Exhibit J-2

Tracking Milestones and Commitment Milestones

Exhibit J-3

Phased TCO Process

General

It is sometimes desirable or necessary to phase or stagger the completion and occupancy of large scale, complicated, or multi-stakeholder, commercial projects on a space by space, partial floor, grouped floor, or partial building "Phased Occupancy" basis, where each defined "Phase" is permitted to be completed and occupied prior to work being completed in a later phase.

Goals

This Exhibit J-5 defines the general goals for a modification of the Port Authority Manual, Process and Procedures Guide, including but not limited to Section III C.10 Types of Authorized Occupancies, (the "PA Manual") that will jointly be developed to define the technical requirements and the process and procedures to enable the Phased Occupancy approach described above. The modification to the PA Manual shall achieve the following goals:

A. To allow "Tenant Fitout" work to occur simultaneously with "Base Building" core & shell work, thereby allowing simultaneous construction work to progress such that the issuance of a Base Building Temporary Permit to Occupy (TPTO) and the issuance of a Tenant Fitout TPTO may occur simultaneously or as close in time as practical.

B. To allow Core & Shell work and Tenant Fitout work to be completed and obtain their respective Permit to Occupy (PTO) for Phased Occupancy areas while other portions of the building may still be under construction.

C. To develop an "Equivalency Review" process that will facilitate the implementation of interim solutions, or alternate temporary designs, to the permanent Life Safety Systems, to allow Phased Occupancy while the completion of the balance of the permanent Life Safety Systems is still in process. This would include a plan to "swing over" the interim solutions to the full permanent Life Safety System upon its completion.

D. To develop a streamlined process for submission and review of requests for Phased Occupancy, and to establish a reasonable time period, commensurate with the complexity of the phased configuration, for review of Phased Occupancy requests.

General Principles:

1. Phased Occupancy will be subject to the review of the Port Authority for code compliance and/or the Equivalency Review.

2. A "Phasing Plan" consisting of a detailed narrative, design documents (signed and sealed) and the anticipated date of occupancy for that Phase, will be required as a TCA submission for each request for Phased Occupancy. The Phasing Plan must clearly describe the boundaries of the Phase, any proposed exiting and the extent of the permanent Base Building Life Safety Systems that will be made operational. However, the goal is not to resubmit full TCA packages that have been previously reviewed. "Phasing Plans" will be submitted under the Design Development / Code Compliance Package (e.g., TCA WTC 2000.00 for Tower 2). The Phasing Plan review, approval, and resolution of all open review comments are required prior to requests for inspections associated with any phased occupancy.

3. Each completed Phase must be code compliant, including but not limited to the requirements for fire alarm, fire protection, life safety, exiting, access for the physically disabled, light and ventilation, and emergency response. The responsibility for compliance with all applicable codes and regulations required for Phased Occupancy shall remain with the A/E of Record for the Base Building and/or Tenant Fitout work.

4. Insofar as the TCA applications for the entire building will likely already have been Fully and/or Conditionally Approved by the Port Authority well in advance of requests for Phased Occupancy, and in order to streamline the administration of the Phased Occupancy request, the Phasing Plan will not include any drawings, specifications, or calculations that have already been approved for the entire building, and are not affected or changed by the Phased Occupancy request.

5. Approval of Phased Occupancy requests shall not be subject to completion or approval of infrastructure from other projects that are not part of the building or structure requesting Phased Occupancy approval.

6. Approval of Phased Occupancy requests shall not be subject to completion of non-Life Safety systems and non-code compliance issues.

7. Approval of Phased Occupancy requests for a TPTO for the core and shell portion of the Phased Occupancy area shall follow the requirements stipulated in the NYC Department of Buildings' "Technical Policy and Procedure Notice No. 12/88", and NYC Department of Buildings "Temporary Certificate of Occupancy for Hi-Rise Class 'E' Buildings Memorandum" dated September 4, 1986.

8. Approval of Phased Occupancy requests shall not be subject to completion of redundant systems mandated by the Protective Design Narrative. Where interim solutions to life safety systems are used either as an equivalency or temporary solution for Phased Occupancy prior to the entire Base Building Life Safety Systems being operational, those temporary systems shall not be subject to the redundancy or hardening requirements of the Protective Design Narrative. Once the entire Base Building Life Safety Systems are completed, the full Protective Design Narrative requirements shall be completed.

9. In order to facilitate concurrent completion of Base Building Core & Shell work and Tenant Fitout work, a process that will enable "progress" inspections of the work as it is completed will be developed. The goal being to incrementally "sign-off" areas/floors as they are completed. Final acceptance by the PA shall be based on the testing of the fully completed system

   To facilitate an expedited and efficient approval process, the PA participation in on site audits will be focused on only those items pertaining to life safety related systems and code compliance issues. Items related to temporary "means and methods" necessary to support construction activities (e.g., hoists, temporary electric, temporary plumbing, etc) would not be subject to PA inspection or review unless it is a Temporary installation in the occupied area

10. To facilitate an expedited and efficient approval process, and to keep the inspecting parties abreast of the progress of the work, the PA shall receive, review and comment on inspection results on a monthly basis. This monthly submission by the respective AOR/EOR would be required and would contain the documentation that was produced in the previous month. All required reports must be provided and critical outstanding comments must be resolved prior to the issuance of the Temporary Permit to Occupy by the PA

11. Prior to the scheduling of a Partial Final Inspection, all Rider comments for this work must be satisfied; A/E of Record must provide all required certifications as to the completion of the work in the Phase / area Involved.

12. All Fire Alarm, Fire Protection and Life Safety requirements must be completed, inspected, tested, and certified by the Architect/Engineer of Record in the partial occupancy area, and all plans, as required by all applicable Laws and regulations, and by the PA Manual (e.g., Fire Protection Plan, Evacuation Plan, Tenant Protection Plan) must be submitted to the PA. Upon satisfactory completion of construction activities as defined in the approved Phased Occupancy diagrams (excluding minor outstanding non-life safety and non-code compliance related punch list items), and acceptance ~~by~~ of the A/E of Record Certifications, and satisfactory PA inspections, the Temporary Permit to Occupy / Use the Phased Occupancy area will be issued.

13. If the interim solutions or alternate temporary designs to the permanent Life Safety Systems are implemented to allow Phased Occupancy, the "swing over" plan from the interim solutions to the full permanent Life Safety System upon its completion shall be identified and shall be a part of the Phasing Plan submittal. After the "swing over" is complete, the testing of the fully completed permanent system will be required prior to the issuance of the Final Permit to Occupy.

14. Temporary Permit to Occupy must be issued by the PA for partial areas for all packages in the area of occupancy

15. The access to and within the completed Phase must be separated from the construction areas so that occupants are not required to be in or go through the construction area. The construction staging areas must be kept separate from the required entrances and exits of the completed Phases and any occupied areas.

EXHIBIT K, K-2, K-3 AND K-HUB

East Bathtub Space Allocation Concept Design

To the extent of any conflict or inconsistency between (i) Exhibit K-2 and Exhibit K, Exhibit K-2 shall control, (ii) Exhibit K-3 and Exhibit K, Exhibit K-3 shall control, and (iii) Exhibit K-HUB and Exhibit K, Exhibit K-HUB shall control.

EXHIBIT K

EAST BATHTUB SPACE ALLOCATION CONCEPT DESIGN

Exhibit K includes

[see Attached List]

DRAWING NO.	TITLE	ISSUE DATE
ARCHITECTURAL SERIES		
K-A0.00	DRAWING INDEX	NOV.16, 2006
K-A0.01	LEVEL B4 (EL 237')	OCT. 4, 2006
K-A0.02	LEVEL B3 (EL 254')	OCT. 4, 2006
K-A0.03	LEVEL B2 (EL 276')	OCT. 4, 2006
K-A0.04	LEVEL B2M (EL 285')	OCT. 4, 2006
K-A0.05	LEVEL B1 (EL 296')	OCT. 4, 2006
K-A0.06	LEVEL B1M (EL 310')	NOV. 1, 2006
K-A0.07	GROUND LEVEL (EL 326')	OCT. 4, 2006
K-A0.08	LEVEL L2 (EL 346')	OCT. 4, 2006
K-A0.09	LEVEL L3 (EL 366')	OCT. 4, 2006
K-A0.10	LEVEL L4 (EL 386')	OCT. 4, 2006
K-A0.11	LEVEL L5 (EL 404')	OCT. 4, 2006
K-A1.01	LEVEL B4 (EL 237') NORTH PLAN	OCT. 4, 2006
K-A1.02	LEVEL B4 (EL 237') SOUTH PLAN	OCT. 4, 2006
K-A1.03	LEVEL B3 (EL 254') NORTH PLAN	OCT. 4, 2006
K-A1.04	LEVEL B3 (EL 254') SOUTH PLAN	OCT. 4, 2006
K-A1.05	LEVEL B2 (EL 276') NORTH PLAN	OCT. 4, 2006
K-A1.06	LEVEL B2 (EL 276') SOUTH PLAN	OCT. 4, 2006
K-A1.07	LEVEL B2M (EL 285') NORTH PLAN	OCT. 4, 2006
K-A1.08	LEVEL B2M (EL 285') SOUTH PLAN	OCT. 4, 2006
K-A1.09	LEVEL B1 (EL 296') NORTH PLAN	OCT. 4, 2006
K-A1.10	LEVEL B1 (EL 296') SOUTH PLAN	OCT. 4, 2006
K-A1.11	LEVEL B1M (EL 310') NORTH PLAN	NOV. 1, 2006
K-A1.12	LEVEL B1M (EL 310') SOUTH PLAN	OCT. 4, 2006
K-A1.13	GROUND LEVEL (EL 326') NORTH PLAN	OCT. 4, 2006
K-A1.14	GROUND LEVEL (EL 326') SOUTH PLAN	OCT. 4, 2006
K-A1.15	LEVEL L2 (EL 346') NORTH PLAN	OCT. 4, 2006
K-A1.16	LEVEL L2 (EL 346') SOUTH PLAN	OCT. 4, 2006
K-A1.17	LEVEL L3 (EL 366') NORTH PLAN	OCT. 4, 2006
K-A1.18	LEVEL L3 (EL 366') SOUTH PLAN	OCT. 4, 2006
K-A1.19	LEVEL L4 (EL 386') NORTH PLAN	OCT. 4, 2006
K-A1.20	LEVEL L4 (EL 386') SOUTH PLAN	OCT. 4, 2006
K-A1.21	LEVEL L5 (EL 404') NORTH PLAN	OCT. 4, 2006
K-A1.22	LEVEL L5 (EL 404') SOUTH PLAN	OCT. 4, 2006
K-A2.01	NORTH-SOUTH SITE SECTION	OCT. 4, 2006
K-A2.20	NORTH-SOUTH PART SECTION	OCT. 4, 2006
K-A2.30	WEST-EAST PART SECTION	OCT. 4, 2006
K-A2.31	WEST-EAST PART SECTION	OCT. 4, 2006
K-A3.01.1	MAXIMUM BUILDING ENVELOPE PLAN	NOV. 16, 2006
K-A3.02.1	MAXIMUM BUILDING ENVELOPE ELEVATION	NOV. 16, 2006
K-A3.03	RESPONSE TO PA COMMENTS & OPEN ISSUES	NOV. 6, 2006
K-0.00	SUPPLEMENTAL DRAWING INDEX	NOV. 16, 2006
STRUCTURAL SERIES		
K-S0.01	LEVEL B4 (El 237')	OCT. 4, 2006
K-S0.02	LEVEL B3 (El 254')	OCT. 4, 2006
K-S0.03	LEVEL B2 (El 276')	OCT. 4, 2006
K-S0.04	LEVEL B2M (El 285')	OCT. 4, 2006
K-S0.05	LEVEL B1 (El 296')	OCT. 4, 2006
K-S0.06	LEVEL B1M (El 310')	OCT. 4, 2006
K-S0.07	GROUND LEVEL (El 326')	OCT. 4, 2006
K-S0.08	LEVEL L2 (El 346')	OCT. 4, 2006
K-S0.09	LEVEL L3 (El 366')	OCT. 4, 2006
K-S0.10	LEVEL L4 (El 386')	OCT. 4, 2006
K-S3.01	SUPERSTRUCTURE ELEVATIONS	OCT. 4, 2006
K-S4.01	SHEARWALL ELEVATIONS	OCT. 4, 2006
K-S4.02	SHEARWALL ELEVATIONS	OCT. 4, 2006
K-S4.03	SHEARWALL ELEVATIONS	OCT. 4, 2006
MECHANICAL SERIES		
K-M0.01	LEVEL B4 (EL 237')	OCT. 4, 2006
K-M0.01.1	T-2 LEVEL 237'	OCT. 4, 2006
K-M0.02	LEVEL B3 (EL 254')	OCT. 4, 2006
K-M0.03	LEVEL B2 (EL 276')	OCT. 4, 2006

K-M0.05	LEVEL B1 (EL 296')	OCT. 4, 2006
K-M0.06	LEVEL B1M (EL 310')	OCT. 4, 2006
K-M0.07	GROUND LEVEL (EL 326')	OCT. 4, 2006
K-M0.08	LEVEL L2 (EL 346')	OCT. 4, 2006
K-M0.09	LEVEL L3 (EL 366')	OCT. 4, 2006
K-M0.10	LEVEL L4 (EL 386')	OCT. 4, 2006
K-M1.02	TOWER 2 AIR RISER DIAGRAM	OCT. 4, 2006
K-M1.03	TOWER 3 AIR RISER DIAGRAM	OCT. 4, 2006
K-M1.04	TOWER 4 AIR RISER DIAGRAM	OCT. 4, 2006
K-M.T2	WTC-T2 404' LEVEL MER	OCT. 4, 2006
K-M.T3.T4	WTC-T3 & T4 386' LEVEL MER	OCT. 4, 2006
K-M.T3.T4.1	WTC-T3 & T4 LEVEL 386' MEZZ	OCT. 4, 2006

ELECTRICAL & PLUMBING SERIES

K- E/PFP0.01	LEVEL B4 (EL 237')	OCT. 4, 2006
K- E/PFP0.02	LEVEL B3 (EL 254')	OCT. 4, 2006
K- E/PFP0.03	LEVEL B2 (EL 276')	OCT. 4, 2006
K- E/PFP0.05	LEVEL B1 (EL 296')	OCT. 4, 2006
K- E/PFP0.06	LEVEL B1M (EL 310')	OCT. 4, 2006
K- E/PFP0.07	GROUND LEVEL (EL 326')	OCT. 4, 2006
K- E/PFP0.08	LEVEL L2 (EL 346')	OCT. 4, 2006
K- E/PFP0.09	LEVEL L3 (EL 366')	OCT. 4, 2006
K- E/PFP0.10	LEVEL L4 (EL 386')	OCT. 4, 2006

EGRESS SERIES

K-LS0.01	LEVEL B4 (EL 237')	OCT. 4, 2006
K-LS0.02	LEVEL B3 (EL 254')	OCT. 4, 2006
K-LS0.03	LEVEL B2 (EL 276')	OCT. 4, 2006
K-LS0.04	LEVEL B2M (EL 285')	OCT. 4, 2006
K-LS0.05	LEVEL B1 (EL 296')	OCT. 4, 2006
K-LS0.06	LEVEL B1M (EL 310')	OCT. 4, 2006
K-LS0.07	GROUND LEVEL (EL 326')	OCT. 4, 2006
K-LS0.08	LEVEL L2 (EL 346')	OCT. 4, 2006
K-LS0.09	LEVEL L3 (EL 366')	OCT. 4, 2006
K-LS0.10	LEVEL L4 (EL 386')	OCT. 4, 2006
K-LS0.11	LEVEL L5 (EL 404')	OCT. 4, 2006

UTILITY & POE SERIES

K-C0.01	EAST BATHTUB POE LOCATION PLAN	OCT. 4, 2006
K-C0.02	UTILITY & POE COORDINATION PLAN	OCT. 4, 2006
K-C0.03	EAST BATHTUB POE	OCT. 4, 2006

EXHIBIT K-2

[see attached]

EXHIBIT K-3

[see attached]

K-HUB

[see attached]

EXHIBIT L

East Bathtub Roles and Responsibilities Matrix

Structural Scope Diagrams

L-A0.01	Level B4 (EL 237')	September 28, 2006
L-A0.02	Level B3 (EL 254')	September 28, 2006
L-A0.03	Level B2 (EL 276')	September 28, 2006
L-A0.05	Level B1 (EL 296')	September 28, 2006
L-A0.07	Ground Level (EL 326')	September 28, 2006

Matrix

Design & Construction Roles and Responsibilities Matrix dated December 15, 2010 attached hereto.

DESIGN & CONSTRUCTION ROLES AND RESPONSIBILITIES MATRIX

PARCEL		PROGRAM AREA	CORE AND SHELL					TENANT FIT-OUT	
			STRUCTURE / ENCLOSURE			BASE BUILDING FIT-OUT			
			DESIGN		CONSTRUCTION	DESIGN	CONSTRUCTION	DESIGN	CONSTRUCTION
			PRIMARY	SECONDARY					
A	TOWER 2 PARCEL	COMMERCIAL	SPI		SPI	SPI	SPI		
		RETAIL		RETAIL		RETAIL	SPI/RETAIL	RETAIL	RETAIL
		HUB		PA		PA	SPI/PA		
		VSC SERVICE ROADWAY				PA	SPI/PA		
		COMMERCIAL PARKING				SPI	SPI	RETAIL	RETAIL
		PA PARKING							
		MTA							
		COMMON		PA / RETAIL		SPI/PA/RETAIL	SPI/PA/RETAIL		
B	HUB PARCEL	COMMERCIAL	PA	SPI	PA	SPI	SPI		
		RETAIL		RETAIL		RETAIL	RETAIL	RETAIL	RETAIL
		HUB		PA		PA	PA		
		TOUR BUS PARKING / VSC SERVICE ROADWAY		PA		PA	PA	PA	PA
		COMMERCIAL PARKING		SPI		SPI	SPI	RETAIL	RETAIL
		PA PARKING							
		MTA		PA/MTA		PA/MTA	PA/MTA	PA/MTA	PA/MTA
		COMMON		SPI / RETAIL		SPI/PA/RETAIL	PA		
C	TOWER 3 PARCEL	COMMERCIAL	SPI		SPI	SPI	SPI		
		RETAIL		RETAIL		RETAIL	SPI/RETAIL	RETAIL	RETAIL
		HUB		PA		PA	SPI/PA		
		VSC SERVICE ROADWAY				PA	SPI/PA		
		COMMERCIAL PARKING				SPI	SPI	RETAIL	RETAIL
		PA PARKING		SPI		SPI	SPI	RETAIL	RETAIL
		MTA		PA/MTA		PA/MTA	PA/MTA	PA/MTA	PA/MTA
		COMMON		PA / RETAIL		SPI/PA/RETAIL	SPI		
D	TOWER 4 PARCEL	COMMERCIAL	SPI		SPI	SPI	SPI		
		RETAIL		RETAIL		RETAIL	RETAIL	RETAIL	RETAIL
		HUB		PA		PA	PA		
		VSC SERVICE ROADWAY							
		COMMERCIAL PARKING							
		PA PARKING		SPI		SPI	SPI	RETAIL	RETAIL
		MTA							
		COMMON		PA / RETAIL		SPI/PA/RETAIL	SPI		

ADDITIONAL ROLES & RESPONSIBILITIES NOTES:

1. THE TERM "DESIGN" INCLUDES ALL NECESSARY DESIGN, DOCUMENTATION (DRAWINGS & SPECIFICATIONS ETC.) & CONSTRUCTION ADMINISTRATION SERVICES TO COMPLETE THE ASSOCIATED SCOPE.

2. "CORE AND SHELL" SHALL BE DIVIDED INTO TWO CATEGORIES OF WORK, (a) 'STRUCTURE AND ENCLOSURE' WHICH INCLUDES ALL STRUCTURAL FRAMING, SLABS AND ABOVE GRADE EXTERIOR ENCLOSURE, (b) 'BASE BUILDING FIT-OUT' WHICH INCLUDES ALL ELEMENTS OF CORE AND SHELL CONSTRUCTION OTHER THAN 'STRUCTURE AND ABOVE GRADE EXTERIOR ENCLOSURE'.

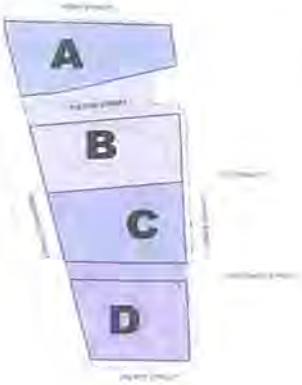
3. THE PA SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE TEMPORARY AND PERMANENT UNDERPINNING STRUCTURE FOR THE MTA #1 SUBWAY AND ALL PROGRAM AREAS LOCATED BELOW AND ADJACENT TO THE SUBWAY ZONE.

4. THE PA SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE VEHICLE SECURITY CENTER AND THE SOUTH BATHTUB.

5. REFER TO THE NOTES INCLUDED IN THE STRUCTURAL SCOPE DIAGRAMS FOR EXTENT OF RESPONSIBILITIES OF THE PRIMARY AND SECONDARY DESIGNER WITHIN EACH STAKEHOLDER'S SCOPE LIMITS.

6. THE PA, ALONG WITH INPUT FROM SPI AND OTHER STAKEHOLDERS, SHALL DESIGN THE STREETS, SIDEWALKS AND COMMON UTILITIES OF THE EAST BATHTUB SITE. THE PA SHALL BE RESPONSIBLE FOR THE DESIGN DOCUMENTATION AND CONSTRUCTION OF STREETS, SIDEWALKS AND COMMON UTILITIES.

7. STAKEHOLDERS (HUB, RETAIL, VSC & PARKING) MEP SCOPE OF WORK, AS MUTUALLY AGREED AND AS DOCUMENTED ON STAKEHOLDER'S DRAWINGS, THAT IS LOCATED WITHIN EACH TOWER'S CONTRACT SCOPE LIMITS SHALL BE SPI'S CONSTRUCTION REPOSIBILITY AND SHALL BE PERFORMED BY BASE BUILDING CONTRACTORS UNLESS SPECIFICALLY STATED TO THE CONTRARY ELSEWHERE IN THE CONTRACT DOCUMENTS.



8. FOLLOWING ARE THE CONDITIONS THAT WILL APPLY TO THE PERFORMANCE OF THE PARKING FIT OUT CONSTURCTION WORK BY THE PORT AUTHORITY

(A) ALTHOUGH THE PORT AUTHORITY HAS NOT YET SELECTED A CONTRACTOR TO PERFORM THE RETAIL CONSTRUCTION OR THE PARKING FIT OUT CONSTRUCTION WORK, THE DESIGN COORDINATION OF ITEMS OF WORK TO BE EMBEDDED IN CONCRETE STRUCTURE (INCLUDING FOR THE TOWER 2 PROJECT, THE TOWER 3 PROJECT AND WORLD TRADE CENTER TRANSPORTATION HUB (WTC HUB) PROJECT) MUST BE UNDERTAKEN PROMPTLY. THE PORT AUTHORITY SHALL HIRE, FOR PURPOSES OF PERFORMING MEP TRADE COORDINATION WORK, THE MEP TRADE CONTRACTORS ALREADY SELECTED BY THE SILVERSTEIN LESSEES, SO AS TO ENABLE TRADE COORDINATION FOR THE COMMERCIAL PARKING AND THE PORT AUTHORITY PARKING TO OCCUR WHILE THE REST OF THE TRADE COORDINATION IS TAKING PLACE. SUCH HIRING WILL BE DONE IN ACCORDANCE WITH THE STAKEHOLDER CHANGE ORDER (PIN) PROCESS CURRENTLY IN PLACE AND WILL BE SIMILAR TO THE PROCESS USED WHEN THE SILVERSTEIN LESSEES PERFORM MEP COORDINATION WORK IN THE TOWER 4 PROJECT ON BEHALF OF THE PORT AUTHORITY.

(B) THE SILVERSTEIN LESSEES SHALL HAVE THE RIGHT TO AUDIT THE MEP DESIGN COORDINATION PROCESS FOR THE PARKING PROGRAM, AND ALL MEP COORDINATION DRAWINGS FOR PARKING FIT OUT WORK SHALL BE SUBJECT TO THE REASONABLE APPROVAL OF THE SILVERSTEIN LESSEES PRIOR TO FINAL SIGN-OFF AND RELEASE FOR CONSTRUCTION.

(C) THE COORDINATION PROCESS DESCRIBED HEREIN SHALL NOT RESULT IN ANY DIMINUTION OF THE PARKING PROGRAM THAT AFFECTS THE COMMERCIAL PARKING PROGRAM CAPACITY OR FUNCTIONALITY AS SHOWN ON THE PARKING 100% CONSTRUCTION DRAWINGS. IN ADDITION, THE PORT AUTHORITY WILL WORK WITH THE SILVERSTEIN LESSEES TO EVALUATE OPERATIONAL STRATEGIES TO MAXIMIZE REVENUES FOR, AND THE NUMBER OF AVAILABLE PARKING SPACES TO, BOTH PARTIES; PROVIDED, HOWEVER, THAT THE SILVERSTEIN LESSEE'S ACKNOWLEDGE THAT THE PORT AUTHORITY'S ABILITY TO DO SO MAY BE LIMITED AS A RESULT OF THE POTENTIAL TENANCY OF THE GSA (OR OTHER TENANTS) IN TOWER 1. IT BEING UNDERSTOOD, HOWEVER, THAT SUCH LIMITATION SHALL RELATE ONLY TO THE PORT AUTHORITY'S DESIGNATED PARKING AREAS AND NOT THE PARKING AREAS DESIGNED FOR THE SILVERSTEIN LESSEES.

(D) SUPPLEMENTING THE PROVISIONS OF THE EXHIBIT J CONSTRUCTION PARTNERSHIP, THE PARKING FIT OUT CONSTRUCTION WORK SHALL BE DEEMED TO BE A PROJECT UNDER DEVELOPMENT, AND THE SCHEDULE THEREFOR SHALL BE COMPLETED AND INCORPORATED INTO THE IMS NO LATER THAN THE IMS UPDATE HAVING A SCHEDULE DATA DATE OF DECEMBER 1, 2010. THE SCHEDULE FOR THE PARKING FIT OUT WORK SHALL CONTAIN THE FOLLOWING COMMITMENT MILESTONES: (i) SUBSTANTIAL COMPLETION OF AUGUST 1, 2013, AND OBTAINING OF A TCO NO LATER THAN OCTOBER 1, 2013, PROVIDED, HOWEVER, THAT COMPLIANCE WITH THE FOREGOING COMMITMENT MILESTONES SHALL BE CONDITIONED UPON THE SILVERSTEIN LESSEES GRANTING TO THE CONTRACTOR PERFORMING THE PARKING FIT OUT CONSTRUCTION WORK ACCESS TO THE PORTIONS OF THE PARKING FACILITY THAT WILL BE LOCATED BELOW TOWER 4 NO LATER THAN JANUARY 1, 2012, AND BELOW TOWERS 2 AND 3 NO LATER THAN AUGUST 1, 2012. ANY UNDEFINED CAPITALIZED TERMS USED IN THIS SUBPARAGRAPH (D) SHALL HAVE THE MEANINGS ASCRIBED TO THEM IN THE EXHIBIT J CONSTRUCTION PARTNERSHIP.

(E) IF BY MAY 1, 2011 THE PORT AUTHORITY HAS NOT EXECUTED A FINAL CONTRACT WITH THE GENERAL CONTRACTOR FOR THE RETAIL DEVELOPMENT THAT INCLUDES THE SCOPE DESCRIBED ABOVE AND REQUIRES TIMELY SATISFACTION OF THE COMMITMENT MILESTONES DESCRIBED IN SUBPARAGRAPH (D) ABOVE, THE PORT AUTHORITY SHALL NO LONGER HAVE THE RIGHT TO PERFORM THE PARKING FIT OUT CONSTRUCTION WORK, AND THE SILVERSTEIN LESSEES SHALL PERFORM SAID WORK, WHICH WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE MDA (INCLUDING THE PROVISIONS OF EXHIBIT J AND EXHIBIT O THEREOF).

EXCEPT AS OTHERWISE PROVIDED HEREIN, ANY UNDEFINED CAPITALIZED TERM USED HEREIN SHALL HAVE THE MEANING ASCRIBED TO IT IN THAT CERTAIN AMENDED AND RESTATED MASTER DEVELOPMENT AGREEMENT FOR TOWERS 2/3/4 OF THE WORLD TRADE CENTER DATED AS OF DECEMBER 16, 2010 (TOGETHER WITH ALL EXHIBITS AND SCHEDULES THERETO, AND AS THE SAME MAY BE AMENDED, THE "MDA").

EXHIBIT M

Logistics and Site Access Exhibit

[see attached]

EXHIBIT N

[INTENTIONALLY OMITTED]

EXHIBIT O

Cost Allocation/Reimbursement Methodology for Construction with the East Bathtub

[see attached]

EXHIBIT O

COST ALLOCATION/REIMBURSEMENT METHODOLOGY FOR CONSTRUCTION WITHIN THE EAST BATHTUB

There are four major stakeholders in the East Bathtub – PATH, other PA interests (PA *qua* owner of 1 WTC, portion of parking), Retail, and Silverstein/Office Lessees. This document is intended to detail the basic principles for cost allocation during and up through completion of the core and shell, when one stakeholder performs work within the East Bathtub on behalf of another stakeholder. The starting point for the allocation methodology is subcontractor *trade costs,* which in all cases shall be competitively bid on an open book basis. However, the final value of the work performed – and the payment to be made by one stakeholder to another -- shall be determined by multiplying the allocated trade costs by a uniform project multiplier. There will be two uniform project multipliers which shall be used to calculate the total value of the work.

- Design & Build Multiplier of 1.75
- Build Only Multiplier of 1.65*

Program space for the Silverstein Lessees, Retail and PA/PATH will have to be built within the construction work limits for Towers 2, 3 and 4, as shown on the approved East Bathtub Space Allocation Concept Design attached as Exhibit K to the Master Development Agreement. On all levels, this work consists of creating "shell" space – basic structure including structural openings for elevators, escalators and MEP shafts and risers – that is located within the superstructure of the office towers, but *not* building out any MEP systems or fit-out work (each party being responsible for the cost and construction of its own MEP and fit-out work). Design (when included) shall consist of design development documents, construction documents and full collaboration with Stakeholder and Stakeholder's consultants. However, the cost reimbursement principles are unavoidably somewhat different for the different levels – below grade, at grade, and above grade – due to the different space-sharing conditions.

ADMINISTRATIVE PROCEDURES

A. Bidding Process.

- All bid packages for subcontractor work will call for break out trade cost pricing for any and all work performed for each stakeholder.

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* The "Build Only" multiplier shall apply where the stakeholder sponsoring the work provides the stakeholder performing the construction with fully coordinated 100% construction documents ("CD's"). Further the stakeholder sponsoring the work must also supply construction administration services customarily provided by design professionals, e.g., shop drawing review, field inspection and signoff, etc. By contrast where the "Design & Build" approach is followed, the stakeholder sponsoring the work must provide a conceptual design to the stakeholder who will complete the design and perform the construction.

- Each stakeholder will be able to review and approve the scope documents and bidding materials relating to the work being performed on that stakeholder's behalf prior to issuance.

- Each stakeholder must agree on cost sharing methodology (i.e. direct cost – 100%, shared allocated by area, shared allocated by MEP load), which methodology shall be based upon the principles contained herein.

- Each stakeholder may participate in the bid review and scope review sessions to the extent that the discussions involve work being bid/performed on that stakeholder's behalf.

- Each stakeholder must approve the cost allocation included in the subcontract before the award, which cost allocation shall be based upon the principles contained herein.

B. Change Orders

- All Stakeholders must be advised of any change order with the potential to increase or decrease the stakeholder's allocated cost share of any subcontract package. The cost of change orders will be allocated based on the principles below, except that cost premiums, in excess of 5% of the original cost of work, associated with any change orders as a result of design omissions when a Stakeholder designs and builds for another Stakeholder utilizing the "Design & Build" approach and multiplier detailed above shall be the responsibility of the Stakeholder engaged in the design and construction.

- All Stakeholders with financial interest in a change order may participate in the review and negotiation of such change orders.

C. Requisition and Draw Process

- Stakeholders have the right to participate in the subcontractor pencil copy meetings where the completion percentages and draw requests are developed.

- Stakeholders have the right to review all requisitions in which they have a participating financial interest, though approval rights over such requisitions will be limited to items in which a stakeholder has a financial interest.

- Any disputes arising from the review process shall not disrupt the timing of the monthly payment cycle. Any adjustments resulting from the resolution of a disputed item shall be reconciled in the next payment cycle following such resolution. Any such disputes shall be resolved in accordance with Article 9 of the Master Development Agreement.

- Any reduction or adjustment in retention amounts held on a trade contract shall be made at the sole discretion of the stakeholder responsible for the construction and shall be made in keeping with the terms of the applicable trade contract. However, in no case shall the final payment of retention (or any payments of retention below 2%) be made without the approval of all Stakeholders with a financial interest in the work being performed pursuant to that trade contract.

D. Close Out Process

- The trade cost final close out will be upon acceptance of the work by all Stakeholders on whose behalf work is being performed pursuant to that contract.

E. Schedule

- All of the above procedures must take place in time frames in keeping with the bid and award schedule set by the party doing construction, and the parties will agree on time periods for such stakeholder input. Any delays that may result are subject to adjudication and resolution pursuant to the procedures set forth in the Master Development Agreement.

COST ALLOCATION PRINCIPLES

Set forth below are detailed principles for allocation on a level-by-level basis of cost for the various levels of office towers and sub-grade in the East Bathtub. The goal is to charge stakeholders occupying space where one stakeholder predominates (e.g., the retail within the office towers) for the incremental cost their space imposes on the other stakeholder.

Below Grade Shared Levels (B1 thru B4 & mezzanines)

- *Structure* including floor slabs, core walls and columns -- costs on each level to be allocated on a pro-rata basis determined by the percentage of gross area of program space (excluding common areas) on that level belonging to each stakeholder.

- *Structure for common areas* (e.g. service corridors) -- costs to be allocated on a pro-rata basis determined by the percentage of gross area of program space on the balance of that floor belonging to each stakeholder. Loading dock areas to be allocated based on designed vehicle usage for the current loading dock design and/or other joint analyses.

- *Stairs:* structure, enclosure and stair MEP systems – costs to be allocated based on designed egress usage by each stakeholder.

- Demising Walls: partitions separating two stakeholders' program areas – costs to be split equally between the stakeholders.

- Partitions separating common areas (e.g., corridors) and an exclusive stakeholder area shall be a dedicated cost to the stakeholder.

- *Doors to a stakeholder's program area* are a dedicated cost to the stakeholder (including doors in shared partitions.) *Partitions within a stakeholder's program area* are a dedicated cost to the stakeholder.

Above Grade Retail Levels where Retail is Sole Stakeholder Occupying Floor Area

Retail will reimburse Silverstein for the entire cost of the following:

- *Structure:* entire structure on these levels including floor slabs, columns, and core elements (including core walls, but excluding base building elevator systems, and equipment that does not service that floor.).

- *Curtain wall/envelope enclosing each floor, including louvers:* Retail shall pay the entire cost of exterior enclosure on these levels. The designers of the towers shall have final approval of the curtain wall , but such designers shall, however, work to assure that the cost of retail curtain wall is not substantially greater than the cost of areas enclosing the balance of the podium, including areas allocable to Office Lessees. Further the differences, if any, between podium and tower curtain walls and related improvements will be commensurate with other class A mixed use projects in Manhattan. Retail will have the opportunity to review and reasonably approve curtain wall materials, but only to ensure the functionality of that exterior enclosure for the retail display and merchandising.

- *Stairs:* all stair related elements including structure, enclosures, and stair MEP systems regardless of stair design egress usage.

- All dedicated retail vertical transportation systems (passenger & service elevators, escalators) to the extent constructed by Silverstein as approved by Retail.

- All partitions, demising walls (including walls between retail and an "open to below" void extending down to the office lobby) and doors.

- All base building MEP services for the retail floors and all base building MEP risers passing through the floors.

- If some portion of a retail-exclusive level is taken up by an "open to below" area that is the upper portion of the office lobby, the exterior enclosure including the ceiling, columns/structure within that portion of

the space shall be the cost responsibility of the office Stakeholder. The interior enclosure shall be the responsibility of the Retail Stakeholder.

Above Grade Mechanical Levels and Above Grade Shared Floors

- *Structure, excluding structure of common areas:* including floor slabs, core walls and columns costs to be allocated on a pro-rata basis determined by the percentage of gross area of program space (excluding common areas) on that level belonging to each stakeholder.

- *Structure for common areas* (e.g. service corridors) -- costs to be allocated on a pro-rata basis determined by the percentage of gross area of program space on the balance of that floor belonging to each stakeholder.

- *Stairs:* structure, enclosure and stair MEP systems – costs to be allocated based on designed egress usage by each stakeholder.

- *Curtain wall, core elements and demising partitions in core* – costs (excluding cost of elevator systems that do not service that level) to be allocated on a pro-rata basis determined by the percentage of gross area of program space, (excluding common areas) on that level, belonging to each stakeholder.

- Demising Walls: partitions separating two stakeholders' program areas – costs to be split equally between the stakeholders.

- Partitions separating common areas (e.g., corridors) and an exclusive stakeholder area shall be a dedicated cost to the stakeholder.

- *Doors to a stakeholder's program area* are a dedicated cost to the stakeholder (including doors in shared partitions.) *Partitions within a stakeholder's program area* are a dedicated cost to the stakeholder.

- All base building MEP services to the level to be allocated on a pro-rata basis determined by the percentage of gross floor area of program space (excluding common areas) on that level belonging to each stakeholder.

Ground Floor Level

- *Structure including floor slabs, core walls, columns* costs to be allocated on a pro-rata basis determined by the percentage of gross area of program space (excluding common areas) on the ground level belonging to each stakeholder. For the purposes of this agreement, the office lobby is defined as an exclusive Office Lessee area and, other than the allocation of structure under this section, the costs to construct the office lobbies are to be borne by the Office Lessee.

- *Structure of Common areas (e.g. service corridors)* costs to be allocated on a pro-rata basis determined by the percentage of gross area of program space (other than common areas) belonging to each stakeholder.

- *Stairs:* structure, enclosure and stair MEP systems – costs to be based on designed egress usage by each stakeholder.

- Demising Walls: partitions separating two stakeholders' program areas – costs to be split equally between the stakeholders.

- Partitions separating common areas (e.g., corridors) and an exclusive stakeholder area shall be a dedicated cost to the stakeholder.

- *Doors to a stakeholder's program area* are a dedicated cost to the stakeholder (including doors in shared partitions.) *Partitions within a stakeholder's program area* are a dedicated cost to the stakeholder.

- *Transit Entrances*: -- all costs of transit entrances to be reimbursed by PATH.

- *Building Enclosure:* entire Retail storefront/enclosure (including Retail stairs) to be allocated to Retail; building façade enclosing PATH shafts to be reimbursed by PATH; building façade enclosing Office Lobby to be allocated to Silverstein; building façade enclosing common elements (e.g. shared stairs) to be allocated on designed egress usage. Retail will have the opportunity to review and reasonably approve curtain wall materials, . but only to ensure the functionality of that exterior enclosure for the retail display and merchandising. The designers of the towers shall have final approval of the curtain wall , but such designers shall, however, work to assure that the cost of retail curtain wall is not substantially greater than the cost of areas enclosing the balance of the podium, including areas allocable to Office Lessees. Further the differences, if any, between podium and tower curtain walls and related improvements will be commensurate with other class A mixed use projects in Manhattan.

Other Principles

- There is no obligation to perform work on behalf of another stakeholder beyond the scope defined in the Master Development Agreement. However, if a stakeholder requests such additional work by another stakeholder, and the other stakeholder agrees to perform the work, the multiplier shall be the uniform multiplier indicated above.

- The cost allocation methodology set forth above is based on the plans approved as Exhibit K to the Master Development Agreement and related documents. In the event that, subsequent to the adoption of the Master Development Agreement, PA, PATH or Retail require structural changes

in order to accommodate special requirements of Retail or PATH, or if any Stakeholder wishes to re-allocate responsibility for certain work to Silverstein for any other reason, and in the event Silverstein agrees to such changes, the cost premiums, if any, attributable to such changes will be paid or reimbursed to Silverstein by Retail, PATH, or any other PA-controlled entity, as appropriate (or offset against Silverstein's obligations under this Exhibit to pay or reimburse that Stakeholder for any costs). Silverstein will not be required to perform any additional work for another Stakeholder or its affiliates until all payments and reimbursements owed to Silverstein by that Stakeholder (including affiliates) have been paid and are current pursuant to the terms of this Exhibit and the other provisions of the Master Development Agreement, irrespective of the status of any third-party financial obligations to the Stakeholder desiring to have Silverstein perform additional work.

- Each stakeholder will be responsible for paying all Port Authority fees and other similar fees relating its program areas. In the case of common areas or if one stakeholder does work for another stakeholder, all such fees actually paid by the stakeholder performing the work shall be allocated based on the relative square footage of the stakeholders' program areas.

- In the event that, subsequent to the adoption of the Master Development Agreement, Silverstein requires structural changes in order to accommodate special requirements of Silverstein or if Silverstein wishes to re-allocate responsibility for certain work to the PA (including Retail, PATH, or any other PA-controlled entity) for any other reason, and in the event that the PA agrees to such changes, the cost premiums, if any, attributable to such changes will be paid or reimbursed to the PA by Silverstein (or offset against the PA's obligations under this Exhibit to pay or reimburse Silverstein for any costs). The PA will not be required to perform any additional work for Silverstein or its affiliates until all payments and reimbursements owed to the PA by Silverstein (including affiliates) have been paid and are current pursuant to the terms of this Exhibit and other provisions of the Master Development Agreement, irrespective of the status of any third-party financial obligations to Silverstein.

- Any cost premiums (to the extent reasonably identified) solely attributable to hardening required by PATH and Retail security standards, but not required to comply with Office Tower security standards, shall be reimbursed to Silverstein by PATH and/or Retail, as appropriate.

- PA and Silverstein will agree on a financial plan for payment requisitions, timely payment of required reimbursement payments, and periodic cost reconciliation.

- Nothing contained herein shall increase the $140 million obligation as provided in Paragraph C.2 of Exhibit D.

- As used in this Exhibit, the term "SPI" or "Silverstein" shall mean the Silverstein Lessees or the applicable Silverstein Lessee, as the case may be.

SUPPLEMENT TO EXHIBIT O

Any undefined capitalized term used herein shall have the meaning ascribed to it in that certain Amended and Restated Master Development Agreement for Towers 2/3/4 of The World Trade Center dated as of December 16, 2010 (together with all exhibits and schedules thereto, and as the same may be amended, the "MDA"). In the event of a conflict between the terms of Exhibit O of the MDA and the terms of this Supplement, the terms of this Supplement shall control, govern and prevail and the contradicted and/or inconsistent provisions of Exhibit O shall be deemed amended and superseded accordingly.

1. Cost Allocation Approval Procedures. Attached hereto as Exhibit O-1 and incorporated by reference into this Supplement are the Cost Allocation Approval Procedures agreed to among the parties to the MDA (the "Cost Allocation Approval Procedures").

2. Warrantee Issues.

(a) If a stakeholder performs work ("Performing Stakeholder") on behalf of another stakeholder ("Benefitting Stakeholder"), Benefitting Stakeholder shall have, during the applicable warranty period, direct access to the trade contractor that performed such work with respect to any issues related to warrantees provided by such trade contractor. If Benefitting Stakeholder shall not be satisfied with the response of such trade contractor, Benefitting Stakeholder shall notify Performing Stakeholder thereof, and Performing Stakeholder shall use commercially reasonable efforts to cause its general contractor or construction manager, as applicable, working in conjunction with the applicable trade contractor, to resolve such warranty-related issues.

(b) Prior to performing any work on behalf of a Benefitting Stakeholder, each Performing Stakeholder performing such work shall ensure that such Benefitting Stakeholder is a third party beneficiary with respect to the obligations of such Performing Stakeholder's general contractor or construction manager, as applicable, and all relevant trade contractors with respect to such work. Each of the Silverstein Lessees hereby represents (as to itself only), and the Port Authority hereby acknowledges, that all Benefitting Stakeholders on whose behalf such Silverstein Lessee has performed (or has, as of the date of the MDA, agreed to perform) work are third party beneficiaries under (i) the construction management agreement or general contractor agreement, as applicable with respect to each of the Tower 2 Project, the Tower 3 Project and the Tower 4 Project and (ii) all trade contracts entered into as of the date of the MDA with respect to each of the Tower 2 Project, the Tower 3 Project and the Tower 4 Project.

(c) All warrantees with respect to work performed by Performing Stakeholder on behalf of Benefitting Stakeholder shall have a specified period of duration, which (i) shall be mutually acceptable to Performing Stakeholder and Benefitting Stakeholder, (ii) in the case of work relating to MEP systems and equipment, shall run through a specified date certain and (iii) in the case of all other work, shall run through a date that is defined by reference to the specifications for such work and shall not be shorter than the warranty period set forth in such specifications.

3. System Completion. With respect to any MEP system constructed by Performing Stakeholder on behalf of Benefitting Stakeholder that includes equipment and requires commissioning, Performing Stakeholder's trade contractors shall provide any start-up and commissioning assistance at the time such systems are started up and commissioned, whether or not Performing Stakeholder has installed (or partially installed) such MEP system. In all other instances and with respect to all other systems (or partial systems) constructed by Performing Stakeholder on behalf of Benefitting Stakeholder (including any MEP system that does not include equipment), a "layup" or "mothballing" procedure mutually agreed to by Performing Stakeholder and Benefitting Stakeholder shall be used. Upon acceptance by Benefitting Stakeholder of such mothballed systems (or partial systems), Performing Stakeholder and Performing Stakeholder's trade contractor shall have no further obligation to Benefitting Stakeholder with respect to such systems (or partial systems), other than warrantee obligations as set forth in Section 2 above.

4. Indemnification and Hold Harmless. The indemnification obligations contained in Section 7.1(a) of the MDA shall be deemed to apply to Losses arising out of work performed by a Silverstein Lessee in its capacity as a Performing Stakeholder. The indemnification obligations contained in Section 7.2(a) of the MDA shall be deemed to apply to Losses arising out of work performed by the Port Authority, PATH or the Retail Lessee in its capacity as a Performing Stakeholder. Except as expressly set forth in this Section 4, the provisions of Article 7 of the MDA remain unmodified.

5. Base Building Schedule Delay, Scope Gaps, Contractor Coordination and Logistics. With respect to base building work that is performed by Performing Stakeholder and shared by Performing Stakeholder and Benefitting Stakeholder, Benefitting Stakeholder shall not be responsible for the costs of any change order arising by virtue of schedule delay, gaps in scope, coordination of contractors or logistics, unless and to the extent such change order is directed by Benefitting Stakeholder or such delay, scope gap, lack of contractor coordination or logistics problem is caused by the acts or omissions of Benefitting Stakeholder.

6. T2 and T3 MEP Bidding and Procurement. With respect to any Tower 2 or Tower 3 MEP system constructed by Performing Stakeholder on behalf of Benefitting Stakeholder (the "T2/T3 MEP Work"), a mutually agreed upon representative of Performing Stakeholder shall make available in a meeting with a mutually agreed upon representative of Benefitting Stakeholder the entire subcontractor scope and bid values with respect to the MEP trades. Without limiting the applicability of the Cost Allocation Approval Procedures to other work performed by a Performing Stakeholder on behalf of a Benefitting Stakeholder, approval for the T2/T3 MEP Work shall follow the procedures contained in the Cost Allocation Approval Procedures.

7. Waivers of Lien. Performing Stakeholder shall obtain partial and final waivers of lien with respect to work performed on behalf of Benefitting Stakeholder and make copies of said waivers of lien available to Benefitting Stakeholder at monthly requisition review meetings. Said waivers of lien with respect to work performed on behalf of Benefitting Stakeholder shall be no different in form and substance from the waivers of lien obtained by Performing Stakeholder with respect to work performed on its own behalf. Copies of said waivers of lien

with respect to work performed on behalf of Benefitting Stakeholder shall be provided to Benefitting Stakeholder upon request.

8. Technical Documentation. With respect to any work performed by Performing Stakeholder on behalf of Benefitting Stakeholder, Performing Stakeholder shall provide to Benefitting Stakeholder (i) all technical documentation required to be provided by a trade contractor performing such work under its trade contract, and (ii) such other documentation reasonably required by Benefitting Stakeholder and customarily provided by a trade contractor performing such work, including but not limited to as-built drawings, owner's manuals and warrantees.

9. Payment is Not Acceptance. The making of any payment by Benefitting Stakeholder to Performing Stakeholder on account of work performed by Performing Stakeholder on behalf of Benefitting Stakeholder shall not constitute an approval or acceptance by Benefitting Stakeholder of the work covered by such payment.

EXHIBIT O-1

(Cost Allocation Approval Procedures)

Cost Allocation Approval Procedures

The following procedures shall be followed in approving the cost allocations and in making a commitment for reimbursement by one stakeholder to another for work performed by one stakeholder on behalf of another in accordance with the provisions of the Master Development Agreement Section 2.3.

In accordance with Exhibit O (Costs Allocation/Reimbursement Methodology for Construction within the East Bathtub) the following trade contract bidding and award process shall be followed to insure an open book process that allows each stakeholder to provide their input and participate in the portions of the trade contract awards associated with the work to be performed on their behalf.

