at elevation 296 of the Transit Hall. The storefront contractor *continues* installation of multiple sections of the storefronts at elevation 274. *At elevation 296, electrical conduits have been installed below ceiling level requiring re-work to raise the conduits above low ceiling level for the installation of ceiling panels. Construction of the ceiling installations, flooring and interior wall panels require coordinated scheduling by all trades.*

North Projection Structural Rehabilitation: During the month of *December* 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 was 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, with specific reference to the life safety system-Fire Alarm and the Building Automation Temperature Control System that are necessary to support the operation of Platform A. The commissioning of the vertical circulation system to support Platform A has commenced. Commissioning of elevators #7 and #8 and escalators #11 and #12 is scheduled to be performed during the week of January 13, 2014, but will probably be completed by the week of January 27, 2013.*

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. *Tower 4 connector work at grade is scheduled to be completed at the end of January 2014 and will improve access on Church Street. The contractor has encountered a problem with space limitations for the delivery of oculus steel at the site. The contractor will resolve this problem by temporary halting deliveries, with no delay to construction. Fulton Street in the area of the oculus steel construction remains a heavily congested area because of the many construction activities and ongoing steel erection. The contractor is installing bollards along West Fulton Street with the goal of opening this end of the street for limited construction access. A security gate (Gate 2B) will be required at this location. Gate 3C has been relocated to the north of its previous location (which was adjacent to Tower 4), and additional security is being provided in areas where public access is permitted adjacent to Tower 4.*

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)

WTCC continues to assess opportunities for workarounds, in particular for platform construction. IMS 70 *continued* to show the opening of Platform A on December 31, 2013, *which did not occur*, but it *changed* the forecasts for some of the oculus steel erection milestones to later dates. *IMS 71, with a data date of December 1, 2013, is expected to be submitted during January, 2014.*

The following table summarizes key activities that *are expected to be underway during the 90-day look-ahead period*:

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 *December 31, 2013*. Based on the contract awards and estimates through *November 30, 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 November 30, 2013, to be over \$2.71 billion, or approximately 72.8 percent of the EAC. This represents a \$26.4 million increase in PATH Hub expenditures since the *November 30, 2013* report, but falls short of the required average monthly burn rate of \$40 million that is necessary to complete the project by the forecast date of December 2015.

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 PATH 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 PATH Hub project.

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

Description	EAC (WTCC's Forecast) (in millions)	Expenditures (in millions)
Construction	\$2,825	\$2,102
Program Management and Design	682	608
Contingency	(b) (4)	(b) (4)
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, and the outcome of this effort was used to update the PEP. A draft of the revised PEP showing all of the proposed changes was provided to WTCC during November 2013, *and it currently remains under WTCC's review.*

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, a PMP sub-plan, on October 31, 2013, and the PMOC is currently reviewing it. 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 December 2013, WTCC QA completed two quality assurance oversight audits of the Construction Manager (CM) QA activities and a hydrostatic test. For the QA audits completed in December 2013, no corrective actions were identified. In addition, WTCC QA is in the process of completing three audits related to: (1) an outsized transition arch, (2) the process for replacing equipment damaged by Hurricane Sandy, and (3) the design certification process. The December 2013 audit totals reflect the audit reports completed at the time this report was drafted.

G. Site Safety and Security Review

The safety performance of the PATH Hub project through October 2013 remained relatively stable, decreasing only slightly from the safety performance in September 2013. From the start of the year through the end of October 2013, there have been 38 recordable injuries and 16 lost-time injuries on the project, with 1,842,903 hours worked. The resulting year-to-date LTIR for the project is 1.74, which is below the established project goal of 2.00. The corresponding TCIR for the project for the same period is 4.12, which is also below the established goal of 5.00. WTCC has continued its active role in managing worker safety on the site. The November 2013 safety data for the project was not fully available at the time this report was 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)

In the west bathtub, the opening of Platform A continued to lag behind the forecast date of December 31, 2013 and has been re-forecast to mid-February by WTCC at this juncture. Many project elements are linked to achievement of that milestone event and WTCC is focusing its resources on completing the construction and testing of those elements at present.

In the east bathtub, the oculus steel erection continues to prove difficult and is also lagging behind plan with respect to established intermediate schedule milestones. Geometry control issues during erection and seasonal weather delays combined during December to place the

oculus steel further behind schedule, with the oculus glass contractor's mobilization deferred to the second quarter of 2014 as a result.

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. Appendix follows.

APPENDIX

APPENDIX A – LIST OF ACRONYMS

CA	Construction Agreement
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
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