The following documents shall be used in each of the procurement steps for each of the trade contract awards that include cost allocated items of work:

- Cost Allocation Bid Response Form
- Cost Allocation Bid Worksheet
- Trade Contract Award Approval Form
- Trade Contract Allocated Requisition Form

Contract Document Preparation and Bidding Phase

1. Prior to putting a trade contract bid package out to bid, a Cost Allocation Bid Response Form will be developed that defines the work items that will be required to be broken out of the base bid by each bidder as part of their bid response. The Bid Response Form will be supplemented, where necessary, with sketches and diagrams that will clarify the scope. Also, a corresponding Cost Allocation Bid Work Sheet shall be prepared for use in analyzing the bid responses received. In preparing these forms, draft copies of each will be provided to each stakeholder for their review and comment. Each stakeholder shall review the scope of the work for each work item listed in the Bid Response Form. The stakeholders shall also review the allocation methodology identified for each work item in the Bid Worksheet. Written comments shall be provided by the stakeholders within two (2) weeks of receipt of the draft forms. Once the stakeholder input is incorporated into the Cost Allocation Bid Response Form it will be provided to the Construction Manager for incorporation into the trade bid package. The Worksheet does not go into the bid package. It is used by the stakeholders in analyzing the responses received.

2. Upon receipt of sealed bids by the Construction Manager a bid opening meeting will be scheduled and each stakeholder representative will be invited to attend. The bids will be opened in the presence of the stakeholder representatives who attend the opening and a photocopy of each Cost Allocation Bid Response Form received will be provided to the stakeholder representatives at the meeting.

3. Subsequently, for each Bid Response Form received the bid values will be entered into a Cost Allocation Bid Worksheet for each bidder. The Worksheet will allocate the bid values based on the agreed allocation methodologies and provide the total value allocable to each stakeholder for each of the bids received. These Worksheets will be distributed to each of the stakeholder representatives.

4. Copies of any Bid Addendums will be provided to the stakeholders as they are issued. Should an addendum require a revision to the Bid Response Form or Worksheet the revised forms will be provided to the stakeholders for their review and comment.

Contract Award Phase

1. Stakeholder representatives will be invited to bid review meetings conducted by the Construction Managers with each of the bidders who have submitted a competitive bid. A review of the individual work items that were priced by the bidder can be done at that time and will provide the stakeholder representatives the opportunity to participate in the evaluation of the items priced and request clarifications or ask questions.

2. If bidders are requested to provide revised pricing for the allocated work items based on the bid review meetings, copies of the revised pricing and the corresponding revised Cost Allocation Bid Worksheets will be provided to the stakeholder representatives. This will be repeated for all bid revisions that may occur as a result of the bid review process.

3. When the Construction Manager reaches the completion of their bid evaluation and negotiations with the bidders he will advise the stakeholders and seek the concurrence of the stakeholders of the final values for the Cost Allocated Work items prior to making the final award. The Construction Manager will provide a summary of the bid process as it relates to the cost allocated items of work showing the original bid values and the final negotiated values with any applicable scope or schedule clarifications or qualifications. A final Trade Contract Award Approval Form will be prepared and distributed to the stakeholder representatives showing the final values of the Work Item and the allocated share to each of the stakeholders.

4. Each stakeholder representative shall indicate approval of the allocated trade cost values by signing the Trade Cost Award Approval Form. Stakeholder approval shall be provided within three (3) business days so as not to delay the trade contract award. The approval signature shall be a commitment by the stakeholder for responsibility for reimbursing to the stakeholder performing the work the allocated trade cost plus the appropriate multiplier.

Construction Phase

1. Upon award of the trade contract, the Trade Contractor shall provide the Construction Manager with a detailed line item Schedule of Values (SOV) for the entire value of the contract award. The SOV shall include the allocated work items for the exact value as they appeared on the approved Trade Cost Award Approval Form. However, an individual work item may now be broken down into several line items that correspond to the construction sequence for the installation of the work, but the total value of the work item shall not differ from the total approved values. The proposed SOV will be provided to the stakeholders with a two (2) week review and comment period before it is finalized between the Construction Manager and the Trade Contractor.

2. Each month the Trade Contractor shall submit a requisition to the Construction Manager indicating the percentage completion for each item in the SOV on a work-in-place basis. The corresponding allocated work line items will then be entered into the Trade Contract Allocated Requisition Form for the work completed that period. The stakeholder representatives will be invited to participate in a site walk-thru and a "pencil requisition" meeting with the Construction Manager to verify that the work being billed for that period has been completed and the percentage completion values are correct.

3. Upon stakeholder approval of each of the Trade Contract Allocated Requisition forms, a total trade value of work completed for each stakeholder will be determined for that billing period and an invoice will be created including applying the appropriate total project cost multiplier. The invoice shall then be sent to the stakeholder for payment, or shall be entered into to the Talley Sheet as a credit to the stakeholder performing the work. Once the Talley Sheet obligation value has been exhausted, the invoice will be sent to the stakeholder for payment.

Cost Allocation Bid Response Form

*** EXAMPLE – all values are for demonstration purposes only ***

World Trade Center Rev. Date: July 16, 2007
Project: Tower 4
Trade Contract: Excavation & Foundations

Instructions to Bidders: The cost for certain items of work on the project will be shared between the various stakeholders who will occupy portions of the podium and below grade levels of the building and these costs need to be identified. The bidder is required to submit the following break-out pricing with their bid. The break-out price for each item should be a complete price for the scope of work identified and be in conformance with the drawings and specifications.

Work Item	Bid Value
1. Excavation required for Parking area bounded approximately by: north site limit line/west site limit line/existing east slurrywall/tower core, including extension to base of parking ramp. Excavation required from existing rock elevation at el. 240 to accommodate a finished SOG at el. 239.	$ 250,000
2. Foundation for the footing/grade beam supporting edge of Parking ramp and the retaining wall under ramp, including excavation and reinforced concrete footing with dowels. Also includes compacted fill under ramp.	$ 50,000
3. Foundation for the following concrete walls including excavation, line drilling, rock anchors and reinforced concrete footing with dowels. Exclude work at column footings.	
a.) Concrete Wall ASW 6 at column line 410 between 4L and south foundation wall.	$ 630,000
b.) Concrete Walls ASW 7.1/7.2/7.3 at east edge of parking ramp, including perpendicular "wing walls".	$ 450,000
4. Foundation for the following stair enclosure concrete walls including excavation, line drilling and reinforced concrete footing with dowels.	
a.) Stair BX near column lines 4J/401.	$ 200,000
b.) Stair BY near column line 4PA/4P7.	$ 200,000
5. Slab on Grade installation including but not limited to concrete slab, reinforcing steel and mesh, underslab drainage system, gravel bed, vapor barrier, concrete sump pits, etc. for a complete system. Includes rock trenching for underslab drainage and MEP lines as shown on the composite trenching drawing no. GT-DP-1.	$ 1,500,000
6. Saw cutting of shear keys in perimeter existing slurry walls for the following below grade slab levels, includes drilling and installation of dowels. See drawing S4-00.	
a.) Shear key at Level B1M.	$ 30,000
b.) Shear key at Level B1.	$ 160,000
c.) Shear key at Level B2.	$ 160,000
d.) Shear key at Level B3.	$ 160,000
e.) Shear key at Level B3M.	$ 50,000
7. Preparation of top of existing slurry wall at Ground floor level to receive structural slab, includes saw cutting and removal of concrete safety barrier wall as indicated on drawings. See drawing S4-00.	$ 275,000
Total:	$

Bidder Information

Firm Name: XYZ Foundations

Contact Name: Mr. XYZ

Signature: XYZ **Date:** Sept. 5, 2007

Cost Allocation Bid Worksheet

World Trade Center
Project: Tower 4
Trade Contract: Excavation & Foundations

**** EXAMPLE -- all values are for demonstration purposes only. ****

Sept. 5, 2007

Bidder: XYZ Foundations

Work Item	Allocation Method	Estimate Value	Subcontractor Bid	SPI		RETAIL		PARKING		PA - HUB		VSC & BUS PARKING		STREETS & INFRASTRUCTURE		ITEM TOTALS	
				$	%	$	%	$	%	$	%	$	%	$	%	$	%
1. Excavation at Parking Area.	PARK	$225,000	$250,000	0	0.00%	0	0.00%	250,000	100.00%	0	0.00%	0	0.00%	0	0.00%	250,000	100.00%
2. Footing/Grade Beam at Parking Ramp	PARK	$45,000	$50,000	0	0.00%	0	0.00%	50,000	100.00%	0	0.00%	0	0.00%	0	0.00%	50,000	100.00%
3. Concrete Wall Foundations																	
a.) Concrete Wall ASW 6	PAHUB	$750,000	$630,000	0	0.00%	0	0.00%	0	0.00%	630,000	100.00%	0	0.00%	0	0.00%	630,000	100.00%
b.) Concrete Wall ASW 7.1/7.2/7.3	PAHUB	$425,000	$450,000	0	0.00%	0	0.00%	0	0.00%	450,000	100.00%	0	0.00%	0	0.00%	450,000	100.00%
4. Stair Enclosure Wall Foundations																	
a.) Stair BX	STBG	$175,000	$200,000	2,000	1.00%	196,480	98.24%	760	0.38%	760	0.38%	0	0.00%	0	0.00%	200,000	100.00%
b.) Stair BY	STBG	$200,000	$200,000	2,000	1.00%	196,480	98.24%	760	0.38%	760	0.38%	0	0.00%	0	0.00%	200,000	100.00%
5. Slab on Grade	B4GSF	$1,450,000	$1,500,000	687,600	45.84%	58,200	3.88%	751,650	50.11%	2,550	0.17%	0	0.00%	0	0.00%	1,500,000	100.00%
6. Shear Keys																	
a.) Level B1M	B1MGSF	$25,000	$30,000	1,485	4.95%	23,067	76.89%	0	0.00%	5,448	18.16%	0	0.00%	0	0.00%	30,000	100.00%
b.) Level B1	B1GSF	$150,000	$160,000	57,984	36.24%	70,912	44.32%	528	0.33%	30,576	19.11%	0	0.00%	0	0.00%	160,000	100.00%
c.) Level B2	B2GSF	$150,000	$160,000	24,848	15.53%	114,256	71.41%	464	0.29%	20,432	12.77%	0	0.00%	0	0.00%	160,000	100.00%
d.) Level B3	B3GSF	$150,000	$160,000	87,680	54.80%	38,528	24.08%	17,008	10.63%	176	0.11%	16,608	10.38%	0	0.00%	160,000	100.00%
e.) Level B3M	B3MGSF	$50,000	$50,000	0	0.00%	50,000	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	50,000	100.00%
7. Prepare Top of Slurry Wall	GRDGSF	$250,000	$275,000	109,670	39.88%	102,890	37.40%	1,430	0.52%	45,238	16.45%	28	0.01%	15,785	5.74%	275,000	100.00%
Allocated Bid Totals:			**$4,115,000**	**$973,267**		**$850,773**		**$1,072,600**		**$1,185,940**		**$16,636**		**$15,785**		**$4,115,000**	
Allocated Estimate Totals:		$4,045,000		$983,844		$401,298		$760,853		$2,168,840		$17,555		$21,156			

Notes: 1. Allocation Methods and allocation percentages are defined in the Master Cost Allocation Codes and Percentages table dated Aug. 31, 2007 based on the 100% DD design documents.
2. Estimate values are based on the 100% SD estimate dated May 9, 2007.

Trade Contract Award Approval Form

World Trade Center
Project: Tower 4
Trade Contract: Excavation & Foundations

**** EXAMPLE – all values are for demonstration purposes only ****

October 1, 2007

Bidder: XYZ Foundations

Work Item	Allocation Method	Final Award Vaule	SPI		RETAIL		PARKING		PA - HUB		VSC & BUS PARKING		STREETS & INFRASTRUCTURE		ITEM TOTALS	
			$	%	$	%	$	%	$	%	$	%	$	%	$	%
1. Excavation at Parking Area.	PARK	$250,000	0	0.00%	0	0.00%	250,000	100.00%	0	0.00%	0	0.00%	0	0.00%	250,000	100.00%
2. Footing/Grade Beam at Parking Ramp	PARK	$50,000	0	0.00%	0	0.00%	50,000	100.00%	0	0.00%	0	0.00%	0	0.00%	50,000	100.00%
3. Concrete Wall Foundations																
a.) Concrete Wall ASW 6	PAHUB	$630,000	0	0.00%	0	0.00%	0	0.00%	630,000	100.00%	0	0.00%	0	0.00%	630,000	100.00%
b.) Concrete Wall ASW 7.1/7.2/7.3	PAHUB	$450,000	0	0.00%	0	0.00%	0	0.00%	450,000	100.00%	0	0.00%	0	0.00%	450,000	100.00%
4. Stair Enclosure Wall Foundations																
a.) Stair DX	STBG	$200,000	2,000	1.00%	196,480	98.24%	760	0.38%	760	0.38%	0	0.00%	0	0.00%	200,000	100.00%
b.) Stair BY	STBG	$200,000	2,000	1.00%	196,480	98.24%	760	0.38%	760	0.38%	0	0.00%	0	0.00%	200,000	100.00%
5. Slab on Grade	B4GSF	$1,500,000	687,500	45.84%	58,200	3.88%	751,850	50.11%	2,550	0.17%	0	0.00%	0	0.00%	1,500,000	100.00%
6. Shear Keys																
a.) Level B1M	B1MGSF	$30,000	1,485	4.95%	23,067	76.89%	0	0.00%	5,448	18.16%	0	0.00%	0	0.00%	30,000	100.00%
b.) Level B1	B1GSF	$160,000	57,984	36.24%	70,912	44.32%	528	0.33%	30,576	19.11%	0	0.00%	0	0.00%	160,000	100.00%
c.) Level B2	B2GSF	$160,000	24,848	15.53%	114,256	71.41%	464	0.29%	20,432	12.77%	0	0.00%	0	0.00%	160,000	100.00%
d.) Level B3	B3GSF	$160,000	87,680	54.80%	38,528	24.08%	17,008	10.63%	176	0.11%	16,608	10.38%	0	0.00%	160,000	100.00%
e.) Level B3M	B3MGSF	$50,000	0	0.00%	50,000	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	50,000	100.00%
7. Prepare Top of Slurry Wall	GRDGSF	$275,000	109,870	39.99%	102,850	37.40%	1,430	0.52%	45,238	16.45%	28	0.01%	15,785	5.74%	275,000	100.00%
Allocated Contract Totals:		$4,115,000	$973,267		$850,773		$1,072,600		$1,185,940		$16,636		$15,785		$4,115,000	

Note: Allocation Methods and allocation percentages are defined in the Master Cost Allocation Codes and Percentages table dated Aug. 31, 2007 based on the 100% DD design documents.

Approvals

Approval constitutes stakeholder agreement and commitment to reimburse SPI for the allocated trade cost values indicated for the scope of work included in the trade contract award plus the appropriate total project cost multiplier.

Approved by: _____ (SPI Stakeholder)

Approved by: _____ (Retail & Parking Stakeholder)

Approved by: _____ (PA-Hub, VSC & Bus Parking, Streets & Infrastructure Stakeholder)

Monthly Trade Contract Allocated Requisition Form

Requisition No.: 02
Requisition Period: March 1 - March 31, 2008

World Trade Center
Project: Tower 4
Trade Contract: Excavation & Foundation

Trade Contractor: XYZ Foundations

**** EXAMPLE - all values are for demonstration purposes only ****

TRADE BREAKDOWN		Work Completed							STAKEHOLDER ALLOCATION													
Description Of Contract Work	Scheduled Value	Percent Complete Thru Current Period	Work in Place Billed to Date	Retention	Billed to Date Less Retention	Work Previously Billed	Current Invoice	Allocation Code	SPI Amount	SPI Percent	Retail Amount	Retail Percent	PA - Parking Amount	PA - Parking Percent	PA - Hub Amount	PA - Hub Percent	VCS & Bus Parking Amount	VCS & Bus Parking Percent	Streets & Infrastructure Amount	Streets & Infrastructure Percent	Total Amount	Total Allocated %
Excavation in Parking Area	$ 250,000	25%	$ 62,500	$ 6,250	56,250.00	-	56,250.00	PARK	-	0.00%	-	0.00%	56,250.00	100.00%	-	0.00%	-	0.00%	-	0.00%	56,250.00	100%
Footing / Grade Beam at Parking Ramp	$ 50,000	20%	$ 10,000	$ 1,000	9,000.00	225.00	8,775.00	PARK	-	0.00%	-	0.00%	8,775.00	100.00%	-	0.00%	-	0.00%	-	0.00%	8,775.00	100%
Shearwall Foundations: Shearwall ASW 5	$ 630,000	15%	$ 94,500	$ 9,450	85,050.00	4,500.00	80,550.00	PAHUB	-	0.00%	-	0.00%	-	0.00%	80,550.00	100.00%	-	0.00%	-	0.00%	80,550.00	100%
Shearwall Foundations: Shearwall ASW 7	$ 450,000	10%	$ 45,000	$ 4,500	40,500.00	2,250.00	38,250.00	PAHUB	-	0.00%	-	0.00%	-	0.00%	38,250.00	100.00%	-	0.00%	-	0.00%	38,250.00	100%
Stair Enclosure Wall Foundations: Stair BX	$ 200,000	0%	$ -	$ -	-	-	-	STBG	-	0.00%	-	0.00%	-	4.12%	-	7.12%	-	0.07%	-	0.00%	-	#DIV/0!
Stair Enclosure Wall Foundations: Stair BY	$ 200,000	5%	$ 10,000	$ 1,000	9,000.00	1,800.00	7,200.00	STBG	569.88	9.35%	5,715.00	79.40%	296.64	4.12%	512.64	7.12%	5.04	0.07%	-	0.00%	7,200.00	100%
Slab On Grade	$ 1,500,000	10%	$ 150,000	$ 15,000	135,000.00	7,200.00	127,800.00	B4GSF	56,583.52	45.94%	4,958.64	3.88%	64,040.56	50.11%	217.28	0.17%	-	0.00%	-	0.00%	127,800.00	100%
Shear Keys: Level B1M	$ 30,000	15%	$ 4,500	$ 450	4,050.00	180.00	3,870.00	B1MGSF	181.57	4.93%	2,975.64	80.85%	-	0.00%	702.79	19.09%	-	0.00%	-	0.00%	3,670.00	100%
Shear Keys: Level B1	$ 160,000	5%	$ 8,000	$ 800	7,200.00	180.00	7,020.00	B1GSF	2,544.05	36.24%	3,111.26	44.32%	23.17	0.33%	1,341.52	19.11%	-	0.00%	-	0.00%	7,020.00	100%
Shear Keys: Level B2	$ 160,000	5%	$ 8,000	$ 800	7,200.00	180.00	7,020.00	B2GSF	1,090.21	15.53%	5,012.08	71.41%	20.38	0.29%	896.45	12.77%	-	0.00%	-	0.00%	7,020.00	100%
Shear Keys: Level B3	$ 160,000	5%	$ 8,000	$ 800	7,200.00	450.00	6,750.00	B3GSF	3,697.00	54.80%	1,625.40	24.08%	717.53	10.63%	7.43	0.11%	700.65	10.38%	-	0.00%	6,750.00	100%
Shear Keys: Level B3M	$ 50,000	5%	$ 2,500	$ 250	2,250.00	450.00	1,800.00	B3MGSF	-	0.00%	1,800.00	100.00%	-	0.00%	-	0.00%	-	0.00%	-	0.00%	1,800.00	100%
Prepare Top of Slurry Wall	$ 275,000	10%	$ 27,500	$ 2,750	24,750.00	5,400.00	19,350.00	GRDGSF	7,716.78	39.88%	7,236.90	37.40%	100.02	0.52%	3,183.08	16.45%	1.94	0.01%	1,110.69	5.74%	19,350.00	100%
Total Base Contract	$ 4,115,000		$ 430,500	$ 43,050	$ 387,450	$ 22,815	$ 364,635		74,494.00		32,437.53		130,223.89		126,661.17		707.63		1,110.69		364,635.00	
Change Order #001	40,000	5%	$ 2,000	$ 200	1,800.00	0	1,800.00	GRDGSF	717.84	39.88%	673.20	37.40%	9.36	0.52%	296.10	16.45%	0.18	0.01%	103.32	5.74%	1,800.00	100%
Change Order #002	15,000	2%	$ 300	$ 30	270.00	0	270.00	PAHUB	-	0.00%	-	0.00%	-	0.00%	270.00	100.00%	-	0.00%	-	0.00%	270.00	100%
Total Change Orders	55,000		2,300	230	2,070	0	2,070		717.84		673.20		9.36		566.10		0.18		103.32		2,070.00	
Total Adjusted Contract	4,170,000		432,800	43,280	389,520	22,815	366,705		75,211.84		33,110.83		130,233.24		126,227.27		707.81		1,214.01		366,705.00	
Stakeholder Totals									75,211.84		163,344.08						128,149.08				366,705.00	

Note: Allocation Methods and allocation percentages are defined in the Master Cost Allocation Codes and Percentages table dated Aug. 31, 2007 based on the 100% DD design documents.

Approved by: _____ (SPI Stakeholder)

Approved by: _____ (Retail & Parking Stakeholder)

Approved by: _____ (PA-Hub, VSC & Bus Parking, Streets & Infrastructure Stakeholder)

EXHIBIT P

Project Development Budgets
(For Tower 4, Tower 3, Tower 3 Podium and Tower 2 structure to grade)

[see attached]

WORLD TRADE CENTER: TOWER 4 SPI BUDGET
EXHIBIT P

1
2
3

Notes:
(1)
(2)
(3)
(4)
(5) For Fuel Cells
(6) Tower 4 Tenant Improvements & Leasing Commissions Include PA + NYC lease terms.
(7) Budget Attributable to SPI Office Only

WORLD TRADE CENTER: TOWER 3 SPI BUDGET

EXHIBIT P

1
2
3
4 HARD COSTS
5
6
7
8
9

(5) For Fuel Cells Only
(8) Budget Attributed to SPI Office Only

WORLD TRADE CENTER: TOWER 3 to 6th FLOOR (7th FLOOR ROOF)
T3 PODIUM PERIOD COSTS

DECEMBER 16, 2010

	BASE BUILDING COMPONENTS TO SUPPORT INTERIM PODIUM OPTIONS - TRADE COSTS				
	SPI	Retail / Parking	HUB / VSC / SURI	TOTAL	Podium Cap Costs
Excavation & Foundation	[redacted]				
Structural Frame					
Roofing & Waterproofing					
Exterior Wall					
Interior Partitions & Finishes					
Specialties					
Equipment & Furnishings					
Vertical Transportation					
Plumbing					
Fire Protection					
HVAC					
Electrical					
Hoist & Sidewalk Bridge					
Site Utilities					
Site Work					
Base Bldg MEP's in Congested Areas					
Subtotal					
Contingency - Podium Scope [redacted]					
Total Trade Costs	$				
General Conditions [redacted]					
Construction Contingency [redacted]					
CM Fee [redacted]					
Bonding [redacted]					
Developer Contingency [redacted]					
Total Podium Hard Costs	$				
Re-Design A/E Costs					
Podium Cap Design Costs					
Construction Administration Costs					
Testing & Inspection					
Insurance Monitoring / Misc Other Podium Costs					
Soft Cost Contingency [redacted]					
TOTAL PODIUM COSTS	$				

Both parties reserve the right to correct any errors and omissions in the above budget during the period from the 12/16/2010 Closing Date to the T4 Liberty Bond Closing Date.

WORLD TRADE CENTER: TOWER 2 STRUCTURE-TO-GRADE
EXHIBIT P

	ESTIMATED COST	ALLOCATED COSTS 2 WTC LLC TRADE	NON-TRADE (@ 50%)	HUB / VSC / SURI	Retail / Parking
Trade Costs	[redacted]				
Turner Direct Trade Work Estimate					
Other Hard Costs					
General Conditions					
Design & Construction Contingency - [redacted]					
Sub Contractors Bonds - [redacted]					
CM Fee					
Temp Utility Consumption (Elec. & Water)					
EEO & MWBE Monitoring					
Subtotal Trade & Other Hard Costs					
Developers Contingency [redacted]					
Stakeholder Multiplier on Trade Costs - [redacted]					
Total Hard Costs					
Design & Testing Consultants					
Construction Admin Phase - Structure To Grade					
Structure To Grade A/E Re-Design Fees					
Testing & Inspection					
Subtotal Design & Testing Consultants					
Other Soft Costs					
Builders Risk / Terrorism / Advisory					
Legal					
General Accounting / Audits					
Accounting & Document Control Systems					
Design & Construction Field Office					
Initial Operation Expenses (100% 2WTC LLC)					
Subtotal Design & Other Soft Costs					
Soft Cost Contingency [redacted]					
Total Soft Costs					
Total Hard & Soft Costs					
Total Allocated Costs					
Total Project Budget					
Project Costs Excluded From 200M Project Budget					
Commercial Electrical PDC Premium					
Adjusted Project Budget					

EXHIBIT Q

Insurance Policies

[see attached]

EXHIBIT Q
INSURANCE POLICIES

Carrier	Policy Numbers
ACE	SWTC 00274P, REFVP0185, REFP0185
Allianz	CLP3001091, CLP3001140
Chubb (Federal Insurance)	6593994
COP Re	710879201
Great Lakes	710879401
Gulf	GA2403811
Hartford	GX 0000546
Houston Casualty	710894301, 7108789014
Industrial Risk Insurers	31-3-89984
Lexington	8750352
Lloyds	710899101
QBE	710879401
Royal & Sun Alliance	RTE 464346
Royal Indemnity	RHG 319800, RHD 319802
Royal Speciality	RHD 319801
SR International	710875501
SR UK	710905101
St. Paul	144SP0922
TIG Insurance	XPT 39239030
Tokio Marine	FDP 4320631
Travelers Insurance	KTXEMB123D5782, KTXUMB123D579401, KTXCMB123D580101, KTXCMB123D581301, KTXCMB123D582501, KTCMB-123D587-2-01
Twin City Fire Insurance	KG 0002846
Wausau (Liberty Mutual Group)	YSMQCZ91423529021, YSC-291-423529-001, MQC-291-423529-012
Württ	711137001
XL	XLPRP 1112801, RBFP01087
Zurich North America	ERP 3514947-00, EPP351494700

EXHIBIT R

[INTENTIONALLY OMITTED]

EXHIBIT S

[INTENTIONALLY OMITTED]

EXHIBIT T

[INTENTIONALLY OMITTED]

EXHIBIT U

[INTENTIONALLY OMITTED]

EXHIBIT V

[INTENTIONALLY OMITTED]

EXHIBIT W

[INTENTIONALLY OMITTED]

EXHIBIT X

[INTENTIONALLY OMITTED]

EXHIBIT Y

[INTENTIONALLY OMITTED]

EXHIBIT Z

[INTENTIONALLY OMITTED]

EXHIBIT AA

[INTENTIONALLY OMITTED]

EXHIBIT BB

[INTENTIONALLY OMITTED]

EXHIBIT CC

[INTENTIONALLY OMITTED]

EXHIBIT DD

VSC Criteria

[see attached]

EXHIBIT EE-1

WTC Tower 2 Structure to Grade Work Plan

[see attached]

EXHIBIT EE-1.1

Architectural, Structural and MEP design drawings

[see attached]

Exhibit EE-1.2

(Costs included in the Structure to Grade Estimate)

Project Budget

Tower 2 - Structure To Grade
250 Greenwich Street
New York, New York

	ESTIMATED COST	ALLOCATED COSTS			
		2 WTC LLC		HUB/VSC/SURI	Retail/Parking
		TRADE	NON-TRADE (@ 50%)		
Hard Costs					
Trade Costs	[redacted]				
Turner Direct Trade Work Estimate					
Other Hard Costs					
General Conditions					
Design & Construction Contingency - [redacted]					
Sub Contractors Bonds - [redacted]					
CM Fee					
Temp Utility Consumption (Elec. & Water)					
EEO & MWBE Monitoring					
Subtotal Trade & Other Hard Costs					
Developers Contingency [redacted]					
Stakeholder Multiplier on Trade Costs - [redacted]					
Total Hard Costs					
Soft Costs					
Design & Testing Consultants					
Construction Admin Phase - Structure To Grade					
Structure To Grade A/E Re-Design Fees					
Testing & Inspection					
Subtotal Design & Testing Consultants					
Other Soft Costs					
Builders Risk / Terrorism / Advisory					
OCIP					
Legal					
General Accounting / Audits					
Acounting & Document Control Systems					
Design & Construction Field Office					
Initial Operation Expenses [redacted] 2WTC LLC)					
Subtotal Design & Other Soft Costs					
Soft Cost Contingency [redacted]					
Total Soft Costs					
TOTAL HARD & SOFT COSTS					
TOTAL ALLOCATED COSTS					
TOTAL PROJECT BUDGET					
Project Costs Excluded From 200M Project Budget					
Commerical Electrical PDC Premium					
ADJUSTED PROJECT BUDGET					

Project Budget

Tower 2 - Structure To Grade
250 Greenwich Street
New York, New York

Soft Cost Detail Breakdown

Construction Administration Phase - Structure To Grade

Architect of Record - AAI
Structural Engineer - CSG
MEP Engineer - JBB
Blast Engineer - WAI
Code Consultant - CCI
Security Consultant - DVS
LEED Consultant - SDK
Civil Consultant - PHA
Geotech Consultant - MRCE
EMF Shielding Consultant - Vitatech
Integrity Monitoring - Thacher
Scheduling Services
Miscellaneous Consultants
Various Additional Services

Subtotal

Reimbursables - 5%

Total Construction Admin Phase - Structure To Grade & Reimb.

A/E Redesign - Structure To Grade

Architect of Record - AAI
Structural Engineer - CSG
MEP Engineer - JBB
Blast Engineer - WAI
Code Consultant - CCI
Security Consultant - DVS
LEED Consultant - SDK
Civil Consultant - PHA
Geotech Consultant - MRCE
EMF Shielding Consultant - Vitatech

Subtotal

Reimbursables - 5%

Total A/E Redesign - Structure To Grade & Reimb.

Testing & Inspection

Concrete/Steel/Fireproofing
Reinforcing & Placement Inspections
Foundation Field Inspection
Foundation Blast Monitoring
MEP Commissioning

Subtotal

Reimbursable Expenses - 5%

Testing & Inspection & Reimb.

Other Soft Cost Detail Breakdown

Design & Construction Field Office

Rent
Utilities
Printing & Shipping
Office Supplies
IT support
Misc Expenses

Total Design & Construction Field Office

Turner

Tower 2 – World Trade Center
200 Greenwich Street
New York, New York

ESTIMATE - DRAFT for Review
July 15, 2010

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Turner Construction Company

Tower 2 World Trade Center
200 Greenwich Street
New York, New York
ESTIMATE - 7/15/2010 DRAFT for Review

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[redacted]

BUILDING SYSTEM

EXCAVATION & FOUNDATIONS

STRUCTURAL FRAME

ROOFING AND WATERPROOFING

EXTERIOR WALL

INTERIOR PARTITIONS & FINISHES

SPECIALTIES & EQUIPMENT

EQUIPMENT & FURNISHINGS

VERTICAL TRANSPORTATION

PLUMBING

FIRE PROTECTION

H.V.A.C.

ELECTRICAL

SUBTOTAL:

SITE WORK

HOISTING & PUBLIC PROTECTION

DEMOLITION, ABATEMENT & JOINING

TOTAL: DIRECT COST

DESIGN & CONSTRUCTION CONTINGENCY (10%)

SUBTOTAL:

SUBCONTRACTOR BONDS
TURNER BOND
GENEAL LIABILITY INSURANCE
GENERAL CONDITIONS

FEE

SUBTOTAL:

ESCALATION

TOTAL CONSTRUCTION COST

COST TO DATE NOT INCLUDED ABOVE
EXCAVATION AND FOUNDATION - HALMAR CONTRACT
CURTAIN WALL - PERMASTEELISA
SITE UTILITES - FCV
ELEVATORS - OTIS
STEEL - HELMARK

Turner Construction Company

Tower 2 World Trade Center
200 Greenwich Street
New York, New York
ESTIMATE - 7/15/2010 DRAFT for Review

T:\NY\Estimating\estfiles\13700\13780 WTC Tower 2\WTC T2 Estimate 2010-06-01 Progress Set\Estimate\2010-07-15 Estimate w Allocations\[2010-07-15 T2 WTC Estimate Update w Allocations.xlsm]Estimate

								Percentages						Cost Breakouts					
Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	SPI	PAH	PARK	VSC	S & RI	RETAIL	SPI	PAH	PARK	VSC	S & RI	RETAIL
001	EXCAVATION & FOUNDATIONS																		
002	Excavation & Foundation																		
003	Halmar's Adjusted Remaining Contract																		
004	Dead man for Guy Cables																		
005	Pads on B4 Level																		
006	Tie Down Beams																		
007	Remove debris from underground contractors																		
008	Concrete for LR1200 Base																		
009	Shappiro Design Cost																		
010	Subtotal: Excavation & Foundation																		
011																			
012	EXCAVATION & FOUNDATIONS																		
013																			
014	STRUCTURAL FRAME																		
015	Superstructure Concrete																		
016	Concrete 1st Round Base Bid																		
017	Subtotal: Superstructure Concrete																		
018																			
019	Raise Concrete Shear Walls																		
020	Raise Shear Walls Above Grade																		
021	Raise Transit Hall Stair to provide access above to Roof																		
022	Raise SW Corner of Core to Elevation 24'-7"																		
023	Subtotal: Raise Concrete Shear Walls																		
024																			
025	Install Curtain Wall Embeds																		
026	Install Day-2 Curtain Wall Embeds (Assume 1 Embed Every 5 feet)																		
027	Pour Ground Floor Curb for Day-2 Curtainwall Embeds																		
028	Subtotal: Install Curtain Wall Embeds																		
029																			
030	Protection Slab																		
031	Temporary Concrete Protection Slab Over Waterproofing																		
032	Subtotal: Protection Slab																		
033																			
034	Encase ConEd Conduit																		
035	Encase Conduit from ConEd Splice Chamber to PDCs																		
036	Subtotal: Encase ConEd Conduit																		
037																			
038	Misc Concrete Items Requested at Bid																		
039	Waterproofing at Water Tank																		
040	Comeback to Infill Four (4'x 4') Openings																		
041	Subtotal: Misc Concrete Items Requested at Bid																		
042																			
043	Temporary Concrete Cover																		
044	Level 1 Temporary Concrete Cover to Infill Opening																		
045	Level B1 Temporary Concrete Cover to Infill Opening																		
046	Level B3 Temporary Concrete Cover to Infill Opening																		
047	Subtotal: Temporary Concrete Cover																		
048																			
049	Concrete Curb at Perimeter Slurry Wall Drains																		
050	Level B1M - Perimeter Drainage Curb																		
051	Level B1 - Perimeter Drainage Curb																		
052	Level B2 - Perimeter Drainage Curb																		
053	Level B3 - Perimeter Drainage Curb																		
054	Level B4 - Perimeter Drainage Curb																		
055	Subtotal: Concrete Curb at Perimeter Slurry Wall Drains																		
056																			
057	Concrete Housekeeping Pads																		
058	Level 1 - Mech 4" Equipment Pads																		
059	Level B1M - Mech 4" Equipment Pads																		
060	Level B1 - Mech 4" Equipment Pads																		
061	Level B2 - Mech 4" Equipment Pads																		
062	Level B3 - Mech 4" Equipment Pads																		
063	Level B4 - Mech 4" Equipment Pads																		
064	Level B2 - Spot Network - Mech 4" Equipment Pads																		
065	Subtotal: Concrete Housekeeping Pads																		
066																			
067	Miscellaneous Concrete																		
068	Level 1 - Plaza Level																		
069	Temporary CIP Concrete Trench Drain at Plaza Perimeter																		
070	Site Perimeter Curb																		
071	Concrete Platform at Stair Tower Egress																		
072	Level B1M																		
073	Level B1																		
074	Level B2																		
075	PA Water Tanks																		
076	Spot Network Service Switchboard Roof																		
077	Spot Network Transformer Vault Compartments																		

Turner Construction Company

Tower 2 World Trade Center
200 Greenwich Street
New York, New York
ESTIMATE - 7/15/2010 DRAFT for Review

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Ranking	BUILDING SYSTEM	Unit	Intermediate		Percentages						Cost Breakouts					
078	Level B3															
079	Concrete Curb 8" High (Arch Plan Note 22)															
080	Level B4															
081	Concrete Curb 8" High (Arch Plan Note 22)															
082	**Subtotal: Miscellaneous Concrete**															
083																
084	**Structural Steel**															
085	Leveled 1st Round Structural Steel Bid															
086	Temporary Roof Over Stairs															
087	**Subtotal: Structural Steel**															
088																
089	**Storage and Truck Loading**															
090	Storage and Truck Loading Charge (Helmark Contract)															
091	Additional Stabilization Plates															
092	**Subtotal: Storage and Truck Loading**															
093																
094	**Misc Structural Steel**															
095	Level 1 Temporary Slab Infill															
096	Metal Decking															
097	Misc Framing for Concrete Cover															
098	Level B1 Temporary Slab Infill															
099	Metal Decking															
100	Misc Framing for Concrete Cover															
101	Level B3 Temporary Slab Infill															
102	Metal Decking															
103	Misc Framing for Concrete Cover															
104	Added Framing to Raise Roof Over Exposed Rebar at Stairs															
105	**Subtotal: Misc Structural Steel**															
106																
107	**Stair Cast In Steel Nosing**															
108	Furnish and Install Steel Embeds in Stair Nosing															
109	**Subtotal: Stair Cast In Steel Nosing**															
110																
111	**Fireproofing**															
112	Level 2 - Spray on Fireproofing at Transit Hall															
113	**Subtotal: Fireproofing**															
114																
115	**Spray Thermal Insulation**															
116	Level 1															
117	Level B1M															
118	Level B1															
119	Level B2															
120	Level B3															
121	Level B4															
122	**Subtotal: Spray Thermal Insulation**															
123																
124	**STRUCTURAL FRAME**															
125																
126	**ROOFING AND WATERPROOFING**															
127	**Roofing**															
128	Level 2 - Roof															
129	TPO Roof over Transit Hall															
130	TPO Roof over Core															
131	Insulation Tapered to Drains															
132	Drainage Mat															
133	Roof Hatch (3' x 3')															
134	Roof Penetrations															
135	Comeback to Close Opening from Hoist															
136	Gutters and Leaders															
137																
138	TPO Roof over Stair Towers															
139	Insulation Tapered to Drains															
140	Drainage Mat															
141	Roof Penetrations															
142	Gutters and Leaders															
143																
144	Level 1 - Plaza Level															
145	Temp Waterproofing and Insulation within Parcel Line															
146	Temp Waterproofing and Insulation outside Parcel Line															
147	Concrete Protection Slab															
148	Insulation															
149	Infill Fin Tube Trench with Rigid Styrofoam															
150	**Subtotal: Roofing**															
151																
152	**Column Covers to Prevent Water Entry**															
153	Aluminum Cap Above Exposed Columns															
154	Wood Blocking and Membrane															

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				Percentages					Cost Breakouts					
Ranking	BUILDING SYSTEM	Unit	Intermediate											
155	**Subtotal: Temp Stainless Steel Cap Above Exposed Columns**													
156														
157	**Interior Waterproofing**													
158	Level 1 - Transit Hall WP and Insulation (Area In Scope Only)													
159	B1 Level - PA Water Tank Waterproofing													
160	B1 Level - Pit Waterproofing													
161	B2 Level - Water Tank Waterproofing													
162	B2 Level - Spot Network Transformer Vault Waterproofing													
163	B2 Level - Spot Network Service Switchboard Roof Waterproofing													
164	B3 Level - Fire Water Tank Waterproofing													
165	B4 Level - Pit Waterproofing													
166	Mechanical Room Waterproofing													
167	**Subtotal: Interior Waterproofing**													
168														
169	**Temp Waterproofing**													
170	PDC Room Waterproofing													
171	B2 Level - Loose Laid EPDM Membrane with Protection Board													
172	Spot Network Room Waterproofing													
173	B1 Level - Loose Laid EPDM Membrane with Protection Board													
174	AC Room Waterproofing													
175	B4 Level - 12' x 12' Scaffold Type Shed w/ Membrane													
176	Misc Waterproofing													
177	Additional 1,000 sf Scaffold Type Shed w/ Membrane													
178	Maintenance and Modifications to Waterproofing													
179	Provide 6-2" electric pumps and 500 lf of hose													
180	**Subtotal: Temp Waterproofing**													
181														
182	ROOFING AND WATERPROOFING													
183														
184	EXTERIOR WALL													
185	Curtain Wall													
186	Ground Floor Embeds and Layout Drawings (Permasteelisa Contract)													
187	Install Level 2 Day-2 Curtainwall Embeds													
188	**Subtotal: Curtain Wall**													
189														
190	**Metal Siding Panels**													
191	Exterior Stud Wall w/ Painted Siding Panels at Transit Hall													
192	Exterior Stud Wall w/ Painted Siding Panels at Stair Towers													
193	Exterior Stud Wall w/ Painted Siding Panels Building Core Walls													
194	Exterior Stud Wall Around Stair Tower at Transit Hall 2nd Floor													
195	Engineered Steel Stud System													
196	Exterior Sheathing													
197	Vapor Barrier													
198	Insulation													
199	Aluminum Base Flashing													
200	Misc Structural Framing to Brace Wall at Transit Hall													
201	Painted Aluminum Fascia with Gravel Stop at Transit Hall													
202	Painted Aluminum Soffit at Transit Hall													
203	Painted Aluminum Fascia with Gravel Stop at Stair Towers													
204	Painted Aluminum Soffit at Stair Towers													
205														
206	Exterior Doors (Including Hardware and Installation)													
207	Exterior Doors Integral to Painted Metal Panels													
208	Exterior Hollow Metal Door and Frames													
209	**Subtotal: Metal Siding Panels**													
210														
211	**Transit Hall 2nd Level Stair Tower Enclosure**													
212	Exterior Stud Wall w/ Painted Siding Panels at Transit Hall Stairs													
213	Painted Aluminum Fascia with Gravel Stop at Transit Hall Stairs													
214	Painted Aluminum Soffit at Transit Hall Stairs													
215	**Subtotal: Transit Hall 2nd Level Stair Tower Enclosure**													
216														
217	**Aluminum Storefront System**													
218	Storefront Doors at Transit Hall Entrance by EFCO													
219	Storefront Door Hardware													
220	Kalwall System													
221	**Subtotal: Aluminum Storefront System**													
222														
223	**Paint Exposed Steel**													
224	TNEMEC Primer and Paint at Exposed Columns													
225	Tall Columns (36' High)													
226	Short Columns (12' High)													
227	**Subtotal: Paint Exposed Steel**													
228														
229	**Rebar Box-Out Above Core Walls**													
230	Plywood Box Out 8'-6" High Braced to Exposed Rebar													
231	White EPDM Membrane Cover													

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Ranking	BUILDING SYSTEM	Unit	Intermediate		Percentages						Cost Breakouts					
232	Relocations due to field conditions	[redacted]														
233	**Subtotal: Rebar Box-Out Above Core Walls**															
234																
235	**Louver Wall at HUB Shaft**															
236	Louver Wall with 800 SF Area															
237	Exterior Stud Framing and Metal Panel Top and Bottom															
238	Misc Structural Framing to Support Louver Wall															
239	Painted Aluminum Fascia with Gravel Stop at Transit Hall															
240	**Subtotal: Louver Wall at HUB Shaft**															
241																
242	**Ductwork Enclosure at Roof Level**															
243	L2 Roof															
244	L1 Roof															
245	**Subtotal: Ductwork Enclosure at Roof Level**															
246																
247	**Canopy Over Transit Hall Entrance**															
248	Level 2 Overhang Above Transit Hall Entrance															
249	Painted Gyp Sheathing Soffit Above Transit Hall Entrance															
250	**Subtotal: Canopy Over Transit Entrance**															
251																
252	**Temp Exterior Doors (Including Hardware and Installation)**															
253	Alt Egress Temp Doors at Ground Level															
254	**Subtotal: Temp Exterior Doors**															
255																
256	**EXTERIOR WALL**															
257																
258	**INTERIOR PARTITIONS & FINISHES**															
259	**Partitions**															
260	Temp Thermal Wall Partitions - 2-1/2" 20ga. Metal stud w/ 2" ri															
261	Level 1															
262	Level B1M															
263	Level B1															
264	Level B2															
265	Level B3															
266	Level B4															
267	Level 1 - GWB Furring at Transit Lobby															
268	Level B4 - 8' high chain link fence															
269																
270	Temp Partitions at Open Shafts (2-HR Rated Masonry Assemb															
271	Level 1															
272	Level B1M															
273	Level B1															
274	Level B2															
275	Level B3															
276	Level B4															
277																
278	Level B2 Temporary Bathroom Enclosure															
279	Level B2 Temporary Bathroom Platform															
280	Level B2 Temporary Bathroom Interior Partitions															
281	Level B2 Temp Bathroom Ceiling/Roof															
282																
283	Temp Infill at Shear Wall Openings (2-HR Rated Assembly)															
284	Level 1															
285	Level B1M															
286	Level B1															
287	Level B2															
288	Level B3															
289	Level B4															
290																
291	CMU Wall - 8" CMU Solid filled															
292	Level 1															
293	Level B1M															
294	Level B1															
295	Level B2															
296	Level B3															
297	Level B4															
298	Level B2 Spot Network Service Switchboard Partitions															
299																
300	Slurry Wall Liner Wall 8" CMU Wall with Bituminous WP															
301	Level 1															
302	Level B1M															
303	Level B1															
304	Level B2 (Spot Network Room Allow 100 LF)															
305	Level B3															
306	Level B4															
307																
308	Firestopping at Rated Masonry Walls															

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Ranking	BUILDING SYSTEM	Unit	Intermediate		Percentages						Cost Breakouts					
309	Firestopping at Top of Wall	[redacted]														
310	CMU Wall - 8" CMU Solid filled															
311	Temp Partitions at Open Shafts															
312	Slurry Wall Liner Wall															
313	Smoke Seal at Vertical Joints															
314	CMU Wall - 8" CMU Solid filled															
315	Temp Partitions at Open Shafts															
316	Slurray Wall Liner Wall															
317																
318	**OSHA & Finish Work Protection (GSF)**															
319	Level 1															
320	Level B1M															
321	Level B1															
322	Level B2															
323	Level B3															
324	Level B4															
325	Remove and Replace Protection as required for work															
326	**Subtotal: Partitions**															
327																
328	**Install Doors, Frames, and Hardware**															
329	Exterior HM Doors & HM Frames - Single															
330	Level 1															
331	Interior HM Doors & HM Frames - Single															
332	Level 1															
333	Level B1M															
334	Level B1															
335	Level B2															
336	Level B3															
337	Level B4															
338																
339	Interior HM Doors & HM Frames - Double															
340	Level 1															
341	Level B1M															
342	Level B1															
343	Level B2															
344	Level B3															
345	Level B4															
346																
347	Below Grade Stair Hollow Metal and Hardware															
348																
349	Level B2 Temp Bathroom Doors - Single															
350	Temp Construction Door - Single HM Door and Frame															
351	Exterior HM Doors & HM Frames - Double															
352	**Subtotal: Install Doors, Frames, and Hardware**															
353																
354	**Furnish Doors & Hardware**															
355	Exterior Doors/Frames/Hardware - Single															
356	Level 1															
357	Interior Door/Frames/Hardware - Single															
358	Level 1															
359	Level B1M															
360	Level B1															
361	Level B2															
362	Level B3															
363	Level B4															
364																
365	Interior Doors/Frames/Hardware - Double															
366	Level 1															
367	Level B1M															
368	Level B1															
369	Level B2															
370	Level B3															
371	Level B4															
372																
373	Below Grade Stair Hollow Metal and Hardware															
374																
375	Level B2 Temp Bathroom Doors - Single															
376	Temp Construction Door - Single HM Door and Frame															
377	Exterior HM Doors & HM Frames - Double															
378	**Subtotal: Furnish Doors and Hardware**															
379																
380	**Flooring and Base**															
381	Sealed Concrete Flooring - Mothball Space															
382	Level 1															
383	Level B1M															
384	Level B1															
385	Level B2															

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Ranking	BUILDING SYSTEM		Percentages	Cost Breakouts
386	Level B3	[redacted]	[redacted]	[redacted]
387	Level B4	[redacted]	[redacted]	[redacted]
388	Painted Concrete Flooring	[redacted]	[redacted]	[redacted]
389	Level 1	[redacted]	[redacted]	[redacted]
390	Level B1M	[redacted]	[redacted]	[redacted]
391	Level B1	[redacted]	[redacted]	[redacted]
392	Level B2	[redacted]	[redacted]	[redacted]
393	Level B3	[redacted]	[redacted]	[redacted]
394	Level B4	[redacted]	[redacted]	[redacted]
395	Mechanical Room Waterproofing	[redacted]	[redacted]	[redacted]
396	Level 1	[redacted]	[redacted]	[redacted]
397	Level B1M	[redacted]	[redacted]	[redacted]
398	Level B1	[redacted]	[redacted]	[redacted]
399	Level B2	[redacted]	[redacted]	[redacted]
400	Level B3	[redacted]	[redacted]	[redacted]
401	Level B4	[redacted]	[redacted]	[redacted]
402		[redacted]	[redacted]	[redacted]
403	Base	[redacted]	[redacted]	[redacted]
404	4" Rubber/Vinyl	[redacted]	[redacted]	[redacted]
405	Level 1	[redacted]	[redacted]	[redacted]
406	Level B1M	[redacted]	[redacted]	[redacted]
407	Level B1	[redacted]	[redacted]	[redacted]
408	Level B2	[redacted]	[redacted]	[redacted]
409	Level B3	[redacted]	[redacted]	[redacted]
410	Level B4	[redacted]	[redacted]	[redacted]
411	**Subtotal: Flooring and Base**	[redacted]	[redacted]	[redacted]
412		[redacted]	[redacted]	[redacted]
413	**Ceilings**	[redacted]	[redacted]	[redacted]
414	Exposed Ceilings	[redacted]	[redacted]	[redacted]
415	Level 1	[redacted]	[redacted]	[redacted]
416	Level B1M	[redacted]	[redacted]	[redacted]
417	Level B1	[redacted]	[redacted]	[redacted]
418	Level B2	[redacted]	[redacted]	[redacted]
419	Level B3	[redacted]	[redacted]	[redacted]
420	Level B4	[redacted]	[redacted]	[redacted]
421	Fire Rated GWB Ceiling under Escalators	[redacted]	[redacted]	[redacted]
422	**Subtotal: Ceilings**	[redacted]	[redacted]	[redacted]
423		[redacted]	[redacted]	[redacted]
424	**Wall Finishes**	[redacted]	[redacted]	[redacted]
425	Painted CMU	[redacted]	[redacted]	[redacted]
426	Level 1	[redacted]	[redacted]	[redacted]
427	Level B1M	[redacted]	[redacted]	[redacted]
428	Level B1	[redacted]	[redacted]	[redacted]
429	Level B2	[redacted]	[redacted]	[redacted]
430	Level B3	[redacted]	[redacted]	[redacted]
431	Level B4	[redacted]	[redacted]	[redacted]
432	Misc Paint Touch-up	[redacted]	[redacted]	[redacted]
433	Level 1	[redacted]	[redacted]	[redacted]
434	Level B1M	[redacted]	[redacted]	[redacted]
435	Level B1	[redacted]	[redacted]	[redacted]
436	Level B2	[redacted]	[redacted]	[redacted]
437	Level B3	[redacted]	[redacted]	[redacted]
438	Level B4	[redacted]	[redacted]	[redacted]
439	**Subtotal: Wall Finishes**	[redacted]	[redacted]	[redacted]
440		[redacted]	[redacted]	[redacted]
441	**Millwork and Finish Carpentry**	[redacted]	[redacted]	[redacted]
442	Misc. Millwork	[redacted]	[redacted]	[redacted]
443	**Subtotal: Millwork and Finish Carpentry**	[redacted]	[redacted]	[redacted]
444		[redacted]	[redacted]	[redacted]
445	**Interior Glazing**	[redacted]	[redacted]	[redacted]
446	Vestibule Entrance to Transit Hall	[redacted]	[redacted]	[redacted]
447	Interior Glazed Office Fronts	[redacted]	[redacted]	[redacted]
448	Glass Handrails	[redacted]	[redacted]	[redacted]
449	Door Sidelight / Vision Panel Glazing Allowance (GSF)	[redacted]	[redacted]	[redacted]
450	**Subtotal: Interior Glazing**	[redacted]	[redacted]	[redacted]
451		[redacted]	[redacted]	[redacted]
452	**Miscellaneous Iron**	[redacted]	[redacted]	[redacted]
453	Level 2 - Roof Level	[redacted]	[redacted]	[redacted]
454	Galv. Steel Roof Rail over Transit Hall	[redacted]	[redacted]	[redacted]
455	Signage Screen	[redacted]	[redacted]	[redacted]
456	Level 1 - Plaza Level	[redacted]	[redacted]	[redacted]
457	Galv. Steel Platforms Stairs, Handrails at Egress Stair (On Elevatio	[redacted]	[redacted]	[redacted]
458	Galv. Steel Platforms, Stairs, Handrails at New Alt Egress (Not Sho	[redacted]	[redacted]	[redacted]
459	Galv. Steel Ramp and Handrails to Cover Plaza Level Stair (Note 3	[redacted]	[redacted]	[redacted]
460	Galv. Steel Balustrade and Handrail (Note 37)	[redacted]	[redacted]	[redacted]
461	Ornogril Anti Clime Site Fence	[redacted]	[redacted]	[redacted]
462	Vertical Support Tube Steel	[redacted]	[redacted]	[redacted]

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463		Galv. Steel Trench Drain Cover at Plaza	[redacted]		
464		Embedded angles at Mechanical Trench			
465		Level B1 - SS Hatches at Storm Water Tanks (Not Shown)			
466		Level B1 - SS Ladders at PA Tanks (Not Shown)			
467		Level B2 - SS Hatches at Storm Water Tanks			
468		Level B2 - SS Ladders at Storm Water Tanks			
469		Level B4 - Sump Pit Grating & Frame			
470					
471		Railings at Steps			
472		Level B1 - Railing at Stairs to 1st Floor Bulkheads			
473		Level B2			
474		Level B3			
475		Level B4			
476					
477		Core Stairwell Handrails			
478		Stair Handrails at Above Grade Stairs (Transit Hall)			
479		Stair Handrails at Below Grade Stairs (By Others)			
480					
481		Steel Corner Guards			
482		Level 1			
483		Level 1M			
484		Level B1			
485		Level B2			
486		Level B3			
487		Level B4			
488					
489		Steel Angle Bracing at CMU Wall			
490		Level 1			
491		Level B1M			
492		Level B1			
493		Level B2			
494		Level B3			
495		Level B4			
496					
497		Steel Angle Ledge Inside Core Wall for Future Access			
498		Level 1			
499		Level B1M			
500		Level B1			
501		Level B2			
502		Level B3			
503		Level B4			
504					
505		Miscellaneous Metals (GSF)			
506		Level 1			
507		Level B1M			
508		Level B1			
509		Level B2			
510		Level B3			
511		Level B4			
512					
513		Spot Network Components			
514		Michelman Vault Doors			
515		Michelman Vault Louvers			
516		**Subtotal: Miscellaneous Iron**			
517					
518		**EMF Shielding**			
519		Shielding Required for Retails Space Adjacent to PDC Rooms			
520		Shielding Required for SPI Space Adjacent to Spot Networks			
521		**Subtotal: EMF Shielding**			
522					
523		**Ornamental Metal**			
524		Ornamental Metal			
525		Ornamental Rails			
526		**Subtotal: Ornamental Metal**			
527					
528		**INTERIOR PARTITIONS & FINISHES**			
529					
530		**SPECIALTIES & EQUIPMENT**			
531		**Miscellaneous Specialties**			
532		Miscellaneous Specialties (GSF)			
533		Level 1			
534		Level B1M			
535		Level B1			
536		Level B2			
537		Level B3			
538		Level B4			
539					

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540	Corner Guards	[redacted]	[redacted]	[redacted]
541	Wall Protection Rails*	[redacted]	[redacted]	[redacted]
542	Fire Extinguishers & Cabinets	[redacted]	[redacted]	[redacted]
543	Visual Display Boards	[redacted]	[redacted]	[redacted]
544	Pantry Equipment	[redacted]	[redacted]	[redacted]
545	Louvers	[redacted]	[redacted]	[redacted]
546	**Subtotal: Miscellaneous Specialties**	[redacted]	[redacted]	[redacted]
547		[redacted]	[redacted]	[redacted]
548	**Toilet Partitions and Accessories**	[redacted]	[redacted]	[redacted]
549	Shower Curtains	[redacted]	[redacted]	[redacted]
550	Curtain Rods	[redacted]	[redacted]	[redacted]
551	Grab Bars	[redacted]	[redacted]	[redacted]
552	Hooks	[redacted]	[redacted]	[redacted]
553	Paper Towel Dispenser w/ Waste Receptacle	[redacted]	[redacted]	[redacted]
554	Paper Towel Dispenser @ Lab Sinks	[redacted]	[redacted]	[redacted]
555	Soap Dispenser	[redacted]	[redacted]	[redacted]
556	Mirrors	[redacted]	[redacted]	[redacted]
557	Sanitary Napkin Disposal	[redacted]	[redacted]	[redacted]
558	Toilet Seat Cover Dispenser	[redacted]	[redacted]	[redacted]
559	Toilet Partitions	[redacted]	[redacted]	[redacted]
560	**Subtotal: Toilet Partitions and Accessories**	[redacted]	[redacted]	[redacted]
561		[redacted]	[redacted]	[redacted]
562	**Signage / Directories**	[redacted]	[redacted]	[redacted]
563	Graphics & Signage at 2nd Floor Roof Allowance	[redacted]	[redacted]	[redacted]
564	Level 1	[redacted]	[redacted]	[redacted]
565	Level B1M	[redacted]	[redacted]	[redacted]
566	Level B1	[redacted]	[redacted]	[redacted]
567	Level B2	[redacted]	[redacted]	[redacted]
568	Level B3	[redacted]	[redacted]	[redacted]
569	Level B4	[redacted]	[redacted]	[redacted]
570	**Subtotal: Signage / Directories**	[redacted]	[redacted]	[redacted]
571		[redacted]	[redacted]	[redacted]
572	**SPECIALTIES & EQUIPMENT**	[redacted]	[redacted]	[redacted]
573		[redacted]	[redacted]	[redacted]
574	**EQUIPMENT & FURNISHINGS**	[redacted]	[redacted]	[redacted]
575	**Window Treatment**	[redacted]	[redacted]	[redacted]
576	Window Shades	[redacted]	[redacted]	[redacted]
577	**Subtotal: Window Treatments**	[redacted]	[redacted]	[redacted]
578		[redacted]	[redacted]	[redacted]
579	**Miscellaneous Equipment**	[redacted]	[redacted]	[redacted]
580	Projection Screens	[redacted]	[redacted]	[redacted]
581	**Subtotal: Miscellaneous Equipment**	[redacted]	[redacted]	[redacted]
582		[redacted]	[redacted]	[redacted]
583	**FF&E**	[redacted]	[redacted]	[redacted]
584	Furniture	[redacted]	[redacted]	[redacted]
585	Shelving	[redacted]	[redacted]	[redacted]
586	**Subtotal: FF&E**	[redacted]	[redacted]	[redacted]
587		[redacted]	[redacted]	[redacted]
588	**EQUIPMENT & FURNISHINGS**	[redacted]	[redacted]	[redacted]
589		[redacted]	[redacted]	[redacted]
590	**VERTICAL TRANSPORTATION**	[redacted]	[redacted]	[redacted]
591	**Vertical Transportation**	[redacted]	[redacted]	[redacted]
592	Elevator Layout Drawings and Inserts (Otis Contract)	[redacted]	[redacted]	[redacted]
593	**Subtotal: Vertical Transportation**	[redacted]	[redacted]	[redacted]
594		[redacted]	[redacted]	[redacted]
595	**VERTICAL TRANSPORTATION**	[redacted]	[redacted]	[redacted]
596		[redacted]	[redacted]	[redacted]
597	**PLUMBING**	[redacted]	[redacted]	[redacted]
598		[redacted]	[redacted]	[redacted]
599	**Underground Plumbing**	[redacted]	[redacted]	[redacted]
600	Underground Sanitary & Vent Piping	[redacted]	[redacted]	[redacted]
601	Sanitary Waste & Vent Piping	[redacted]	[redacted]	[redacted]
602	Overtime Work	[redacted]	[redacted]	[redacted]
603	Additional Testing	[redacted]	[redacted]	[redacted]
604	Floor Drains @ Level B4	[redacted]	[redacted]	[redacted]
605	Excavation/Backfill	[redacted]	[redacted]	[redacted]
606	Underground Storm Drainage Piping	[redacted]	[redacted]	[redacted]
607	Storm Water Piping	[redacted]	[redacted]	[redacted]
608	Slurry Wall Drains @ Level B4	[redacted]	[redacted]	[redacted]
609	Excavation/Backfill	[redacted]	[redacted]	[redacted]
610	**Subtotal: Underground Plumbing**	[redacted]	[redacted]	[redacted]
611		[redacted]	[redacted]	[redacted]
612	**Sewerage Ejector Pumps**	[redacted]	[redacted]	[redacted]
613	Level B4 Duplex Sewage Ejector Pump EJ-1,-2	[redacted]	[redacted]	[redacted]
614	Level B4 Simplex Sewage Ejector Pump for Retail Pit	[redacted]	[redacted]	[redacted]
615	**Subtotal: Sewerage Ejector Pumps**	[redacted]	[redacted]	[redacted]
616		[redacted]	[redacted]	[redacted]

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Ranking	BUILDING SYSTEM	[redacted]	Percentages	Cost Breakouts
617	**Domestic Water Distribution**			
618	Incoming Domestic CW Service Work			
619	2" Water Meter			
620	8" Water Meter			
621	2" Backflow Preventer			
622	8" Backflow Preventer			
623	Domestic Water Suction Tank - Steel (15,000 gals)			
624	High/Mid Zone House Tanks - Steel (2 @ total of 18,000 gals)			
625	Triplex Low Zone House Pumps			
626	Hose Bibs			
627	Domestic Cold Water Piping to Hose Bibs			
628	Insulation			
629	Domestic Hot Water and Hot Water Circulation Piping			
630	Domestic Water Valves & Specialties			
631	Connect to HUB Domestic Water Service Valved Outlet			
632	DEP Duplex Pumps (7.5 hp ea)			
633	CW Piping			
634	Insulation			
635	Backflow Preventer			
636	Cooling Tower Make-up Pumps			
637	**Subtotal: Domestic Water Distribution**			
638				
639	**Sanitary Drainage & Vent Piping System**			
640	Sanitary House Trap			
641	Sanitary & Vent Piping			
642	Below Grade			
643	Sanitary Waste & Vent Piping			
644	Cleanouts			
645	Floor Drains			
646	Trap Primers			
647	Fresh Air Intake Piping			
648	SD Piping (Sump Discharge)			
649	**Subtotal: Sanitary Drainage & Vent Piping System**			
650				
651	**Storm Drainage System**			
652	Storm House Trap			
653	Storm Water Tank - Concrete (80,000 gals)			
654	Sewage Ejector Pits			
655	Sump Pits			
656	Sand Interceptors			
657	Elevator Sump Pumps SP-3 @ Column lines 208/2C on Level B4			
658	Storm Water Filtration Pumping System			
659	Storm Water Filtration System			
660	Storm Piping Distribution			
661	Below Grade Above Ground			
662	Storm Water Piping			
663	Insulation for Horizontal Pipe			
664	Slurry Wall Drains			
665	Area Drains			
666	Temporary Roof and Plaza Drains			
667	Cleanouts			
668	Trench Drain @ Plaza - Cast in Place Concrete w/Dome Drain & Heavy D			
669	Floor Drain Body			
670	Cast in Place Concrete Trench			
671	Steel Grating - Heavy Duty			
672	Gutters @ Stairwells			
673	Splash Block			
674	**Subtotal: Storm Drainage System**			
675				
676	**Natural Gas Piping System**			
677	Incoming Natural Gas Service and Piping Work			
678	**Subtotal: Natural Gas Piping System**			
679				
680	**General Plumbing Work Items**			
681	Rigging & Hoisting			
682	Engineering, Layout & Shop Drawings			
683	Start-up & Testing			
684	Pressure Testing & Disinfection of Piping			
685	Layout & Shop Drawings			
686	System Identification			
687	Sleeves & Fire Stopping			
688	Seismic Restraints/Vibration Isolation			
689	Commissioning			
690	MEP Coordination			
691	Overtime			
692	3rd Party Commissioning Agent			
693	**Subtotal: General Plumbing Work Items**			

Ranking	BUILDING SYSTEM
694	
695	**Additional Scope and Allowances**
696	Heat Tracing of all Domestic CW piping (Furnish only)
697	Makeup Water for HVAC Condenser System (allowance)
698	CW Piping (assume 275 lf)
699	Insulation
700	Backflow Preventer
701	Capped & Valved Outlet
702	Elevator Sump Pump @ Retail
703	Roof Drainage System on Core
704	Roof Drains @ 2nd Floor
705	Storm Water Piping
706	Insulation for Horizontal Pipe
707	Sleeves for Day 2
708	Revised sketches for Floors P2-B1 and P2-B4 received via email on 6/
709	Deleted CW Piping/Insulation
710	Added DEP Makeup Water Piping/Insulation
711	Added Temp Storm Water Piping/Insulation on Horizontal
712	Temporary Plumbing (allowance)
713	Temporary Sanitary Drainage of Elevator Pits
714	Sanitary Waste Risers (1)
715	Sanitary Horizontal Piping
716	Utilize Permanent Sump/Ejector Pumps
717	4 Year Warranty & Maintenance/Service
718	Temporary Toilets
719	Water Closets (10 men/2 women)
720	Urinal Trough
721	Sinks (1 men/1 women)
722	CW Piping
723	CW Piping Risers (1)
724	CW Piping Horizontal
725	Insulation
726	Heat Tracing of CW Piping
727	Backflow Preventer
728	Sanitary Waste & Vent Piping
729	Sanitary Waste & Vent Risers (1)
730	Sanitary Horizontal Piping
731	Temp Ejector Pump
732	Temporary Water/Sanitary Drainage for Hose Bibs/Barrels
733	CW Piping Riser
734	CW Horizontal Piping
735	Insulation
736	Heat Tracing of CW Piping
737	Hose Bibs
738	Barrels
739	Sanitary Waste & Vent Risers
740	Sanitary Horizontal Piping
741	Portable Eyewash Station w/20 Refill Cartridges
742	Additional Vent, Ejector Discharge, and Sump Discharge Piping
743	**Subtotal: Additional Scope and Allowances**
744	
745	**Base Building Congested Area**
746	Furnish and Install Congested Area Distribution
747	**Subtotal: Base Building Congested Area**
748	
749	**PLUMBING**
750	
751	**FIRE PROTECTION**
752	
753	**Wet Sprinkler Heads & Piping**
754	Floor Control Valve Assemblies
755	Sprinkler Heads
756	Sprinkler Main Piping
757	Drain Piping
758	Insulation
759	Sprinkler Valves & Specialties
760	Connections to Existing FSP & Drain Risers
761	Pressure Reducing Valves
762	**Subtotal: Wet Sprinkler Heads & Piping**
763	
764	**General Fire Protection Work Items**
765	Factory Mutual Premium
766	Rigging, Hoisting & Delivery
767	Seismic Restraints
768	Hydraulic Calculations, Layout & Shop Drawings
769	Testing & Inspections
770	Sleeves & Firestopping

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		Percentages	Cost Breakouts
Ranking	BUILDING SYSTEM		
771	System Identification		
772	Commissioning		
773	MEP Coordination		
774	Overtime		
775	3rd Party Commissioning Agent		
776	Heat Tracing		
777	**Subtotal: General Fire Protection Work Items**		
778			
779	**Additional Scope and Allowances**		
780	Sprinkler Heads @ Room B4-24 (not shown)		
781	Sprinkler Heads @ East Corridor on Level B4 (not shown)		
782	Sprinkler Main Piping for feed from the FSP risers along column line 2(		
783	Specialty Fire Suppression Systems		
784	Preaction System @ PDC & Battery Rooms on Level B3 (7,550 gsf		
785	Preaction Main Piping		
786	Preaction Sprinkler Heads w/Branch Piping		
787	Dry Sprinkler System		
788	FM-200		
789	Deluge Systems		
790	CO2 Fire Suppression System		
791	Additional Sprinkler Heads for Permanent System (allowance)		
792	Sleeves for Day 2		
793	Temporary Fire Protection (allowance)		
794	Temporary Standpipe Risers (2 for Construction)		
795	Permanent Below Grade Standpipe Risers and Siamese		
796	Fire Extinguishers (50 lb)		
797	Monthly Inspections		
798	Recharge Fire Extinguisher (2)		
799	Additional Fire Sprinklers Heads for Temporary Bathroom		
800	Additional Sprinkler Heads for Temporary Coverage on Level B4		
801	**Subtotal: Additional Scope and Allowances**		
802			
803	**Base Building Congested Area**		
804	Furnish and Install Congested Area Distribution		
805	**Subtotal: Base Building Congested Area**		
806			
807	FIRE PROTECTION		
808			
809	H.V.A.C.		
810			
811	**Heating Plant**		
812	Steam System		
813	Steam Unit Heater UH-B4-1 @ Level B4 Temp. Space Awaiting		
814	Electric Unit Heater @ Level B1 T2 House Trap Room		
815	Electric Unit Heater @ Level B1 T2 Steam Service POE Room		
816			
817	Hot Water Piping System		
818	**Subtotal: Heating Plant**		
819			
820	**Temporary Cooling Plant**		
821	Condenser Water System		
822	Fluid Coolers (3 sets @ 38 tons ea)		
823	CW Pumps (2 @ 15 hp ea)		
824	Variable Speed Drives (2 @ 15 hp ea)		
825	CW Chemical Treatment System		
826	Glycol Makeup Water System		
827	Condenser Water Mains & Risers		
828	Condenser Water Branch Piping to AC Unit		
829	Condenser Water Branch Piping to PAC Units		
830	Condensate Drain Piping (allowance0		
831	Insulation		
832	Glycol Solution (assume 40%)		
833	AC Unit Connection		
834	PAC Unit Connections		
835	Riser Valves for Condenser Water Risers		
836	Branch Valves to PAC Units		
837	Branch Valves to AC Unit		
838	Branch Valves to Fluid Coolers (3")		
839	CWS&R Valves & Misc. Specialties		
840	Capped & Valved Outlet		
841	Heat Tracing of Condenser Water Piping		
842	**Subtotal: Temporary Cooling Plant**		
843			
844	**Air Distribution**		
845	Air Conditioning Unit AC-B4-1 @ Level B4 (16,000 cfm) assume 84 tor		
846	Supply Fan		
847	Variable Speed Drive (25 hp)		

Ranking	BUILDING SYSTEM	Percentages	Cost Breakouts
848	Cooling Coil		
849	Double Wall Galvanized Ductwork		
850	Galvanized Ductwork		
851	Insulation		
852	Fire/Smoke Dampers as shown		
853	Grilles, Registers, & Diffusers - Large		
854	Capped Duct		
855			
856	H&V Unit V-G-1 Below Grade		
857	Supply Fan		
858	Motor Starter (2 HP)		
859	Particulate/Gas Phase Filtration on Drwg. M8.01		
860	Duct Mounted Reheat Coil		
861	Sound Trap ST-5-6		
862	Galvanized Ductwork @ 1st Floor Exposed to Weather		
863	Galvanized Ductwork		
864	Insulation		
865	Fire/Smoke Dampers as shown		
866	Grilles, Registers, & Diffusers - Large		
867	Wire Mesh Screens		
868			
869	H&V Unit V-5-1 Commercial Park		
870	Supply Fan		
871	Variable Speed Drives (60 HP)		
872	Particulate/Gas Phase Filtration on Drwg. M8.01		
873	Sound Trap		
874	Galvanized Ductwork @ 1st Floor Exposed to Weather		
875	Galvanized Ductwork		
876	Insulation		
877	Fire/Smoke Dampers as shown		
878	Grilles, Registers, & Diffusers		
879	Capped Duct		
880	**Subtotal: Air Distribution**		
881			
882	**Supplemental Cooling Systems**		
883	Water Cooled Packaged Air Conditioning Units @ PDC Rooms (8 @ a		
884	Water Cooled Packaged Air Conditioning Units @ Battery Rooms (4 @		
885	Condensate Pumps		
886	Galvanized Ductwork		
887	Insulation		
888	Grilles, Registers & Diffusers		
889	Fire/Smoke Dampers as shown		
890	Wire Mesh Screens		
891	**Subtotal: Supplemental Cooling Systems**		
892			
893	**Ventilation Systems**		
894	Battery Room Exhaust		
895	Battery Room Exhaust Fans E-G-1,-G-2 (2 @ 400 cfm ea)		
896	Motor Starters		
897	Sound Trap		
898	Galvanized Ductwork @ 1st Floor Exposed to Weather		
899	Galvanized Ductwork		
900	Insulation		
901	Fire/Smoke Dampers as shown		
902	Grilles, Registers, & Diffusers		
903			
904	Ejector Pump Room Exhaust		
905	Ejector Pump Room Exhaust Fan E-G-3 (800 cfm)		
906	Motor Starter		
907	Sound Trap		
908	Galvanized Ductwork @ 1st Floor Exposed to Weather		
909	Galvanized Ductwork		
910	Insulation		
911	Fire/Smoke Dampers as shown		
912	Grilles, Registers, & Diffusers		
913			
914	Commercial Car Park Exhaust		
915	Commercial Car Park Exhaust Fans E-5-4,-5-12 (2 @ 25,000 cfm ea)		
916	Variable Speed Drives (2 @ 20 hp ea)		
917	Sound Trap ST-5-11,-5-12 (2 @ 22,500 cfm ea)		
918	Galvanized Ductwork @ 1st Floor Exposed to Weather		
919	Galvanized Ductwork		
920	Insulation		
921	Fire/Smoke Dampers as shown		
922	Grilles, Registers, & Diffusers		
923	Capped Duct		
924			

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Ranking	BUILDING SYSTEM	Unit	Intermediate		Percentages						Cost Breakouts					
925	MER Exhaust E-76-1			[redacted]												
926	**Subtotal: Ventilation**															
927																
928	**Emergency Generator System**															
929	Emergency Generator System 200KW w/ Built-In Fuel Oil Storage Tank															
930	Generator Exhaust															
931	Muffler Installation															
932	Calcium Silicate															
933	Automatic Dampers															
934	Intake & Discharge Plenum															
935	Sound Attenuators															
936	Generator Exhaust Louvers															
937	**Subtotal: Emergency Generator System**															
938																
939	**Life Safety Fuel Oil System**															
940	Install Life Safety Fuel Oil Storage Tank 15,000 gals															
941	Furnish Life Safety Fuel Oil Storage Tank 15,000 gals															
942	Duplex Fuel Oil Pump Sets															
943	Fuel Oil Filtration System															
944	Fuel Oil Specialties															
945	Fuel Oil Supply & Return Piping															
946	Fuel Oil Fill & Vent Piping															
947	Fuel Oil Initial Fill up for Testing															
948	Fuel Oil Connections															
949	**Subtotal: Life Safety Fuel Oil System**															
950																
951	**Temporary Heating & Cooling**															
952	Temporary Heating & Cooling (assume not required)															
953	**Subtotal: Temporary Heating & Cooling**															
954																
955	**Automatic Temperature Controls**															
956	Temporary DDC Temperature Control System															
957	**Subtotal: Temporary DDC Temperature Control System**															
958																
959	**General HVAC Work Items**															
960	Rigging & Hoisting															
961	Testing and Balancing															
962	Seismic Restraints/Vibration Isolation															
963	Sleeves & Fire Stopping															
964	Permits & Fees															
965	Commissioning															
966	MEP Coordination															
967	Overtime															
968	3rd Party Commissioning Agent															
969	Painting of Ductwork/Piping															
970	Concrete Equipment Pads															
971	**Subtotal: General HVAC Work Items**															
972																
973	**Additional Scope and Allowances**															
974	Electric Unit Heater @ Level B1 T2 Water Meter Room															
975	Duplex Steam Condensate Pump Set w/Receiver															
976	Low Pressure Steam & Condensate Return Piping (allowance)															
977	Low Pressure Steam & Condensate Return Piping to AC-B4-1/UH-															
978	Insulation															
979	Steam & Condensate Specialties															
980	AC Unit Connection															
981	H&V Unit Connections															
982	UH Connections															
983	Connect to HUB Existing Steam & Condensate Return Piping															
984	Heating Coil - Steam for AC-B4-1, V-G-1, V-S-1															
985	Stainless Steel Premium for Ductwork @ 1st Floor Exposed to Weathe															
986	Battery Room Exhaust Fans E-G-1,-G-2 Premium for Explosion Proof															
987	Extend (7) Existing 10" sleeves for Life Safety Fuel Oil System through															
988	Temporary Ventilation															
989	Floor Circulation Fans (16 @ 2 hp ea) based on Dayton Model # 5k															
990	Galvanized Ductwork															
991	Installation and Support of Core MEP Duct Risers due to Day 2 conges															
992	Galvanized Ductwork															
993	Insulation															
994	Horizontal Ductwork															
995	Insulation															
996	Capped Ductwork															
997	Scaffolding for Shafts															
998	Sleeves for Day 2															
999	Spot Network Vault Ventilation															
1000	Additional Scope for Spot Network (i.e. AC unit, ductwork, etc.)															
1001	Additional Control Scope															

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Ranking	BUILDING SYSTEM		Percentages	Cost Breakouts
1002	Additional Misc. Equipment Changes	[redacted]		
1003	Provide ALD's for Core Venting (added per 7/13 email from JBB)			
1004	Provide ALD's for Shaft Vent (added per 7/13 email from JBB)			
1005				
1006	**Subtotal: Additional Scope and Allowances**			
1007				
1008	**Base Building Congested Area**			
1009	Furnish and Install Congested Area Distribution			
1010	**Subtotal: Base Building Congested Area**			
1011				
1012	**H.V.A.C.**			
1013				
1014	**ELECTRICAL**			
1015				
1016	**Underground Electrical**			
1017	Underground Electric Work Contract Value			
1018	Underground Electric Overtime Allowance			
1019	**Subtotal: Underground Electrical**			
1020				
1021	**Power and Distribution**			
1022	B4			
1023	Empty Conduit to Tower 3 & 4 2x6 5" RGS			
1024	B3			
1025	Empty Conduit to Tower 3 & 4 2x6 5" RGS			
1026	Empty Conduit to Tower 3 & 4 2x3 5" RGS			
1027	Con Ed Feeders from B1 4-5" RGS 2 active 750 kcmil & 2 spare Hc			
1028	Con Ed Feeders from B1 8-5" RGS 4 active 750 kcmil & 4 spare Ve			
1029	Con Ed Feeders from B1 8-5" RGS 2 active 750 kcmil & 6 spare Ve			
1030	Feeders from PDC-A to B, PDC-G to H 1-5" RGS 750 kcmil			
1031	Furnish Only SPI PDC A, B, C, D, E, F, G, H and Ancillary Equipme			
1032	SPI PDC "A" Install Only			
1033	SPI PDC "B" Install Only			
1034	SPI PDC "C" Install Only			
1035	SPI PDC "D" Install Only			
1036	SPI PDC "E" Install Only			
1037	SPI PDC "F" Install Only			
1038	SPI PDC "G" Install Only			
1039	SPI PDC "H" Install Only			
1040	Delivery and Rigging of SPI PDC's			
1041	Terminations at Potheads			
1042	Meter Cubicle to Meter Pan 7-#10 1" EMT			
1043	To Con Edison Totalizer 5-#12 3/4" EMT			
1044	Terminations for Above Metering			
1045	B3 Substation Mimic & Control System			
1046	Mimic and Control Panels Install Only			
1047	Cabling for Mimic and Control Panels 30-#12AWG in 1 1/2" RGS			
1048	125v d. c. power to Mimic and Control Panels 3-#12AWG in 3/4" FF			
1049	Short Circuit & Coordination Study			
1050	B3 Substation Control Power Supply			
1051	Feeder to AC Transfer Switches from DS-LC#7 3-600 in 3 1/2" RGS			
1052	Feeder between AC transfer switches A & B 3-600 in 3 1/2" RGS			
1053	AC Transfer Switch ATS-A & B Install Only			
1054	Feeders to Battery Chargers 3-2/0 in 1 1/2" RGS			
1055	Battery Chargers Install Only			
1056	Feeder Battery Charger to batteries 4 sets of 2-350 in 2" FRE			
1057	Batteries Strings Install Only			
1058	Feeder Battery String to d.c. Disconnect 4 sets of 2-350 in 2" FRE			
1059	d. c. Disconnect Switch Install Only			
1060	Feeder d. c. Disconnect to d. c. Transfer Switch ATS-C & D 4 sets			
1061	Feeders between d. c. Transfer Switches ATS-C & D 4 sets of 2-35			
1062	d. c. Transfer Switches ATS-C & D Install Only			
1063	Feeders from d. c. Transfer Switches ATS-C & D to d. c. Panels A			
1064	d. c. Panelboards A & B Install Only			
1065	Feeders d. c. Panels A & B to Sub Panels A thru H 2 sets 2-300 in			
1066	d.c Panelboards A thru H Install Only			
1067	d.c. Circuits to Switchgear Circuit Breakers for Control Power 30-#8 in 2 1			
1068	2 1/2" FRE			
1069	#8 AWG			
1070	Normal Power Riser			
1071	Utility Feed 800A 4W From SS-B4 to DP-B3			
1072	DP-B3 800A 480/277V			
1073	Feeder 100A 4W DP-B3 to PP-HT-B3			
1074	PP-HT-B3 100A 480/277V			
1075	Feeder 70A 4W DP-B3 to LP-B3			
1076	LP-B3 100A 480/277V			
1077	Feeder 65A 4W DP-B3 to XFMR			
1078	XFMR 45 kVA			

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Ranking	BUILDING SYSTEM	[redacted]			
1079	Feeder 175A 4W XFMR to UP-B3				
1080	UP-B3 225A 208/120V				
1081	Feeder SS-B4 200A to ATS P1 & P2				
1082	Feeders 200A ATS-P1 & P2 to EDP1-B3 & EDP2-B3				
1083	EDP1-B3 200A 480/277V				
1084	EDP2-B3 200A 480/277V				
1085	Feeder 100A 4W EDP1-B3 to ELP-B3				
1086	ELP-B3 100A 480/277V				
1087	Feeder 70A SS-B4 to ATS-FS				
1088	XFMR, Fuse Cut-Outs & Circuits to FACP & DGP's				
1089	Emergency Temporary Power Riser				
1090	Emergency Feed from Generator 400A 4W to EMDP-B3				
1091	EMDP-B3 400A 480/277V				
1092	Emer. Feeder MDP-B3 200A to ATS P1 & P2				
1093	Emer. Feeder MDP-B3 70A to ATS-FA				
1094	100A Fused Disconnect Switch, Painted Red				
1095	ATS P1 & P2 200A w/Maint. Bypass				
1096	ATS FA 70A w/Maint. Bypass				
1097	Control Wiring Between Generator & ATS's 12-#12AWG in 1" EMT				
1098	Emergency Genset Exterior Enclosure 190 kVA / 150kW				
1099	East Bathtub PDC Premium Allocation Adjustment				
1100	**Subtotal: Power and Distribution**				
1101					
1102	**Lighting**				
1103	B4				
1104	F2				
1105	F2A				
1106	F2A Add for Emergency				
1107	F3				
1108	Ceiling Mounted Occupancy Sensors				
1109	Light Switches				
1110	Digital Override Switch				
1111	Exit Light				
1112	Do Not Exit Light				
1113	Lighting Horn Strobe				
1114	Timer Switch				
1115	Branch Wiring EMT Conduit & Wire				
1116	Core Lighting				
1117	B3				
1118	F2				
1119	F2A				
1120	F2A Add for Emergency				
1121	F3				
1122	Ceiling Mounted Occupancy Sensors				
1123	Light Switches				
1124	Digital Override Switch				
1125	Exit Light				
1126	Do Not Exit Light				
1127	Lighting Horn Strobe				
1128	Timer Switch				
1129	Branch Wiring EMT Conduit & Wire				
1130	Core Lighting				
1131	B2				
1132	F2				
1133	F2A				
1134	F2A Add for Emergency				
1135	F3				
1136	Ceiling Mounted Occupancy Sensors				
1137	Light Switches				
1138	Digital Override Switch				
1139	Exit Light				
1140	Do Not Exit Light				
1141	Lighting Horn Strobe				
1142	Timer Switch				
1143	Branch Wiring EMT Conduit & Wire				
1144	Core Lighting				
1145	B1				
1146	F2				
1147	F2A				
1148	F2A Add for Emergency				
1149	F3				
1150	Ceiling Mounted Occupancy Sensors				
1151	Light Switches				
1152	Digital Override Switch				
1153	Exit Light				
1154	Do Not Exit Light				
1155	Lighting Horn Strobe				

Ranking	BUILDING SYSTEM	Percentages	Cost Breakouts
1156	Timer Switch	[redacted]	[redacted]
1157	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1158	Core Lighting	[redacted]	[redacted]
1159	Ground Level	[redacted]	[redacted]
1160	F2 in MER	[redacted]	[redacted]
1161	F2 Add for Emergency	[redacted]	[redacted]
1162	2FAD Soffit Lights (3 Fixtures per Entrance)	[redacted]	[redacted]
1163	F3	[redacted]	[redacted]
1164	Ceiling Mounted Occupancy Sensors	[redacted]	[redacted]
1165	Light Switches	[redacted]	[redacted]
1166	Digital Override Switch	[redacted]	[redacted]
1167	Exit Light	[redacted]	[redacted]
1168	Do Not Exit Light	[redacted]	[redacted]
1169	Lighting Horn Strobe	[redacted]	[redacted]
1170	Timer Switch	[redacted]	[redacted]
1171	Roof Lighting (Additional F3 Fixtures at L2 Roof)	[redacted]	[redacted]
1172	Exterior Lighting (Additional F3 Fixtures at Perimeter)	[redacted]	[redacted]
1173	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1174	Core Lighting	[redacted]	[redacted]
1175	**Subtotal: Lighting**	[redacted]	[redacted]
1176		[redacted]	[redacted]
1177	**Lighting Control System**	[redacted]	[redacted]
1178	Lighting Controls - Allowance	[redacted]	[redacted]
1179	**Subtotal: Lighting Control System**	[redacted]	[redacted]
1180		[redacted]	[redacted]
1181	**Convenience Power**	[redacted]	[redacted]
1182	B4	[redacted]	[redacted]
1183	Emergency Duplex Receptacle	[redacted]	[redacted]
1184	Dedicated Duplex Receptacle	[redacted]	[redacted]
1185	Duplex Receptacle	[redacted]	[redacted]
1186	GFI Duplex Receptacle	[redacted]	[redacted]
1187	Duplex Receptacle at Circ Fans (4 per level)	[redacted]	[redacted]
1188	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1189	B3	[redacted]	[redacted]
1190	Emergency Duplex Receptacle	[redacted]	[redacted]
1191	Dedicated Duplex Receptacle	[redacted]	[redacted]
1192	Duplex Receptacle	[redacted]	[redacted]
1193	GFI Duplex Receptacle	[redacted]	[redacted]
1194	Duplex Receptacle at Circ Fans (4 per level)	[redacted]	[redacted]
1195	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1196	B2	[redacted]	[redacted]
1197	Emergency Duplex Receptacle	[redacted]	[redacted]
1198	Dedicated Duplex Receptacle	[redacted]	[redacted]
1199	Duplex Receptacle	[redacted]	[redacted]
1200	GFI Duplex Receptacle	[redacted]	[redacted]
1201	Duplex Receptacle at Circ Fans (4 per level)	[redacted]	[redacted]
1202	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1203	B1	[redacted]	[redacted]
1204	Emergency Duplex Receptacle	[redacted]	[redacted]
1205	Dedicated Duplex Receptacle	[redacted]	[redacted]
1206	Duplex Receptacle	[redacted]	[redacted]
1207	GFI Duplex Receptacle	[redacted]	[redacted]
1208	Duplex Receptacle at Circ Fans (4 per level)	[redacted]	[redacted]
1209	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1210	Ground Level	[redacted]	[redacted]
1211	Emergency Duplex Receptacle	[redacted]	[redacted]
1212	Dedicated Duplex Receptacle	[redacted]	[redacted]
1213	Duplex Receptacle	[redacted]	[redacted]
1214	GFI Duplex Receptacle	[redacted]	[redacted]
1215	GFI Duplex Receptacle on Roof	[redacted]	[redacted]
1216	Branch Wiring EMT Conduit & Wire	[redacted]	[redacted]
1217	**Subtotal: Convenience Power**	[redacted]	[redacted]
1218		[redacted]	[redacted]
1219	**Equipment Connections**	[redacted]	[redacted]
1220	B4	[redacted]	[redacted]
1221	DEP Pump 7 1/2 HP to Panel EDP2-B3	[redacted]	[redacted]
1222	Sump Pumps 20 HP to Panel EDP2-B3	[redacted]	[redacted]
1223	AC-B4-1 to Panel DP-B3	[redacted]	[redacted]
1224	Outside Air Fan 2 HP to Panel DP-B3	[redacted]	[redacted]
1225	Ejector Pumps 10 HP to Panel EDP2-B3	[redacted]	[redacted]
1226	Sump Pumps 10 HP to Panel EDP2-B3	[redacted]	[redacted]
1227	Circulation Fans, 4 per Floor, 2 HP Each	[redacted]	[redacted]
1228	B3	[redacted]	[redacted]
1229	PAC-3B-1 17FLA to Panel DP-B3	[redacted]	[redacted]
1230	PAC-Standby 17FLA to Panel DP-B3	[redacted]	[redacted]
1231	PAC-3B-3 17FLA to Panel DP-B3	[redacted]	[redacted]
1232	PAC-3B-9 16FLA to panel UP-B3	[redacted]	[redacted]

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Ranking	BUILDING 3YSTEM	Percentages	Cost Breakouts
		[redacted]	[redacted]
1233	PAC-3B-11, 12, 13,14 11 FLA to panel UP-B3 for Battery Rooms		
1234	Air Compressor 1/4 HP		
1235	CW Pump 15 HP to Panel DP-B3		
1236	PAC-3B-5 17FLA to Panel DP-B3		
1237	PAC-B3-11 16 FLA to Panel UP-B3		
1238	PAC-B3-7 17FLA to Panel DP-B3		
1239	1/20 HP Small Ventilator		
1240	Circulation Fans, 4 per Floor, 2 HP Each		
1241	B2		
1242	Water Heater 1/4 HP		
1243	Air Compressor 1/2 HP		
1244	Pre-Heater 1/4 HP		
1245	CP-B2-1 1 HP		
1246	Pumps 75 HP		
1247	Circulation Fans, 4 per Floor, 2 HP Each		
1248	B1		
1249	Motors 5 kW Unit Heaters		
1250	Motor 15 HP		
1251	Circulation Fans, 4 per Floor, 2 HP Each		
1252	Ground		
1253	Dry Coolers 10 HP to DP-B3		
1254	Battery Exhaust 1 HP to DP-B3		
1255	E-5-4 20 HP to EDP1-B3		
1256	E-5-12 20 HP to EDP1-B3		
1257	Car Park Vent 20 HP to EDP1-B3		
1258	Systems-All Levels		
1259	Heat Trace Install Only		
1260	Fire & Smoke Damper Power		
1261	**Subtotal: Equipment Connections**		
1262			
1263	**Telephone & Data**		
1264	IT Allowance None Shown based on Fit-Out Area		
1265	Cat 6 Wire for Ethernet Switch at Each Substation in 3/4" EMT		
1266	Terminate, Test and Label Cat 6 Cables		
1267	Ethernet Switches		
1268	Riser Cable & Conduits		
1269	Telephone / Data Equipment		
1270	Telephone / Data Riser Wiring		
1271	**Subtotal: Telephone & Data**		
1272			
1273	**Fire Alarm**		
1274	Fire Alarm System		
1275	B4		
1276	Area Smoke Detector		
1277	Speaker Strobe		
1278	Tamper Switches		
1279	Flow Switches		
1280	Manual Pull Station		
1281	Fire Warden Station		
1282	Strobe		
1283	Speaker		
1284	Fire Alarm Cable and Conduit		
1285	Data Gathering Panel		
1286	Fire Alarm Control Panel		
1287	FA System Program, Certify, Test and Commission - 400 Hrs.		
1288	B3		
1289	Area Smoke Detector		
1290	Speaker Strobe		
1291	Tamper Switches		
1292	Flow Switches		
1293	Manual Pull Station		
1294	Fire Warden Station		
1295	Strobe		
1296	Speaker		
1297	Fire Alarm Cable and Conduit		
1298	Data Gathering Panel		
1299	Fire Alarm Control Panel		
1300	FA System Program, Certify, Test and Commission - 400 Hrs.		
1301	B2		
1302	Area Smoke Detector		
1303	Speaker Strobe		
1304	Tamper Switches		
1305	Flow Switches		
1306	Manual Pull Station		
1307	Fire Warden Station		
1308	Strobe		
1309	Speaker		

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Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	Percentages						Cost Breakouts					
								SPI	PAH	PARK	VSC	S & RI	RETAIL	SPI	PAH	PARK	VSC	S & RI	RETAIL
1310	Fire Alarm Cable and Conduit	[redacted]																	
1311	Data Gathering Panel																		
1312	Fire Alarm Control Panel																		
1313	FA System Program, Certify, Test and Commission - 400 Hrs.																		
1314	B1																		
1315	Area Smoke Detector																		
1316	Speaker Strobe																		
1317	Tamper Switches																		
1318	Flow Switches																		
1319	Manual Pull Station																		
1320	Fire Warden Station																		
1321	Strobe																		
1322	Speaker																		
1323	Fire Alarm Cable and Conduit																		
1324	Data Gathering Panel																		
1325	Fire Alarm Control Panel																		
1326	FA System Program, Certify, Test and Commission - 400 Hrs.																		
1327	Ground																		
1328	Area Smoke Detector																		
1329	Speaker Strobe																		
1330	Tamper Switches																		
1331	Flow Switches																		
1332	Manual Pull Station																		
1333	Fire Warden Station																		
1334	Strobe																		
1335	Speaker																		
1336	Fire Alarm Cable and Conduit																		
1337	Data Gathering Panel																		
1338	Fire Alarm Control Panel																		
1339	FA System Program, Certify, Test and Commission - 400 Hrs.																		
1340	Monitor at WTC Tower 7																		
1341	**Subtotal: Fire Alarm**																		
1342																			
1343	**Security**																		
1344	Security Card Reader Allowance																		
1345	Security Camera Allowance - Exterior and Interior, Average																		
1346	Security System, Head End and Connections, Allowance																		
1347	Monitor at WTC Tower 7																		
1348	Testing and Commissioning 200 Hours																		
1349	Wiring																		
1350	**Subtotal: Security**																		
1351																			
1352	**Close Circuit Television System**																		
1353	Close Circuit Television System																		
1354	Wiring																		
1355	**Subtotal: Close Circuit Television System**																		
1356																			
1357	**Grounding**																		
1358	MGB																		
1359	Connections to MGBs, 500 kcmil in 1 1/4" RGS																		
1360	Ground Terminal Boxes Allowance																		
1361	MGB																		
1362	Cadweld to Steel																		
1363	Ground Cable																		
1364	Testing																		
1365	Excavation & Backfill																		
1366	Halo Ground, Substation Rooms, 2 1/2" x 1/4" Copper Bus, Include																		
1367	Connections to Halo Ground, Allowance, 2 per substation																		
1368	Connections to Ground system, Allowance 4 per room																		
1369	**Subtotal: Grounding**																		
1370																			
1371	**Lightning Protection System**																		
1372	Lightning Protection																		
1373	**Subtotal: Lightning Protection System**																		
1374																			
1375	**Spot Network**																		
1376	Spot Network																		
1377	Install Spot Network & Vertical Distribution																		
1378	Furnish 2500 kVA Transformer Cast Coil																		
1379	Furnish 4000 A Network Protectors																		
1380	Furnish 5000A Network Bus and Connections																		
1381	Furnish Substations 5000A 480/277V LV Draw-Out Power Breaker																		
1382	Lighting & Lighting Controls in Spot Network Rooms																		
1383	Mechanical Connections for Ventilation & A/C in Spot Network Roo																		
1384	Fire Alarm System Devices in Spot Network Rooms																		
1385	**Subtotal: Spot Network**																		
1386																			

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Ranking	BUILDING SYSTEM	Percentages	Cost Breakouts
1387	**Temporary Power & Light**		
1388	Temporary Light and Power from Narrative		
1389	Temp Power General		
1390	Heat Trace Temp Water Riser		
1391	Ejector Pump, bathroom, B-2		
1392	Equipment Connection Spay-On Fire Protection Pump Ground Floc		
1393	Feeder Temp Power 1200A 4W		
1394	Temp Switchboard 480/277V 1,200A		
1395	Temp Lighting, Metal Halide		
1396	General Power at each Column Assume 3B per Floor		
1397	Welder Connections, Assume 60A, 100 LF		
1398	Jump Welder Connections		
1399	Allowance for Site Lighting & Street Lighting Maintenance		
1400	Light Stanchions, 1,000W, Quartz Halogen		
1401	Extension Cords 40 Foot		
1402	Temp Bathroom on B-2, Lighting, Water Htr, Space Heater and Hea		
1403	Phone lines for Office Shanties & Trailers - Assume 25 pair CAT 3		
1404	Temp Heaters 10 kW Furnish and Install		
1405	Sump Pump Power Drop at Elevator Pits, 120V GFCI, 100LF, Inclu		
1406	Removal of All Temp Power Allow 20 M-D		
1407	Removal of Temporary Spot Network, Allow 120 M-D		
1408	Temporary Light		
1409	Temporary Light in Mothball Areas - Metal Halide		
1410	Temporary Lighting in N.I.C. Areas - Metal Halide		
1411	**Subtotal: Temporary Power & Light**		
1412			
1413	**Testing and Commissioning**		
1414	Commissioning		
1415	**Subtotal: Testing and Commissioning**		
1416			
1417	**Seismic & Vibration Isolation**		
1418	Seismic		
1419	**Subtotal: Seismic & Vibration Isolation**		
1420			
1421	**PA System**		
1422	PA System		
1423	**Subtotal: PA System**		
1424			
1425	**General Work Items**		
1426	General Work Items		
1427	Fire Stopping		
1428	Filing and Permits		
1429	Electrical Identification		
1430	Rigging Hoisting		
1431	Power Monitoring System		
1432	Factory Testing		
1433	UPS System		
1434	A/V System		
1435	Clock System		
1436	LEED Requirement Premiums		
1437	Expansion Fittings		
1438	Heat Trace - Install Only		
1439	Temporary Heat		
1440	Excavation and Backfill		
1441	Subto Short Circuit & Coordination Study		
1442	**Subtotal: General Work Items**		
1443			
1444	**Base Building Congested Area**		
1445	Furnish and Install Congested Area Distribution		
1446	**Subtotal: Base Building Congested Area**		
1447			
1448	**ELECTRICAL**		
1449			
1450	**SUBTOTAL:**		
1451			
1452	**SITE WORK**		
1453	Site Work		
1454	Level 1 Concrete Sidewalk Over Structural Slab Below		
1455	Waterproofing over structural slab below		
1456	Infill Site to Grade Level		
1457			
1458			
1459	**Site Utilities**		
1460	Site Utilities (FCV Remaining Contract Work)		
1461	Modification to Sewer		
1462	Re-excavate and backfill Church St services		
1463	**Subtotal: Site Utilities**		

[redacted]

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	Ranking	BUILDING SYSTEM	[redacted]
1464			
1465		SITE WORK	
1466			
1467		HOISTING & PUBLIC PROTECTION	
1468		Hoisting & Public Protection	
1469		Rack and Pinion Dual Hoist Car	
1470		Setup	
1471		Rental (10 Months)	
1472		Bridge from Hoist Car to Slab Edge	
1473		Weatherproof Enclosure Above Hoist	
1474		Misc Modifications and Repairs to Platforms	
1475			
1476		Work Platform Inside Core to Build PA Shaft Masonry Walls	
1477		Level 1	
1478		Level B1M	
1479		Level B1	
1480		Level B2	
1481		Level B3	
1482		Level B4	
1483			
1484		Work Platform to Install Areas Drains Below Core Roof	
1485			
1486		Subtotal: Hoisting & Public Protection	
1487		GENERAL LIABILITY INSURANCE - OCIP	
1488		HOISTING & PUBLIC PROTECTION	
1489			
1490		DEMOLITION, ABATEMENT & JOINING	
1491		Demolition	
1492		Demolition & Relocation	
1493		Subtotal: Demolition	
1494			
1495		DEMOLITION, ABATEMENT & JOINING	
1496			
1497			
1498		TOTAL: DIRECT COST	
1499			
1500		DESIGN & CONSTRUCTION CONTINGENCY (10%)	
1501			
1502			
1503		SUBTOTAL:	
1504			
1505			
1506		SUBCONTRACTOR BONDS	
1507		TURNER BOND	
1508		GENEAL LIABILITY INSURANCE	
1509		GENERAL CONDITIONS	
1510			
1511		FEE	
1512			
1513		SUBTOTAL:	
1514			
1515		ESCALATION	
1516			
1517			
1518		TOTAL CONSTRUCTION COST	
1519			
1520		COST TO DATE NOT INCLUDED ABOVE	
1521		EXCAVATION AND FOUNDATION - HALMAR CONTRACT	
1522		CURTAIN WALL - PERMASTEELISA	
1523		SITE UTILITES - FCV	
1524		ELEVATORS - OTIS	
1525		STEEL - HELMARK	

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ASSUMPTIONS & QUALIFICATIONS
July 15, 2010

[redacted]

TURNER CONSTRUCTION COMPANY

Tower 2 World Trade Center
Progress Issue Architectural and MEPF Documents Issued June 1, 2010.
200 Greenwich Street
New York, New York
July 1st, 2010

No.	DRAWING DESCRIPTION	DATE	COMMENTS
	GENERAL		
A0-004	Abbreviations Legends and Symbols	6/1/2010	
A0-006	Wall & Partition Type Schedule	6/1/2010	
A0-007	Door Schedule and Details	6/1/2010	
A0-010	Room Finish Schedule	6/1/2010	
A0-011	Room Finish Schedule	6/1/2010	
A0-500	Code Notes	6/1/2010	
	ARCHITECTURAL		
A1-003	Gridlines Setting Out Plan	6/1/2010	
A2-0B4	Basement Level B4 Floor Plan	6/1/2010	
A2-0B3	Basement Level B3 Floor Plan	6/1/2010	
A2-0B2	Basement Level B2 Floor Plan	6/1/2010	
A2-0B1	Basement Level B1 Floor Plan	6/1/2010	
A2-B1M	Basement Level B1M Floor Plan	6/1/2010	
A2-001	1st Floor Plan (Lobby/Retail)	6/1/2010	
A2-002A	2nd Floor Plan (Roof)	6/1/2010	
A4-030	Water Tank Details	6/1/2010	
A4-040	Loading Dock Details	6/1/2010	
A4-046	Loading Dock Sections	6/1/2010	
A4-101	Typical Sump Pit Details	6/1/2010	
A4-102	Typical Below Grade Details	6/1/2010	
A4-200	Typical Details	6/1/2010	
A5-120	Partial Building Sections	6/1/2010	
A5-121	Partial Building Sections	6/1/2010	
A5-122	Partial Wall Sections at Podium	6/1/2010	
A5-123	Partial Wall Sections at Podium	6/1/2010	
A5-124	Partial Wall Sections at Podium	6/1/2010	
A5-125	Partial Wall Sections at Podium	6/1/2010	
A5-126	Partial Wall Sections at Podium	6/1/2010	
A5-127	Slurry Wall Elevation and Poe Matrix	6/1/2010	
A6-001	Stair BE & A Sections	6/1/2010	
A6-002	Stair BA & A Intermediate Landings Detail Plan	6/1/2010	
A6-003	Stair BG, BB & B Section	6/1/2010	
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Turner

World Trade Center Tower 2
200 Greenwich Street
~~5/4/2010~~ Rev. #1: 5/11/10
Superstructure Concrete Bid Package

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A4 212	CORE PLAN DETAILSCORE PLAN DETAILS	9/15/2008	2
A4-213	CORE PLAN DETAILS	9/15/2008	2
A4-214	CORE PLAN DETAILS	9/15/2008	2
A4-215	CORE PLAN DETAILS	9/15/2008	3
A4-216	CORE PLAN AND SECTION DETAILS	9/15/2008	3
A4-217	CORE PLAN DETAILS	9/15/2008	3
A4-218	SERVICE ELEVATOR LOBBY PLAN	9/15/2008	2
A4-220	CORE PRIMARY ELECT. CLOSET, SECONDARY TELE ROOM PLANS, SECTION DETAILS TYPICAL FLOOR	9/15/2008	3
A4-251	CORE SECTION DETAILS	9/15/2008	6
A4-252	CORE SECTION DETAILS	9/15/2008	6
A4-255	CORE SECTION DETAILS	9/15/2008	3
A4-260	CORE SECTION DETAILS	9/15/2008	3
A4-270	CORE SECTION DETAILS	9/15/2008	3

A4-300	MISCELLANEOUS METALS	9/15/2008	3
A4-301	MISCELLANEOUS DETAILS	9/15/2008	2
A4-401	INTERIOR WATERPROOFING DETAILS	9/15/2008	4
A4-510	PERIMETER PLAN DETAILS	9/15/2008	3
A4-511	PERIMETER PLAN DETAILS	9/15/2008	3
A4-512	PERIMETER PLAN DETAILS	9/15/2008	3
A4-513	PERIMETER PLAN DETAILS	9/15/2008	3
A4-514	PERIMETER PLAN DETAILS	9/15/2008	3
A4-515	PERIMETER PLAN DETAILS	9/15/2008	3
A4-516	PERIMETER PLAN DETAILS	9/15/2008	2
A4-520	PERIMETER PLAN DETAILS	9/15/2008	3
A4-521	PERIMETER PLAN DETAILS	9/15/2008	3
A4-522	PERIMETER PLAN DETAILS	9/15/2008	3
A4-523	PERIMETER PLAN DETAILS	9/15/2008	3
	BUILDING ELEVATIONS & SECTIONS		
A5-001	WEST AND SOUTH BUILDING ELEVATIONS	9/15/2008	4
A5-002	EAST AND NORTH BUILDING ELEVATIONS	9/15/2008	4
A5-003	BUILDING SECTIONS	9/15/2008	5
A5-020	WEST PARTIAL PODIUM ELEVATION (GREENWICH STREET)	9/15/2008	4
A5-021	SOUTH PARTIAL TOWER ELEVATION (FULTON STREET)	9/15/2008	4
A5-022	SOUTH PARTIAL PODIUM ELEVATION (FULTON STREET)	9/15/2008	4
A5-023	EAST PARTIAL ELEVATION PODIUM (CHURCH STREET)	9/15/2008	4
A5-024	EAST PARTIAL TOWER ELEVATION (CHURCH STREET)	9/15/2008	4
A5-025	NORTH PARTIAL PODIUM ELEVATION (VESEY STREET)	9/15/2008	4
A5-026	NORTH PARTIAL PODIUM ELEVATION TOWER (VESEY STREET)	9/15/2008	4
A5-100	NORTH/SOUTH PARTIAL BUILDING SECTION TOWER BASE	9/15/2008	4
A5-102	EAST/WEST PARTIAL BUILDING SECTION RETAIL AND MECHANICAL	9/15/2008	4
A5-103	EAST/WEST PARTIAL BUILDING SECTION TRADING AND	9/15/2008	4
A5-120	**PARTIAL BUILDING SECTIONS**	**12/16/2008**	**5**
A5-121	**PARTIAL BUILDING SECTIONS**	**12/16/2008**	**5**
A5-122	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	3
A5-123	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-124	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-125	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-126	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-127	SLURRY WALL ELEVATION AND POE MATRIX	12/16/2008	1
A5-130	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-131	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-132	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-133	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-134	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-135	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-136	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-137	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-138	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-139	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-140	EAST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-141	EAST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-142	NORTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-143	NORTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-144	NORTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
	VERTICAL TRANSPORTATION (ELEVATORS, ESCALATORS,STAIRS,		
A6-001	STAIR BE & A SECTION	9/15/2008	5
A6-002	STAIR BA AND A INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-003	STAIR BG, BB & B SECTION	9/15/2008	5

A6-004	STAIR B & G INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-005	STAIR BC SECTION	9/15/2008	5
A6-006	STAIR C SECTION AND INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	5
A6-007	STAIR BD & D SECTION	9/15/2008	5
A6-008	STAIR BD & D & L INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-009	STAIR BF & F SECTION	9/15/2008	5
A6-010	STAIR BF & F INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-011	STB4-04 SECTIONS AND INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	5
A6-018	MISCELLANEOUS STAIR/LADDER SECTIONS	9/15/2008	3
A6-050	TYPICAL CONCRETE STAIR DETAILS	9/15/2008	5
A6-052	TYPICAL STAIR MARKING DETAILS	9/15/2008	5
A6-055	MISCELLENEOUS STAIR DETAILS	9/15/2008	3
A6-060	TYPICAL STEEL STAIR DETAILS	9/15/2008	5
A6-061	TYPICAL STAIR DETAILS	9/15/2008	5
A6-065	SECURITY GATE SECTIONS	9/15/2008	3
A6-066	SECURITY GATE SECTIONS	9/15/2008	3
A6-100	ESCALATOR ES1-ES2 PLANS, SECTIONS, DETAILS	9/15/2008	5
A6-200	ELEVATOR SECTIONS BANK B	9/15/2008	5
A6-201	ELEVATOR SECTIONS BANK C	9/15/2008	5
A6-202	ELEVATOR SECTIONS BANK D	9/15/2008	5
A6-203	ELEVATOR SECTIONS BANK E	9/15/2008	5
A6-210	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-2	9/15/2008	5
A6-211	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-4	9/15/2008	6
A6-212	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-1	9/15/2008	3
A6-220	ELEVATOR SECTIONS - A1 AND H1	9/15/2008	6
A6-222	ELEVATOR HALL ELEVATIONS	9/15/2008	4
A6-225	BANK A TYPICAL CAB PLANS AND ELEVATIONS	9/15/2008	6
A6-226	BANK A ELEVATOR SHAFT DETAILS	9/15/2008	6
A6-230	PASSENGER ELEVATORS, TYPICAL CAB PLANS AND ELEVATIONS	9/15/2008	5
A6-231	ELEVATOR H1 CAB LAYOUT AND ELEVATIONS; SERVICE ELEVATOR CAB LAYOUTS	9/15/2008	6
A6-235	ELEVATOR TYPICAL CAB DETAILS	9/15/2008	5
A6-240	L1 LIFT PLANS, SECTIONS, ELEVATIONS, DETAILS	9/15/2008	6
A6-241	L1 ELEVATOR DETAIL	9/15/2008	6
A6-242	L1 ELEVATOR SECTION DETAILS	9/15/2008	6
A6-250	ELEVATOR HALL DETAILS	9/15/2008	6
A6-251	ELEVATOR HALL DETAILS	9/15/2008	6
A6-252	ELEVATOR HALL DETAILS	9/15/2008	4
A6-253	ELEVATOR HALL DETAILS	9/15/2008	4
	ROOFING DETAILS		
A7-001	TYPICAL ROOF DETAILS	9/15/2008	5
A7-002	TYPICAL ROOF DETAILS	9/15/2008	5
A7-003	TYPICAL ROOF DETAILS	9/15/2008	2
A7-004	TYPICAL ROOF DETAILS	9/15/2008	2
A8	**BUILDING ENVELOPE (STOREFRONTS, CLADDING, CANOPY &**		
A8-001	CLADDING KEY ELEVATIONS	9/15/2008	4
A8-002	PERFORMANCE MOCK-UP TOWER	9/15/2008	4
A8-007	EXTERIOR WALL PERSPECTIVES	9/15/2008	3
A8-010	EXTERIOR WALL ZONE 1-LOBBY	9/15/2008	4
A8-011	EXTERIOR WALL ZONE 1, 1A - LOBBY/RETAIL	9/15/2008	3
A8-012	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-013	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-014	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-015	EXTERIOR WALL ZONE 1, 1A - LOBBY/RETAIL	9/15/2008	3

A8-020	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-021	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-022	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-023	EXTERIOR WALL DETAILS ZONE 2 - PODIUM	9/15/2008	4
A8-024	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-025	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-026	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-027	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-100	EXTERIOR WALL DETAILS ZONE 1 LOBBY	9/15/2008	4
A8-101	GRILLE DETAILS	9/15/2008	3
A8-102	EXTERIOR WALL SECTIONS	9/15/2008	3
A8-103	EXTERIOR WALL DETAILS	9/15/2008	3
A8-104	F.O VENTS & FILL ALARM PANEL DETAILS	9/15/2008	2
A8-110	TYPICAL ENTRANCE DETAILS AND DOOR SCHEDULE	9/15/2008	3
A8-111	EXTERIOR ENTRANCE DETAILS	9/15/2008	3
A8 112	EXTERIOR ENTRANCE DETAILS	9/15/2008	3
A8-113	EXTERIOR ENTRANCE DETAILS	9/15/2008	2
A8-114	EXTERIOR ENTRANCE DETAILS	9/15/2008	2
A8-115	EXTERIOR ENTRANCE DETAILS	9/15/2008	2
A8-116	EXTERIOR EXIT DETAILS	9/15/2008	3
A8-117	REVOLVING DOOR DETAILS	9/15/2008	2
A8-200	EXTERIOR WALL DETAILS ZONE 2 - PODIUM	9/15/2008	4
A8-201	EXTERIOR WALL DETAILS ZONE 2 - PODIUM	9/15/2008	4
A8-202	EXTERIOR WALL DETAILS ZONE 2 PODIUM	4/25/2008	3
A8-210	12TH FLOOR GENERATOR EXHAUST FLUE EAST FACADE	9/15/2008	2
A8-700	EXTERIOR WALL TYPICAL DETAILS	9/15/2008	4
A8-701	ROOF PLENUM DETAILS	9/15/2008	3
A8-702	ROOF PLENUM DETAILS	9/15/2008	3
A9	**FINISHES**		
A9-0B4	BASEMENT LEVEL B4 REFLECTED CEILING PLAN	12/16/2008	4
A9-0B3	BASEMENT LEVEL B3 REFLECTED CEILING PLAN	12/16/2008	4
A9-0B2	BASEMENT LEVEL B2 REFLECTED CEILING PLAN	12/16/2008	4
A9-0B1	BASEMENT LEVEL B1 REFLECTED CEILING PLAN	12/16/2008	4
A9-0B1M	BASEMENT LEVEL B1M REFLECTED CEILING PLAN	12/16/2008	4
A9-001	BASEMENT LEVEL B1 PART FLOOR PLAN (LOBBY/RETAIL)	9/15/2008	2
A9-010	B1 LEVEL LOBBY ELEVATIONSB1 LEVEL LOBBY ELEVATIONS	9/15/2008	2
A9-011	B1 LEVEL LOBBY DETAILS	9/15/2008	2
A9-100	1ST FLOOR PLAN (LOBBY / RETAIL)	9/15/2008	3
A9-101	1ST FLOOR CORE PLAN	9/15/2008	3
A9-101_A	1ST FLOOR LEVEL LOBBY PLAN A	9/15/2008	3
A9-101_B	1ST FLOOR LEVEL LOBBY PLAN B	9/15/2008	3
A9-101_C	1ST FLOOR LEVEL LOBBY PLAN C	9/15/2008	3
A9-101_D	1ST FLOOR LEVEL LOBBY PLAN D	9/15/2008	3
A9-102_A	1ST FLOOR LEVEL REFLECTED CEILING LOBBY PLAN A	9/15/2008	3
A9-102_B	1ST FLOOR LEVEL REFLECTED CEILING LOBBY PLAN B	9/15/2008	3
A9-102_C	1ST FLOOR LEVEL REFLECTED CEILING LOBBY PLAN C	9/15/2008	3
A9-102_D	1ST FLOOR LEVEL REFLECTED CEILING LOBBY PLAN D	9/15/2008	3
A9-110	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-111	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-112	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-113	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-114	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3

A9-115	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-116	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-117	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-118	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-119	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	3
A9-120	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	2
A9-121	FIRST FLOOR LEVEL LOBBY ELEVATIONS	9/15/2008	2
A9-122	TRADING ELEVATOR SHAFT LOBBY FINISHES	9/15/2008	2
A9-130	WEST (LOWER) LOBBY DETAILS	9/15/2008	3
A9-131	WEST (LOWER) LOBBY DETAILS	9/15/2008	3
A9-132	LOBBY DETAILS	9/15/2008	3
A9-135	NORTH/SOUTH LOBBY DETAILS	9/15/2008	3
A9-136	NORTH/SOUTH LOBBY DETAILS	9/15/2008	3
A9-137	LOBBY PERIMETER CEILING DETAILS	9/15/2008	3
A9-138	LOBBY CEILING DETAILS	9/15/2008	1
A9-140	LOBBY DETAILS	9/15/2008	3
A9-141	UPPER/LIFT LOBBY DETAILS	9/15/2008	3
A9-142	EAST (UPPER) LOBBY DETAILS	9/15/2008	3
A9-143	EAST (UPPER) LOBBY DETAILS	9/15/2008	2
A9-146	LOBBY DETAILS	9/15/2008	2
A9-147	CORE LOBBY DETAILS	9/15/2008	3
A9-148	LOBBY DOORS	9/15/2008	2
A9-149	LOBBY DOORS	9/15/2008	2
A9-150	LOBBY DESK RECEPTION DESK LAYOUT	9/15/2008	2
A9-151	LOWER LOBBY (WEST) RECEPTION DESK	9/15/2008	2
A9-152	UPPER LOBBY (EAST) RECEPTION DESK	9/15/2008	2
A9-153	LOBBY DESK DETAILS	9/15/2008	2
A9-154	LOBBY SECURITY GATE DETAILS	9/15/2008	1
A9-620	TYPICAL RESTROOM SECTIONS & DETAILS	9/15/2008	3
A9-621	RESTROOM SECTIONS & DETAILS	9/15/2008	3
A9-650	B.O.H. SUITES PLANS AND DETAILS	9/15/2008	3
A9-700	REFLECTED CEILING PLANS BASEMENT LEVELS B4 & B3	12/16/2008	4
A9-701	REFLECTED CEILING PLANS BASEMENT LEVELS B2 & B1	12/16/2008	4
A9-710	LOCKER ROOM TOILET & RESTROOM ELEVATIONS @ BASEMENT	12/16/2008	3
A9-711	MILLWORK ELEVATIONS BASEMENT LEVELS	12/16/2008	3
A9-712	MILLWORK ELEVATIONS BASEMENT LEVELS	12/16/2008	1
A9-720	BOH TYPICAL WASHROOM & MILLWORK DETAILS	12/16/2008	2
A9-900	MTA "E" PLATFORM ALTERATIONS & FINISHES	12/16/2008	5
A9-901	MTA "E" PLATFORM ALTERATIONS & FINISHES CAISSON DETAILS	12/16/2008	3
A9-902	E TRAIN PLATFORM ALTERATIONS PHASING MATRIX	12/16/2008	3
A9-903	MTA "E" PLATFORM ALTERATIONS AND FINISHES	12/16/2008	2
	GRAPHICS DRAWINGS		
GS-100	SIGN LOCATION PLANS - TOWER 2 - LEVEL B4	4/25/2008	1
GS-101	SIGN LOCATION PLANS - TOWER 2 - LEVEL B3	4/25/2008	1
GS-102	SIGN LOCATION PLANS - TOWER 2 - LEVEL B2	4/25/2008	1
GS-103	SIGN LOCATION PLANS - TOWER 2 - LEVEL B1	4/25/2008	1
GS-104	SIGN LOCATION PLANS - TOWER 2 - LEVEL B1M	4/25/2008	1
GS-105	SIGN LOCATION PLANS - TOWER 2 - LEVEL 1	4/25/2008	1
GS-106	SIGN LOCATION PLANS - TOWER 2 - LEVEL 2	4/25/2008	1
GS-200	TECHNICAL PLANS - TOWER 2 - COLORS / FONTS /	4/25/2008	1
GS-201	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A1 - A2	4/25/2008	1
GS-202	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A3	4/25/2008	1
GS-203	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A5	4/25/2008	1

GS-204	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A6	4/25/2008	1
GS-205	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A7	4/25/2008	1
GS-206	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A8	4/25/2008	1
GS-207	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A10	4/25/2008	1
GS-208	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A11	4/25/2008	1
GS-209	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A12	4/25/2008	1
GS-210	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A13	4/25/2008	1
GS-211	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES A19	4/25/2008	1
GS-212	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES SAFETY PATTERN	4/25/2008	1
GS-213	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES B2	4/25/2008	1
GS-214	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES E	4/25/2008	1
GS-215	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES G	4/25/2008	1
GS-216	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES H	4/25/2008	1
GS-217	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES P	4/25/2008	1
GS-218	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES S1	4/25/2008	1
GS-219	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES S2	4/25/2008	1
GS-220	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES T - LOCAL LAW 26	4/25/2008	1
GS-221	TECHNICAL PLANS - TOWER 2 - SIGN TYPE SERIES T - LOCAL LAW 26	4/25/2008	1
	CIVIL DRAWINGS		
C-100	EAST BATHTUB WTC TOWER 2 GENERAL NOTES & LEGEND FOR SITE/UTILI	~~4/25/2008~~ **8/11/2008**	~~2~~ **3**
C-110	EAST BATHTUB WTC TOWER 2 SITE CONNECTION PROPOSAL BL. 58 LOT 1	~~4/25/2008~~ **3/24/2009**	~~2~~ **3**
C-120	EAST BATHTUB WTC TOWER 2 UTILITY/P.O.E. COORDINATION PLAN	~~4/25/2008~~ **3/24/2009**	~~2~~ **4**
C-130	EAST BATHTUB WTC TOWER 2 WATERMAIN RELOCATION PLAN	~~4/25/2008~~ **8/11/2008**	1
	GEOTECHNICAL DRAWINGS		
	(see Bulletin #6)		
	STRUCTURAL DRAWINGS		
S1-B3A	FRAMING PLAN LEVEL B3 LOADING DOCK PART PLAN	~~12/16/2008~~ **1/26/2009**	~~5~~ **7**
S1-01A	FOUNDATION PLAN / ARRANGEMENT AT E PLATFORM	~~12/16/2008~~ **6/5/2009**	~~11~~ **14**
S1-03	FRAMING PLAN LEVEL 03 - RETAIL	8/1/2008	7
S1-04	FRAMING PLAN LEVEL 04 - RETAIL / MECH	8/1/2008	9
S1-05	FRAMING PLAN LEVEL 05 MECH	8/1/2008	9
S1-05M	FRAMING PLAN LEVEL 05M - MECH MEZZ	8/1/2008	3
S2-B4A	INTERMEDIATE CORE FRAMING PLAN BETWEEN B4 & B3	8/1/2008	2
S2-B3A	INTERMEDIATE CORE FRAMING PLAN BETWEEN B3 & B2	8/1/2008	2
S2-01E	CORE FRAMING PLAN INTERMEDIATE LEVELS 01A, 01B, 02E &	8/1/2008	6
S2-02	CORE FRAMING PLAN LEVELS 02 - 03	8/1/2008	7
S2-04	CORE FRAMING PLAN LEVEL 04	8/1/2008	7
S2-04E	CORE FRAMING PLAN INTERMEDIATE LEVEL 04, 06-09 & 11-13	8/1/2008	7
S2-05	CORE FRAMING PLAN LEVEL 05	8/1/2008	7
S2-05M	CORE FRAMING PLAN INTERMEDIATE LEVEL 05	8/1/2008	4
S3-20	WIND FRAME CONNECTION DETAILS	8/1/2008	3
S4-101A	SHEARWALL ELEVATIONS T2/1 (PART 1/3) - GEOMETRY	8/1/2008	8
S4-101A-R	SHEARWALL ELEVATIONS T2/1 (PART 1/3) - REINFORCING	8/1/2008	4
S4-102A	SHEARWALL ELEVATIONS T2/2 (PART 1/3) - GEOMETRY	8/1/2008	8

S4-102A-R	SHEARWALL ELEVATIONS T2/2 (PART 1/3) - REINFORCING	8/1/2008	4
S4-103A	SHEARWALL ELEVATIONS T2/3 (PART 1/3) - GEOMETRY	8/1/2008	8
S4-103A-R	SHEARWALL ELEVATIONS T2/3 (PART 1/3) - REINFORCING	8/1/2008	4
S4-104A	SHEARWALL ELEVATIONS T2/4 (PART 1/3) - GEOMETRY	8/1/2008	8
S4-104A-R	SHEARWALL ELEVATIONS T2/4 (PART 1/3) - REINFORCING	8/1/2008	4
S4-105A	SHEARWALL ELEVATIONS T2/5 (PART1/3) - GEOMETRY	8/1/2008	7
S4-105A-R	SHEARWALL ELEVATIONS T2/5 (PART 1/3) - REINFORCING	8/1/2008	4
S4-106A	SHEARWALL ELEVATIONS T2/6 (PART 1/3) - GEOMETRY	8/1/2008	7
S4-106A-R	SHEARWALL ELEVATIONS T2/6 (PART 1/3) - REINFORCING	8/1/2008	4
S5-02	COLUMN DETAIL LEVEL B4	12/16/2008	3
S5-10	ABOVE GRADE COLUMN SCHEDULE	8/1/2008	4
S6-21	TYPICAL ABOVE GRADE STRUCTURAL DETAILS 2	8/1/2008	6
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Turner

World Trade Center Tower 2
200 Greenwich Street
5/11/2010
STRUCTURAL STEEL BID PACKAGE

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A1-003	GRIDLINES SETTING OUT PLAN	4/21/2010	8
	FLOOR PLANS		
A2-0B4	BASEMENT LEVEL B4 FLOOR PLAN	4/21/2010	12
	FLOOR CORE PLANS		
A3-0B4	BASEMENT LEVEL B4 FLOOR CORE PLAN	4/21/2010	9
A3-1B4_A	BASEMENT LEVEL B4 - QUADRANT PLAN A	4/21/2010	7
A3-1B4_B	BASEMENT LEVEL B4 - QUADRANT PLAN B	4/21/2010	7
A3-1B4_C	BASEMENT LEVEL B4 - QUADRANT PLAN C	4/21/2010	8

A3-1B4_D	BASEMENT LEVEL B4 - QUADRANT PLAN D	4/21/2010	7
	CORE SECTIONS & INTERIOR DETAILS		
A4-100	TYPICAL ELEVATOR / SUMP PIT DETAILS	4/21/2010	8
A4-101	TYPICAL SUMP PIT DETAILS	4/21/2010	5
A4-102	TYPICAL BELOW GRADE DETAILS	4/21/2010	5
	BUILDING ELEVATIONS & SECTIONS		
A5-120	PARTIAL BUILDING SECTIONS	4/21/2010	6
A5-121	PARTIAL BUILDING SECTIONS	4/21/2010	6
	GEOTECHNICAL DRAWINGS		
GT-DP-1	UNDER SLAB GROUNDWATER DRAIN, TRENCH PLAN	4/21/2010	10
GT-DP-2	UNDER SLAB GROUNDWATER DRAIN, PIPE PLAN	4/21/2010	10
GT-DP-3	UNDER SLAB GROUNDWATER DRAIN, SECTIONS AND DETAILS	4/21/2010	7
	STRUCTURAL DRAWINGS		
S0-21	BELOW GRADE LOADING DIAGRAM	4/21/2010	8
FS-100	FOUNDATION PLAN LEVEL B4	4/21/2010	14
FS-101	SHEARWALL FOOTING DETAILS	4/21/2010	9
FS-102	AUXILIARY SHEAR WALL FOOTING DETAILS	4/21/2010	10
FS-200	TYPICAL FOUNDATION DETAILS 1	4/21/2010	11
FS-201	TYPICAL FOUNDATION DETAILS 2	4/21/2010	11
FS-300	FOUNDATIONS SECTIONS 1	4/21/2010	11
FS-301	FOUNDATION SECTIONS 2	4/21/2010	2
FS-400	SHEARWALL FOUNDATION ELEVATIONS 1	4/21/2010	10
FS-401	SHEARWALL FOUNDATION ELEVATIONS 2	4/21/2010	10
S1-B3	FRAMING PLAN LEVEL B3	4/21/2010	13
S1-B2	FRAMING PLAN LEVEL B2	4/21/2010	13
S1-B1	FRAMING PLAN LEVEL B1	4/21/2010	13
S1-B1M	FRAMING PLAN LEVEL B1M	4/21/2010	13
S1-01	FRAMING PLAN LEVEL 01 GROUND FLOOR	4/21/2010	14
S1-02	FRAMING PLAN LEVEL 02 RETAIL	4/21/2010	10
S1-200	T2 / HUB INTERFACE B1 THRU 1ST FL PART PLAN	4/21/2010	0
S1-201	T2 / HUB INTERFACE FOUNDATION THRU B2 PART PLAN	4/21/2010	0
S2-B3	CORE FRAMING PLAN LEVEL B3	4/21/2010	9
S2-B2	CORE FRAMING PLAN LEVEL B2	4/21/2010	10
S2-B2E	CORE FRAMING PLAN INTERMEDIATE LEVELS B2, B3 & B4	4/21/2010	8
S2-B1	CORE FRAMING PLAN LEVEL B1	4/21/2010	12
S2-B1E	CORE FRAMING PLAN INTERMEDIATE LEVEL B1	4/21/2010	11
S2-01	CORE FRAMING PLAN LEVEL 01 GROUND FLOOR LEVEL	4/21/2010	11
S2-01 ALT	TEMPORARY CORE FRAMING PLAN LEVEL 01	4/21/2010	0
S3-00	BELOW GRADE ELEVATIONS 1	4/21/2010	10
S3-01	STEEL DETAILS (A-FRAMES)	4/21/2010	4
S3-02	STEEL DETAILS (SLOPING COLUMNS)	4/21/2010	4
S3-10A	SOUTH TOWER WIND FRAME ELEVATION (PART 1 / 2)	4/21/2010	8
S3-11A	NORTH TOWER WIND FRAME ELEVATION (PART 1 / 2)	4/21/2010	8
S3-12A	WEST TOWER WIND FRAME ELEVATION (PART 1/2)	4/21/2010	8
S3-13A	EAST TOWER WIND FRAME ELEVATION (PART 1/2)	4/21/2010	7
S3-14	WIND FRAME ELEVATION - PODIUM	4/21/2010	12
S4-B4	SHEARWALL PLAN - LEVEL B4 / FOUNDATION - B1M	4/21/2010	12
S4-B4A	AUXILIARY SHEARWALL PLAN LEVEL B4 / FOUNDATION -	4/21/2010	10
S4-01	SHEARWALL PLAN -LEVELS 01 - 05	4/21/2010	8
S4-100	SHEARWALL ELEVATIONS T2 BELOW GRADE GEOMETRY	4/21/2010	12
S4-100-R	SHEARWALL ELEVATIONS T2 BELOW GRADE	4/21/2010	6
S4-100A	SHEARWALL ELEVATIONS T2 BELOW GRADE GEOMETRY	4/21/2010	12
S4-100A-R	SHEARWALL ELEVATIONS T2 BELOW GRADE	4/21/2010	6
S4-125	AUXILIARY SHEARWALL ELEVATIONS T2/ASW1	4/21/2010	11
S5-00	BELOW GRADE COLUMN SCHEDULE	4/21/2010	12

S5-01	TYPICAL BELOW GRADE COLUMN DETAILS	4/21/2010	12
S5-11	ABOVE GRADE COLUMN DETAILS 1	4/21/2010	6
S5-12	ABOVE GRADE COLUMN DETAILS 2	4/21/2010	7
S6-00	TYPICAL BELOW GRADE STRUCTURAL DETAILS 1	4/21/2010	12
S6-01	TYPICAL BELOW GRADE STRUCTURAL DETAILS 2	4/21/2010	11
S6-02	TYPICAL BELOW GRADE STRUCTURAL DETAILS 3	4/21/2010	11
S6-20	TYPICAL ABOVE GRADE STRUCTURAL DETAILS 1	4/21/2010	8
S6-24	TYPICAL ABOVE GRADE STRUCTURAL DETAILS 5	4/21/2010	9
S6-26	TYPICAL ABOVE GRADE STRUCTURAL DETAILS 7 (LEVEL 2)	4/21/2010	0
S6-27	TYPICAL ABOVE GRADE STRUCTURAL DETAILS 8	4/21/2010	0
S7-00	BELOW GRADE SECTIONS 1	4/21/2010	11
S7-01	BELOW GRADE SECTIONS 2	4/21/2010	7
S7-05	BELOW GRADE SECTIONS 5	4/21/2010	0
S8-00	TYPICAL BELOW GRADE STAIR DETAILS	4/21/2010	9
S8-01	STAIR BA/BE PARTIAL SECTION	4/21/2010	8
S8-03	STAIR BB/BG PARTIAL SECTION	4/21/2010	8
S8-05	STAIR BC PARTIAL SECTION	4/21/2010	8
S8-07	STAIR BD PARTIAL SECTION	4/21/2010	8
S8-09	STAIR BF & F PARTIAL SECTION	4/21/2010	8
S8-11	STAIR ST B4-04 PARTIAL SECTION	4/21/2010	6
S8-51	STAIR WALL ELEVATIONS 2	4/21/2010	2
S8-52	STAIR WALL ELEVATIONS 3	4/21/2010	3
S8-53	STAIR WALL ELEVATIONS 4	4/21/2010	3
S9-00	TYPICAL BELOW GRADE SLAB KEY DETAILS	4/21/2010	12
	ELECTRICAL DRAWINGS		
E2-B4	BASEMENT LEVEL B4 ELECTRICAL PLAN	4/21/2010	12
E7-02	ELECTRICAL DETAILS SHEET NO. 2	4/21/2010	7
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PU0-00	GENERAL NOTES, KEY TO SYMBOLS AND DRAWING INDEX	4/21/2010	2
PU2-B4-1	UNDERGROUND PLUMBING PLAN	4/21/2010	11
PU2-B4-2	SPI COMMERCIAL PARKING UNDERGROUND PLUMBING PLAN	4/21/2010	7
PU5-01	SANITARY UNDERGROUND RISER DIAGRAM	4/21/2010	3
PU5-02	STORM WATER UNDERGROUND RISER DIAGRAM	4/21/2010	2
PU7-01	PLUMBING DETAILS / EQUIPMENT SCHEDULE	4/21/2010	2

ADDITIONAL DRAWINGS FOR REFERANCE			
Drawing	**Title**	**Date**	**Revision**
A0-004	ABBREVIATIONS, LEGENDS AND SYMBOLS	9/15/2008	8
A0-006	WALL & PARTITION TYPE SCHEDULE	9/15/2008	7
A1-001	LOCATION PLAN	12/16/2008	6
	FLOOR PLANS		
A2-0B4	BASEMENT LEVEL B4 FLOOR PLAN	4/24/2009	11
A2-0B3	BASEMENT LEVEL B3 FLOOR PLAN	4/24/2009	9
A2-0B3A	BASEMENT LEVEL B3 LOADING DOCK FLOOR PLAN	12/16/2008	7
A2-0B2	BASEMENT LEVEL B2 FLOOR PLAN	12/16/2008	8
A2 0B1	BASEMENT LEVEL B1 FLOOR PLAN	12/16/2008	8
A2-0B1M	BASEMENT LEVEL B1M FLOOR PLAN	12/16/2008	10
A2-001	1ST FLOOR PLAN (LOBBY / RETAIL)	9/15/2008	5
A2-002	2ND FLOOR PLAN (RETAIL)	9/15/2008	5
	FLOOR CORE PLANS		
A3-0B4	BASEMENT LEVEL B4 FLOOR CORE PLAN	12/16/2008	8
A3-0B3	BASEMENT LEVEL B3 FLOOR CORE PLAN	12/16/2008	7
A3-0B2	BASEMENT LEVEL B2 FLOOR CORE PLAN	12/16/2008	7

A3-0B1	BASEMENT LEVEL B1 FLOOR CORE PLAN	12/16/2008	7
A3-001	1ST FLOOR CORE PLAN	9/15/2008	6
A3-002	2ND FLOOR CORE PLAN	9/15/2008	6
A3-1B4_A	BASEMENT LEVEL B4 - QUADRANT PLAN A	12/16/2008	6
A3-1B4_B	BASEMENT LEVEL B4 - QUADRANT PLAN B	12/16/2008	6
A3-1B4_C	BASEMENT LEVEL B4 - QUADRANT PLAN C	12/16/2008	7
A3-1B4_D	BASEMENT LEVEL B4 - QUADRANT PLAN D	12/16/2008	6
A3-1B3_A	BASEMENT LEVEL B3 - QUADRANT PLAN A	12/16/2008	6
A3-1B3_B	BASEMENT LEVEL B3 - QUADRANT PLAN B	12/16/2008	6
A3-1B3_C	BASEMENT LEVEL B3 - QUADRANT PLAN C	12/16/2008	6
A3-1B3_D	BASEMENT LEVEL B3 - QUADRANT PLAN D	12/16/2008	6
A3-1B3_E	BASEMENT LEVEL B3 - FLOOR PLAN QUADRANT E	12/16/2008	5
A3-1B2_A	BASEMENT LEVEL B2 - QUADRANT PLAN A	12/16/2008	5
A3-1B2_B	BASEMENT LEVEL B2 - QUADRANT PLAN B	12/16/2008	6
A3-1B2_C	BASEMENT LEVEL B2 - QUADRANT PLAN C	12/16/2008	5
A3-1B2_D	BASEMENT LEVEL B2 - QUADRANT PLAN D	12/16/2008	6
A3-1B1_A	BASEMENT LEVEL B1 - QUADRANT PLAN A	12/16/2008	6
A3-1B1_B	BASEMENT LEVEL B1 - QUADRANT PLAN B	12/16/2008	6
A3-1B1_C	BASEMENT LEVEL B1 - QUADRANT PLAN C	12/16/2008	6
A3-1B1_D	BASEMENT LEVEL B1 - QUADRANT PLAN D	12/16/2008	6
A3-1B1M_A	BASEMENT LEVEL B1M - PLAN A	12/16/2008	8
A3-1B1M_B	BASEMENT LEVEL B1M - PLAN B	12/16/2008	8
A3-101_A	1ST FLOOR LEVEL - QUADRANT PLAN A	9/15/2008	5
A3-101_B	1ST FLOOR LEVEL - QUADRANT B	9/15/2008	4
A3-101_C	1ST FLOOR LEVEL - QUADRANT C	9/15/2008	5
A3-101_D	1ST FLOOR LEVEL - QUADRANT D	9/15/2008	4
A3-102_A	2ND FLOOR PLAN - DETAIL PLAN A	9/15/2008	5
A3-102_B	2ND FLOOR PLAN - DETAIL PLAN B	9/15/2008	3
	CORE SECTIONS & INTERIOR DETAILS		
A4-030	WATER TANK DETAILS	12/16/2008	3
A4-031	FUEL OIL TANK ROOM DETAILS	12/16/2008	3
A4-032	MISCELLANEOUS BELOW GRADE STAIRS & RAMPS	12/16/2008	3
A4-040	LOADING DOCK DETAILS	12/16/2008	3
A4-046	LOADING DOCK SECTIONS	12/16/2008	3
A4-047	BELOW GRADE LOADING DOCK ELEVATIONS / DETAILS AND	12/16/2008	4
A4-100	TYPICAL ELEVATOR / SUMP PIT DETAILS	12/16/2008	7
A4-101	TYPICAL SUMP PIT DETAILS	12/16/2008	4
A4-102	TYPICAL BELOW GRADE DETAILS	12/16/2008	4
A4-150	FLOOR BUILD UP DETAILS	9/15/2008	4
A4-151	FLOOR BUILD UP DETAILS	9/15/2008	4
A4-200	TYPICAL DETAILS	9/15/2008	4
A4-201	TYPICAL FLOOR SLAB DETAILS	9/15/2008	3
A4-205	CORE PLAN DETAILS	9/15/2008	4
A4-206	CORE PLAN DETAILS	9/15/2008	3
A4-207	CORE PLAN DETAILS	9/15/2008	3
A4-208	CORE PLAN DETAILS	9/15/2008	3
A4-209	CORE PLAN DETAILS	9/15/2008	3
A4-210	CORE PLAN DETAILS	9/15/2008	2
A4-211	CORE PLAN DETAILS	9/15/2008	2
A4 212	CORE PLAN DETAILSCORE PLAN DETAILS	9/15/2008	2
A4-213	CORE PLAN DETAILS	9/15/2008	2
A4-214	CORE PLAN DETAILS	9/15/2008	2
A4-215	CORE PLAN DETAILS	9/15/2008	3
A4-216	CORE PLAN AND SECTION DETAILS	9/15/2008	3

A4-217	CORE PLAN DETAILS	9/15/2008	3
A4-218	SERVICE ELEVATOR LOBBY PLAN	9/15/2008	2
A4-220	CORE PRIMARY ELECT. CLOSET, SECONDARY TELE ROOM PLANS,	9/15/2008	3
A4-251	CORE SECTION DETAILS	9/15/2008	6
A4-252	CORE SECTION DETAILS	9/15/2008	6
A4-255	CORE SECTION DETAILS	9/15/2008	3
A4-260	CORE SECTION DETAILS	9/15/2008	3
A4-270	CORE SECTION DETAILS	9/15/2008	3
A4-300	MISCELLANEOUS METALS	9/15/2008	3
A4-301	MISCELLANEOUS DETAILS	9/15/2008	2
A4-500	PERIMETER PLAN DETAILS LEVELS 14-18	9/15/2008	4
A4-501	PERIMETER PLAN DETAILS LEVELS 19 AND 20	9/15/2008	3
A4-502	PERIMETER PLAN DETAILS AT LEVEL 40	9/15/2008	3
A4-503	PERIMETER PLAN DETAILS	9/15/2008	4
A4-504	PERIMETER PLAN DETAILS	9/15/2008	4
A4-505	PERIMETER PLAN DETAILS	9/15/2008	3
A4-506	PERIMETER PLAN DETAILS	9/15/2008	3
A4-510	PERIMETER PLAN DETAILS	9/15/2008	3
A4-511	PERIMETER PLAN DETAILS	9/15/2008	3
A4-512	PERIMETER PLAN DETAILS	9/15/2008	3
A4-513	PERIMETER PLAN DETAILS	9/15/2008	3
A4-514	PERIMETER PLAN DETAILS	9/15/2008	3
A4-515	PERIMETER PLAN DETAILS	9/15/2008	3
A4-516	PERIMETER PLAN DETAILS	9/15/2008	2
A4-520	PERIMETER PLAN DETAILS	9/15/2008	3
A4-521	PERIMETER PLAN DETAILS	9/15/2008	3
A4-522	PERIMETER PLAN DETAILS	9/15/2008	3
A4-523	PERIMETER PLAN DETAILS	9/15/2008	3
	BUILDING ELEVATIONS & SECTIONS		
A5-001	WEST AND SOUTH BUILDING ELEVATIONS	9/15/2008	4
A5-002	EAST AND NORTH BUILDING ELEVATIONS	9/15/2008	4
A5-003	BUILDING SECTIONS	9/15/2008	5
A5-020	WEST PARTIAL PODIUM ELEVATION (GREENWICH STREET)	9/15/2008	4
A5-021	SOUTH PARTIAL TOWER ELEVATION (FULTON STREET)	9/15/2008	4
A5-022	SOUTH PARTIAL PODIUM ELEVATION (FULTON STREET)	9/15/2008	4
A5-023	EAST PARTIAL ELEVATION PODIUM (CHURCH STREET)	9/15/2008	4
A5-024	EAST PARTIAL TOWER ELEVATION (CHURCH STREET)	9/15/2008	4
A5-025	NORTH PARTIAL PODIUM ELEVATION (VESEY STREET)	9/15/2008	4
A5-026	NORTH PARTIAL PODIUM ELEVATION TOWER (VESEY STREET)	9/15/2008	4
A5-100	NORTH/SOUTH PARTIAL BUILDING SECTION TOWER BASE	9/15/2008	4
A5-101	NORTH/SOUTH PARTIAL BUILDING SECTION SKYLOBBY & TOWER	9/15/2008	4
A5-102	EAST/WEST PARTIAL BUILDING SECTION RETAIL AND MECHANICAL	9/15/2008	4
A5-120	PARTIAL BUILDING SECTIONS	12/16/2008	5
A5-121	PARTIAL BUILDING SECTIONS	12/16/2008	5
A5-122	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	3
A5-123	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-124	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-125	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-126	PARTIAL WALL SECTIONS AT PODIUM	9/15/2008	2
A5-127	SLURRY WALL ELEVATION AND POE MATRIX	12/16/2008	1
A5-130	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-131	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-132	WEST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-133	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-134	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-135	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3

A5-136	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-137	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-138	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-139	SOUTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-140	EAST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-141	EAST PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-142	NORTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
A5-143	NORTH PARTIAL EXTERIOR WALL SECTIONS AT PODIUM	9/15/2008	3
	VERTICAL TRANSPORTATION (ELEVATORS, ESCALATORS,STAIRS, RAILINGS & MISCELLANEOUS METALS)		
A6-001	STAIR BE & A SECTION	9/15/2008	5
A6-002	STAIR BA AND A INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-003	STAIR BG, BB & B SECTION	9/15/2008	5
A6-004	STAIR B & G INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-005	STAIR BC SECTION	9/15/2008	5
A6-006	STAIR C SECTION AND INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	5
A6-007	STAIR BD & D SECTION	9/15/2008	5
A6-008	STAIR BD & D & L INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-009	STAIR BF & F SECTION	9/15/2008	5
A6-010	STAIR BF & F INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	3
A6-011	STB4-04 SECTIONS AND INTERMEDIATE LANDINGS DETAIL PLAN	9/15/2008	5
A6-018	MISCELLANEOUS STAIR/LADDER SECTIONS	9/15/2008	3
A6-050	TYPICAL CONCRETE STAIR DETAILS	9/15/2008	5
A6-052	TYPICAL STAIR MARKING DETAILS	9/15/2008	5
A6-055	MISCELLENEOUS STAIR DETAILS	9/15/2008	3
A6-060	TYPICAL STEEL STAIR DETAILS	9/15/2008	5
A6-061	TYPICAL STAIR DETAILS	9/15/2008	5
A6-065	SECURITY GATE SECTIONS	9/15/2008	3
A6-066	SECURITY GATE SECTIONS	9/15/2008	3
A6-100	ESCALATOR ES1-ES2 PLANS, SECTIONS, DETAILS	9/15/2008	5
A6-200	ELEVATOR SECTIONS BANK B	9/15/2008	5
A6-201	ELEVATOR SECTIONS BANK C	9/15/2008	5
A6-202	ELEVATOR SECTIONS BANK D	9/15/2008	5
A6-203	ELEVATOR SECTIONS BANK E	9/15/2008	5
A6-210	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-2	9/15/2008	5
A6-211	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-4	9/15/2008	6
A6-212	ELEVATOR SECTIONS - SERVICE ELEVATOR SE-1	9/15/2008	3
A6-220	ELEVATOR SECTIONS - A1 AND H1	9/15/2008	6
A6-222	ELEVATOR HALL ELEVATIONS	9/15/2008	4
A6-225	BANK A TYPICAL CAB PLANS AND ELEVATIONS	9/15/2008	6
A6-226	BANK A ELEVATOR SHAFT DETAILS	9/15/2008	6
A6-230	PASSENGER ELEVATORS, TYPICAL CAB PLANS AND ELEVATIONS	9/15/2008	5
A6-231	ELEVATOR H1 CAB LAYOUT AND ELEVATIONS; SERVICE ELEVATOR CAB LAYOUTS	9/15/2008	6
A6-235	ELEVATOR TYPICAL CAB DETAILS	9/15/2008	5
A6-240	L1 LIFT PLANS, SECTIONS, ELEVATIONS, DETAILS	9/15/2008	6
A6-241	L1 ELEVATOR DETAIL	9/15/2008	6
A6-242	L1 ELEVATOR SECTION DETAILS	9/15/2008	6
A6-250	ELEVATOR HALL DETAILS	9/15/2008	6
A6-251	ELEVATOR HALL DETAILS	9/15/2008	6
A6-252	ELEVATOR HALL DETAILS	9/15/2008	4
A6-253	ELEVATOR HALL DETAILS	9/15/2008	4
	ROOFING DETAILS		

A7-001	TYPICAL ROOF DETAILS	9/15/2008	5
A7-002	TYPICAL ROOF DETAILS	9/15/2008	5
A7-003	TYPICAL ROOF DETAILS	9/15/2008	2
A7-004	TYPICAL ROOF DETAILS	9/15/2008	2
	BUILDING ENVELOPE		
A8-001	CLADDING KEY ELEVATIONS	9/15/2008	4
A8-010	EXTERIOR WALL ZONE 1-LOBBY	9/15/2008	4
A8-011	EXTERIOR WALL ZONE 1, 1A - LOBBY/RETAIL	9/15/2008	3
A8-012	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-013	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-014	EXTERIOR WALL - ZONE 1A - RETAIL	9/15/2008	3
A8-015	EXTERIOR WALL ZONE 1, 1A - LOBBY/RETAIL	9/15/2008	3
A8-020	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-021	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-022	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-023	EXTERIOR WALL DETAILS ZONE 2 - PODIUM	9/15/2008	4
A8-024	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-025	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-026	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-027	EXTERIOR WALL ZONE 2 - PODIUM	9/15/2008	4
A8-100	EXTERIOR WALL DETAILS ZONE 1 LOBBY	9/15/2008	4
A8-101	GRILLE DETAILS	9/15/2008	3
A8-102	EXTERIOR WALL SECTIONS	9/15/2008	3
A8-103	EXTERIOR WALL DETAILS	9/15/2008	3
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TURNER CONSTRUCTION COMPANY
WORLD TRADE CENTER
TOWER 2

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UNDERGROUND PLUMBING DOUCMENT LIST

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TURNER CONSTRUCTION COMPANY
WORLD TRADE CENTER
TOWER 2

Updated: 05/11/10

UNDERGROUND ELECTRIC LIST

Turner Project Manual			
Pages	**Description**	**Date**	**Revision**
735	Project Manual	5/1/2010	2
Tower 2 100% CD 4/25/08			
Section	**Title (Pages)**	**Date**	**Revision**
00001	PROJECT TITLE PAGE (1)	12/16/2009	--
00010	TABLE OF CONTENTS (5)	4/14/2009	--
00015	LIST OF DRAWINGS (1)	4/14/2009	--
00020	LIST OF SCHEDULES AND FORMS (3)	4/25/2008	--
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01352	LEED GREEN BUILDING REQUIREMENTS (7)	4/25/2008	0
01400	QUALITY REQUIREMENTS (8)	4/25/2008	0
01570	CONSTRUCTION WASTE MANAGEMENT (6)	4/25/2008	0
01572	EROSION AND SEDIMENTATION CONTROL (6)	4/25/2008	0
01575	PEST CONTROL (3)	4/25/2008	0
01700	EXECUTION AND CLOSEOUT REQUIREMENTS (4)	4/25/2008	0
02000	SITE WORK STANDARD SPECIFICATIONS AND DRAWINGS (4)	4/25/2008	0
02810	SITE IRRIGATION	4/14/2009	0
02200	EXCAVATION, FILLING AND GRADING (10)	4/25/2008	1
02240	DEWATERING FOR SITE WORK (2)	4/25/2008	0
02260	ROCK EXCAVATION (8)	4/25/2008	2
02269	ROCK ANCHORS (11)	4/25/2008	1
02270	EROSION AND SEDIMENT CONTROL (4)	4/25/2008	0
02280	SHEETING FOR UTILITY TRENCHES (1)	4/25/2008	0
02301	EARTHWORK FOR SITE WORK (3)	4/25/2008	0
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02360	DRILLED CAISSONS (10)	4/25/2008	0
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~~SKA 5088 B~~	~~T2 UTILITY / POE SLURRY WALL ELEVATION (VESEY STREET)~~	~~8/11/08~~	~~1~~
~~SKA 5088 C~~	~~T2 UTILITY / POE SLURRY WALL ELEVATION (VESEY STREET)~~	~~8/11/08~~	~~1~~
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~~SKA 5088 E~~	~~T2 UTILITY / POE SLURRY WALL ELEVATION (CHURCH STREET)~~	~~8/11/08~~	~~1~~
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~~C-1173~~	~~Vesey Street Profiles~~	~~6/16/2008~~	~~0~~

~~SK-3004~~	~~Slurry Wall Composite Utility Section Plan~~	~~6/26/2008~~	~~0~~
~~SK-3005~~	~~Overall Utilities Diagram Sitewide POE~~	~~6/26/2008~~	~~0~~
~~SK-ECS~~	~~Empire City Subway Manhole Details, Scope of Work and Specifications~~	~~8/6/2008~~	~~0~~
~~Drawing 1 of 1~~	~~Vesey St. Plan and Profiles~~	~~11/22/2006~~	~~0~~
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~~C-7101~~	~~Subdrain Details~~	~~5/12/2008~~	~~0~~
~~SK-3007~~	~~Vesey Street Site Connection Plan~~	~~7/17/2008~~	~~1~~
~~SK-3006~~	~~Site Connection Profiles and Details~~	~~7/17/2008~~	~~0~~
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	~~Water main relocation as built~~	~~10/3/2008~~	~~0~~
~~sketch WM-2~~	~~Vesey Street water main as-built~~	~~7/11/2008~~	~~0~~
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S8-05	STAIR BC PARTIAL SECTION	4/21/2010	8
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IR-001	Tower 2 Irrigation Plan	4/14/2009	1
IR-002	Tower 2 Irrigation Details	4/14/2009	1

Estimate Item	Difference Pricing/added scope for Primary PDCs (from estimate)	Original Cost	Added Costs
A	Battery room exhaust including electrical connections	[redacted]	
B	Added mimic panel		
C	Added B3 substation and control power work		
D	Installation of new PDC cabinets		
E	Added feeders and concrete encasement		
F	Added CMU walls and Equipment pads		
G	PAC added cost, battery unit room and wiring		
H	Added Con Ed metering installation		
	Sub Total		
		Total Labor	[redacted]

T&H Proposal Item	Difference Pricing/added scope for Primary PDCs (assumes 8 feeders) (equipment only)	Original Cost	Added Cost
I	Con end metering cubicle	[redacted]	
H	Incoming service cubicle		
	Main breaker cubicle		
L	Con Edison G&T Device with cubicle (4 total)		
	Customer G&T Device (4 total)		
J	Mimic control and annunicator		
N	Advisory board drawings		
	Con Ed witness testing		
K	Con Ed EO-2022 battery system		
	Breakers - towers 2, 3, 4 and spare		
	Short circuit coordination study		
	Start up services		
	Training		
	Key Interlock		
	Factory witness testing		
	O&Ms		
	Delivery		
	Sub Total		
		Total Equipment	[redacted]

Original Silverstein PDC	[redacted]
Premimum Cost for Upgrade to Con Ed PDCs	
Total PDC Cost	

Turner Construction Company

Tower 2 World Trade Center
250 Greenwich Street
New York, New York
ESTIMATE - 7/1/2010 DRAFT for Review - Updated 7/13/2010

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Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	Percentages SPI	PAH	PARK	VSC	S & RI	RETAIL	Cost Breakouts SPI	PAH	PARK	VSC	S & RI	RETAIL
001	EXCAVATION & FOUNDATIONS																		
002	Excavation & Foundation																		
003	Halmar's Adjusted Remaining Contract																		
004	Dead man for Guy Cables																		
005	Pads on B4 Level																		
006	Tie Down Beams																		
007	Remove debris from underground contractors																		
008	Concrete for LR1200 Base																		
009	Shappiro Design Cost																		
010	Subtotal: Excavation & Foundation																		
011																			
012	EXCAVATION & FOUNDATIONS																		
013																			
014	STRUCTURAL FRAME																		
015	Superstructure Concrete																		
016	Concrete 1st Round Base Bid																		
017	Subtotal: Superstructure Concrete																		
018																			
019	Raise Concrete Shear Walls																		
020	Raise Shear Walls Above Grade																		
021	Raise Transit Hall Stair to provide access above to Roof																		
022	Raise SW Corner of Core to Elevation 24'-7"																		
023	Subtotal: Raise Concrete Shear Walls																		
024																			
025	Install Curtain Wall Embeds																		
026	Install Day-2 Curtain Wall Embeds (Assume 1 Embed Every 5 feet)																		
027	Pour Ground Floor Curb for Day-2 Curtainwall Embeds																		
028	Subtotal: Install Curtain Wall Embeds																		
029																			
030	Protection Slab																		
031	Temporary Concrete Protection Slab Over Waterproofing																		
032	Subtotal: Protection Slab																		
033																			
034	Encase ConEd Conduit																		
035	Encase Conduit from ConEd Space Chamber to PDCs																		
036	Subtotal: Encase ConEd Conduit																		
037																			
038	Misc Concrete Items Requested at Bid																		
039	Waterproofing at Water Tank																		
040	Cumeback to Infill Four (4'x 4') Openings																		
041	Subtotal: Misc Concrete Items Requested at Bid																		
042																			
043	Temporary Concrete Cover																		
044	Level 1 Temporary Concrete Cover to Infill Opening																		
045	Level B1 Temporary Concrete Cover to Infill Opening																		
046	Level B3 Temporary Concrete Cover to Infill Opening																		
047	Subtotal: Temporary Concrete Cover																		
048																			
049	Concrete Curb at Perimeter Slurry Wall Drains																		
050	Level B1M - Perimeter Drainage Curb																		
051	Level B1 - Perimeter Drainage Curb																		
052	Level B2 - Perimeter Drainage Curb																		
053	Level B3 - Perimeter Drainage Curb																		
054	Level B4 - Perimeter Drainage Curb																		
055	Subtotal: Concrete Curb at Perimeter Slurry Wall Drains																		
056																			
057	Concrete Housekeeping Pads																		
058	Level 1 - Mech 4" Equipment Pads																		
059	Level B1M - Mech 4" Equipment Pads																		
060	Level B1 - Mech 4" Equipment Pads																		
061	Level B2 - Mech 4" Equipment Pads																		
062	Level B3 - Mech 4" Equipment Pads																		
063	Level B4 - Mech 4" Equipment Pads																		
064	Level B2 - Spot Network - Mech 4" Equipment Pads																		
065	Subtotal: Concrete Housekeeping Pads																		
066																			
067	Miscellaneous Concrete																		
068	Level 1 - Plaza Level																		
069	Temporary CIP Concrete Trench Drain at Plaza Perimeter																		
070	Site Perimeter Curb																		
071	Concrete Platform at Stair Tower Egress																		
072	Level B1M																		
073	Level B1																		
074	Level B2																		
075	PA Water Tanks																		
076	Spot Network Service Switchboard Roof																		
077	Spot Network Transformer Vault Compartments																		

Turner Construction Company

Tower 2 World Trade Center
200 Greenwich Street
New York, New York
ESTIMATE - 7/1/2010 DRAFT for Review - Updated 7/12/2010

Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	Percentages SPI	PAH	PARK	VSC	S & RI	RETAIL	Cost Breakouts SPI	PAH	PARK	VSC	S & RI	RETAIL
232	Relocations due to field conditions																		
233	Subtotal: Rebar Box-Out Above Core Walls																		
234																			
235	Louver Wall at HUB Shaft																		
236	Louver Wall with 600 SF Area																		
237	Exterior Stud Framing and Metal Panel Top and Bottom																		
238	Misc Structural Framing to Support Louver Wall																		
239	Painted Aluminum Fascia with Gravel Stop at Transit Hall																		
240	Subtotal: Louver Wall at HUB Shaft																		
241																			
242	Ductwork Enclosure at Roof Level																		
243	L2 Roof																		
244	L1 Roof																		
245	Subtotal: Ductwork Enclosure at Roof Level																		
246																			
247	Canopy Over Transit Hall Entrance																		
248	Level 2 Overhang Above Transit Hall Entrance																		
249	Painted Gyp Sheathing Soffit Above Transit Hall Entrance																		
250	Subtotal: Canopy Over Transit Entrance																		
251																			
252	Temp Exterior Doors (Including Hardware and Installation)																		
253	All Egress Temp Doors at Ground Level																		
254	Subtotal: Temp Exterior Doors																		
255																			
256	EXTERIOR WALL																		
257																			
258	INTERIOR PARTITIONS & FINISHES																		
259	Partitions																		
260	Temp Thermal Wall Partitions - 2-1/2" 20ga Metal stud w/ 2" rigid insul, v																		
261	Level 1																		
262	Level B1M																		
263	Level B1																		
264	Level B2																		
265	Level B3																		
266	Level B4																		
267	Level 1 - GWB Furring at Transit Lobby																		
268	Level B4 - 8' high chain link fence																		
269																			
270	Temp Partitions at Open Shafts (2-HR Rated Masonry Assembly)																		
271	Level 1																		
272	Level B1M																		
273	Level B1																		
274	Level B2																		
275	Level B3																		
276	Level B4																		
277																			
278	Level B2 Temporary Bathroom Enclosure																		
279	Level B2 Temporary Bathroom Platform																		
280	Level B2 Temporary Bathroom Interior Partitions																		
281	Level B2 Temp Bathroom Ceiling/Roof																		
282																			
283	Temp Infill at Shear Wall Openings (2-HR Rated Assembly)																		
284	Level 1																		
285	Level B1M																		
286	Level B1																		
287	Level B2																		
288	Level B3																		
289	Level B4																		
290																			
291	CMU Wall - 8" CMU Solid filled																		
292	Level 1																		
293	Level B1M																		
294	Level B1																		
295	Level B2																		
296	Level B3																		
297	Level B4																		
298	Level B2 Spot Network Service Switchboard Partitions																		
299																			
300	Slurry Wall Liner Wall 8" CMU Wall with Bituminous WP																		
301	Level 1																		
302	Level B1M																		
303	Level B1																		
304	Level B2 (Spot Network Room Allow 100 LF)																		
305	Level B3																		
306	Level B4																		
307																			
308	OSHA & Finish Work Protection (GSF)																		

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								SPI	PAH	PARK	VSC	S & RI	RETAIL	SPI	PAH	PARK	VSC	S & RI	RETAIL
309	Level 1																		
310	Level B1M																		
311	Level B1																		
312	Level B2																		
313	Level B3																		
314	Level B4																		
315	Remove and Replace Protection as required for work																		
316	Subtotal: Partitions																		
317																			
318	Install Doors, Frames, and Hardware																		
319	Exterior HM Doors & HM Frames - Single																		
320	Level 1																		
321	Interior HM Doors & HM Frames - Single																		
322	Level 1																		
323	Level B1M																		
324	Level B1																		
325	Level B2																		
326	Level B3																		
327	Level B4																		
328																			
329	Interior HM Doors & HM Frames - Double																		
330	Level 1																		
331	Level B1M																		
332	Level B1																		
333	Level B2																		
334	Level B3																		
335	Level B4																		
336																			
337	Below Grade Stair Hollow Metal and Hardware																		
338																			
339	Level B2 Temp Bathroom Doors - Single																		
340	Temp Construction Door - Single HM Door and Frame																		
341	Exterior HM Doors & HM Frames - Double																		
342	Subtotal: Install Doors, Frames, and Hardware																		
343																			
344	Furnish Doors & Hardware																		
345	Exterior Doors/Frames/Hardware - Single																		
346	Level 1																		
347	Interior Door/Frames/Hardware - Single																		
348	Level 1																		
349	Level B1M																		
350	Level B1																		
351	Level B2																		
352	Level B3																		
353	Level B4																		
354																			
355	Interior Doors/Frames/Hardware - Double																		
356	Level 1																		
357	Level B1M																		
358	Level B1																		
359	Level B2																		
360	Level B3																		
361	Level B4																		
362																			
363	Below Grade Stair Hollow Metal and Hardware																		
364																			
365	Level B2 Temp Bathroom Doors - Single																		
366	Temp Construction Door - Single HM Door and Frame																		
367	Exterior HM Doors & HM Frames - Double																		
368	Subtotal: Furnish Doors and Hardware																		
369																			
370	Flooring and Base																		
371	Sealed Concrete Flooring - Mothball Space																		
372	Level 1																		
373	Level B1M																		
374	Level B1																		
375	Level B2																		
376	Level B3																		
377	Level B4																		
378	Painted Concrete Flooring																		
379	Level 1																		
380	Level B1M																		
381	Level B1																		
382	Level B2																		
383	Level B3																		
384	Level B4																		
385	Mechanical Room Waterproofing																		

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Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	Percentages SPI	PAH	PARK	VSC	S & RI	RETAIL	Cost Breakouts SPI	PAH	PARK	VSC	S & RI	RETAIL
848	Motor Starter (2 HP)																		
849	Particulate/Gas Phase Filtration on Drwg M8.01																		
850	Duct Mounted Reheat Coil																		
851	Sound Trap ST-5-6																		
852	Galvanized Ductwork @ 1st Floor Exposed to Weather																		
853	Galvanized Ductwork																		
854	Insulation																		
855	Fire/Smoke Dampers as shown																		
856	Grilles, Registers, & Diffusers - Large																		
857	Wire Mesh Screens																		
858																			
859	H&V Unit V-5-1 Commercial Park																		
860	Supply Fan																		
861	Variable Speed Drives (60 HP)																		
862	Particulate/Gas Phase Filtration on Drwg M8.01																		
863	Sound Trap																		
864	Galvanized Ductwork @ 1st Floor Exposed to Weather																		
865	Galvanized Ductwork																		
866	Insulation																		
867	Fire/Smoke Dampers as shown																		
868	Grilles, Registers, & Diffusers																		
869	Capped Duct																		
870	Subtotal: Air Distribution																		
871																			
872	Supplemental Cooling Systems																		
873	Water Cooled Packaged Air Conditioning Units @ PDC Rooms (8 @ a																		
874	Water Cooled Packaged Air Conditioning Units @ Battery Rooms (4 @																		
875	Condensate Pumps																		
876	Galvanized Ductwork																		
877	Insulation																		
878	Grilles, Registers & Diffusers																		
879	Fire/Smoke Dampers as shown																		
880	Wire Mesh Screens																		
881	Subtotal: Supplemental Cooling Systems																		
882																			
883	Ventilation Systems																		
884	Battery Room Exhaust																		
885	Battery Room Exhaust Fans E-G-1,-G-2 (2 @ 400 cfm ea)																		
886	Motor Starters																		
887	Sound Trap																		
888	Galvanized Ductwork @ 1st Floor Exposed to Weather																		
889	Galvanized Ductwork																		
890	Insulation																		
891	Fire/Smoke Dampers as shown																		
892	Grilles, Registers, & Diffusers																		
893																			
894	Ejector Pump Room Exhaust																		
895	Ejector Pump Room Exhaust Fan E-G-3 (800 cfm)																		
896	Motor Starter																		
897	Sound Trap																		
898	Galvanized Ductwork @ 1st Floor Exposed to Weather																		
899	Galvanized Ductwork																		
900	Insulation																		
901	Fire/Smoke Dampers as shown																		
902	Grilles, Registers, & Diffusers																		
903																			
904	Commercial Car Park Exhaust																		
905	Commercial Car Park Exhaust Fans E-5-11,-5-12 (2 @ 25,000 cfm ea)																		
906	Variable Speed Drives (2 @ 20 hp ea)																		
907	Sound Trap ST-5-11,-5-12 (2 @ 22,500 cfm ea)																		
908	Galvanized Ductwork @ 1st Floor Exposed to Weather																		
909	Galvanized Ductwork																		
910	Insulation																		
911	Fire/Smoke Dampers as shown																		
912	Grilles, Registers, & Diffusers																		
913	Capped Duct																		
914																			
915	MER Exhaust E-70-1																		
916	Subtotal: Ventilation																		
917																			
918	Emergency Generator System																		
919	Emergency Generator System 200KW w/ Built-In Fuel Oil Storage Tank																		
920	Generator Exhaust																		
921	Muffler Installation																		
922	Calcium Silicate																		
923	Automatic Dampers																		
924	Intake & Discharge Plenum																		

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Ranking	BUILDING SYSTEM	Quantity	Unit	Unit Cost	Estimate	Intermediate Totals	Code	Percentages SPI	PAN	PARK	VSC	S A RI	RETAIL	Cost Breakouts SPI	PAN	PARK	VSC	S A RI	RETAIL
925	Sound Attenuators																		
926	Generator Exhaust Louvers																		
927	Subtotal: Emergency Generator System																		
928																			
929	Life Safety Fuel Oil System																		
930	Install Life Safety Fuel Oil Storage Tank 15,000 gals																		
931	Furnish Life Safety Fuel Oil Storage Tank 15,000 gals																		
932	Duplex Fuel Oil Pump Sets																		
933	Fuel Oil Filtration System																		
934	Fuel Oil Specialties																		
935	Fuel Oil Supply & Return Piping																		
936	Fuel Oil Fill & Vent Piping																		
937	Fuel Oil Initial Fill up for Testing																		
938	Fuel Oil Connections																		
939	Subtotal: Life Safety Fuel Oil System																		
940																			
941	Temporary Heating & Cooling																		
942	Temporary Heating & Cooling (assume not required)																		
943	Subtotal: Temporary Heating & Cooling																		
944																			
945	Automatic Temperature Controls																		
946	Temporary DDC Temperature Control System																		
947	Subtotal: Temporary DDC Temperature Control System																		
948																			
949	General HVAC Work Items																		
950	Rigging & Hoisting																		
951	Testing and Balancing																		
952	Seismic Restraints/Vibration Isolation																		
953	Sleeves & Fire Stopping																		
954	Permits & Fees																		
955	Commissioning																		
956	MEP Coordination																		
957	Overtime																		
958	3rd Party Commissioning Agent																		
959	Painting of Ductwork/Piping																		
960	Concrete Equipment Pads																		
961	Subtotal: General HVAC Work Items																		
962																			
963	Additional Scope and Allowances																		
964	Electric Unit Heater @ Level B1 T2 Water Meter Room																		
965	Duplex Steam Condensate Pump Set w/Receiver																		
966	Low Pressure Steam & Condensate Return Piping (allowance)																		
967	Low Pressure Steam & Condensate Return Piping to AC-B4-1/UH-1																		
968	Insulation																		
969	Steam & Condensate Specialties																		
970	AC Unit Connection																		
971	H&V Unit Connections																		
972	UH Connections																		
973	Connect to HUB Existing Steam & Condensate Return Piping																		
974	Heating Coil - Steam for AC-B4-1, V-G-1, V-S-1																		
975	Stainless Steel Premium for Ductwork @ 1st Floor Exposed to Weathe																		
976	Gallery Room Exhaust Fans E-G-1,-G-2 Premium for Explosion Proof																		
977	Extend (7) Existing 10" sleeves for Life Safety Fuel Oil System through																		
978	Temporary Ventilation																		
979	Floor Circulation Fans (10 @ 2 hp ea) based on Dayton Model 6 5K																		
980	Galvanized Ductwork																		
981	Installation and Support of Core MEP Duct Risers due to Day 2 conges																		
982	Galvanized Ductwork																		
983	Insulation																		
984	Horizontal Ductwork																		
985	Insulation																		
986	Capped Ductwork																		
987	Scaffolding for Shafts																		
988	Sleeves for Day 2																		
989	Spot Network Vault Ventilation																		
990	Additional Scope for Spot Network (i.e. AC unit, ductwork, etc.)																		
991	Additional Control Scope																		
992	Additional Misc. Equipment Changes																		
993	Subtotal: Additional Scope and Allowances																		
994																			
995	Base Building Congested Area																		
996	Furnish and Install Congested Area Distribution																		
997	Subtotal: Base Building Congested Area																		
998																			
999	H.V.A.C.																		
1000																			
1001	ELECTRICAL																		

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								SPI	PAH	PARK	VSC	S A RI	RETAIL	SPI	PAH	PARK	VSC	S A RI	RETAIL
1002																			
1003	Underground Electrical																		
1004	Underground Electric Work Contract Value																		
1005	Underground Electric Overtime Allowance																		
1006	Subtotal: Underground Electrical																		
1007																			
1008	Power and Distribution																		
1009	B4																		
1010	Empty Conduit to Tower 3 & 4 2x6 5" RGS																		
1011	B3																		
1012	Empty Conduit to Tower 3 & 4 2x6 5" RGS																		
1013	Empty Conduit to Tower 3 & 4 2x3 5" RGS																		
1014	Con Ed Feeders from B1 4-5" RGS 2 active 750 kcmil & 2 spare Hr																		
1015	Con Ed Feeders from B1 8-5" RGS 4 active 750 kcmil & 4 spare Vc																		
1016	Con Ed Feeders from B1 8-5" RGS 2 active 750 kcmil & 6 spare Vc																		
1017	Feeders from PDC-A to B, PDC-G to H 1-5" RGS 750 kcmil																		
1018	Furnish Only SPI PDC A, B, C, D, E, F, G, H and Ancillary Equipmt																		
1019	SPI PDC "A" Install Only																		
1020	SPI PDC "B" Install Only																		
1021	SPI PDC "C" Install Only																		
1022	SPI PDC "D" Install Only																		
1023	SPI PDC "E" Install Only																		
1024	SPI PDC "F" Install Only																		
1025	SPI PDC "G" Install Only																		
1026	SPI PDC "H" Install Only																		
1027	Delivery and Rigging of SPI PDC's																		
1028	Terminations at Pothead																		
1029	Meter Cubicle to Meter Pan 7-#10 1" EMT																		
1030	To Con Edison Totalizer 5-#12 3/4" EMT																		
1031	Terminations for Above Metering																		
1032	B3 Substation Music & Control Systems																		
1033	Music and Control Panels Install Only																		
1034	Cabling for Music and Control Panels 30-#12AWG in 1 1/2" RGS																		
1035	125v d. c. power to Music and Control Panels 3-#12AWG in 3/4" FI																		
1036	Short Circuit & Coordination Study																		
1037	B3 Substation Control Power Supply																		
1038	Feeder to AC Transfer Switches from DS-LC87 3-600 in 3 1/2" RG:																		
1039	Feeder between AC transfer switches A & B 3-000 in 3 1/2" RGS																		
1040	AC Transfer Switch ATS-A & B Install Only																		
1041	Feeders to Battery Chargers 3/2/0 in 1 1/2" RGS																		
1042	Battery Chargers Install Only																		
1043	Feeder Battery Charger to batteries 4 sets of 2-350 in 2" FRE																		
1044	Batteries Strings Install Only																		
1045	Feeder Battery String to d.c. Disconnect 4 sets of 2-350 in 2" FRE																		
1046	d. c. Disconnect Switch Install Only																		
1047	Feeder d. c. Disconnect to d. c. Transfer Switch ATS-C & D 4 sets																		
1048	Feeders between d. c. Transfer Switches ATS-C & D 4 sets of 2-35																		
1049	d. c. Transfer Switches ATS-C & D Install Only																		
1050	Feeders from d. c. Transfer Switches ATS-C & D to d. c. Panels A																		
1051	d. c. Panelboards A & B Install Only																		
1052	Feeders d. c. Panels A & B to Sub Panels A thru H 2 sets 2-300 in																		
1053	d. c. Panelboards A thru H Install Only																		
1054	d. c. Circuits to Switchgear Circuit Breakers for Control Power 30-#8 in 2 1/																		
1055	2 1/2" FRE																		
1056	#8 AWG																		
1057	Normal Power Riser																		
1058	Utility Feed 600A 4W From SS-B4 to DP-B3																		
1059	DP-B3 600A 480/277V																		
1060	Feeder 100A 4W DP-B3 to PP-HT-B3																		
1061	PP-HT-B3 100A 480/277V																		
1062	Feeder 70A 4W DP-B3 to LP-B3																		
1063	LP-B3 100A 480/277V																		
1064	Feeder 65A 4W DP-B3 to XFMR																		
1065	XFMR 45 kVA																		
1066	Feeder 175A 4W XFMR to UP-B3																		
1067	UP-B3 225A 208/120V																		
1068	Feeder SS-B4 200A to ATS P1 & P2																		
1069	Feeders 200A ATS-P1 & P2 to EDP1-B3 & EDP2-B3																		
1070	EDP1-B3 200A 480/277V																		
1071	EDP2-B3 200A 480/277V																		
1072	Feeder 100A 4W EDP1-B3 to ELP-B3																		
1073	ELP-B3 100A 480/277V																		
1074	Feeder 70A SS-B4 to ATS-FS																		
1075	XFMR, Fuse Cut-Outs & Circuits to FACP & DCP's																		
1076	Emergency Temporary Power Riser																		
1077	Emergency Feed from Generator 400A 4W to EMDP-B3																		
1078	EMDP-B3 400A 480/277V																		

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1156	Lighting Horn Strobe	[redacted]																	
1157	Timer Switch																		
1158	Roof Lighting (Additional F3 Fixtures at L2 Roof)																		
1159	Exterior Lighting (Additional F3 Fixtures at Perimeter)																		
1160	Branch Wiring EMT Conduit & Wire																		
1161	Core Lighting																		
1162	Subtotal: Lighting																		
1163																			
1164	Lighting Control System																		
1165	Lighting Controls - Allowance																		
1166	Subtotal: Lighting Control System																		
1167																			
1168	Convenience Power																		
1169	B4																		
1170	Emergency Duplex Receptacle																		
1171	Dedicated Duplex Receptacle																		
1172	Duplex Receptacle																		
1173	GFI Duplex Receptacle																		
1174	Duplex Receptacle at Circ Fans (4 per level)																		
1175	Branch Wiring EMT Conduit & Wire																		
1176	B3																		
1177	Emergency Duplex Receptacle																		
1178	Dedicated Duplex Receptacle																		
1179	Duplex Receptacle																		
1180	GFI Duplex Receptacle																		
1181	Duplex Receptacle at Circ Fans (4 per level)																		
1182	Branch Wiring EMT Conduit & Wire																		
1183	B2																		
1184	Emergency Duplex Receptacle																		
1185	Dedicated Duplex Receptacle																		
1186	Duplex Receptacle																		
1187	GFI Duplex Receptacle																		
1188	Duplex Receptacle at Circ Fans (4 per level)																		
1189	Branch Wiring EMT Conduit & Wire																		
1190	B1																		
1191	Emergency Duplex Receptacle																		
1192	Dedicated Duplex Receptacle																		
1193	Duplex Receptacle																		
1194	GFI Duplex Receptacle																		
1195	Duplex Receptacle at Circ Fans (4 per level)																		
1196	Branch Wiring EMT Conduit & Wire																		
1197	Ground Level																		
1198	Emergency Duplex Receptacle																		
1199	Dedicated Duplex Receptacle																		
1200	Duplex Receptacle																		
1201	GFI Duplex Receptacle																		
1202	GFI Duplex Receptacle on Roof																		
1203	Branch Wiring EMT Conduit & Wire																		
1204	Subtotal: Convenience Power																		
1205																			
1206	Equipment Connections																		
1207	B4																		
1208	DEP Pump 7 1/2 HP to Panel EDP2-B3																		
1209	Sump Pumps 20 HP to Panel EDP2-B3																		
1210	AC-B4-1 to Panel DP-B3																		
1211	Outside Air Fan 2 HP to Panel DP-B3																		
1212	Ejector Pumps 10 HP to Panel EDP2-B3																		
1213	Sump Pumps 10 HP to Panel EDP2-B3																		
1214	Circulation Fans, 4 per Floor, 2 HP Each																		
1215	B3																		
1216	PAC-3B-1 17FLA to Panel DP-B3																		
1217	PAC-Standby 17FLA to Panel DP-B3																		
1218	PAC-3B-3 17FLA to Panel DP-B3																		
1219	PAC-3B-9 16FLA to panel UP-B3																		
1220	Air Compressor 1/4 HP																		
1221	CW Pump 15 HP to Panel DP-B3																		
1222	PAC-3B-5 17FLA to Panel DP-B3																		
1223	PAC-B3-11 16 FLA to Panel UP-B3																		
1224	PAC-B3-7 17FLA to Panel DP-B3																		
1225	1/20 HP Small Ventilator																		
1226	Circulation Fans, 4 per Floor, 2 HP Each																		
1227	B2																		
1228	Water Heater 1/4 HP																		
1229	Air Compressor 1/2 HP																		
1230	Pre-Heater 1/4 HP																		
1231	CP-B2-1 1 HP																		
1232	Pumps 75 HP																		

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								SPI	PAH	PARK	VSC	S & RI	RETAIL	SPI	PAH	PARK	VSC	S & RI	RETAIL
1233	Circulation Fans, 4 per Floor, 2 HP Each																		
1234	B1																		
1235	Motors 5 kW Unit Heaters																		
1236	Motor 15 HP																		
1237	Circulation Fans, 4 per Floor, 2 HP Each																		
1238	Ground																		
1239	Dry Coolers 10 HP to DP-B3																		
1240	Battery Exhaust 1 HP to DP-B3																		
1241	E-S-4 20 HP to EDP1-B3																		
1242	E-S-12 20 HP to EDP1-B3																		
1243	Car Park Vent 20 HP to EDP1-B3																		
1244	Systems-All Levels																		
1245	Heat Trace Install Only																		
1246	Fire & Smoke Damper Power																		
1247	Subtotal: Equipment Connections																		
1248																			
1249	Telephone & Data																		
1250	IT Allowance None Shown based on Fit-Out Area																		
1251	Cat 6 Wire for Ethernet Switch at Each Substation in 3/4" EMT																		
1252	Terminate, Test and Label Cat 6 Cables																		
1253	Ethernet Switches																		
1254	Riser Cable & Conduits																		
1255	Telephone / Data Equipment																		
1256	Telephone / Data Riser Wiring																		
1257	Subtotal: Telephone & Data																		
1258																			
1259	Fire Alarm																		
1260	Fire Alarm System																		
1261	B4																		
1262	Area Smoke Detector																		
1263	Speaker Strobe																		
1264	Tamper Switches																		
1265	Flow Switches																		
1266	Manual Pull Station																		
1267	Fire Warden Station																		
1268	Strobe																		
1269	Speaker																		
1270	Fire Alarm Cable and Conduit																		
1271	Data Gathering Panel																		
1272	Fire Alarm Control Panel																		
1273	FA System Program, Certify, Test and Commission - 400 Hrs																		
1274	B3																		
1275	Area Smoke Detector																		
1276	Speaker Strobe																		
1277	Tamper Switches																		
1278	Flow Switches																		
1279	Manual Pull Station																		
1280	Fire Warden Station																		
1281	Strobe																		
1282	Speaker																		
1283	Fire Alarm Cable and Conduit																		
1284	Data Gathering Panel																		
1285	Fire Alarm Control Panel																		
1286	FA System Program, Certify, Test and Commission - 400 Hrs																		
1287	B2																		
1288	Area Smoke Detector																		
1289	Speaker Strobe																		
1290	Tamper Switches																		
1291	Flow Switches																		
1292	Manual Pull Station																		
1293	Fire Warden Station																		
1294	Strobe																		
1295	Speaker																		
1296	Fire Alarm Cable and Conduit																		
1297	Data Gathering Panel																		
1298	Fire Alarm Control Panel																		
1299	FA System Program, Certify, Test and Commission - 400 Hrs																		
1300	B1																		
1301	Area Smoke Detector																		
1302	Speaker Strobe																		
1303	Tamper Switches																		
1304	Flow Switches																		
1305	Manual Pull Station																		
1306	Fire Warden Station																		
1307	Strobe																		
1308	Speaker																		
1309	Fire Alarm Cable and Conduit																		

OPTION PRICING #1

TURNER
TOWERS 2,3&4 Primary Power
Power located at Tower #2 to feed Towers 2,3 &4
Owner: Silversteen
CM: Turner
GC
(8) MV PDC'S

ITEM H

ITEM I

ITEM J

ITEM K

ITEM L

ITEM M

ITEM N

UNIT #	DESCRIPTION	QTY	UNIT	TOTAL
1	INCOMING SERVICE CUBICLE	8	[redacted]	
2	CON EDISON METERING CUBICLE	6		
3	MAIN BREAKER CUBICLE	6		
4	FEEDER TOWER #2	8		
5	FEEDER TOWER #3	8		
6	FEEDER TOWER #4	8		
7	SPARE	8		
	MIMIC CONTROL AND ANNUINCIATOR PANEL	8		
	CON ED EO-2022 BATTERY SYSTEM	1		
	CON ED G&T DEVICE WITH STORAGE CUBICLE	5		
	CUSTOMER G&T DEVICE WITH STORAGE CUBICLE	5		
	SUB TOTAL #1			
	MISC ITEMS REQUIRED FOR A COMPLETE PROJECT			
A	**SHORT CIRCUIT AND COORDINATION STUDY**	1		
B	ADVISORY BOARD DRAWINGS	1		
C	**START UP SERVICES**	1		
D	TRAINING	1		
E	**KEY INTERLOCK SCHEME**	1		
F	***FACTORY WITNESS TESTING***	1		
G	OPERATION AND MAINTENANCE MANUALS	1		
H	DELIVERY TO SITE	1		
I	THIRD PARTY NETA TESTING BY INSTALLING CONTRACTOR (NOT INCLUDED)	0		
J	UNLOADING RIGGING INTO PLACE BY INSTALLING CONTRACTOR (NOT INCLUDED)	0		
	SUB TOTAL #2			

EXHIBIT EE-2

WTC Tower 3 Interim Podium Capping Plan

[see attached]

Exhibit EE-2.1

Capped Podium Building Construction Schedule

Exhibit EE-2.2

Restart Logistics Plan

Exhibit EE-2.3

Mothballed Logistics Plan

Exhibit EE-2.5

Drawing of SWOCC Area

EXHIBIT FF

New Mutual Release

[see attached]

2010 MUTUAL RELEASE AGREEMENT

THIS 2010 MUTUAL RELEASE AGREEMENT (this "2010 Mutual Release"), dated as of December 16, 2010, is made by and among: THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY, a body corporate and politic, created by compact between the States of New York and New Jersey with the consent of Congress, having its principal office at 225 Park Avenue South, New York, New York 10003 (the "Port Authority"); WTC RETAIL LLC, a Delaware limited liability company, formerly known as Westfield WTC LLC, having its principal office c/o The Port Authority, 225 Park Avenue South, New York, New York 10003 (the "Retail Lessee"); 1 WORLD TRADE CENTER LLC, a Delaware limited liability company, having its principal office c/o The Port Authority, 225 Park Avenue South, New York, New York 10003 ("1 WTC"); THE PORT AUTHORITY TRANS-HUDSON CORPORATION, a New York/New Jersey corporation ("PATH" and, together with the Port Authority, and the Retail Lessee 1 WTC, the "PA Parties"); and 2 WORLD TRADE CENTER LLC, a Delaware limited liability company ("2 WTC"), 3 WORLD TRADE CENTER LLC, a Delaware limited liability company ("3 WTC"), 4 WORLD TRADE CENTER LLC, a Delaware limited liability company ("4 WTC"), WORLD TRADE CENTER PROPERTIES LLC, a Delaware limited liability company ("WTC Prop"), 1 WTC HOLDINGS LLC, a Delaware limited liability company ("1 WTC HOLDINGS"), 2 WTC HOLDINGS LLC, a Delaware limited liability company ("2 WTC HOLDINGS"), 3 WTC HOLDINGS LLC, a Delaware limited liability company, formerly known as 5 WTC HOLDINGS LLC ("3 WTC HOLDINGS"), 4 WTC HOLDINGS LLC, a Delaware limited liability company ("4 WTC HOLDINGS"), SILVERSTEIN PROPERTIES, INC., a New York corporation ("SPI"), SILVERSTEIN EAST WTC FACILITY MANAGER LLC, a Delaware limited liability company ("SP Facility"), WTC REDEVELOPMENT LLC, a Delaware limited liability company ("SP Redevelopment"), SILVERSTEIN WTC MGMT. CO. LLC, a Delaware limited liability company ("SP Mgmt"), SILVERSTEIN WTC MGMT. CO. II LLC, a Delaware limited liability company ("SP Mgmt II"), SILVERSTEIN WTC PROPERTIES LLC, a Delaware limited liability company, formerly known as Silverstein WTC Manager LLC which, in turn, is formerly known as Silverstein WTC Associates LLC ("SP Prop"), SILVERSTEIN WTC LLC, a Delaware limited liability company ("SP WTC"),

SILVERSTEIN FREEDOM TOWER DEVELOPMENT LLC, a Delaware limited liability company ("SP FTD"), SILVERSTEIN 2/3/4 WTC REDEVELOPMENT LLC, a Delaware limited liability company ("2/3/4 WTC"), SPRING WORLD INC., a Delaware corporation ("Spring Sub"), SPRING WTC HOLDINGS INC., a Delaware corporation ("Spring Parent"), WTC MANAGEMENT AND DEVELOPMENT LLC, a Delaware limited liability company ("WTC Manager"), SILVERSTEIN WTC MANAGEMENT AND DEVELOPMENT LLC, a Delaware limited liability company ("Silverstein Manager"),WTC INVESTORS LLC, a Delaware limited liability company ("WTC Investors"), WTC INVESTORS MANAGEMENT AND DEVELOPMENT LLC, a Delaware limited liability company ("WTC Investors Mgmt") and the NET LESSEES' ASSOCIATION OF THE WORLD TRADE CENTER, an unincorporated association formed pursuant to the REOA (the "NLA" and, together with 2 WTC, 3 WTC, 4 WTC, WTC Prop, 1 WTC Holdings, 2 WTC Holdings, 3 WTC Holdings, 4 WTC Holdings, SPI, SP Facility, SP Redevelopment SP Mgmt, SP Mgmt II, SP Prop, SP WTC, SP FTD, 2/3/4 WTC, Spring Sub, Spring Parent, WTC Manager, Silverstein Manager, WTC Investors and WTC Investors Mgmt, the "Silverstein Parties"), each having its principal office c/o Silverstein Properties, Inc., 7 World Trade Center, New York, New York 10007. The Silverstein Parties and the PA Parties are collectively referred to as the "Parties".

WITNESSETH:

WHEREAS, following the terrorist attacks of September 11, 2001, certain of the PA Parties and the Silverstein Parties have been engaged in the redevelopment of the portion of the World Trade Center site bounded by Vesey, Church, Liberty and West Streets (the "Redevelopment");

WHEREAS, in connection with the Redevelopment, certain of the PA Parties and Silverstein Parties entered into that certain Master Development Agreement for Towers 2, 3, and 4 of the World Trade Center, made as of November 16, 2006 (the "MDA"), together with numerous other agreements related to the Redevelopment, which allocated rights and responsibilities between and among the PA Parties and the Silverstein Parties (collectively, the "2006 Deal Documents");

WHEREAS, in connection with the execution of the MDA, the PA Parties and the Silverstein Parties executed a mutual release dated as of November 16, 2006 (the "2006 Mutual Release") as one of the 2006 Deal Documents;

WHEREAS, since the execution of the 2006 Mutual Release, certain disputes have arisen between the PA Parties and the Silverstein Parties, including, but not limited to, those claims brought in an arbitration commenced by certain of the Silverstein Parties against the Port Authority by Notice of Arbitration dated November 12, 2008 ("Arbitration One") and in an arbitration commenced by certain of the Silverstein Parties against the Port Authority by Notice of Arbitration dated August 4, 2009 ("Arbitration Two"), both brought concerning issues arising in connection with the Redevelopment; and

WHEREAS, the PA Parties and the Silverstein Parties have resolved these disputes and desire to work together collaboratively to complete the Redevelopment of the World Trade Center, and in connection therewith are simultaneously herewith entering into an Amended and Restated MDA and numerous other agreements, including this 2010 Mutual Release, related to the Redevelopment (the "2010 Deal Documents").

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the PA Parties and the Silverstein Parties hereby agree as follows:

1. PA Release of Silverstein. Except as provided in Section 2, each of the Silverstein Parties, and (i) each of their respective shareholders, officers, directors, members, partners, managers, employees, beneficiaries, successors and permitted assigns who, in the case of each of the foregoing, are individuals, and (ii) any intermediate limited liability companies whose sole involvement of any kind and at any time in or with the World Trade Center is as a holding company through which one or more members directly or indirectly hold their interests in a Silverstein Party, and any members of such limited liability companies who are individuals ((i) and (ii) collectively, the "Individual SP Releasees" and, collectively with the Silverstein Parties, the "SP Group"), is hereby released by each of the PA Parties from all known and unknown claims, causes of action, suits, actions, arbitrations, inquiries, litigations, proceedings, controversies, wrongdoings, disputes,

governmental or regulatory investigations, liabilities, damages, costs, obligations, judgments, contracts, covenants, commitments, promises, and demands, in each case at law, in equity or otherwise (collectively, "Claims") that any of the PA Parties has or may have, as of the date of this 2010 Mutual Release, against any member of the SP Group (collectively, "SP Released Claims").

2. Exceptions to SP Released Claims. All releases under this 2010 Mutual Release in favor of any member of the SP Group shall be void ab initio if such member hereafter participates in or causes to be asserted any Claim against any member of the PA Group pursuant to, relating to, or arising from or under any of the PA Released Claims. In addition to the foregoing, the SP Released Claims shall not include any of the following:

(a) Claims regarding enforcement of this 2010 Mutual Release or any of the 2010 Deal Documents; and

(b) Claims to which a third party would be subrogated by virtue of any insurance policy, to the extent, if any, that the release of such Claims would impair subrogation and, as a result, diminish insurance coverage or recovery; and

(c) Claims of the Retail Lessee arising prior to December 23, 2003, or of any Westfield WTC LLC ("Westfield") related entity arising prior to, on or after December 23, 2003, or arising out of the April 2005 Stipulation between Zurich American Insurance Company ("Zurich") and certain Silverstein Parties (the "Stipulation") and all related commitments or agreements on the part of the carriers excess to Zurich to be bound by the Stipulation, that any Westfield Entity may pursue directly or through, or with the cooperation (as named plaintiff or otherwise) of, the Retail Lessee or any other PA Party.

3. Silverstein Release of PA. Except as provided in Section 4, each of the PA Parties, their successors and assigns, and each of their respective individual shareholders, officers, directors, commissioners, members, partners, managers, direct and indirect owners and affiliates, employees, subsidiaries, beneficiaries, from time to time, (collectively, the "Individual PA Releasees" and, collectively with the PA Parties, the "PA Group"), is hereby released by each of the SP Group from:

(a) all known and unknown Claims that any member of the SP Group has or may have, as of the date of this 2010 Mutual Release, against any member of the PA Group; and

(b) all future Claims that any member of the SP Group may have against any member of the PA Group and/or any of its current or future affiliates pursuant to, relating to, or arising from, or in connection with, any matter relating to the performance or future performance by the PA Group under Sections 2.3 and 6.15 of the Freedom Tower Development Agreement by and between 1 World Trade Center LLC and Silverstein Freedom Tower Developer LLC dated as of November 16, 2006, including but not limited to Claims related to any future transaction between any of the PA Parties and/or any of their affiliates and The Durst Organization and any affiliates thereof (collectively with the Claims released in Section 3(a), the "PA Released Claims").

4. Exception to PA Released Claims. All releases under this 2010 Mutual Release in favor of any member of the PA Group shall be void ab initio if such member hereafter asserts any Claim against any member of the SP Group pursuant to, relating to, or arising from or under any of the SP Released Claims. In addition to the foregoing, the PA Released Claims shall not include any of the following:

(a) Claims regarding the enforcement of this 2010 Mutual Release or any of the 2010 Deal Documents; and

(b) Claims to which a third party would be subrogated by virtue of any insurance policy, to the extent, if any, that the release of such Claims would impair subrogation and, as a result, diminish insurance coverage or recovery.

5. Covenant Not to Sue. Each of the PA Parties hereby agrees never to sue or arbitrate with any of the Silverstein Parties, and each of the Silverstein Parties hereby agrees never to sue or arbitrate with any of the PA Parties, in each case for or based upon any Claim released hereunder.

6. Defense. This 2010 Mutual Release may be treated as a full-and-complete defense to, and, subject to the Port Authority Legislation, as defined below, used as a basis for an injunction against, any action, suit or other proceeding that may be instituted, prosecuted or attempted in breach

of this 2010 Mutual Release. "Port Authority Legislation" shall mean the concurrent legislation of the State of New York and the State of New Jersey set forth at Chapter 301 of the Laws of New York of 1950, as amended by Chapter 938 of the Laws of New York of 1974 (McKinney's Unconsolidated Laws Sec. 7101-7112) and Chapter 204 of the Laws of New Jersey of 1951 (N.J.S.A. 32:1-157 to 32:1-168) as amended from time to time.

7. No Admission. Nothing contained in this 2010 Mutual Release shall be construed at any time as an admission by any of the PA Parties or any of the Silverstein Parties.

8. No Prior Transfer of Claims. Each of the Parties represents and warrants to the others that it has not transferred, assigned or otherwise conveyed any of its rights, title or interest in or to any of the Claims released by this 2010 Mutual Release.

9. Representations and Warranties.

(a) The Silverstein Parties represent and warrant to the PA Parties that (i) each Silverstein Party's execution, delivery and performance of this 2010 Mutual Release have been duly authorized by all necessary action, and (ii) this 2010 Mutual Release has been duly executed and delivered by each Silverstein Party and, assuming this 2010 Mutual Release constitutes the valid and binding obligation of the PA Parties, is the valid and binding obligation of each Silverstein Party, enforceable against such Party in accordance with its terms.

(b) The PA Parties represent and warrant to the Silverstein Parties that (i) each PA Party's execution, delivery and performance of this Mutual Release have been duly authorized by all necessary action, and (ii) this Mutual Release has been duly executed and delivered by each PA Party and, assuming this Mutual Release constitutes the valid and binding obligation of the Silverstein Parties, is the valid and binding obligation of each PA Party, enforceable against such Party in accordance with its terms.

(c) The Silverstein Parties represent and warrant that the Silverstein Parties are all of the entities in which Larry A. Silverstein, any member of his family or any trust for the benefit of any of them has had or now has a direct or indirect interest and that, since July 16, 2001, has had or

now has an ownership interest or economic interest in any portion of the World Trade Center (which, for avoidance of doubt, does not include 7 World Trade Center or the site therefor, to which this mutual release is inapplicable) or that has performed any work or provided materials or services of any kind in connection with the redevelopment of any portion of the World Trade Center.

(d) The PA Parties represent and warrant that the PA Parties are all of the entities in which the Port Authority has had or now has a direct or indirect interest and that, since July 16, 2001, has had or now has an ownership interest or economic interest in any portion of the World Trade Center or that has performed any work or provided materials or services of any kind in connection with the redevelopment of any portion of the World Trade Center.

10. Joint Drafting. Each of the Parties hereby acknowledges and agrees that it has been represented by counsel of its own choosing in connection with the execution and delivery of this 2010 Mutual Release, and any ambiguity in or dispute about the meaning of any term or provision of this 2010 Mutual Release shall not be construed against any of the Parties, but shall be construed as if this 2010 Mutual Release were jointly drafted.

11. No Mutual Mistake. Each of the Parties acknowledges and agrees that this 2010 Mutual Release fully and finally settles all Claims released hereunder, and shall not be subject to any claim of mutual mistake or mistake of facts.

12. Binding Effect; Assignment. This 2010 Mutual Release shall be binding upon each of the Parties and upon their respective successors and permitted assigns; provided, however, that no rights or obligations under this 2010 Mutual Release may be assigned or transferred by any of the Silverstein Parties without the express prior written consent of the Port Authority, and no rights or obligations under this 2010 Mutual Release may be assigned or transferred by any of the PA Parties without the express prior written consent of SPI.

13. No Third-Party Beneficiaries. Nothing in this 2010 Mutual Release is intended or shall be construed to confer upon or give to any person, other than the Parties, the Individual PA

Releasees and the Individual SP Releasees, any rights or remedies under or by reason of this 2010 Mutual Release.

14. Amendment. This 2010 Mutual Release may be amended or modified only by a written instrument signed by all of the Parties.

15. Severability. If a court of competent jurisdiction finds any provision of this 2010 Mutual Release to be invalid or unenforceable as to any person or circumstance, (a) such finding shall not render that provision invalid or unenforceable as to any other person or circumstance, and (b) any such invalid or unenforceable provision shall be deemed modified to the minimum extent required to cause it to be enforceable and valid; provided, however, that if any such provision cannot be so modified, it shall be stricken and all other provisions of this 2010 Mutual Release shall remain valid and enforceable.

16. Expenses. Each of the Parties agrees that, in the event of a dispute or any legal action taken to enforce or construe the terms of this 2010 Mutual Release, the prevailing party in such dispute or legal action shall be entitled to recover its costs and expenses, including reasonable attorneys' fees, in addition to any other relief awarded in such dispute or legal action.

17. Entire Agreement. This 2010 Mutual Release constitutes the entire agreement between or among the Parties, and supersedes any prior agreements or understandings between or among them, relating to the subject matter of this 2010 Mutual Release.

18. Remedies; Waivers. The rights and remedies of the Parties under this 2010 Mutual Release shall be cumulative and are not exclusive of any rights or remedies otherwise existing at law or in equity. Neither the failure nor any delay in exercising any right, power or privilege under this 2010 Mutual Release will operate as a waiver of such right, power or privilege, and no single or partial exercise of any such right, power or privilege will preclude any other or further exercise of such right, power or privilege or the exercise of any other right, power or privilege. To the maximum extent permitted by applicable law: (a) no waiver of any right or remedy under this 2010 Mutual Release shall be effective unless in a writing signed by the Party to be bound thereby; (b) no

waiver that may be given by any such Party will be applicable, except in the specific instance for which such waiver is given; and (c) no notice to or demand on any such Party will be deemed to be a waiver of any obligation or right of such Party to take further action without notice or demand as provided in this 2010 Mutual Release.

19. Counterparts. This 2010 Mutual Release may be executed and delivered in counterparts, each of which, when so executed and delivered, shall be deemed an original, but such counterparts shall together constitute but one and the same instrument.

20. Governing Law; Consent to Jurisdiction. This 2010 Mutual Release shall be governed by, and construed in accordance with, the laws of the State of New York without regard to the choice of law rules for the State of New York. Without limiting the generality of the foregoing, with respect to any claim or notice arising hereunder, all Parties (and, with respect to the Port Authority, subject to the terms of the Port Authority Legislation), to the maximum extent permitted by applicable law, irrevocably and unconditionally submit to the jurisdiction of the New York State Supreme Court, County of New York, in connection with any proceedings commenced regarding this 2010 Mutual Release, and all Parties irrevocably submit to the jurisdiction of said court for the determination of all issues in such proceedings, without regard to choice of law principles and irrevocably waive (and, with respect to the Port Authority, subject to the terms of the Port Authority Legislation) to the maximum extent permitted by law, any objection to venue or inconvenient forum.

21. Disclaimer of Personal Liability. Neither the Commissioners of the Port Authority nor the shareholders, members, directors or partners of the Port Authority, nor any officer, agent, or employee of the Port Authority shall be charged personally by any party hereto with any liability or held liable to them under any term or provision of this 2010 Mutual Release, or because of its execution or attempted execution, or because of any breach or attempted or alleged breach thereof.

22. Rules of Construction. The definitions in this 2010 Mutual Release shall apply equally to both the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The

words "include," "includes" and "including" shall be deemed to be followed by the phrase "but not limited to" and any list of examples following such term shall in no way restrict or limit the generality of the word or provision in respect of which such examples are provided. Words such as "herein," "hereof," "hereto," "hereby" and "hereunder" refer to this 2010 Mutual Release, taken as a whole. Except as otherwise expressly provided herein: (a) any reference in this 2010 Mutual Release to any agreement shall mean such agreement as amended, restated, supplemented or otherwise modified from time to time; and (b) any reference in this 2010 Mutual Release to any law shall include corresponding provisions of any successor law and any regulations and rules promulgated pursuant to such law or such successor law. Neither the captions to Sections or subdivisions thereof shall be deemed to be a part of this 2010 Mutual Release.

[Remainder of this page intentionally left blank]

EXECUTION

IN WITNESS WHEREOF, each of the Parties hereto has caused this Mutual Release to be duly executed by its authorized representative as of the date first written above.

THE PA PARTIES:

The Port Authority of New York and New Jersey

By:_____
Name:
Title:

WTC Retail LLC

By:_____
Name:
Title:

1 World Trade Center LLC

By:_____
Name:
Title:

The Port Authority Trans-Hudson Corporation

By:_____
Name:
Title:

THE SILVERSTEIN PARTIES:

2 World Trade Center LLC

By:_____
Name:
Title:

3 World Trade Center LLC

By:_____
Name:
Title:

4 World Trade Center LLC

By:_____
Name:
Title:

World Trade Center Properties LLC

By:_____
Name:
Title:

Silverstein Properties, Inc.

By:_____
Name:
Title:

Silverstein WTC Facility Manager LLC

By:_____
Name:
Title:

Silverstein WTC Mgmt. Co. LLC

By:_____
Name:
Title:

1 WTC Holdings LLC

By:_____
Name:
Title:

2 WTC Holdings LLC

By:_____
Name:
Title:

3 WTC Holdings LLC

By:_____
Name:
Title:

4 WTC Holdings LLC

By:_____
Name:
Title:

WTC Redevelopment LLC

By:_____
Name:
Title:

Silverstein WTC Properties LLC

By:_____
Name:
Title:

Silverstein WTC LLC

By:_____
Name:
Title:

2/3/4 WTC Redevelopment LLC

By:_____
Name:
Title:

Spring World Inc.

By:_____
Name:
Title:

Spring WTC Holdings Inc.

By:_____
Name:
Title:

WTC Investors LLC

By:_____
Name:
Title:

The Net Lessees Association

By:_____
Name:
Title:

World Trade Center Report:

A Roadmap Forward

October 2, 2008

THE PORT AUTHORITY OF NY & NJ

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I. Letter from Chris Ward, Executive Director, Port Authority of NY & NJ

II. Schedules and Budgets

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INTRODUCTION

October 2, 2008

The Honorable David A. Paterson
Governor of the State of New York
State Capitol
Albany, New York 12224

Dear Governor Paterson:

It has been three months since we first reported on the status of rebuilding at the World Trade Center site. At the time, the rebuilding effort stood at a crossroads. If we were to achieve a fully rebuilt site on an acceptable schedule within an acceptable budget, a new way of doing business was required: a set of aggressive yet realistic schedules and budgets; intermediate milestones to which the public could hold us accountable; resolutions to fundamental issues that had gone unresolved for too long; and, an efficient, inclusive decision-making structure to coordinate this incredibly complex program.

Today, I believe we have each of these essential elements in place. While we still face many challenges ahead, we believe we have created a level of certainty and control over this project that has been missing since its inception. With the major issues resolved, this effort can finally be managed like a construction project – a complex construction project unlike any other in the world, but a construction project nonetheless. That is the kind of certainty that you and the Port Authority's Board of Commissioners have demanded and that the public deserves.

Three months ago, our June assessment defined four central questions that, candidly, we could not answer with confidence: what we were building; who was building it; when it would be built; and for how much. Our June assessment then outlined 15 issues that had to be resolved before we could answer these questions with certainty. In the last three months, at your direction, and together with the Port Authority Board of Commissioners and our project partners, we have undertaken an intensive effort to resolve.

In order to bring coherence to this complex set of issues, we needed a functional governance model to address them. So we established a World Trade Center (WTC) Steering Committee with representatives from the key WTC stakeholders: the Port Authority of New York and New Jersey and its Board of Commissioners (Port Authority); the Federal Transit Administration (FTA); the City of New York; the National September 11 Memorial & Museum (Memorial Foundation); Silverstein Properties, Inc. (SPI); the Metropolitan Transportation Authority (MTA); the New York State Department of Transportation (NYSDOT); and the Lower Manhattan Development Corporation (LMDC).

Three main principles guided this effort:

First and foremost, to get the rebuilding program to a level of certainty and control so that schedules and budgets reflect the construction reality on the ground instead of politically- or emotionally-driven promises.

Second, to approach this effort with the same clear-eyed perspective that produced our initial assessment – to put all options on the table, to question previous assumptions and to be honest about what we can and cannot do.

Third, the absolute necessity to make tough but practical decisions to drive this program forward.

The efforts of the past three months have produced the following results, which are critical to getting this rebuilding program on track:

1. **A simplified design of the World Trade Center Transportation Hub that retains architect Santiago Calatrava's iconic vision and, at the same time, delivers schedule and cost savings, increased transportation capacity, reduced construction risk and reliable delivery of other projects on the WTC site.**

   Working with architect Santiago Calatrava, the Downtown Design Partnership and the Steering Committee, we have developed a range of design approaches that will significantly simplify the construction of the World Trade Center Transportation Hub (Transportation Hub or Hub) (see "15 Issues Resolved" for a full description of the redesign). Through the strategic placement of columns and other conventional elements, we have been able to save time and money and reduce risk. Importantly, we have been able to do all of this while retaining the core Calatrava design, which will significantly increase transportation capacity downtown and make this Transportation Hub one of the world's great public spaces. Plus, we have been able to do this without forcing a massive redesign process that could have delayed the project even further. Because of this certainty, we will begin to procure Hub steel as early as next month.

2. **A construction solution that will allow the Memorial to open on the tenth anniversary of the September 11th attacks.**

   Over the past three months, we have developed a construction solution – a deckover approach – that literally builds the roof of the Hub's PATH Mezzanine first, which will serve as the floor of the Memorial Plaza. By building the roof first, we have prioritized the completion of the Memorial and decoupled its construction from the Hub's platform work below, thereby ensuring the Memorial Plaza's completion by September 11, 2011.

3. **A strategy to construct Greenwich Street – the front door for Towers 2, 3 and 4 and a key access point to the Memorial – years before we anticipated in our June assessment.**

   This strategy consists of several resolutions described in detail later in the report, the main one being a new, more efficient approach to the permanent underpinning of the MTA's #1 subway line, which must be completed before Greenwich Street is built on top of it.

4. **A series of agreements that will give the Port Authority greater control over delivery of the Vehicle Security Center, which will serve as a key access point to all of the commercial development on the WTC site.**

   These agreements include: settling a seven-year old land claim that delayed the VSC's construction; acquiring full control over the VSC's design, procurement and construction based on the FTA's tentative agreement, subject to your requesting such action, to reallocate federal funding from the VSC to the Hub, thus removing a layer of federal requirements off of the project; and a police and security agreement with the City of New York for the World Trade Center area that will give greater certainty over how the VSC will interact with the rest of the site's security plan.

These main results were made possible by resolving all 15 fundamental issues that had gone unresolved prior to our June assessment. (All 15 resolutions are described in detail in the "15 Issues Resolved" chapter.) As a result, we can now say with certainty what we're building, who's building it, when it will be built and for how much. That is not to say there won't be challenges ahead or new obstacles to overcome, but we have come a very long way since June.

As our initial assessment put plainly, to forecast completion dates and costs before these fundamental issues had been resolved would only create a new set of unrealistic commitments and expectations. But because of these resolutions, we can now present with confidence schedules and budgets with interim milestones so the public can track our progress and hold the Port Authority and our project partners accountable.

I realize these new schedules and budgets will be met with a degree of skepticism. After all, schedules and budgets have been released before. But it's important to understand that these schedules and budgets are markedly different from past ones. Here's why:

First, they reflect the construction realities on the ground that had not been fully understood until now, given the infancy and complexity of the project.

Second, they reflect a level of built-in risk – through the application of what is called a "probabilistic analysis" or risk analysis – that had not been applied to past schedules. (This concept is explained later in the "Schedules and Budgets" chapter of the report.)

Third, they include interim milestones so the public can hold us accountable. This is critical. I cannot promise that we will meet every single milestone every step of the way; after all, this is the most complex construction program in the region's history and some setbacks are inevitable. But what I can promise is that we will have full transparency. Now, when we miss a milestone, we will not only let the public know – we will tell them why we missed it and how we plan to fix the problem.

Completion Dates	Target Date	Probabilistic Date	Budget Estimate
Transportation Hub	4Q 2013	2Q 2014	$3.2 billion
Memorial*			
Interim Plaza Turnover (80% deck complete)	4Q 2010	1Q 2011	
Complete Plaza Turnover (100% deck complete)	3Q 2011	4Q 2011	
Museum Completion	1Q 2013	2Q 2013	
One World Trade Center, Freedom Tower	2Q 2013	4Q 2013	$3.1 billion
Greenwich Street	2Q 2012	4Q 2012	$281 million**
Vehicle Security Center	1Q 2012	3Q 2012	$633 million

* Memorial Foundation is in control of this budget

** The budget for Greenwich Street is part of the Hub's overall $3.2 billion budget.

As you can see from our revised schedules and budgets, no panaceas emerged over the last three months. As I said in our initial assessment, "there should be no illusion that future mitigation efforts will dramatically scale back schedule and cost to the point of meeting those dates and costs originally projected, which, as this report makes clear, are not realistic."

Sure enough, we found no rewind button that could take us back in time or reverse the trajectory of the last seven years. With projects already underway, billions of dollars already committed and foundations already built, it is impossible and impractical to turn back the clock and reimagine the World Trade Center landscape in radically different terms.

But what we did find were creative, innovative and practical solutions to major unresolved issues, creating a clear path toward meeting key milestones – like the tenth anniversary of the September 11th attacks and others critical to the commercial viability of the site – that we did not have before. Substantial progress toward those key milestones is already underway:

In just the last three months since our June assessment, we have begun erecting steel for the Memorial; nearly completed bidding out the contracts for One World Trade Center, The Freedom Tower; installed all 47 steel arches that form the underground East-West passageway for the Transportation Hub; and have all but finished the excavation for Towers 2, 3 and 4. This is important progress that we must build on.

Moreover, in addition to making permanent a centralized decision-making structure – the WTC Steering Committee – which has proven critical over the past three months, this report also recommends the establishment of a new Office of Program Logistics to be housed in the Port Authority – a command and control structure to efficiently manage the enormously complex construction logistics on and around the 16-acre WTC site.

The residents and business of Lower Manhattan are understandably frustrated. They live and work in a 24/7 construction zone and we must do a better job of communicating with them. But the fact is, as this report makes clear, the current construction activity at the World Trade Center site pales in comparison to what the site will look like over the next five years. Thus, it is essential that we have a

mechanism in place – this new Office of Program Logistics – to communicate regularly and openly with the residents, businesses and public officials of Lower Manhattan, and work together to mitigate what will inevitably be necessary inconveniences due to the reality of how much we are building in such a small, congested area of the City.

Finally, while much progress has been made, this remains an enormously difficult undertaking. While this report will bring far greater certainty than we had before, it has not solved every problem. From a construction and logistics perspective; from a community coordination perspective; and, combined with a rapidly deteriorating economy, from a real estate market perspective, the years ahead will undoubtedly bring a new series of challenges. But, as I hope this report shows, we will confront these challenges with the same urgency, candor and pragmatism that we have brought to this process to date.

I want to personally thank the Port Authority Board of Commissioners and all of our project partners for their efforts over the past three months. This was not an easy process. There were few easy conversations and even fewer easy choices. But each partner exhibited a level of leadership, cooperation and patience without which we could not have gotten this far.

Most importantly, I want to thank the Port Authority staff, and all of our project partners' staffs, for working around the clock to resolve these issues in an environment that offers constant demands and little relief. There is an enormous amount of work reflected in the pages that follow, and it is because of this work that we can stand behind our conclusions with confidence.

With this new level of certainty and control, and with our continued commitment to be open, honest and accountable, I am confident that we can deliver on the promise of a rebuilt World Trade Center and a renewed Lower Manhattan.

Sincerely,

Chris Ward
Executive Director
Port Authority of New York & New Jersey

Cc: Governor Jon Corzine
Anthony R. Coscia, Chairman, Port Authority of NY & NJ
Henry R. Silverman, Vice-Chairman, Port Authority of NY & NJ
Port Authority Board of Commissioners
Mayor Michael Bloomberg
Assembly Speaker Sheldon Silver
Senate Majority Leader Dean Skelos
Assembly Minority Leader James Tedisco
Senate Minority Leader Malcolm Smith
Council Speaker Christine Quinn
Council Member Alan Gerson
Manhattan Borough President Scott Stringer
Senator Charles Schumer
Senator Hillary Clinton
Congressman Jerrold Nadler

Schedules and Budgets

Listed below are the updated schedules and budgets for each of the major public projects on the World Trade Center site. We have also included a brief narrative to give these numbers some context.

Each schedule includes a completion date, and, perhaps most important, interim milestones so the public can track our progress and hold us accountable. This is a new element of the Port Authority's published schedules and one we believe is critical. This way, the public will know if we've missed a key milestone and, most importantly for the management of the project, why we missed it so we can fix the problem.

We have also built in risk to the schedules for the Transportation Hub, the Memorial and Greenwich Street. This too is a new element of the Port Authority's published schedules and one we believe is just as critical. We recognize that projects this complex inevitably involve risk and, while we believe we can meet our target dates, the risk-ranging process (one that the FTA and LMCCC have done in the past) will allow us both to manage public expectations and pinpoint where the most significant risks lie so we can develop a risk mitigation plan to address them.

Here's how the process worked:

Our scheduling team, working with engineering and construction experts and, most importantly, our contractors charged with executing the design in the field, first developed a set of "target schedules" that our architects, engineers and contractors all agreed could be achieved with careful management and oversight. These target schedules were developed after detailed planning sessions to determine a logical sequence of activities each with assigned construction durations based on industry-standard productivity rates, as well as factoring in our experience to date with the WTC site and all of its logistical constraints. In the past, our scheduling process would have stopped here. But we wanted greater certainty, so we took the process to the next level.

Once we had these target schedules, our team engaged in a series of risk workshops. During these sessions, risks from minimum to maximum and most-likely duration were assigned to each activity that made up the program's overall schedule, taking into consideration the best- and worst-case scenarios for the design, material fabrication, construction and logistical risks of each activity.

A computer simulation then took these combinations and "built" the project 10,000 different times, randomly assigning these risked durations to each activity within the best- and worst-case scenarios to generate the probabilistic schedules we have today.

What's more is that, in the process, the computer simulation created a risk profile for each project, pinpointing the areas of the rebuilding program that contain the greatest risk, so we can use our time most efficiently to develop a risk mitigation plan to address them.

Schedules and Budgets Summary (see Graphic 1 for individual milestones)

Completion Dates	Target Date	Probabilistic Date	Budget Estimate
Transportation Hub	4Q 2013	2Q 2014	$3.2 billion
Memorial*			
Interim Plaza Turnover (80% deck complete)	4Q 2010	1Q 2011	
Complete Plaza Turnover (100% deck complete)	3Q 2011	4Q 2011	
Museum Completion	1Q 2013	2Q 2013	
One World Trade Center, Freedom Tower	2Q 2013	4Q 2013	$3.1 billion
Greenwich Street	2Q 2012	4Q 2012	$281 million**
Vehicle Security Center	1Q 2012	3Q 2012	$633 million

* Memorial Foundation is in control of this budget

** The budget for Greenwich Street is part of the Hub's overall $3.2 billion budget.

In addition to meeting these schedule deadlines and milestones, this report acknowledges the reality that the costs of all of these projects have increased. We take seriously our responsibility for getting all of these projects complete and want to leave no doubt that, working with our project partners, the funding will be identified to meet this commitment and see these projects through.

Before explaining the cost and schedule increases specific to each project, it's important to note that all of these projects are experiencing intense upward pressure from soaring construction and commodity prices independent of factors under our direct control.

Driven by increasing costs for essential building materials, crude oil and a weakened dollar, U.S. construction prices have skyrocketed since 2003, when the World Trade Center Master Plan was conceived. These factors, along with a limited supply of contractors in New York City, have driven the cost of construction to unprecedented heights.

From 2004 to 2007, construction costs in New York City rose 1% per month, a rate that is expected to continue through the rest of the decade. To put this in perspective, presently high-rise office building construction cost in New York City exceeds $400 per square foot (psf) exclusive of soft costs, land costs and developer profits, compared to a $230 psf average price in 2003.

Commodity prices for steel, concrete and other essential building materials have been among the major contributors to the price escalation. For example, the Associated General Contractors Construction Inflation Alert issued in March 2008 reported that steel mill prices have increased 63% between 2003 and 2007. As diesel fuel prices are closely linked to steel prices, recent increases in the price of oil have driven the five year price increase of steel to 150% in the first half of 2008.

Schedules and Budgets Explained

WTC Transportation Hub

The cost of the Transportation Hub has increased substantially since the last estimate of $2.5 billion. Construction and commodity price escalations are partially to blame, as was the lack of a complete design up until now. But it's also clear that the original cost estimate was too low to begin with if we were to achieve our project goals. If you consider how much value this money is buying, it begins to put the cost in perspective. Consider what this project must accomplish:

- When complete, the 800,000 square foot Transportation Hub will serve 250,000 people and more than 200,000 commuters per day. Far more than "simply a PATH station," it will be a Grand Central Station for Lower Manhattan – the third-largest transportation hub in New York City – and serve commuters via the subway, PATH, and ferries from two states and all five boroughs;
- Even before completing the permanent Hub, two different temporary PATH stations must be built and deconstructed at a cost of more than $400 million, almost $100 million of which is included in the project's overall budget;
- $75 million extra for the loss of Hub construction productivity and additional construction for the deck directly attributable to delivering the Memorial Plaza on September 11, 2011;
- $591 million worth of security infrastructure and hardening, given that the Hub and the WTC retail space are the only facilities on site that are completely accessible to the public;
- $281 million to build a permanent support structure ("underpinning") for the #1 subway line;
- To increase transportation capacity for future regional growth consistent with the scope in the FTA's grant of $2.2 billion, construction of three extended 10-car platforms in addition to a brand new platform that will increase capacity from three platforms to four (previous platforms accommodated only 8-cars), and five tracks that are fully ADA-compliant;
- Approximately 500,000 square feet of first-class retail and restaurant space to help revitalize the Lower Manhattan economy (larger than the retail contained in the Time Warner Center), representing the largest concentration of new retail space developed in New York in decades; and,
- The most integrated network of underground pedestrian connections in all of New York City (all served by world-class retail space), which will seamlessly link PATH service, 13 different subway l lines and the Battery Park City Ferry Terminal, as well as other locations on and around the WTC site, including the WTC Memorial, Towers 1, 2, 3 and 4, and the World Financial Center (WFC). Specifically, connections will be built:
  - From the Lower Concourse, connections will be available to PATH trains to Newark, Hoboken, and Journal Square; northbound and southbound R/W lines; northbound and southbound 1 line; and the MTA's Fulton Street Transit Center, allowing separate connections to the 4/5, J/M/Z, A/C, and 2/3 lines.
  - From the Upper Concourse, direct connections will be available to the southbound R/W line, the northbound 1 line, the E, A/C, and 2/3 lines, and the MTA's Fulton Street Transit Center, allowing separate connections to the 4/5, J/M/Z, A/C. and 2/3 lines.

– North/South Connections: Sub-grade pedestrian connectors will extend north from the Transit Hall to provide access to Vesey Street, a separate connection to the E, A/C, and 2/3 lines and Tower 2. Sub-grade pedestrian connectors will extend south from the Transit Hall to provide access to Cortlandt Way, the corner of Liberty and Church Streets, separate connections to the southbound R/W and northbound #1 lines, and Towers 3 and 4.
– East/West Connections: The east-west pedestrian corridor will offer a safer, faster and traffic-free way to and from work for those who travel via the 2/3, 4/5, and J/M/Z subway lines to Fulton Street and then head for destinations west of Broadway. From the west end of the concourse extending from the Transit Hall, direct access will be provided to One World Trade Center, The Freedom Tower and other components of the WTC complex, and continuing west to the World Financial Center and Battery Park City. For PATH commuters working at the WFC or in Battery Park City, this connector will eliminate the current need to double back along Vesey Street or Liberty Street.

Still, given the scope and expense of this project, it's worth spending some time on a question some people have reasonably asked: why build such a station in the first place? Why not simply scrap the current design and make the current temporary PATH station permanent?

These are fair questions to ask, so we took a hard look at what this would really mean. It turns out that it is not as simple or easy as it sounds. In fact, while it may be a less-expensive, short-term answer to the challenges on the site, it is an impractical and risky long-term solution. Here's why we decided not to go that route:

- Would buy us only a fraction of what was listed above;
- Would not increase transportation capacity – the next generation infrastructure – necessary for anticipated regional growth (e.g., could not accommodate new 10-car PATH trains – current station can handle only 8-car trains, which are becoming functionally obsolete; could also not accommodate an additional platform, which will allow us to expand platform capacity from three platforms to four.
- Significant changes to the scope of the Terminal would be inconsistent with the $2.2 billion in Federal Transit Administration funding;
- Would squander a significant portion of the $1.35 billion in investment that has already been spent on construction of the Hub;
- Would not meet desired life cycle and performance requirements over the next several decades and would result in increased repairs, replacement, and maintenance costs, as well as service disruptions (e.g., the existing station platforms, designed as part of the original 1970's construction, were never designed for the next fifty years, much less the next hundred). Thus, had the attacks on September 11, 2001 never happened, the Port Authority still would have had to rebuild the train station;
- Would not include approximately 500,000 square feet of prime retail and restaurant space to help revitalize the economy and quality of life of Lower Manhattan;
- The existing station must be rebuilt anyway because it sits on the northern end of where Greenwich Street will be built and is on the future site of the Performing Arts Center, as well as

on one of the entrances to the Vehicle Security Center. Other features that the current station conflicts with include: Hub emergency egress; #1 subway street access/egress; #1 subway platform; Retail space; Car parking space; Street Utilities; 20" water main and hydrant; 16" high pressure gas main; 12" storm sewer and manhole; PAC back of house space; Access road serving One World Trade Center, The Freedom Tower;

- Would have to revise the Environmental Impact Statement, which could take more than a year to complete;
- Would not meet updated security, life-safety and regulatory requirements; and,
- Would require a complete redesign of all mechanical, electric and plumbing systems (MEP), including all fan plants, outside air intake/exhaust shafts, air distribution, piping, etc. This would require significant coordination with adjacent stakeholders – a process that has been ongoing already for two-plus years to reach the final design now on the table.

Thus, in the end, the choice was clear. We now have a redesign that considerably simplifies the original design, one our builders know how to build, one that delivers priority projects within acceptable timeframes, one that fulfills the goal of significantly increasing transportation capacity, and one that creates certainty going forward given that we have a completed design and can go to the market for steel as early as next month.

National September 11 Memorial & Museum

As discussed later in the report, we have made significant changes to the rebuilding program to ensure that the Memorial is open on the tenth anniversary of September 11, 2001. This is a significant difference from our June assessment, which showed the Memorial Plaza completion in 2013 or 2014, and it is a credit to the Port Authority staff, the Memorial Foundation, the City of New York and all of our project partners who worked intensively over the past three months to pull this date back.

To give the public some perspective, we have attached a rendering of what the Memorial will look like when every last piece is in place, including the two waterfalls, the parapets, the 500-plus trees, the Museum Visitor's Center, etc (see Graphic 2). While the Port Authority can commit to much of this picture, and will continue to work closely with the Memorial Foundation and the City of New York to get even more, given that the area will continue to be a construction site, parts of the final Memorial fit-out, such as the landscaping, as well as the Museum Visitor's Center, will not be fully complete and will be phased in over time.

Given the importance of this date, we have included several milestones below so the public understands what to expect.

The first milestone – 4th Quarter 2010 – is an interim turnover of what amounts to approximately 80% of the Memorial Plaza floor. This date is important because it will allow continued construction on the two signature waterfalls that fill the voids left by the Twin Towers, as well as the parapets where the names will be inscribed of those killed at the World Trade Center on September 11, 2001 and February 26, 1993. As of this interim date, construction work will continue in the Northeast corner of the Memorial Plaza, which makes up the remaining 20%.

The second milestone – 3rd Quarter 2011 (before 9/11/11) – marks the turnover of the complete floor of the Memorial Plaza – when 100% of the plaza floor will be complete. At this point, we will have completed 100% of the Memorial Plaza's floor, the two signature waterfalls, the parapets where the names will be inscribed, some landscaping and the early-stage structure of the Museum Visitor's Center – though some of these commitments are dependent on certain deliverables from the Memorial Foundation. Given the importance of this milestone, subject to Board approval, the Port Authority will make a financial commitment to meet it.

While we have come a very long way since our June assessment, it should be noted that, even though the Memorial will open on September 11, 2011, the WTC site will still be a construction site. In fact, construction work on the overall program will be peaking during the second half of 2011. The largest office tower in the country will be under construction less than 50 feet from the north end of the Memorial, as will three other major office buildings, the Vehicle Security Center, and the below- and above-grade work on the third-largest transportation hub in the City.

As a result, we must work closely with the Memorial Foundation, the City of New York and the other stakeholders to develop an operations strategy to ensure safe, controlled access to the Memorial after September 11, 2011, when construction will still be ongoing.

One World Trade Center, The Freedom Tower

One World Trade Center, The Freedom Tower was originally budgeted at $2.9 billion when the Port Authority took over the project from Silverstein Properties in November 2006. Despite substantial construction and commodity price escalation since that time (price escalation specifically on mechanical, engineering and plumbing trades have increased 25% in the last two years – representing approximately $93 million of the increase), the Port Authority now estimates that the project will be completed for $3.1 billion, within 7% of our original budget estimate.

The project's original completion date of fourth Quarter 2012 has been pushed back until 2nd Quarter 2013 due to the ongoing complexity of building on the site of an active railroad system, PATH, that requires certain below-grade foundation be completed only during track shutdowns, as well as certain scope changes (MEP system adjustments, security enhancements and program modifications).

Greenwich Street

One of the real success stories of the last three months was the development of a strategy to address three projects along the Greenwich Street Corridor that are critical to delivering Greenwich Street – the front door for Towers 2, 3 and 4 and a key access point to the Memorial – while at the same time preserving the important program space located below the subway line.

As explained later in the report, millions of dollars and several years will be saved on the construction of Greenwich Street as a result of this new strategy.

Vehicular Security Center and Tour Bus Parking Facility (VSC)

The VSC's original 2005 budget was $478 million. However, this budget reflected a project with a significantly reduced scope than the one we are building today. For example, the original budget did not include the build-out necessary to take on the capacity for cars. Nor did it include the common infrastructure connections for electrical power and air conditioning or the increased hardening, and columns and structural spans added to the roadway configuration to meet increased security standards, which are now part of the current design. With these scope changes, as well as with construction and commodity price escalation factored in, the current budget estimate of the VSC is $633 million.

The original schedule for the VSC set in 2005 envisioned project completion in the first Quarter of 2011. Because of the increased scope discussed above, the previously-unresolved land claim issue with St. Nicholas Greek Orthodox Church, and the lack of a security agreement with the City of New York – all issues that are now resolved – the completion date has been pushed back to 1st Quarter 2012.

15 Issues Resolved

As we stated in June, an examination of the overall World Trade Center rebuilding program made clear that project schedules and budgets were significantly out of line with earlier projections. There were many reasons for this. Five in particular stuck out:

First, the original schedules and budgets were unrealistic to begin with. Had the rebuilding program gone without a hitch, those dates and costs could never have been met because they were established at a time before the construction reality on the ground was fully understood and before the designs of most of the projects were completed.

Second, the uniquely complex engineering and constructability challenges throughout the 16-acre WTC site (see Graphic 3, 4, and 5 to orient you to the site map). The WTC rebuilding program attempts to fit within the size of just a few city blocks:

- Five major skyscrapers, which will house Class A office space comparable to all of downtown Atlanta;
- One of the world's most significant memorials and museums;
- The third-largest transportation hub in New York City;
- A world-class retail venue serving all of Lower Manhattan;
- A major performing arts center;
- A state-of-the-art vehicle security center;
- Two brand-new city streets (Greenwich and Fulton) and two brand-new pedestrian ways (Cortlandt and Dey); and,
- All of the critical infrastructure to support these projects (chiller plant, utility and communication networks, etc).

And all of this is happening within the confines of a transportation corridor that moves 150,000 commuters a day through an active construction site via the MTA #1 subway line, which literally cuts through the center of the site, and the WTC PATH trains, which run beneath the site.

Add to this challenge the fact that there are 19 public agencies, two private developers, 101 different contractors and sub-contractors and 33 different designers, architects and consulting firms all in charge of one element of the project or another, and you have a construction challenge that is as complex as any in the world.

Third, beyond the unprecedented size and complexity of the program, what has become increasingly apparent in the two years, since the major phase of rebuilding commenced, is that nearly all components of the WTC program are interdependent (see Graphic 6 for an illustration of the interdependencies of the Transportation Hub project). Put another way, it is not as if each project is being built in a vacuum or on an isolated "Greenfield" site; rather, the reality is more akin to a game of pick-up sticks, where if you move one stick, it is nearly impossible not to move all of the others. As a result, delays and challenges associated with any one project whose design and construction, in some cases, may reside with stakeholders other than the Port Authority, can have ripple effects on all other projects, further complicating construction.

Fourth, the significant cost escalations in commodity and construction prices. As the Bureau of Labor Statistics reports, the construction material price index has increased over 30% from December 2003, when the conceptual planning phase of the program was ongoing.

But perhaps the most critical observation from our June assessment, because it informs how this project will be managed going forward, and is something directly within our control (as opposed to the price of steel), was the fact that certain key issues that are fundamental drivers of schedules and budgets still needed to be resolved for the project to move forward. These 15 key issues provided the roadmap for getting the rebuilding effort on track.

Immediately following the release of the June assessment, the World Trade Center Steering Committee organized the list of unresolved issues into logical categories. Then, Working Groups consisting of representatives from each of the Steering Committee members were established to focus on each issue – both to fully understand the problem and to define a set of options to solve them. Working groups targeted key areas of the rebuilding program, including: Transportation Hub Design Alternatives; the Greenwich Street Corridor; the Vehicle Security Center; and the Memorial. In addition, an internal Port Authority group was established to focus on Contracting Performance and Efficiencies.

Three main principles guided these groups:

First and foremost, to get the rebuilding program to a level of certainty and control so that schedules and budgets reflect the construction reality on the ground instead of politically- or emotionally-driven promises.

Second, to approach this effort with the same clear-eyed perspective that produced our initial assessment – to put all options on the table, to question previous assumptions and to be honest about what we can and cannot do.

Third, the absolute necessity to make tough but practical decisions to drive this program forward.

Supporting each Working Group, in addition to staff from the Port Authority construction and engineering departments, were teams of construction, engineering and scheduling professionals from a variety of world-class firms, including Parsons Brinkerhoff, URS, Turner Construction and The LiRo Group, as well as from the construction contractors on the WTC site, including Phoenix Constructors (the joint venture of Skanska, Fluor, Granite Construction Inc., and Bovis Lend Lease), which is building the Transportation Hub; Tishman Construction, which is the construction manager for One World Trade Center, The Freedom Tower, Towers 3 and 4; Turner Construction, the construction manager for Tower 2; and Westfield, the Port Authority's designated retail developer. Our team of experts helped analyze each project for schedule, cost and risk, and were critical to developing and validating the resolutions throughout this report.

What follows is an explanation of how we resolved each of the 15 previously unresolved issues. For each issue, we describe what needed to be resolved and why, and the resolution that was reached.

15 Issues

Transportation Hub Design

- World Trade Center Transportation Hub Design Alternatives
- Final Design/Engineering on the NE Corner of the Memorial Quadrant

Greenwich Corridor

- Construction of a Permanent Underpinning for the MTA's #1 Subway Line
- Temporary PATH Station Reconfiguration
- Cortlandt Street Subway Station – Design and Schedule Issues

Vehicle Security Center

- Construction Sequencing and Funding of the Vehicular Security Center
- St. Nicholas Greek Orthodox Church – Land Rights Claim
- 130 Liberty Street Abatement and Demolition
- World Trade Center Police and Security Plans

Contracting Performance and Efficiencies

- Contracting Strategy for the World Trade Center Transit Hub
- Procurement and Contracting Inefficiencies
- Owner/Builder Management Coordination for Memorial and Museum

Other Significant Issues [1] [2]

- Route 9A/West Side Highway Staging and Funding
- Below-Grade Engineering at the Performing Arts Center Site
- Site Logistics

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[1] These issues were not explicitly raised in our June assessment, but was added after further analysis revealed challenges that needed to be addressed.

[2] In our June assessment, one of the 15 issues identified was the "Potential Redesign of Tower 3 to Accommodate Merrill Lynch Lease Requirements." At the time of the June assessment, discussions were ongoing with Silverstein Properties Inc. and Merrill Lynch to secure Merrill Lynch as the tenant for 3 World Trade Center. The potential tenant lease would have required redesign of some elements of the building, including sub-grade areas that impact the WTC Transportation Hub, retail elements, VSC and shared infrastructure. In July, Merrill Lynch informed the Port Authority and Silverstein Properties Inc. that it was no longer planning to move out of its current locations at the World Financial Center. At that time, any need to redesign Tower 3 ceased.

1

World Trade Center Transportation Hub Design Alternatives

Context

Designed to serve approximately 250,000 people per day, the World Trade Center Transportation Hub is one of the most important projects on the 16-acre WTC site. It will significantly expand transportation capacity – as the City's third-largest transportation hub – and, together with WTC retail space, will serve as an anchor for the economic revitalization and quality of life of Lower Manhattan.

In addition, perhaps no other project interfaces more with every other project on the site than the Transportation Hub (see Graphic 6). Think of it as the spoke of a wheel. As a result, in order to gain certainty and control over schedules and budgets for every other project, we had to gain greater certainty and control over this project.

To do that, the Port Authority decided to make changes to the design with the following goals in mind:

1. *Reduce construction risk through simplification:* The original design for the Transportation Hub by architect Santiago Calatrava and the Downtown Design Partnership of STV and DMJM+Harris offered an iconic and highly functional structure that would instantly stand alongside the great train halls of the world. The start-from-scratch moment following the attacks on September 11, 2001 provided a once-in-a-century opportunity to significantly increase transportation capacity while simultaneously building a great public work in Lower Manhattan as opposed to something like the current Penn Station.

   However, with that iconic design came construction and engineering complexity that increased schedule, cost and constructability risk. Any redesign alternative considered had to simplify construction – primarily around the support for the arched roof of the PATH Mezzanine, which, unlike conventional structures, relied on very long cantilevered Vierendeel trusses[3] anchored at either end, rather than on traditional columns placed at intervals along the span.

2. *Increase transportation benefits:* At its core, besides the retail components and significant public space, the Transportation Hub is just that: a critical transportation center that will connect two different states and all five boroughs of New York City. After bringing together PATH and the MTA, we agreed that any redesign must enhance the transportation benefits of the Hub.

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[3]A Vieriendeel Truss is a frame truss named after the Belgian engineer Arthur Vierendeel. It is an atypical type truss in that it does not contain any triangulated, diagonal members. Contrary to a conventional truss structure, whose members are designed to resist tension and compression only, members of a Vierendeel Truss are subject to bending as well as axial compression and axial tension. This frame action is accomplished through rigid nodal connections, as opposed pinned connections which permit the connected members to rotate in relation to each other. Vierendeel trusses are less efficient than conventional trusses, and are typically used where diagonal members would disrupt the functional space of an area. In this case, the Architect has chosen a Vierendeel truss for aesthetic reasons rather than functional reasons.

3. *Improve project delivery of the Memorial, Greenwich Street and WTC Retail Space:* Because of the complexity of the original design and the means and methods of construction, legitimate questions were raised as to the impact on schedules of other projects on the 16-acre site, most particularly the Memorial Plaza, the northeast corner of which sits effectively on the roof of the Hub's PATH Mezzanine. The longer it takes to build the Hub's roof, the longer it takes to build the Memorial Plaza. Another concern was the impact on the construction of Greenwich Street, which will serve as the front door of Towers 2, 3 and 4. Any redesign had to speed up the delivery dates of both projects. Finally, the synergistic relationship between the Transportation Hub and WTC retail space had to be maintained. Any delay in the completion of the Hub would delay the opening of the retail space, which provides much-needed services to the individuals who work, live and visit Lower Manhattan.

4. *Build now:* Besides the complexity of design, more than anything else, this project has suffered from a lack of decision-making and certainty. Uncertainty is expensive – both in terms of hard dollars given the explosion of construction and commodity prices, and in terms of schedule with the risk associated with a design process that never ends. Whatever combination of redesign approaches were chosen, we needed to be in a position to quickly go from the drawing board to the construction site.

Analysis

To meet these four goals, the Port Authority and Steering Committee developed and analyzed a number of alternative approaches, including:

- A variety of different methods to reduce construction risk at the primary point of complexity: the very long-span (150 foot) arched roof structure that was originally supposed to be supported by two Vierendeel Trusses and a complex bearing system supported by the North-South shear walls and super columns to the East. The primary method of simplification examined were dropping columns and plate girders to help support the arched roof structure conventionally instead of more unconventionally through Vierendeel Trusses;
- Introducing bolted connections instead of fracture-critical welded connections, which would simplify constructability given that a bolted connection is much easier and faster to install;
- Deckover approaches to "build the roof first," which would require decking over the western portion of the Hub – the PATH Mezzanine – in order to deliver the Memorial Plaza sooner;
- Reuse of the current "temporary" PATH platforms, columns and mezzanine, making them "permanent" instead of rebuilding them;
- Simplify the above-grade Oculus in a variety of ways;
- Numerous different methods of construction phasing to improve project delivery;
- Various scenarios of outages to the PATH system and the #1 Subway Line;
- Redesigns to more centrally locate the subway entrances;
- Different methods of supporting the #1 Line where the Hub corridor passes under it (e.g., using trusses, arches and/or columns); and,
- Scrap the current design altogether and start over.

Resolution

- Design simplified, while retaining iconic vision
- The use of columns and other conventional elements saves time, money and reduces risk associated with constructability and schedule
- Deckover solution delivers Memorial Plaza for 9/11/11
- Improves transportation benefits
- Design process is complete (3,700 drawings have been completed) – can finally just build.

After considering numerous alternative approaches, Santiago Calatrava and the DDP team incorporated a combination of many components discussed above – the main ones being: (1) simplification and conventional design elements; (2) deckover solution (i.e., "build the roof first"); and, (3) transportation improvements. The following description summarizes each component:

Simplification and Conventional Design Elements (see Graphic 7)

Columns in PATH Mezzanine

The redesign replaces both Vierendeel Trusses on either side of the Mezzanine with two standard steel plate girders spanning East to West and supported by 4 columns in strategic locations where construction and engineering risk was greatest, thus providing additional support to the roof structure (see Graphic 8). The benefits of this change are substantial:

- Introduces new, conventional supports to roof structure, thus eliminating substantial risk associated with the original design, which depended on more complex Vierendeel Trusses;
- Both plate girders are fully bolted (conventional connections) with no field welds (more unconventional connections) associated with the Vierendeel Trusses, thereby eliminating the fracture-critical welds;
- Reduces steel tonnage by 1,500 tons or 15%;
- Makes fabrication and erection easier because the pieces of the roof are smaller and more conventional, given that they no longer have to span the full length of the structure and can be supported separately by columns;
- Eliminates a significant step in the original construction sequence for the installation of the Memorial Plaza trees because the columns create independent support elements for the roof, which previously relied on the interaction of the concrete and steel to create the same support, saving time;
- Reduces risk associated with the engineering of the shoring towers because the number of towers will be reduced, making it a more conventional build;
- Provides greater flexibility and reduces the need for tower cranes, allowing for greater mobility for laborers and equipment, thus simplifying construction;
- Reduces the number of PATH track outages because the support structures are smaller and can be fabricated and installed more rapidly;

- Reduces cambering and fit challenges during construction because the roof is now on a permanent, rigid support structure as opposed to a roof constructed on temporary shoring which required "jacking down" (i.e., lowering) the structure after all roof elements, including the Memorial planters, were installed in the original design – thus saving significant amounts of time;
- Enables the existing PATH roof to remain in place while constructing the new Mezzanine roof, which reduces construction risk and allows for the protection of the public without having to construct a special shield; and,
- Changed from marble to stone flooring.

Simplified Structural Support for #1 Subway Line

- Replaces original support structure of #1 line box from a completely-welded truss to a bolted tied-arch construction with far fewer weld points (eliminates 70% of welding on #1 line support structure – from 1,400 ft of welds to 400 ft) (see Graphic 9);
- Replaces welding connections with bolted connections in concealed locations in both East and West Bathtubs;
- Accommodates MTA's NYS Building Code compliance as basis of design to eliminate the need to construct an extra ventilation structure over #1 line box, saving time and money (see Graphic 10); and,
- Incorporates the permanent underpinning approach to the #1 subway line, which is explained later in the "15 Issues Resolved" section.

Oculus Roof Simplification *(see Graphic 11)*

- Roof wings no longer open and close (see Graphic 12)
- Cuts back length of wings on Tower 3 side
- Reduces number of purlins from 5 to 1 (purlins are the structural connections between wing elements)

Deckover Solution

Before this redesign effort, the original design called for the Transportation Hub to be constructed from the bottom up, with the roof being completed in stages and the final roof closure toward the end of the platform construction process instead of the at beginning. The main reason was to allow the contractor access from above to feed the construction site. This staged completion meant that the roof and platform construction would be completed together. Unfortunately, this meant that the Memorial Plaza would not have been completed until some time in 2013.

To solve this problem, the deckover approach incorporated into the new design means that we will build the roof first, thus prioritizing the completion of the Memorial Plaza and decoupling the station platform work below (see Graphic 13). This construction solution is made possible, in part, by the new permanent columns that are being utilized to support the roof structure instead of temporary shoring towers, therefore reducing the waiting time previously required to lower the roof. The

permanent columns, in conjunction with the new plate girder supports, have been strategically placed to allow for roof concrete and planter construction to begin immediately upon installation of the station arches.

As a result, our Hub contractor will utilize two main points of access for construction: (1) from the West, from Fulton Street through East-West Connector; (2) from the East, from Church Street over temporary bridge structure to complete this work. Additionally, alternate access for the completion of the platforms and station below will now be done through deck openings on the North side of Fulton Street and scheduled deliveries of equipment and materials via work trains from PATH yards in New Jersey.

In addition, the redesign incorporates a new construction phasing approach that will erect the Hub from West to East instead of East to West, again in an effort to prioritize the Memorial Plaza and get Greenwich Street up and running sooner.

It is worth noting that the deckover solution will cost the Port Authority $75 million extra for the loss of Hub construction productivity and additional construction for the deck directly attributable to the prioritization of the delivery of the Memorial Plaza on September 11, 2011.

Transportation Improvements

The redesign also changes the entrance positions for the #1 Line and the R and W lines – from locations that were on the side of the Transit Hall and less prominently exposed to the public, to central locations within the Hall, making it easier and faster for commuters to get to and from the subways (see Graphics 14 and 15). The redesign also increases the size of the fare collection zone to make it more convenient for commuters.

2

Final Design/Engineering on the NE Corner of Memorial Quadrant

Context

Because the roof of the Hub's PATH Mezzanine serves as the floor of the Memorial Plaza, coordination between the two designs is essential. However, the Memorial Foundation and Port Authority had been negotiating for months over the final design details of each and could not reach agreement on the number of trees that could be accommodated on the northeast corner of the Memorial quadrant. While this may sound like a relatively trivial design element in the scheme of things, given that each tree – with the tree itself, soil and planter – weighs 150 tons, that means that approximately 7,500 tons (50-60 trees to be placed on the NE corner of the Plaza) had to be factored into the design of the Hub's roof support – approximately the equivalent weight of 180 fully loaded tractor trailers or half the weight of the Brooklyn bridge. The delay in reaching an agreement has compounded delays on the final design of the Transportation Hub.

Resolution

On July 16, 2008, the Port Authority, the Memorial Foundation and the Mayor's Office of City Planning agreed to a final plan to place additional trees on the NE Quadrant. The design of the Transportation Hub and the roof design above the PATH mezzanine have been modified to accommodate this agreement. As a result, combined with the redesign decisions discussed in the previous section, all critical-path elements of the Hub design have been finalized – adding certainty to schedules and budgets.

3

Construction of a Permanent Underpinning for the MTA's #1 Subway Line

Context

Next to the final design of the Transportation Hub, the projects within the Greenwich Corridor represented the other major opportunity to control schedule and cost overruns.

We looked at a series of issues relating to the projects that directly influence the schedule and cost escalations of the construction of Greenwich Street, which include: (1) the permanent underpinning of the MTA's #1 subway line, which sits directly beneath the future Greenwich Street; (2) the reconfiguration of the Temporary PATH Station, which is located directly in the path where the northern portion of Greenwich Street will eventually be located; (3) the design and construction of the Cortlandt Street Subway Station, which will eventually be the station that accesses the #1 line beneath the future Greenwich Street. (Graphic 16 identifies each project within the Greenwich Corridor.)

This section deals with the resolution reached on the permanent underpinning of the MTA's #1 subway line. By "underpinning," we mean the structural support for the subway that divides the East and West portions of the site. That subway, thanks to the remarkable efforts of the MTA, was up and running less than a year after the attacks on September 11, 2001. In fact, for the first time in history, a train structure unparalleled in length – over 1,000 feet long – is being suspended in the air by steel columns that then transfer the loads to the underpinning system. What's more is that the "box" that the subway moves through cannot be allowed to move more than two inches under the weight of the passing subway cars.

However, this support was designed to be temporary. Ultimately, the Port Authority must construct a permanent underpinning to support the full weight of the subway and Greenwich Street above it.

Because of an overly-complex design, the original cost estimate for the permanent underpinning was $325 million and was to be completed in September 2014, which meant Greenwich Street could not be completed until as late as 2015 or 2016. That would have impacted the overall operation of the WTC site, as well as, Towers 2, 3 and 4, which all face Greenwich Street.

Options

The Greenwich Corridor Working Group developed and validated four options that would have demonstrable benefits to schedule, budget and project delivery. The four alternatives are summarized below:

1. **Up/Down, Save the Subway Box**

   The intent of this option is to provide a permanent structure for the box utilizing a caisson installation and structural invert slab that allows for refurbishment of the box and completion of Greenwich Street while simultaneously excavating and installing program space beneath the subway box structure.

   Primary construction activities include:

   - Drill caissons
   - Construct invert structure
   - Transfer load
   - Enlarge the box
   - Simultaneously begin excavation and install utilities, streets and sidewalks

   This alternative would require up to three months of service shutdown of the #1 line during installation of the caissons. The overall construction cost of this option is estimated at $381 million. This alternative would deliver a completed by Greenwich street by second Quarter, 2012.

2. **Up/Down, Cut the Subway Box**

   The intent of this option is the complete demolition and reconstruction of the subway box. While reconstructing the subway, the construction methodology allows for simultaneous construction of structural support and program space beneath the box.

   Primary construction activities include:

   - Demolish the subway box
   - Drill caissons
   - Insert invert structure
   - Construct expanded subway box
   - Simultaneously begin excavation and install utilities, streets and sidewalks

   The overall construction cost of this option is estimated at $361 million, but would require a three year shutdown of the #1 line, an impact estimated to cost the MTA about $30 million per year in additional operating costs. This approach would deliver a completed Greenwich St. in mid-2012.

3. **Top-Down Construction Methodology, incorporating existing temporary support into permanent support structure** (see Graphic 17)

   The intent of this option is to incorporate the existing mini-piles into the temporary and permanent structure, building each successive level from the underside of the box downward.

Primary construction activities include:

- Install the top level of bracing and structure
- Install the invert structure
- Add walls
- Partially excavate level
- Pour partial wall
- Complete excavation
- Pour structural slab
- Complete walls
- Repeat three times
- Transfer load
- Enlarge the box
- Install utilities, streets and sidewalks

This alternative proved to be the least expensive of the four approaches (total cost approximately $281 million), and would deliver a completed Greenwich St. in 4th Quarter 2012 (unlike the schedule estimates of the other three options, this schedule was risked and this date represents the probabilistic date). This alternative does not require the extensive service disruption needed for Option 2 and would not require the loss of program space described in Option 4.

4. **Bury the subway box, remove the program space underneath**

The intent of this option is to suspend excavation under the subway box, and replan the program space, limiting any further construction under the box and beginning a backfill operation.

Primary construction activities include:

- Construct temporary or permanent walls to contain refilled earth
- Install tension tie-rods
- Fill in earth below subway box
- Transfer load
- Begin box construction
- Install utilities, streets and sidewalk

This alternative would cost approximately $370 million (significantly more than Alternative 3) and would also force the relocation of 165,000 square feet of program space currently designed beneath the permanent #1 Line Box. This space, to be used for retail, bus and car parking and other facilities, could not be completely relocated within the overall WTC space. This alternative would deliver a completed Greenwich St. by mid-2011.

It's important to note that these figures incorporate the resolutions that are reflected in the following issues relating to the Temporary PATH Station and Cortlandt St. Station.

Resolution

When compared to the existing baseline design, all of the options identified will significantly improve schedule. However, as indicated above Option #3, the Top-Down Construction, presents the greatest cost savings, and nearly the greatest schedule savings, while significantly reducing the number of subway outages and other negative impacts that will be necessary to complete construction. The ability of our Greenwich Corridor Working Group to develop a more efficient construction approach to the #1 Line Underpinning has been a major accomplishment of the WTC Assessment process.

Going forward, logistics between the Greenwich Corridor projects and other projects directly adjacent remain a critical issue to the viability of any option and must be managed.

PATH and #1 Line Outages

It is important to make clear that all of this construction will necessitate future outages to the #1 line, terminating at Chamber Street station. In order to speed up construction, these outages would be necessary under any of the options we looked at. Currently, we are working closely with the MTA to devise an outage strategy for six weeks during the summer of 2010, with some potential outages as necessary in 2009. These outages will be used strategically to complete the work supporting the (1) #1 line permanent underpinning; (2) the MTA Cortlandt St. Station; and, (3) the construction of the Hub passageway between the Path Mezzanine and the Oculus Hall.

Is also is important to make clear that the WTC PATH line will be impacted by weekend closures starting during the summer of 2009 and continuing approximately forty out of fifty-two weeks of the year for approximately three years. These weekend closures are necessary for the construction of the Hub and, under any scenario, would have had to be effectuated at some point to take full advantage of schedule savings on the overall rebuilding program.

The Port Authority will work closely with the MTA and PATH to mitigate the impact of the service interruptions on riders.

4

Temporary PATH Station Reconfiguration

Context

One of the most significant challenges with getting Greenwich Street up and running – which will serve as the front door to Towers 2, 3 and 4, as well as an access point to the Memorial – is the fact that the existing temporary PATH station is located directly where the northern portion of Greenwich Street will eventually be located (see Graphic 16).

The Temporary PATH station is currently the only means of entering and exiting the PATH World Trade Center station. This is the second location for the temporary station. The first was opened in November 2003, restoring PATH service to the Lower Manhattan. That station is now being demolished. The current temporary station opened in March 2008.

The Port Authority built the Temporary PATH station in its current location because, under previous schedules, the station would be torn down long before Greenwich Street was supposed to be built. Why? Because the permanent Transportation Hub was supposed to have already been built and fully operational by then, thus rendering the temporary station unnecessary. As we now know, the projected completion date for the Transportation Hub is later than the original date for the planned take-down of the temporary PATH station and the completion date for Greenwich Street.

Other critical issues related to the timing of the Temporary PATH station reconfiguration or removal include that it also blocks: construction of the #1 Line underpinning; the Cortlandt Street station reconstruction; installation of the primary water main servicing the site; and the below-grade roadway that eventually will connect the loading docks for One World Trade Center, The Freedom Tower, WTC retail space and the Performing Arts Center to the main VSC below-grade roadway.

Resolution

As a result of the original assessment, and the work of the past three months, this challenge will be successfully addressed by reconfiguring the current temporary station.

Port Authority engineers and construction professionals, working closely with the Greenwich Corridor Working Group, are developing several options for reconfiguring the temporary station in time to get out of the critical path of the construction of Greenwich Street. As such, all the good work that has been done to speed up the permanent underpinning of the #1 subway line, and thus the construction of Greenwich Street, will not be wasted. We will also continue to refine our methods to allow One World Trade Center, The Freedom Tower to begin operations as soon as the office building receives its certificate of occupancy.

5

Cortlandt Street Subway Station – Design and Schedule Issues

Context

The MTA is planning to rebuild the Cortlandt Street station, but there are design and construction issues that first needed to be coordinated and agreed upon between the MTA and the Port Authority. The issues to be resolved include, among others: (1) a variety of complex and time- and cost-intensive construction measures to meet regulatory National Fire Prevention Association (NFPA) 130 standards; (2) an agreement between the MTA and Port Authority on design and construction responsibilities so that the MTA station design concept can be incorporated in the #1 Line support strategy and a final design can be completed for the structure to grade.

Without resolution of these two issues, a day-for-day schedule loss is anticipated going forward and the interim Greenwich Street completion date will be compromised for the tenth anniversary of September 11, 2001.

Resolution

The Port Authority and MTA have reached resolutions on both issues:

First, the MTA Cortlandt Street Station reconstruction will be redesigned to comply with NYS Building Code requirements including emergency egress and fire protection, in lieu of NFPA130 (all of the MTA stations currently follow the NYS Building Code requirements). Six months and approximately $60 million in savings can be attributed to this one change, mainly due to the fact that the roof on the subway box does not have to be deconstructed and then built all over again to accommodate mechanical requirements. (see Graphic 10).

Second, the Port Authority and the MTA are working on an MOU under which the MTA will pay the Port Authority to reconstruct the Cortlandt Street Station as part of its overall Hub construction contract. Given the extent of construction coordination required between the Hub and Cortlandt Street station projects, it makes more sense for one contractor to combine these efforts – improving construction efficiency and reducing schedule and budget risks.

6

Construction Sequencing and Funding of the Vehicle Security Center

Context

The World Trade Center Vehicle Security Center and Tour Bus Parking Facility (VSC) will provide as part of the comprehensive WTC area police and security plan for screening of buses, trucks, and cars entering the WTC site and its facilities (see Graphic 18).

Importantly, during the rebuilding phase, the VSC will serve as the critical passageway for the delivery of construction fit-out material to the commercial towers, retail space, Memorial Museum, and other facilities. That is why it is critical that the VSC gets built as soon as possible. Otherwise, it could delay other projects on the site.

Resolution

Over the past three months, as described in the next several sections, we have taken several important steps to reducing schedule and cost overruns and gaining greater certainty and control of the VSC project. This particular section focuses on two of those steps:

First, we will begin accelerating certain portions of the VSC work that can facilitate certain aspects of the Memorial Plaza's completion. The construction of the southeastern portion of the VSC substructure is necessary to enable the Memorial Plaza to be completed in a timely manner. Additionally, construction of the VSC interior footings and foundations can be added to the existing South Bathtub Perimeter Wall contract to allow certain concurrent construction activities. This allows the Southeast section by Liberty and Greenwich streets – assuming 130 Liberty Street is demolished in time – to be completed sooner, which, in turn, allows access to the Memorial. Port Authority engineers will continue to examine ways to accelerate VSC construction where possible.

Second, the FTA has agreed in principle to cancel its VSC grant to the Port Authority and thru a grant amendment reallocate the unspent funds, roughly $450 million, to the WTC Transportation Hub, subject to the Governor's request for such action. This reallocation of funds will help speed up the VSC schedule by eliminating the Federal review process with respect to this project and by giving the Port Authority greater control and flexibility over design, procurement and construction as the comprehensive WTC area police and security plan is developed with the City of New York.

7

St. Nicholas Greek Orthodox Church – Land Rights Claim

Context

St. Nicholas Greek Orthodox Church (Church) was destroyed during the attacks on September 11, 2001. The World Trade Center Master Plan, approved in 2005 after several years of public discussion, calls for the land on which the structure once stood to be part of the VSC, which serves the entire WTC site. The Church agreed to accept land a short distance to the east, on the same block, for the construction of their new Church. However, the Church and the Port Authority needed to negotiate a compensation package to effectuate this concept and allow the Church to rebuild. Otherwise, the issue would have continued to delay the VSC. Negotiations had been ongoing on for some time, but no resolution could be reached

Without this property, the Port Authority could not proceed with the construction of the VSC, which not only increases the direct timeline and cost of the VSC, but affects those facilities like Towers 1, 2, 3 and 4 and the Memorial and Museum that depend on the VSC being open in time to service those facilities.

Resolution

The Port Authority and St. Nicholas Greek Orthodox Church have reached an agreement that will allow the 92-year-old church to be rebuilt near its former Cedar Street location – allowing for the VSC, a vital artery that will serve nearly every facility on the site, to begin construction immediately. This agreement on one of the linchpin issues for the site brings to a successful conclusion months of negotiations.

Under the agreement, the Church agreed to convey property at 155 Cedar Street – where the church was located before it was destroyed on 9/11 – to the LMDC. LMDC, in turn, will transfer a portion of the parcel at 130 Liberty Street to the Church for its new building. LMDC will then transfer property at 155 Cedar Street, 140 Liberty Street and a portion of 130 Liberty Street to the Port Authority for construction of the South Bathtub, which will house the VSC.

The Church will receive up to $20 million to offset direct costs for the rebuilt church, including $10 million from the Port Authority to mitigate the impact on the cost of building the church over the VSC, and $10 million from a third party as part of a future development agreement for the Tower 5 site. The Port Authority will provide up to an additional $20 million to build the infrastructure needed to support the church on top of the VSC and for interim access and temporary use of the Church's property until the transfers take place.

As a result of resolution of this property issue and the elimination of federal funding involvement, the Port Authority was able to move forward with the award of the construction contract for building the slurry wall and basement area for the entire VSC complex, a major milestone in the VSC's construction.

8

130 Liberty Street Abatement and Demolition

Context

The former Deutsche Bank building at 130 Liberty Street was damaged in the attacks of September 11, 2001 and stood empty and idle for years after the attacks while Deutsche Bank and its insurers wrangled over its fate. After an arbitration process presided over by former Senator George Mitchell, the LMDC stepped in to acquire the building and decontaminate and deconstruct it in order to advance the progress of rebuilding. Because of those delays and the year-long process of obtaining regulatory approval of the original Deconstruction and Implementation plans for the project, the decontamination and deconstruction of the building did not begin until late 2006.

The former Deutsche Bank building at 130 Liberty Street must be demolished as part of the excavation of the "South Bathtub" of the WTC site, for the future VSC, Tower 5 and St. Nicholas Greek Orthodox Church. This bathtub system is to be constructed using "slurry walls." Unfortunately, the abatement and demolition have incurred significant delays.

Resolution

For over a year, LMDC/LMCCC, the Port Authority, City DOT, State DOT and Silverstein Properties have been meeting to coordinate the plans for the VSC, and the attendant slurry walls, as well as to address and coordinate other issues necessary to allow the Port Authority to begin construction on the slurry walls and to accommodate the site needs of the Port Authority contractor Cruz/Nicholson. These efforts have included re-alignment of the sidewalk protection, additional supports at Liberty Park for the Liberty Street Bridge, and the identification and leasing of property that will allow the removal of trailers and other construction equipment off the 130 Liberty Street side to accommodate the mobilization of the Port Authority contractors.

Although plans for the VSC are not yet complete, the plans for the slurry wall intended to allow for the future design and construction of the VSC would not change and call for portions of the slurry wall to be built in areas now occupied by the remaining structure of the Deutsche Bank building. Accordingly, the deconstruction of 130 Liberty Street must be coordinated with the schedule for the construction of the slurry walls. The Port Authority has already awarded the slurry wall contract and the contractor is expected to reach the portion of the site under 130 Liberty Street next summer – around the time the 130 Liberty Street building will be completely demolished.

LMDC's current schedule indicates that decontamination of the Deutsche Bank building will be completed during January 2009, and that deconstruction will be complete by August 2009. The 130 Liberty Street project is being run using a CPM Schedule and Risk Analysis.

There are approximately 450 abatement and other workers in the building each day over the course of three shifts, 24 hours a day, six days a week, and those numbers should increase to more than 500 a day over the next few weeks. Since abatement recommenced this spring, these workers have cleaned (and Federal, City and State regulators have cleared) floors 14 through 19. Floors 12 and 13 are expected to be cleared by next week and floor 10 and 11 by the end of this month.

There are three phases remaining to reach completion:

1. *Completion of decontamination:* Each floor must be completely demolished, all demolished debris such as carpet tile, sheetrock, ceiling tile, etc., treated as asbestos containing material and removed in "containment". This means that the entire acre floor must be enclosed with an air tight plastic barrier, negative air pressure maintained within the floor, worker access to the floor limited to a shower and air lock system, and all workers on the floor, as well as supervisors, inspectors, etc., wear hazardous material suits with full face respirators at all times. It takes approximately one month of work to demolish and remove the materials from the floor and then another month to clean the steel and concrete floors of all fireproofing and other debris. After this is done, a group of regulators examines the floor and must sign off before it is cleared.

2. *Facade of the building and internal stairways:* After the floors are cleaned, the facade of the building must be removed and the interior stairways that were required to be installed and rebuilt after the August 2007 fire, must be cleaned and removed. This work is expected to be completed several weeks after abatement.

3. *Demolition/deconstruction:* The deconstruction and decontamination of the building is subject to the regulatory oversight of numerous federal, City and State regulatory agencies, and the plan governing the deconstruction must be approved by these regulatory agencies. The final Deconstruction Plan and Contractor's Implementation Plan is currently in development. The Deconstruction Plan specifies Code, regulatory, City Department of Building and other requirements for the deconstruction of the building and then the contractor describes its means and methods to accomplishing the work in the Implementation Plan. Since the abatement and deconstruction of the building have been decoupled, and the building will be entirely clean prior to deconstruction, the latter phase of the work is expected to proceed under more routine demolition protocols. As noted above, the work is expected to be complete by August 2009.

9

World Trade Center Police and Security Plans

Context

Before a comprehensive security plan could be developed and implemented at the World Trade Center site and the surrounding area, the City of New York and the Port Authority had to reach agreement on jurisdictional questions for policing the site, taking into account the new City streets that will traverse the site itself, and the security needs of the office, retail, public transportation, Memorial & Museum, and cultural facilities, as they fit into the overall WTC area. Because the plan will have impacts throughout the site and the surrounding area, it was important that an agreement be reached as soon as possible in order to complete the implementation of nearly every project at the site. Unfortunately, agreement could not be reached after months of negotiation.

Resolution

In July, after many months of negotiation, the City of New York and the Port Authority entered into a Memorandum of Understanding envisioning that the Port Authority Police Department (PAPD) and New York City Police Department (NYPD) will jointly police and secure the World Trade Center area. To provide for seamless law enforcement activities, this agreement creates a framework for the PAPD and NYPD to work together, fostering a security environment that is coordinated, cooperative and certain, and one that ensures a vibrant 24/7 community in Lower Manhattan.

The agreement provides a clear delineation of responsibility. The City will form a dedicated police and security unit (WTC Unit) for the World Trade Center Area on a schedule to be established by the NYPD as part of a security plan for the World Trade Center Area to be developed by NYPD, with the concurrence of the Port Authority (the Security Plan). The Security Plan will also provide for the WTC Unit's management of the security operations control center and oversight of security operations, personnel and technologies, including screening procedures and vehicular access, at the World Trade Center, as well as the interface with the Port Authority with respect to the Port Authority's law enforcement and security activities at the World Trade Center, to be implemented through a Port Authority World Trade Center Command Center at the site.

The Port Authority will have primary responsibility for all law enforcement and security activities at the World Trade Center Transportation Hub, will exercise command and control over Port Authority police personnel at the World Trade Center Transportation Hub, will participate in and conduct police and security operations with respect to all office towers, and memorial and cultural facilities at the World Trade Center in accordance with the Security Plan, and will directly or through its tenants be responsible for, and bear the costs of, the installation and maintenance of all security equipment at the World Trade Center.

15 ISSUES RESOLVED

As part of the agreement, the Port Authority and the City will establish a World Trade Center Area security advisory committee. The committee will meet on a regular basis to review any and all relevant reports and consider law enforcement and security related matters pertaining to the World Trade Center Area and coordinate interagency cooperation with respect to such matters. The committee will consist of a representative of the City, the Port Authority, the Governor of New York and the Governor of New Jersey.

10 & 11

Contracting Strategy for the World Trade Center Transit Hub & Procurement and Contracting Inefficiencies

Context

As discussed, one of the four central questions raised in our June assessment – other than what we are building, when it will be built and for how much – was, "who is going to build it." The "who" question had been answered for all of the major projects on the site, but there had been lingering uncertainty as to whether the current builders of the Transportation Hub – the Phoenix Joint Venture consisting of Skanska, Fluor, Granite Construction Inc. and Bovis Lend Lease – would stay on to complete the bulk of the work left on the Hub.

This uncertainty arose from the fact that in the urgency to rebuild the Port Authority established a less-then-ideal Construction Management/General Contractor contract with Phoenix. The contract was developed and institutionalized before the Port Authority was able to finalize key design decisions on the project and without the proper incentive structure that is typical of large-scale construction contracts. Specifically, because the Transportation Hub design had not been finalized at the time the Phoenix contract was executed, much of the early Hub construction work was individually negotiated and in the interest of getting the work started often resulted in the initial use of a "time and materials" contract, which was later converted to lump sum. This arrangement does not provide the level of cost certainty and scope control needed on such a complex project.

Moreover, there have been some issues over Phoenix's compliance with the terms of the contract. Some of these stem from the combination of procurement and contract administration requirements imposed by the Port Authority and the FTA which imposed unanticipated burdens on both the Phoenix Joint Venture and the Port Authority. Some were from the Port's management approach and some were from Phoenix's failure to meet key contractual terms in a timely manner. Together these inefficiencies have contributed to schedule delays and cost escalations on the project.

Resolution

In the interest of bringing greater certainty to the rebuilding effort and reducing cost, schedule and constructability risk, we have decided to retain the Phoenix Joint Venture under a modified relationship that provides the right incentives to control schedule, cost and risk. The reasons for this decision are as follows:

1. *Reformed contracting relationship:* In consultation with the Phoenix team, the Port Authority has initiated a number of process improvements that will create a more effective working relationship with the Joint Venture. Moreover, where possible certain conflicts between Port Authority standard contractual requirements and FTA protocols are being resolved in order to

create more efficient contract administration. The issue of contracting inefficiencies was one of the key 15 decision points raised in the June WTC Assessment, and a Port Authority working group is implementing changes that will speed payments for work performed, improve cost accounting and project controls, and better align the Port Authority's contractual structure with Phoenix to FTA reporting requirements.

2. *From time and materials basis to lump sum, fixed price:* Now that the scope and final design of the Hub project has been finalized, it will be possible for Phoenix to commit to remaining Hub work on a lump sum, fixed price basis. This will result in cost certainty on the project, better budget control, and will also create improved incentives for the Phoenix team to perform efficiently.

3. *Benefits of market competition without the schedule risk of new bidding process:* One potential argument for considering an open bid process for remaining Hub work as opposed to retaining Phoenix is increased competition and potentially lower costs. However, for much of the remaining work on the Hub, such as the purchase of steel and mechanical/electrical work, competition will be achieved through sub-contractor bidding processes that will be fully open and transparent. Moreover, we will avoid the lengthy delay and uncertainty of a whole new bidding process. The FTA shared our concern that an open bid process would add schedule risk to the project without clear evidence that a lower cost could be achieved or that a new general contractor would improve performance.

4. *Continuity with builders who know the site and project:* The extended knowledge that the Phoenix team has developed on the WTC site over the last several years will reduce project risk and help the Port Authority meet the new schedule milestones of the project. An open bid process would only increase project risk through the uncertainty of contracting resources in the marketplace at this time, and the challenge of coordinating many different contractors who are new to the site and the project. In contrast, we now have a single point of accountability in the Joint Venture and a partner that knows more about the construction reality at the World Trade Center site than any other contractor in New York.

12

Owner/Builder Management Coordination for Memorial and Museum

Context

Prior to resolution, the responsibility for the design and construction management of the Memorial Foundation was split between the Memorial Foundation, which as owner of the National September 11 Memorial & Museum oversees the implementation of the design, and the Port Authority, which as builder oversees the construction. In order to make coordination as efficient as possible, the two parties needed to define a set of guidelines for working together. Without a clear definition of roles and responsibilities, as well as a concise list of steps that can be taken to achieve greater project efficiencies at the staff level, the Memorial and Museum will be vulnerable to schedule delays and cost escalations.

Resolution

There have been extensive discussions between the Port Authority, the Memorial Foundation management and Bovis Lend Lease (the Memorial's builder) to clarify roles and responsibilities. The Port Authority is finalizing an agreement to act as the sole construction manager, with oversight and direction of Bovis Lend Lease. The Memorial Foundation acknowledges that construction direction should come only from the Port Authority, while the Memorial Foundation reserves the right to participate in all the construction meetings. The Memorial Foundation is responsible for the management of their design professionals and delivering a set of coordinated construction plans at an agreed upon schedule. With these responsibilities clarified, design and construction can more forward more efficiently.

13

Route 9A/West Side Highway Staging and Funding

Context

The Port Authority has ongoing projects that require coordination with the New York State Department of Transportation (NYSDOT) Route 9A (West Side Highway) project. NYSDOT is realigning a segment of Route 9A and installing underground utilities adjacent to the WTC site. At the same time, the Port Authority is constructing major project elements that parallel Route 9A, including One World Trade Center, The Freedom Tower, Vehicle Security Center, Memorial and Museum, and the WTC Transportation Hub.

Without an agreement between NYSDOT and the Port Authority to fund cost impacts to the route 9A project, further schedule delays and further escalated costs to the following projects will continue: the Vehicle Security Center; the Memorial and Museum; the WTC Transportation Hub, One World Trade Center, The Freedom Tower, and Route 9A.

The sequencing and staging of construction are important for the following reasons: As Graphic 19 illustrates, NYSDOT, under their original schedule, was potentially going to finish their 9A project at the end of 2009 – before the Port Authority would have the chance to utilize the below-grade space beneath 9A for its own projects on the WTC site. Unless NYSDOT and the Port Authority could agree on a restaging plan for the project, the Port Authority would have to rip up the completed 9A, which includes pavement and up to seven feet of additional fill beyond exiting grade, in order to get necessary access for Port Authority project work. The Port Authority would be required to deconstruct a significant portion of the new northbound roadway between Liberty and Vesey Street in order to access below grade construction areas in support of the VSC, Memorial, One World Trade Center, The Freedom Tower and the WTC Transportation Hub projects.

Resolution

The Port Authority has worked with NYSDOT on a restaging sequence for the 9A project that will advance the construction of the WTC projects with minimal schedule impacts to the PA. The original sequence, which would have meant the loss of access to the VSC, Memorial, Transportation Hub Concourse, and One World Trade Center, The Freedom Tower projects, would have delayed these individual projects between six and fifteen months (see Graphic 20, which shows how the Port Authority will now have time to complete its work and not have to come back and rip up an already-completed 9A section).

This plan accelerates installation of utilities and raising of grades, to support planned access to the Memorial and other projects. Upon completion of the Port Authority construction and use of the 9A ROW for access and staging, NYSDOT's contractor will complete the remaining 9A work.

15 ISSUES RESOLVED

In order to facilitate this coordinated approach, in July 2008 the Port Authority advanced $16 million to NYSDOT so that their contractor could proceed with necessary WTC infrastructure work. The Port Authority is in further discussions with NYSDOT so that NYSDOT's 9A contractor can build additional infrastructure for the WTC program as part of ongoing 9A work. Moreover, as part of the Port Authority's Office of Program Logistics function, the Port Authority will continue to closely coordinate work with NYSDOT along the 9A corridor.

14

Below-Grade Engineering at the Performing Arts Center Site

Context

The WTC master plan proposes that the Performing Arts Center (PAC) be built where the existing Temporary PATH Station is located. In order to ensure that a world-class facility can be built on this site, the design and engineering of the below-grade areas should be coordinated with the many other uses that need to be accommodated at this site. Other uses include: Hub ventilation and egress, #1 Line Cortlandt Street Station access and egress, retail, parking and parking access (vehicle helix), access roads, and utilities. At the same time, design of the below-grade elements of the future PAC has to be coordinated with the final design of the Transportation Hub.

Final design and engineering of the many uses at the site cannot be completed without a complete understanding of what the below-grade needs of the PAC will be.

Resolution

The Port Authority has met with City officials and reached agreement to proceed with the design of the below-grade elements that will support the parking helix and the Performing Arts Center. This agreement will allow the Port Authority to advance the construction of the Hub project per its new schedule, while providing the needed infrastructure for the future PAC.

15

Site Logistics

Context

As has been discussed, the WTC rebuilding program attempts to fit within the size of just a few city blocks:

- Five major skyscrapers, which will house Class A office space comparable to all of downtown Atlanta;
- One of the world's most significant memorials and museums;
- The third-largest transportation hub in New York City;
- A world-class retail venue serving all of Lower Manhattan;
- A major performing arts center;
- A state-of-the-art vehicle security center;
- Two brand-new city streets (Greenwich and Fulton) and two brand-new pedestrian ways (Cortlandt and Dey); and,
- All of the critical infrastructure to support these projects (chiller plant, utility and communication networks, etc).

The result of all of this construction – unless there is a clear plan in place – is a potential logistics nightmare in what is already one of the most congested areas of New York City. Graphic 21 shows that the number of workers on site will more than quadruple over the next three years, and the number of trucks going in and out of the site will more than double. With so many major projects being built at the same time, space for construction staging, lay-down areas, truck queuing, etc. will be vital.

Unless there is a single command and control structure to coordinate with City DOT and all the stakeholders all of the moving pieces in this confined space, every project on the site risks schedule delays and cost escalations. Moreover, there must be a single point of contact so the residents and businesses of Lower Manhattan understand in real time what the impacts are of the construction activity around them.

Resolution

To address this logistics challenge, the Port Authority has established a new Office of Program Logistics, which will zero in on the following issues:

- *Planning/Analysis:* Develop and maintain a proactive approach to the identification and resolution of challenges by designing short- and long-term plans to overcome critical path obstacles. Logistics planning will be tailored in phases: first, to address the current conditions on

the ground; second, to address the challenges as certain key milestones are achieved and the site transitions from a pure construction site to a live operation, such as on the tenth anniversary of the September 11th attacks; third, when construction is finally complete and the site is fully operational.

- *Liaison:* Maintain an active network of internal and external WTC stakeholder groups to collaboratively address time-sensitive schedules for construction, with a goal of maximizing safety and minimizing financial implications as well as public inconvenience.

- *Communication:* Provide a central information source for stakeholders, agencies, and the general public regarding WTC program logistics and ongoing processes.

To accomplish its goals, the Office of Program Logistics has established an organizational structure and administrative protocol. Staff has been dedicated to specific issues such as transportation, working with City agencies on permitting, and information dissemination, as well as scheduling and coordination transparency.

Through the Office of Program Logistics, projects – both internal and external to the site – will be advanced in a sensible and integrated manner, while allowing for the successful execution of individual designs and construction. Stakeholders, agencies, and the public will be better coordinated and informed as to realistic schedules and impacts. The Office will be the single entity to coordinate the moving pieces of every project, avoiding unnecessary schedule delays and cost escalations.

Moving Forward

The efforts of the last three months have given the Port Authority a level of certainty and control over the rebuilding program that we have not had before. We now have schedules and budgets that reflect the construction reality on the ground and, because of tough but practical decisions, we have resolved the major unresolved issues facing this rebuilding program.

However, we still face many challenges ahead. That is why it is all the more important that, moving forward, we make permanent what has worked so well over the past three months.

1. A functional decision-making model – the WTC Steering Committee – that is inclusive and can efficiently address problems that arise throughout the rebuilding effort. The stakeholder group we established in June is working. We have seen a level of cooperation, coordination and information sharing that we've simply never had before. The dividends are already paying off in the form of the creative and practical solutions that are described throughout this report. Going forward, the WTC Steering Committee will continue to meet to ensure that stakeholders on the site are working together and resolving challenges as quickly as they arise to prevent slippage in schedules and escalation in costs.

2. The strong partnership we have established with the FTA, which is our critical funding partner for the WTC Transportation Hub. Like our Board of Commissioners, the FTA has long called for greater project controls and a candid and on-going assessment of where this project stands. We look forward to working closely in partnership with them.

3. A continued effort to be upfront with the public. Over the years, there has been too little public communication about the rebuilding effort and the challenges we face. As a result, the public does not fully understand what is actually being constructed, why it will necessitate public inconveniences at times (street closures, train outages, traffic congestion, etc.), and has little confidence in the ability of all the WTC stakeholders involved to get the job done.

Going forward, we intend to do things differently. We will establish clear construction milestones and will report openly and often about our progress in reaching them. And, if we don't hit a target, we will provide a clear explanation of why and a detailed plan to fix the problem. That is what our Board of Commissioners and the public have demanded and deserve.

We cannot promise that the path forward will be smooth or simple, but we can promise that the public will know about our progress, as well as our challenges, as we work every single day to rebuild the World Trade Center.

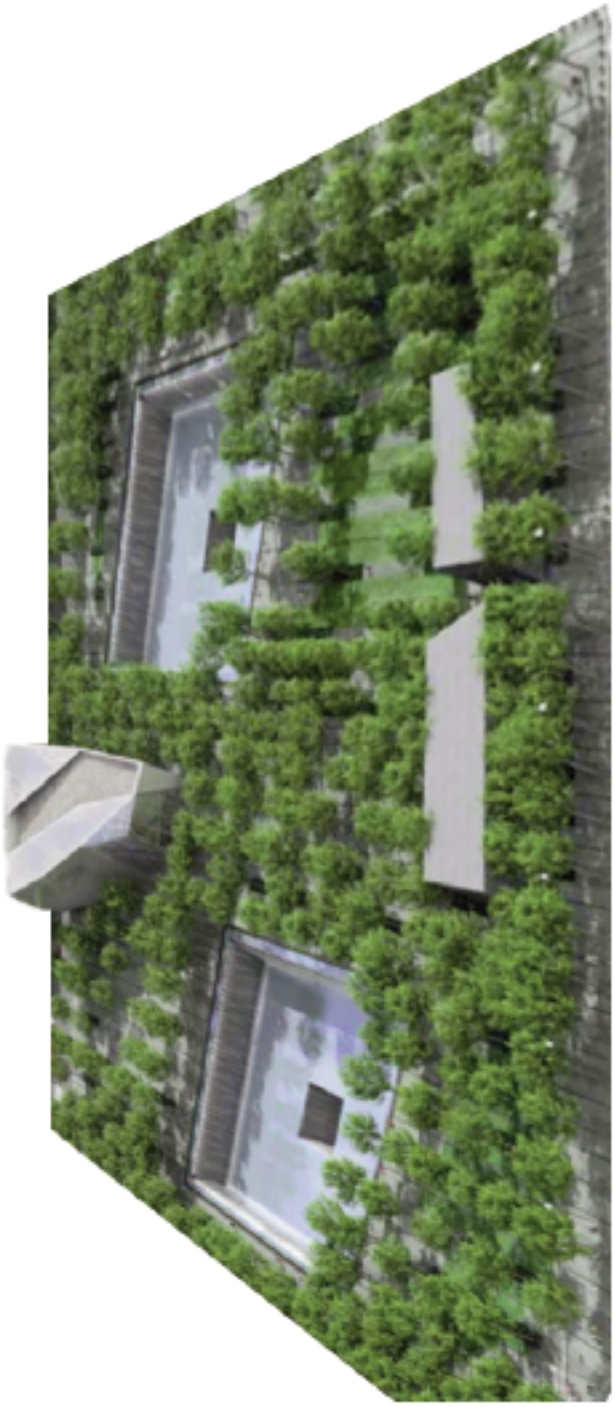
GRAPHIC 1

WTC Program
Major Milestones

Quarter	WTC Transportation Hub	Memorial	Vehicle Security Center	One World Trade Center, Freedom Tower	Greenwich Street	Quarter
Q4-08	·Final Construction Documents to Phoenix Constructors ·Begin Procurement of Structural Steel ·Start South Mezzanine Steel ·Turnover Tower 2 Core and Tower 4 "sliver"	·Sector 2 Steel Complete ·Pavilion Structural Design Complete (by NS11MM)	·Contractor Mobilization	· Foundations Complete · Complete South Core Shear Walls to Grade		Q4-08
Q1-09	·Steel Fabrication Package Award ·Complete South Mezzanine Steel ·Complete Pavilion/Spot Network Footings	·Temporary Ramp Removed ·Pavilion Cladding Design Complete (by NS11MM)	·Start West St. Slurry Wall	·Begin Fulton Street Deck	·Top Down Underpinning Design Complete	Q1-09
Q2-09	·Begin 9A Underpass Excavation for East-West Corridor	·Pavilion Interior Design Complete (by NS11MM)			·Phase 1 Excavation & Bracing complete	Q2-09
Q3-09	·Platform Column Foundations Begin ·Fulton Street Slab Available for Access		·130 Liberty St. Deconstruction Complete (by LMDC)	·Concrete Slabs to Grade substantially complete		Q3-09
Q4-09	·Begin Construction of Underpass Supercolumns ·Complete Steel Erection at South Mezzanine & Pavilion Transfer Structure			·Start Erection of Tower Steel	·Begin Construction of Underpass Supercolumns	Q4-09
Q1-10	·First Roof Steel to Site					Q1-10
Q2-10	·PATH Hall Arch Installation Begins	·Plaza to Grade ·Pavilion Steel Erection Begins	·Start Excavation	·Start Spray Fireproofing	·East and West Truss Installation	Q2-10
Q3-10		·Plaza Finishes Begin	·Start Tie-back Installation	·Start Curtainwall Installation	·Cortlandt Street Station Structure	Q3-10
Q4-10	·25' Walkway at North Pool Available to Memorial (i.e., 80% of the Memorial Plaza floor)					Q4-10
Q1-11		·Museum Design Complete (byNS11MM) ·Museum Construction Begins	·Perimeter Wall Substantial Completion ·Start Ramp Structure Foundations			Q1-11
Q2-11	·Platform A Construction Complete	·Start Pavilion Curtainwall	·Start Ramp Structure Steel Erection	·Complete Installation of Podium Glass	·Begin Cortlandt Street Station Finishes	Q2-11
Q3-11	·Platform B Construction Starts ·PATH Mezzanine Roof Complete (deckover)	·NE Quadrant Finishes begin ·Memorial Plaza floor (100%), Fountains, Parapets/Names Complete		·Complete Core Shear Walls to 93rd Floor	·Greenwich Street Partially Complete for Memorial Access	Q3-11
Q4-11		·Pavilion Shell Complete		·Complete Tower Steel Erection to Roof		Q4-11
Q1-12			·Ramp available for Tower Fitout	·Complete Spray Fireproofing		Q1-12
Q2-12						Q2-12
Q3-12	·Oculus Construction Begins ·Platform B Construction Complete		·VSC Operational	·Complete Curtainwall (excluding Hoist Area)		Q3-12
Q4-12	·Platforms C & D Construction Starts				·Greenwich Street Complete	Q4-12
Q1-13						Q1-13
Q2-13	·Oculus Wings Complete	·Memorial and Museum Complete				Q2-13
Q3-13						Q3-13
Q4-13				· Building Complete		Q4-13
Q1-14	·Platforms C & D Construction Complete					Q1-14
Q2-14	·Oculus Construction Complete (minus punch list) ·PATH Hall Complete (minus punch list)					Q2-14
Q3-14						Q3-14
Q4-14						Q4-14

GRAPHIC 2

Rendering of Memorial Plaza

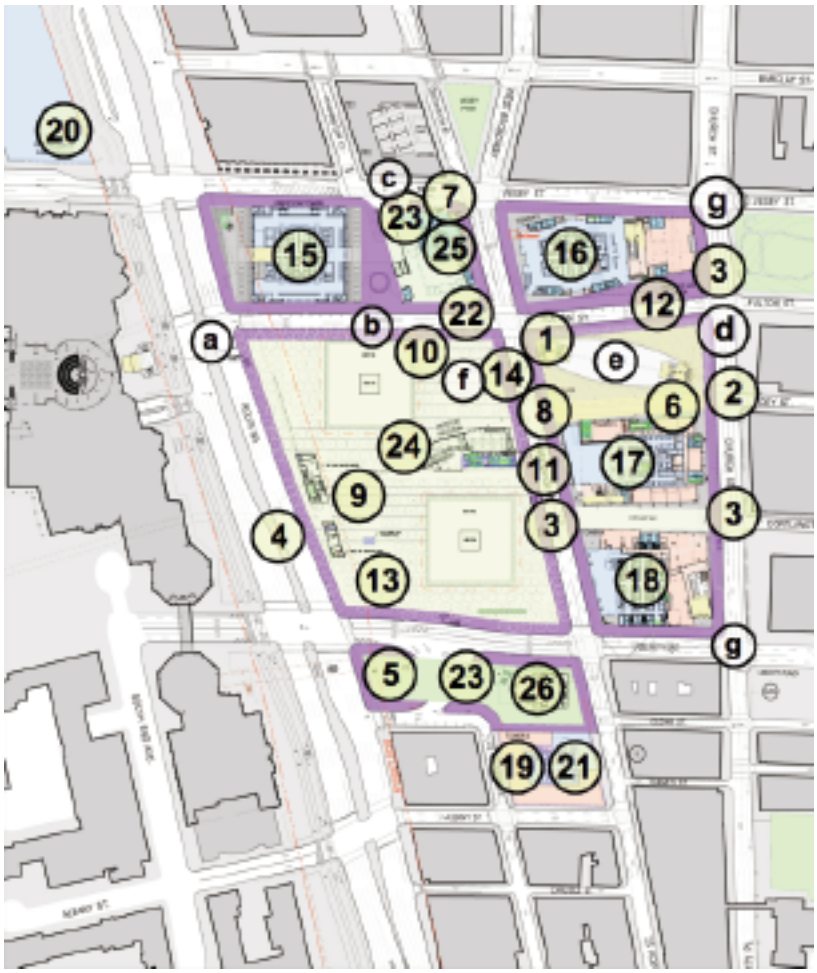


Source: National September 11 Memorial & Museum

GRAPHIC 3

Goldman Sachs Hqs.
West St./Route 9A
Tower 1
WTC Memorial
Fulton St.
West St.
7 WTC
Performing Arts Center
Visitor Center
Liberty St.
Tower 2
Greenwich St.
Tower 3
Tower 4
Transportation Hub
Church St.

GRAPHIC 4



WTC Redevelopment Major Projects

Transportation Projects

1. Transportation Hub
a. WFC Underpass
   b. East West Connector (below Fulton Street)
   c. North Temporary Access
   d. Utility work at Church Street
   e. Oculus
   f. PATH Facility
   g. Eastside North and South Connectors
2. Dey Street Passageway and Fulton Street Transit Center
3. Subway Stations (FTA funded)
4. Route 9a Realignment

Infrastructure Projects

5. VSC Phase 1-Vehicular Security Center and Tour Bus Parking Facility
6. VSC Phase 2 – Eastside Tour Bus Parking Facility
7. VSC 3 – West Bathtub Vehicular Access (helix)
8. Street, Utilities and Related Infrastructure
9. Central Chiller Plant and River Water System
10. Common Electrical System (PDC/SN and Emergency Generator Plant)
11. Common Infrastructure – Underpinning of 1 Subway
12. Site-wide Security/Operations Center (to be located)
13. Master Manager Facility

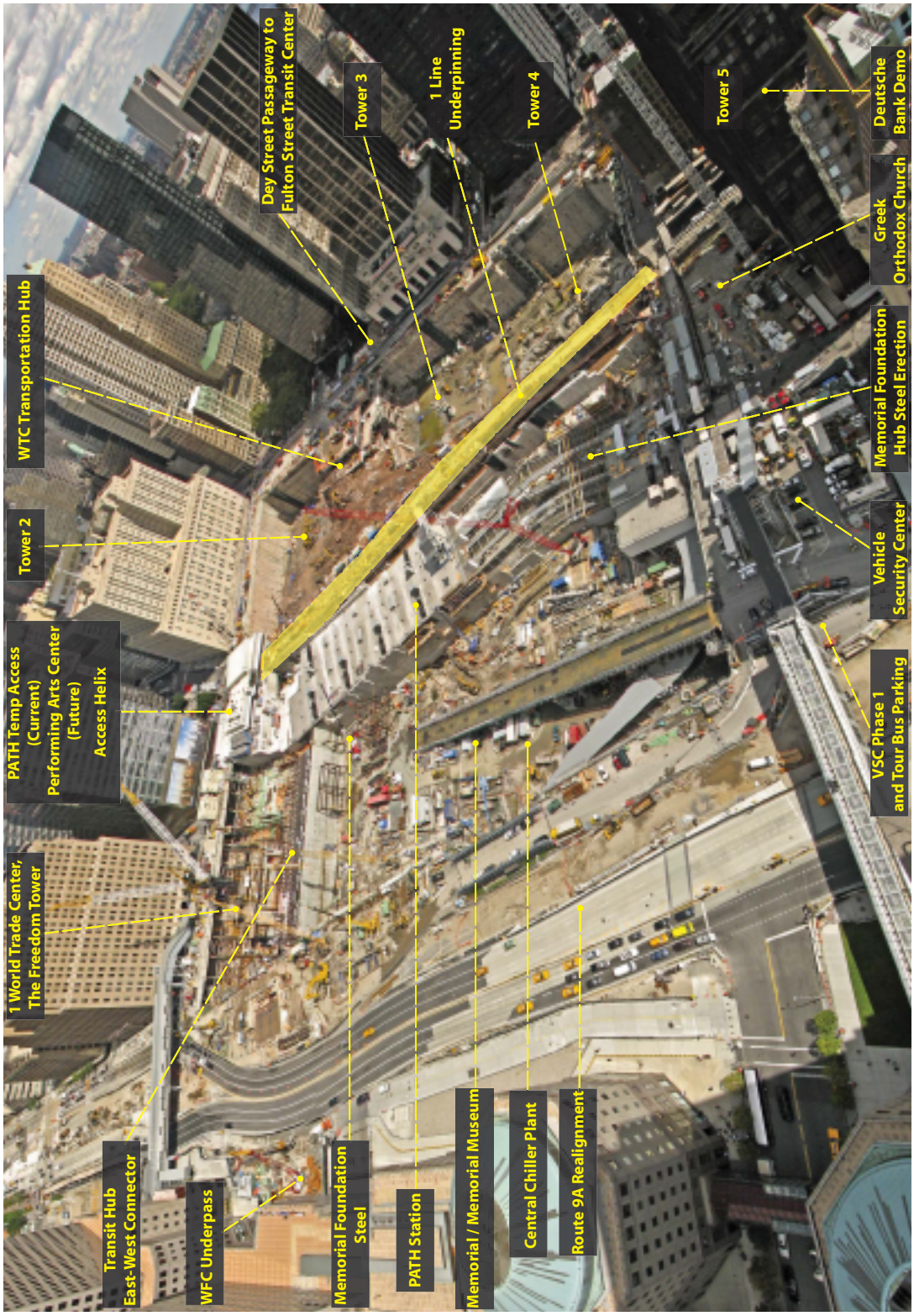
Commercial Projects

14. Commercial Infrastructure – East Bathtub Incremental Construction (accelerated turnover and 240 elevation work)
15. 1 World Trade Center, The Freedom Tower
16. Tower 2
17. Tower 3
18. Tower 4
19. Tower 5
20. Goldman Sachs World Headquarters
21. Deutsche Bank Building Deconstruction
22. Retail Development
23. Commercial Infrastructure (Parking)

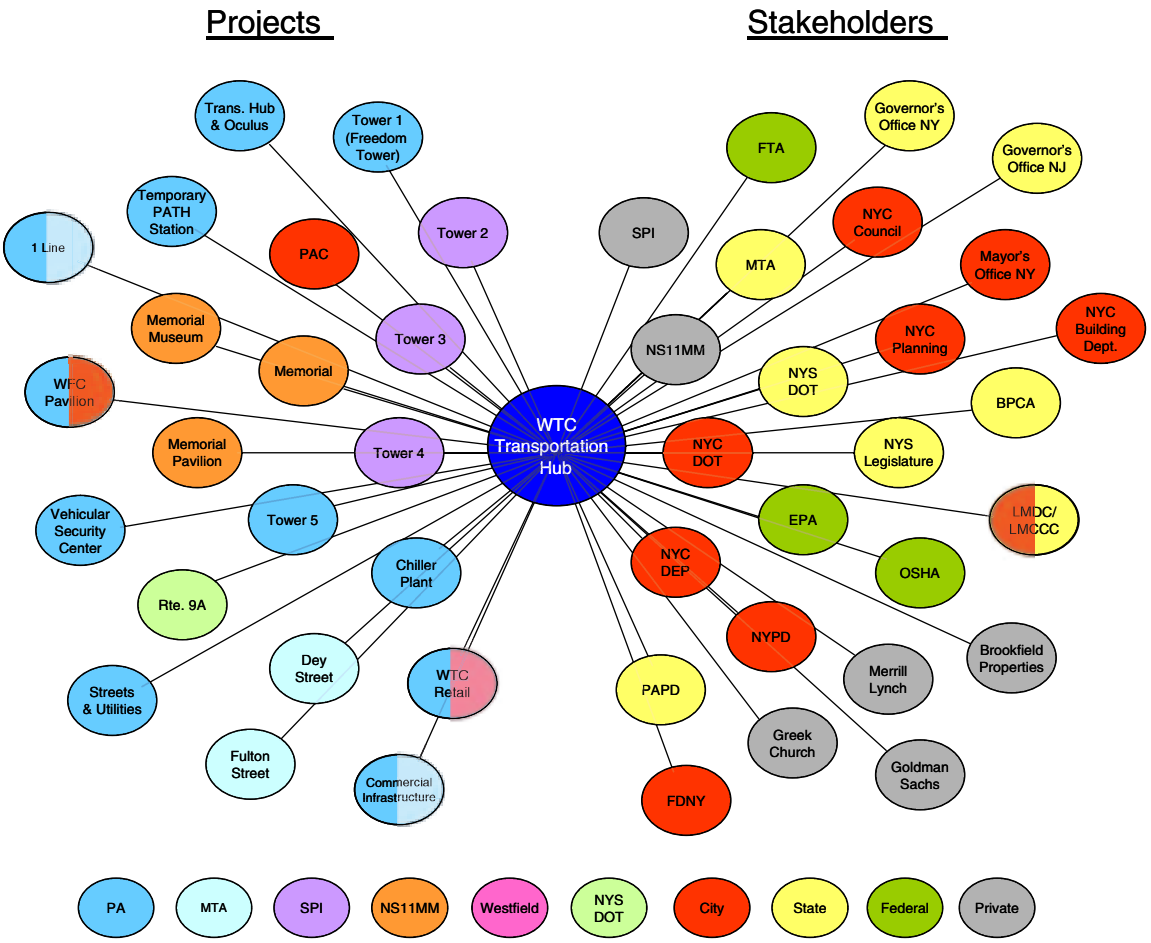
Cultural Projects

24. Memorial/Memorial Museum and Memorial Pavilion
25. Performing Arts Center
26. St. Nicholas Greek Orthodox Church

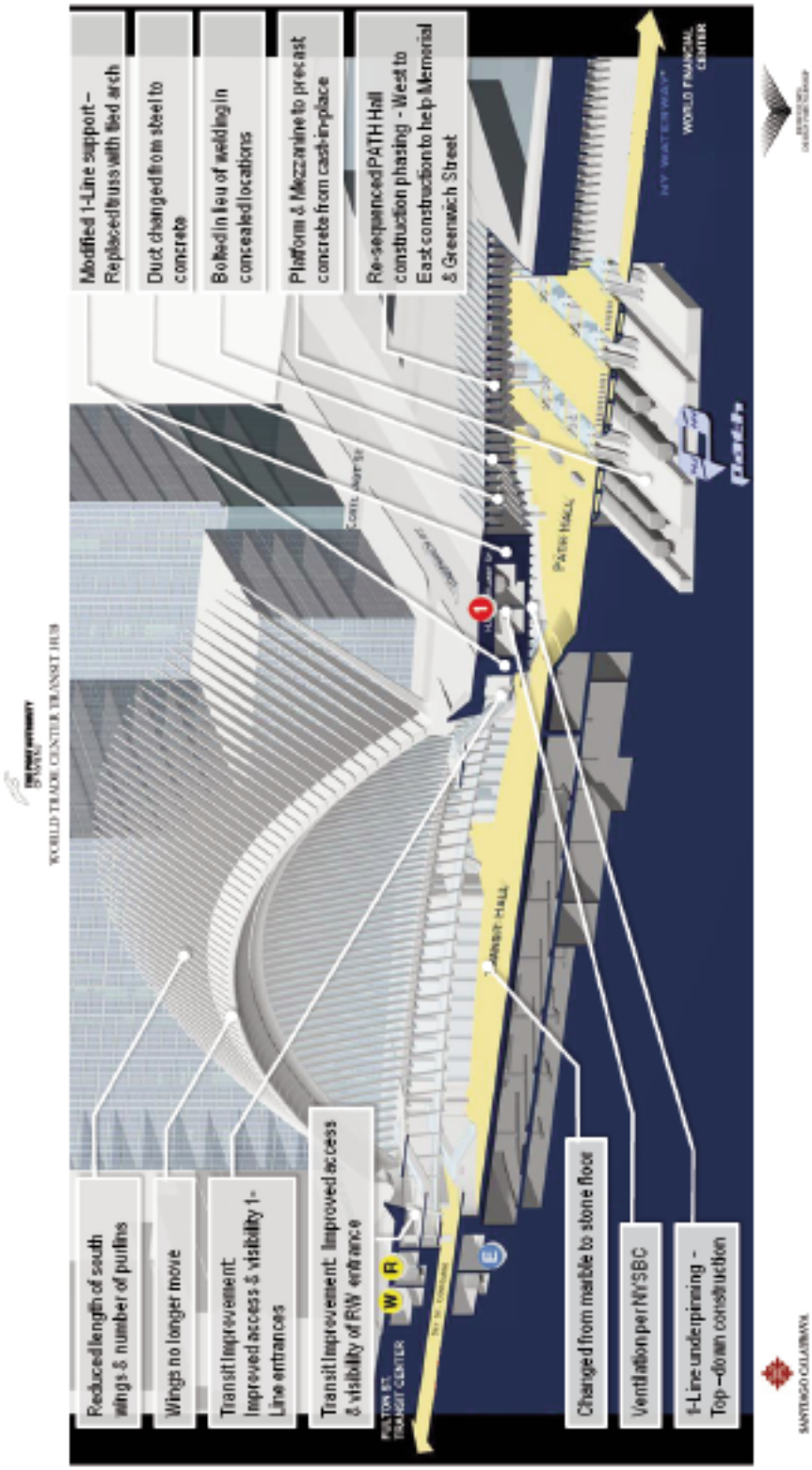
GRAPHIC 5


1 World Trade Center, The Freedom Tower
PATH Temp Access (Current) Performing Arts Center (Future) Access Helix
Tower 2
WTC Transportation Hub
Transit Hub East-West Connector
WFC Underpass
Memorial Foundation Steel
PATH Station
Memorial / Memorial Museum
Central Chiller Plant
Route 9A Realignment
Dey Street Passageway to Fulton Street Transit Center
Tower 3
1 Line Underpinning
Tower 4
Tower 5
VSC Phase 1 and Tour Bus Parking
Vehicle Security Center
Memorial Foundation Hub Steel Erection
Greek Orthodox Church
Deutsche Bank Demo

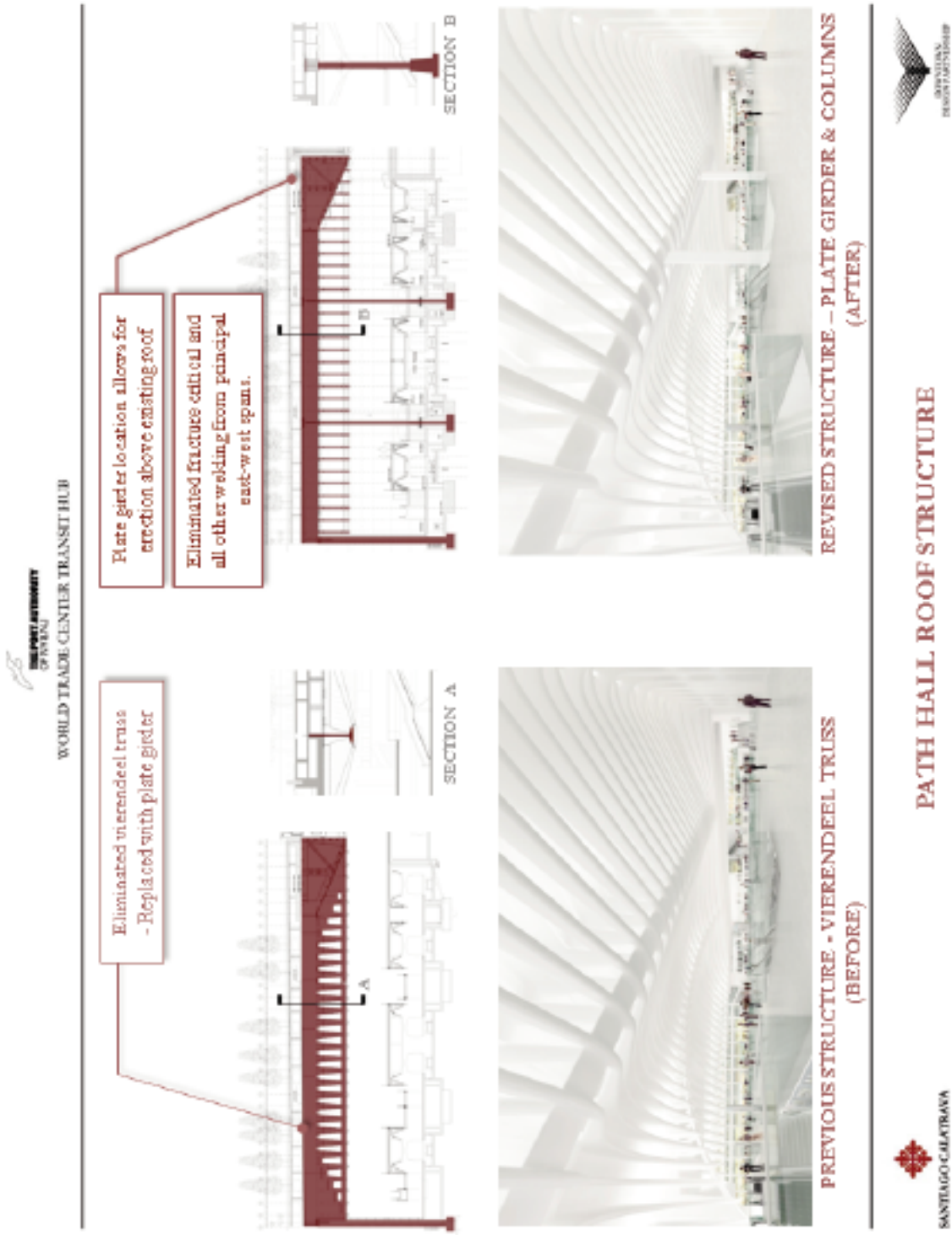
GRAPHIC 6


Projects
Stakeholders
WTC Transportation Hub
Trans. Hub & Oculus
Tower 1 (Freedom Tower)
Temporary PATH Station
1 Line
PAC
Tower 2
Memorial Museum
Tower 3
Memorial
WFC Pavilion
Memorial Pavilion
Tower 4
Vehicular Security Center
Tower 5
Chiller Plant
Rte. 9A
Dey Street
WTC Retail
Streets & Utilities
Fulton Street
Commercial Infrastructure
FTA
Governor's Office NY
Governor's Office NJ
SPI
NYC Council
MTA
Mayor's Office NY
NS11MM
NYC Planning
NYC Building Dept.
NYS DOT
BPCA
NYC DOT
NYS Legislature
EPA
LMDC/ LMCCC
NYC DEP
OSHA
NYPD
Brookfield Properties
Merrill Lynch
PAPD
Greek Church
Goldman Sachs
FDNY
PA
MTA
SPI
NS11MM
Westfield
NYS DOT
City
State
Federal
Private

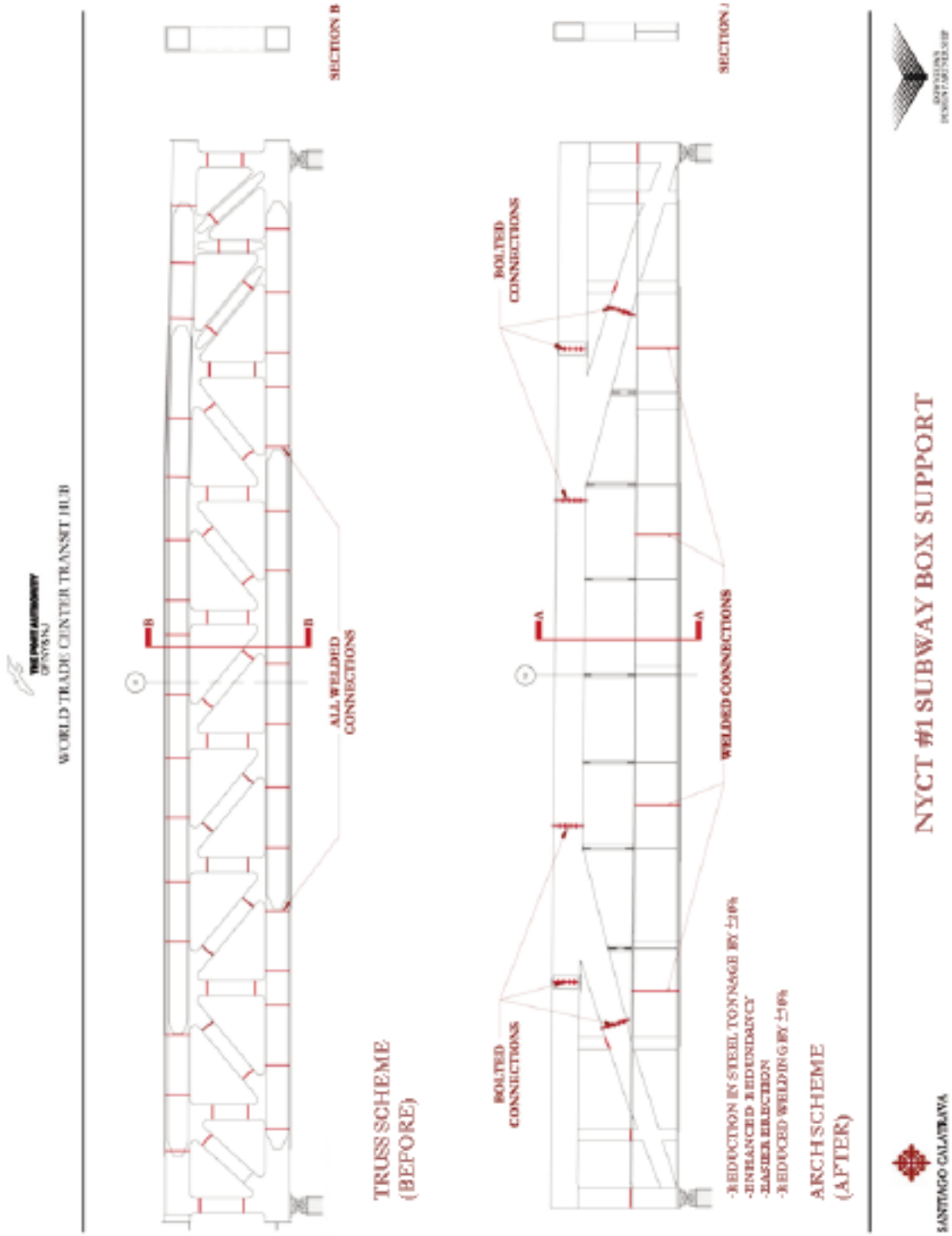
GRAPHIC 7


WORLD TRADE CENTER TRANSIT HUB
Reduced length of south wings & number of purlins
Wings no longer movie
Transit Improvement: Improved access & visibility 1-Line entrances
Transit Improvement: Improved access & visibility of NW entrance
Modified 1-Line support – Replaced truss with tied arch
Duct changed from steel to concrete
Bolted in lieu of welding in concealed locations
Platform & Mezzanine to precast concrete from cast-in-place
Re-sequenced PATH Hall construction phasing - West to East construction to help Memorial & Greenwich Street
Changed from marble to stone floor
Ventilation per NYSBC
1-Line underpinning - Top-down construction
PATH HALL
TRANSIT HALL
WORLD FINANCIAL CENTER
SANTIAGO CALATRAVA

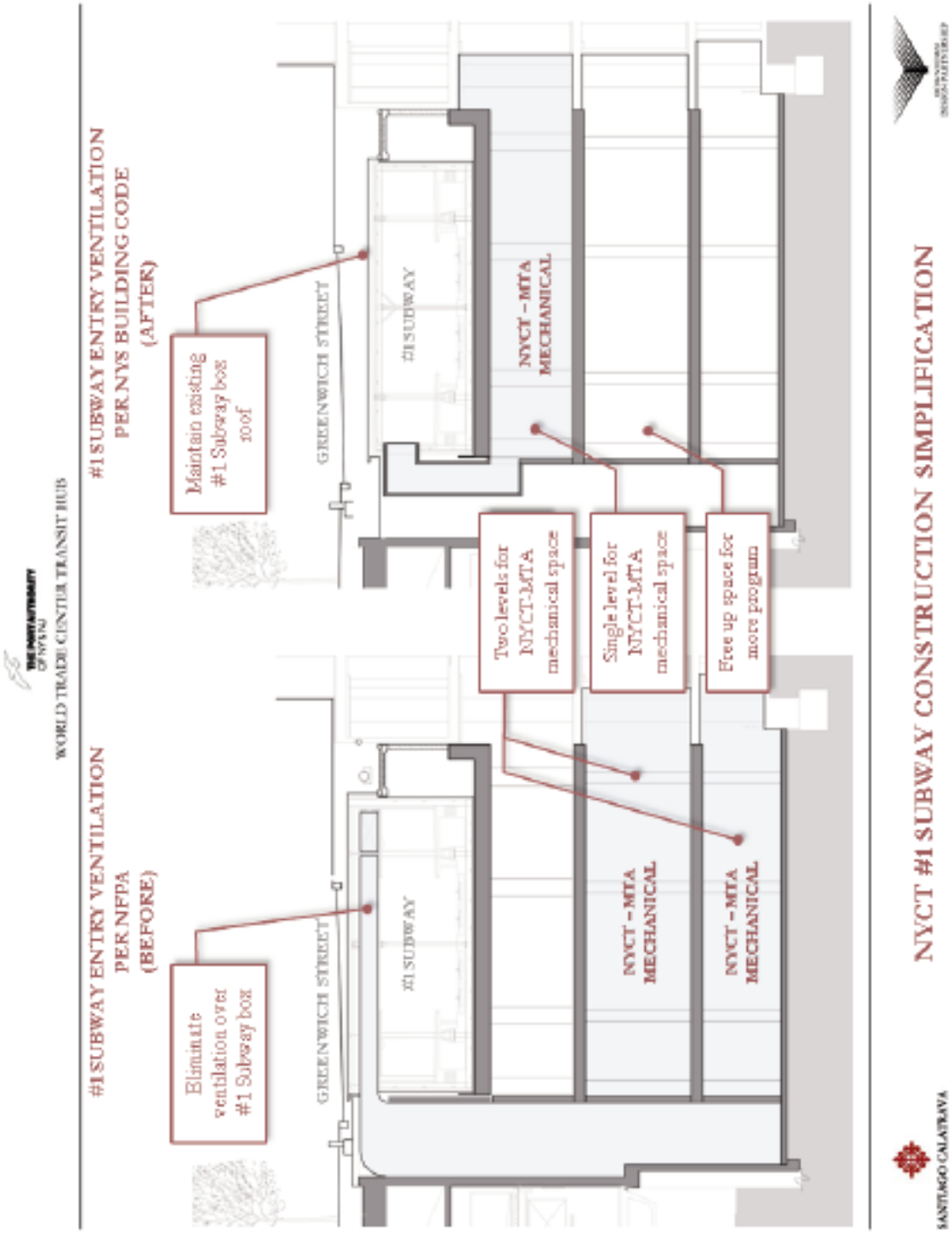
GRAPHIC 8


WORLD TRADE CENTER TRANSIT HUB
Eliminated vierendeel truss - Replaced with plate girder
Plate girder location allows for erection above existing roof
Eliminated fracture critical and all other welding from principal east-west spans.
A
B
SECTION A
SECTION B
PREVIOUS STRUCTURE - VIERENDEEL TRUSS (BEFORE)
REVISED STRUCTURE – PLATE GIRDER & COLUMNS (AFTER)
PATH HALL ROOF STRUCTURE
SANTIAGO CALATRAVA

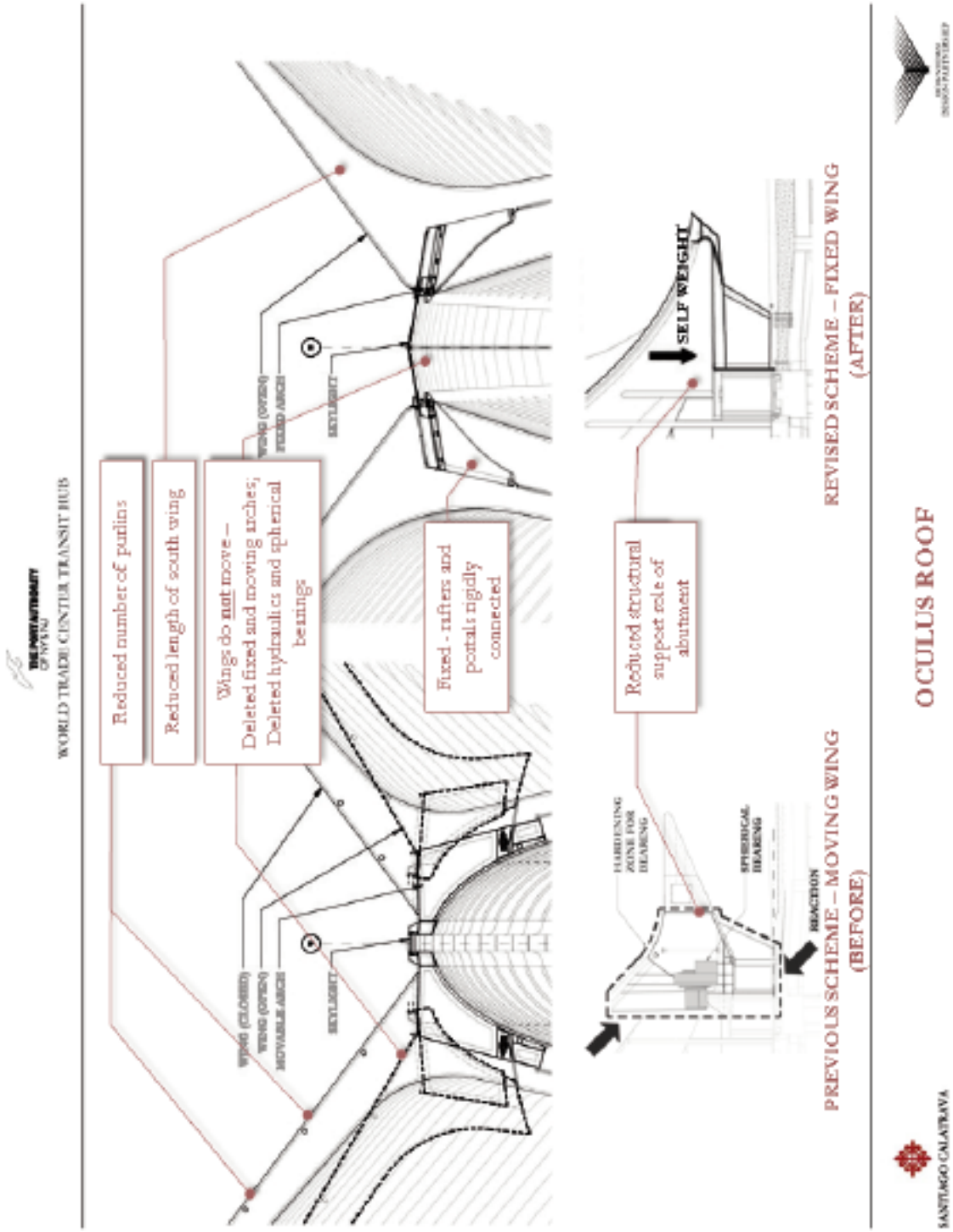
GRAPHIC 9


THE PORT AUTHORITY OF NY & NJ
WORLD TRADE CENTER TRANSIT HUB
B
B
SECTION B
ALL WELDED CONNECTIONS
TRUSS SCHEME (BEFORE)
BOLTED CONNECTIONS
A
A
SECTION A
WELDED CONNECTIONS
BOLTED CONNECTIONS
-REDUCTION IN STEEL TONNAGE BY ±10%
-ENHANCED REDUNDANCY
-EASIER ERECTION
-REDUCED WELDING BY ±10%
ARCH SCHEME (AFTER)
SANTIAGO CALATRAVA
NYCT #1 SUBWAY BOX SUPPORT

GRAPHIC 10


WORLD TRADE CENTER TRANSIT HUB
#1 SUBWAY ENTRY VENTILATION
PER NFPA
(BEFORE)
Eliminate ventilation over #1 Subway box
GREENWICH STREET
#1 SUBWAY
NYCT – MTA MECHANICAL
NYCT – MTA MECHANICAL
#1 SUBWAY ENTRY VENTILATION
PER NYS BUILDING CODE
(AFTER)
Maintain existing #1 Subway box roof
GREENWICH STREET
#1 SUBWAY
NYCT – MTA MECHANICAL
Two levels for NYCT-MTA mechanical space
Single level for NYCT-MTA mechanical space
Free up space for more program
NYCT #1 SUBWAY CONSTRUCTION SIMPLIFICATION
SANTIAGO CALATRAVA

GRAPHIC 11

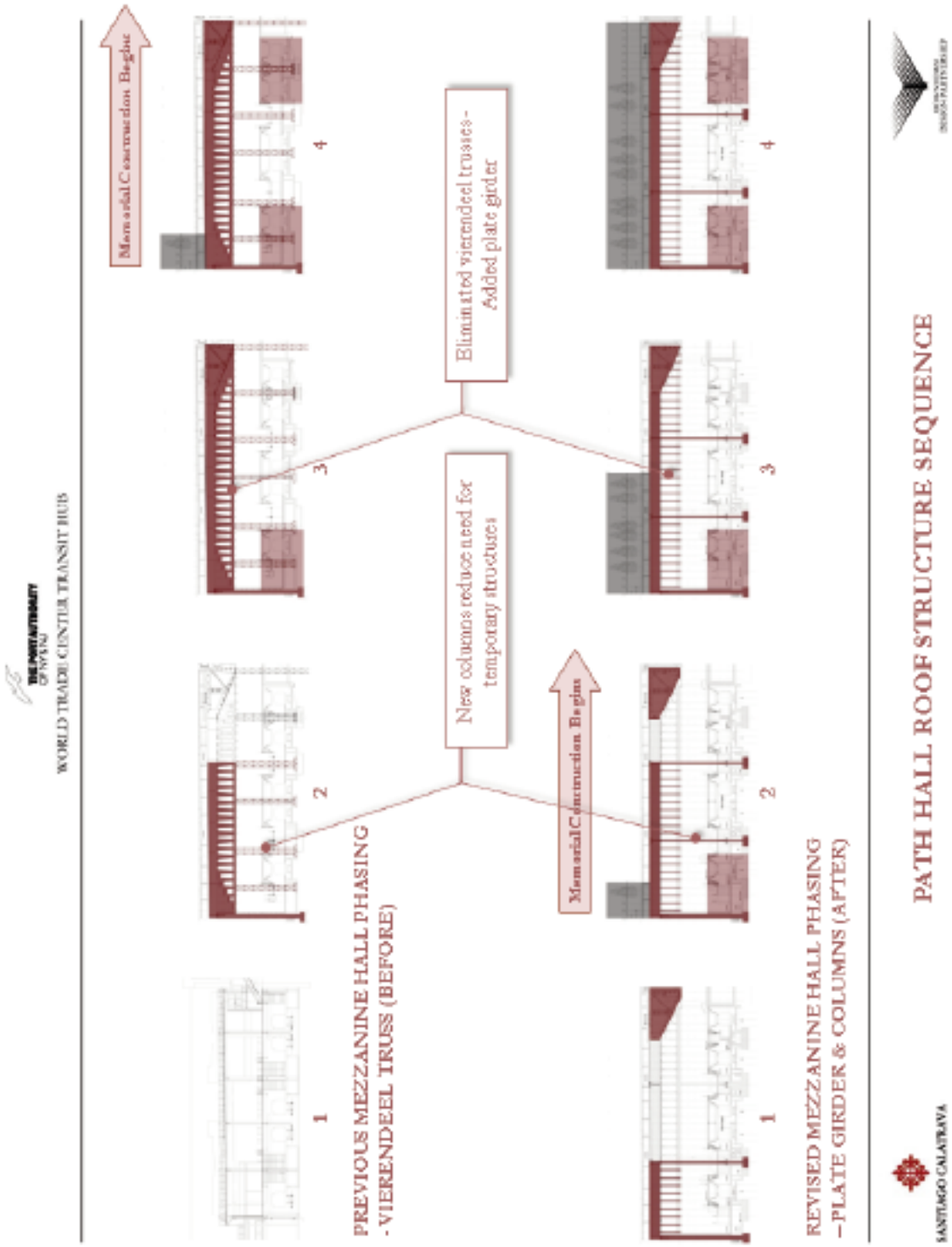

WORLD TRADE CENTER TRANSIT HUB
Reduced number of purlins
Reduced length of south wing
Wings do not move –
Deleted fixed and moving arches;
Deleted hydraulics and spherical bearings
Fixed - rafters and portals rigidly connected
Reduced structural support role of abutment
SELF WEIGHT
REVISED SCHEME – FIXED WING
(AFTER)
PREVIOUS SCHEME – MOVING WING
(BEFORE)
OCULUS ROOF
SANTIAGO CALATRAVA

GRAPHIC 12

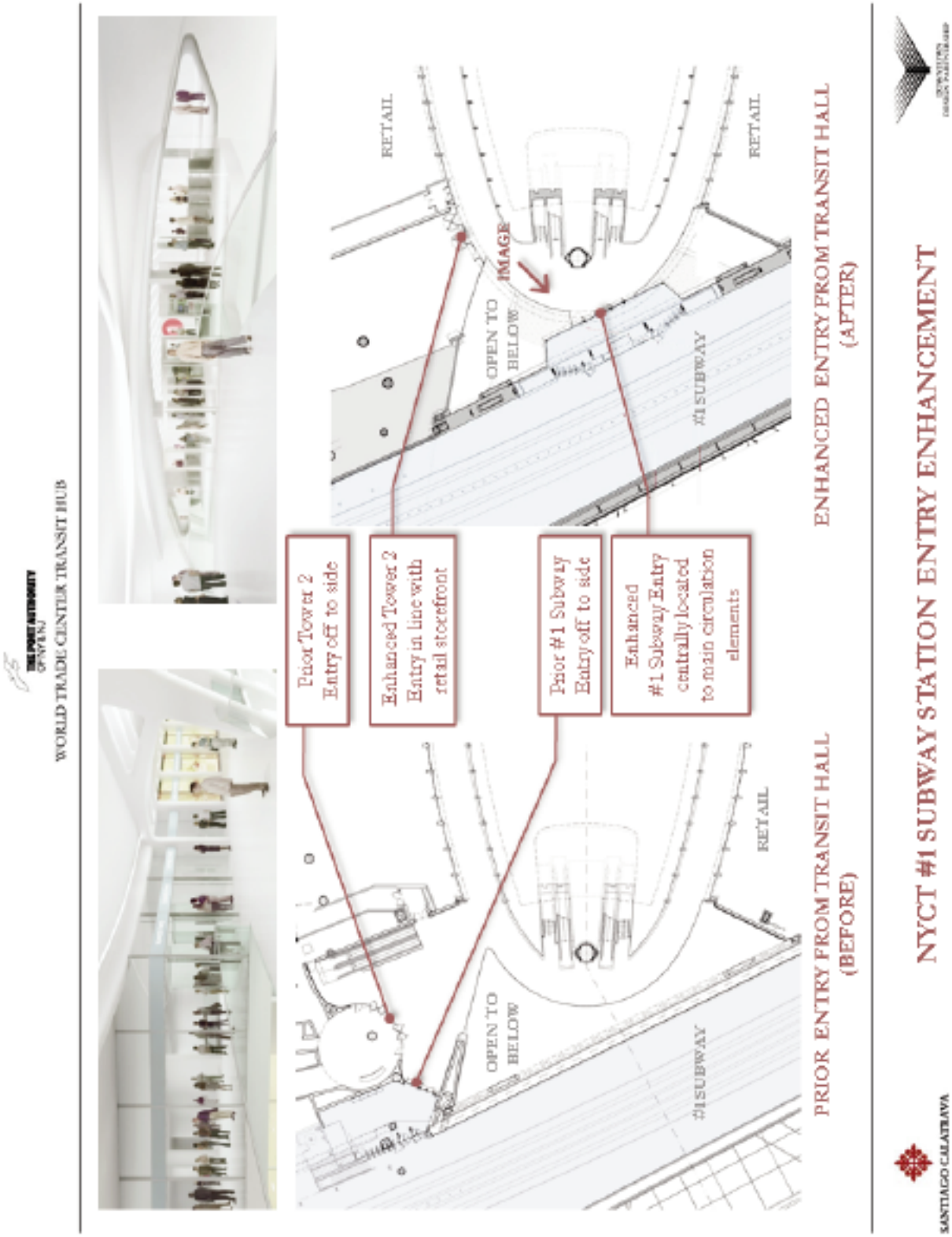
SKYLIGHT SCHEME

MOVING ROOF SCHEME

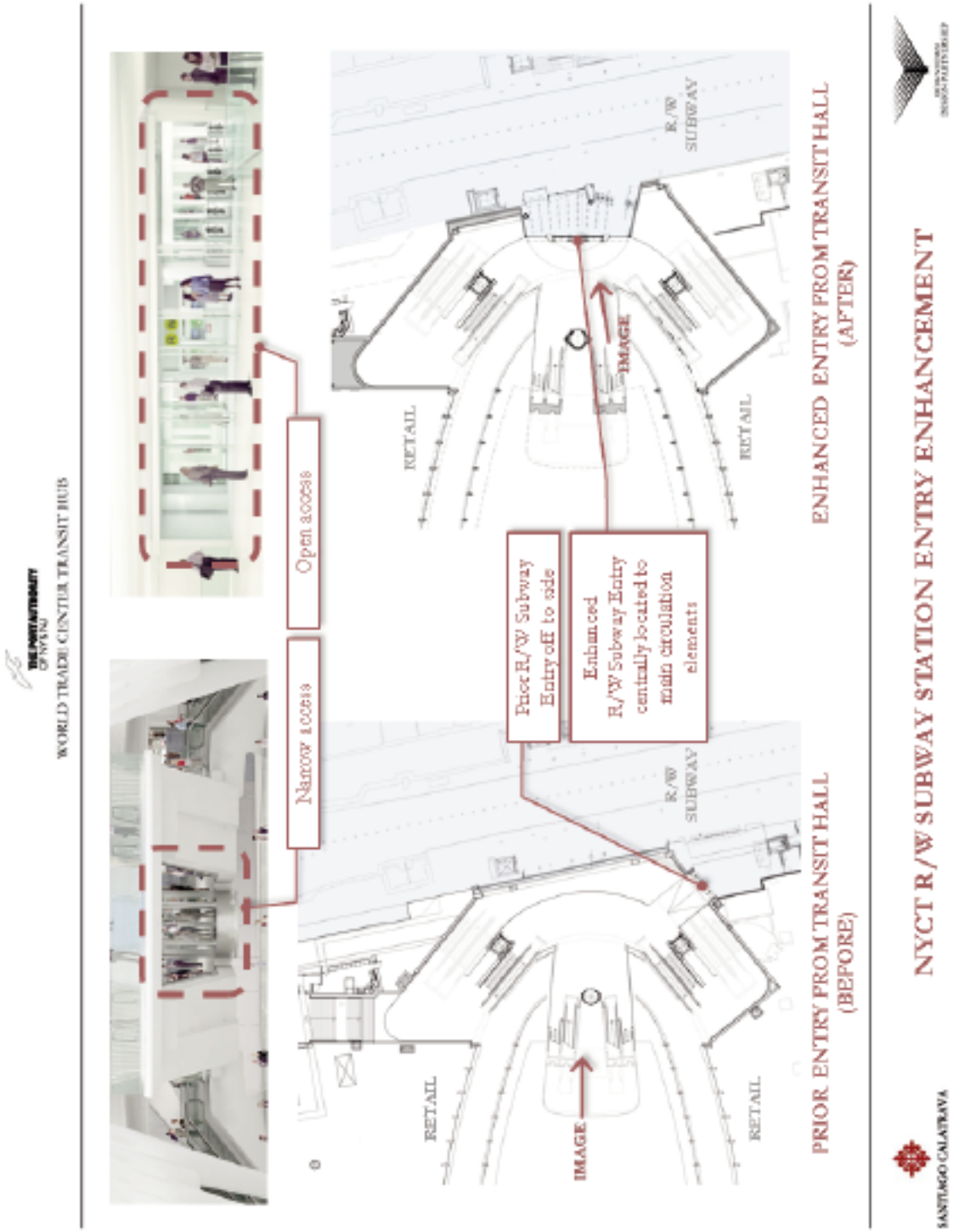
GRAPHIC 13


THE PORT AUTHORITY OF NY & NJ
WORLD TRADE CENTER TRANSIT HUB
Memorial Construction Begins
1
2
3
4
PREVIOUS MEZZANINE HALL PHASING
- VIERENDEEL TRUSS (BEFORE)
New columns reduce need for temporary structures
Eliminated vierendeel trusses -
Added plate girder
Memorial Construction Begins
1
2
3
4
REVISED MEZZANINE HALL PHASING
– PLATE GIRDER & COLUMNS (AFTER)
PATH HALL ROOF STRUCTURE SEQUENCE
SANTIAGO CALATRAVA

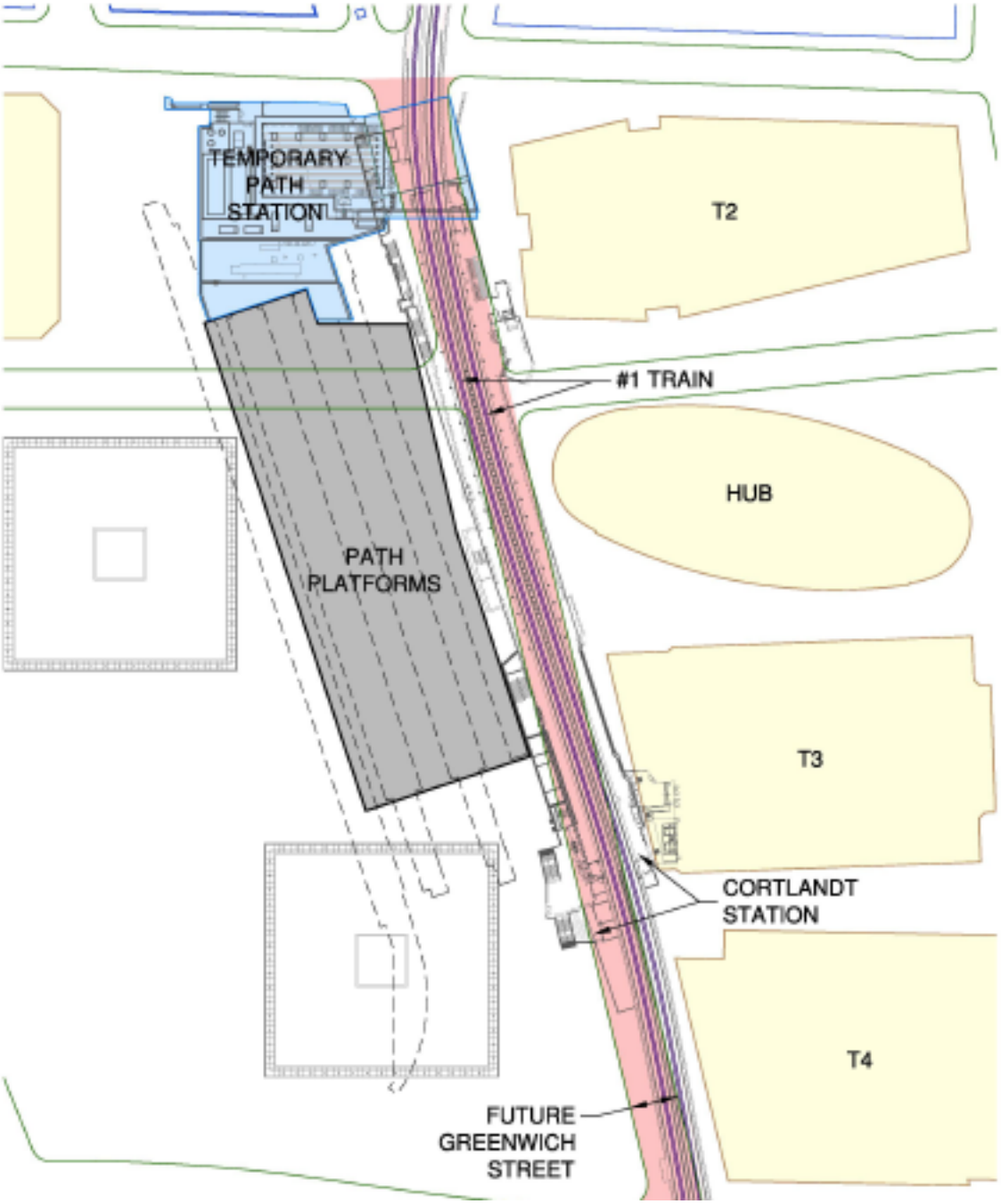
GRAPHIC 14


WORLD TRADE CENTER TRANSIT HUB
Prior Tower 2 Entry off to side
Enhanced Tower 2 Entry in line with retail storefront
Prior #1 Subway Entry off to side
Enhanced #1 Subway Entry centrally located to main circulation elements
RETAIL
OPEN TO BELOW
#1 SUBWAY
IMAGE
PRIOR ENTRY FROM TRANSIT HALL (BEFORE)
ENHANCED ENTRY FROM TRANSIT HALL (AFTER)
NYCT #1 SUBWAY STATION ENTRY ENHANCEMENT
SANTIAGO CALATRAVA

GRAPHIC 15


WORLD TRADE CENTER TRANSIT HUB
Narrow access
Open access
RETAIL
IMAGE
R/W SUBWAY
Prior R/W Subway Entry off to side
Enhanced R/W Subway Entry centrally located to main circulation elements
PRIOR ENTRY FROM TRANSIT HALL (BEFORE)
ENHANCED ENTRY FROM TRANSIT HALL (AFTER)
NYCT R/W SUBWAY STATION ENTRY ENHANCEMENT
SANTIAGO CALATRAVA

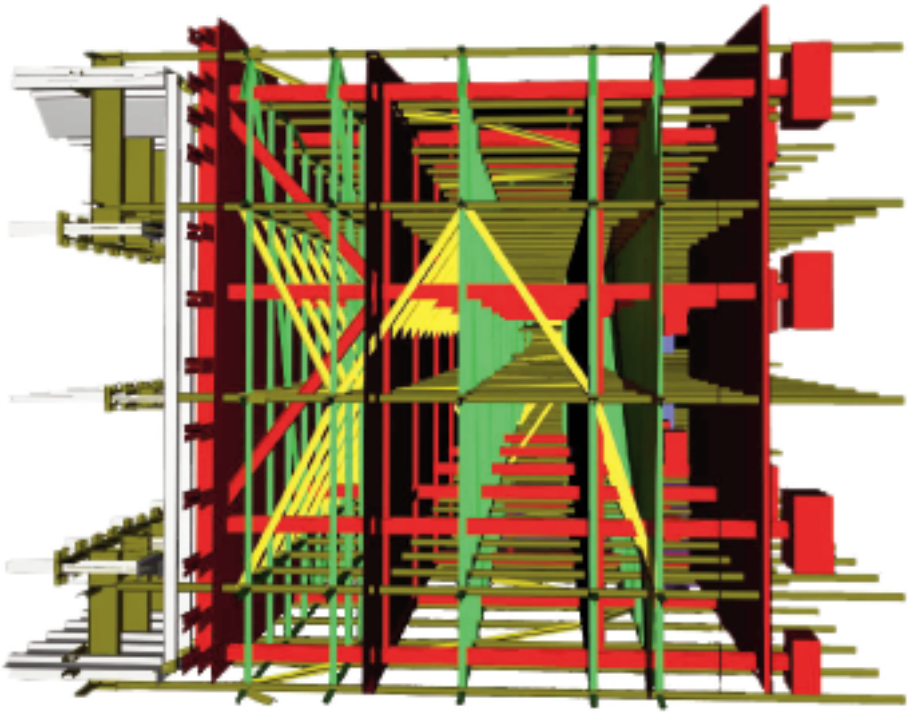
GRAPHIC 16


TEMPORARY
PATH
STATION
T2
#1 TRAIN
HUB
PATH
PLATFORMS
T3
CORTLANDT
STATION
T4
FUTURE
GREENWICH
STREET

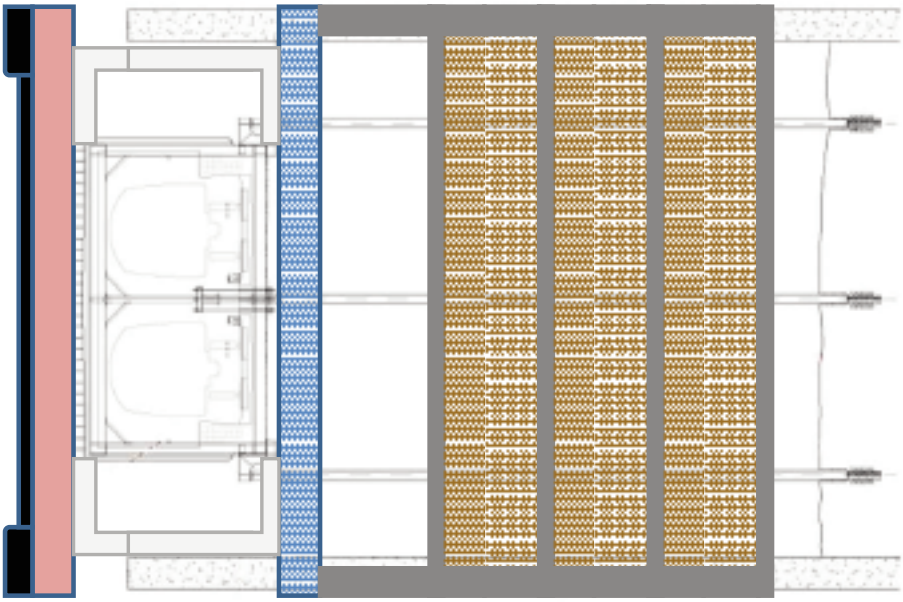
GRAPHIC 17

Underpinning of the #1 Line

Before: Original Underpinning Design

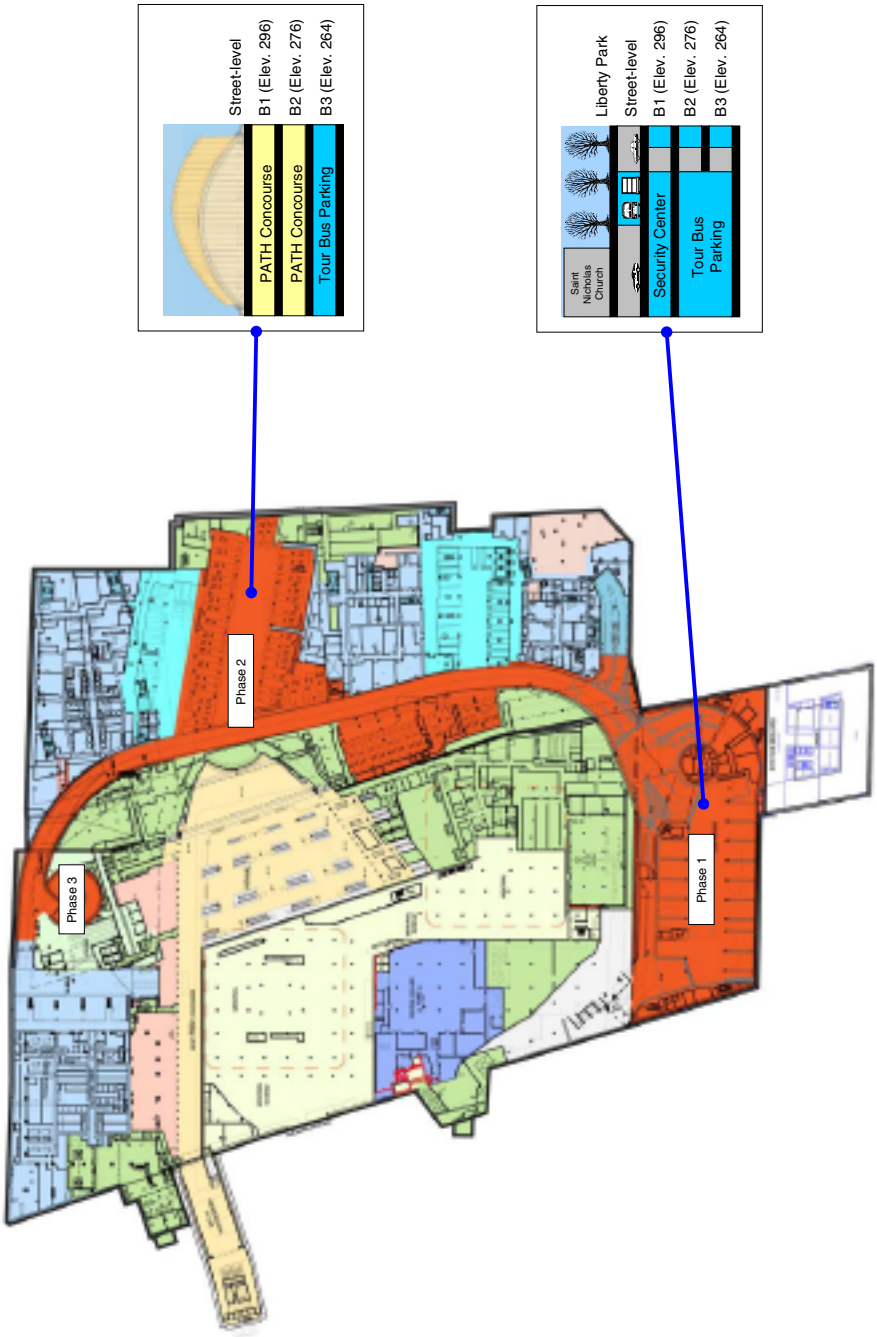


After: Top Down Construction

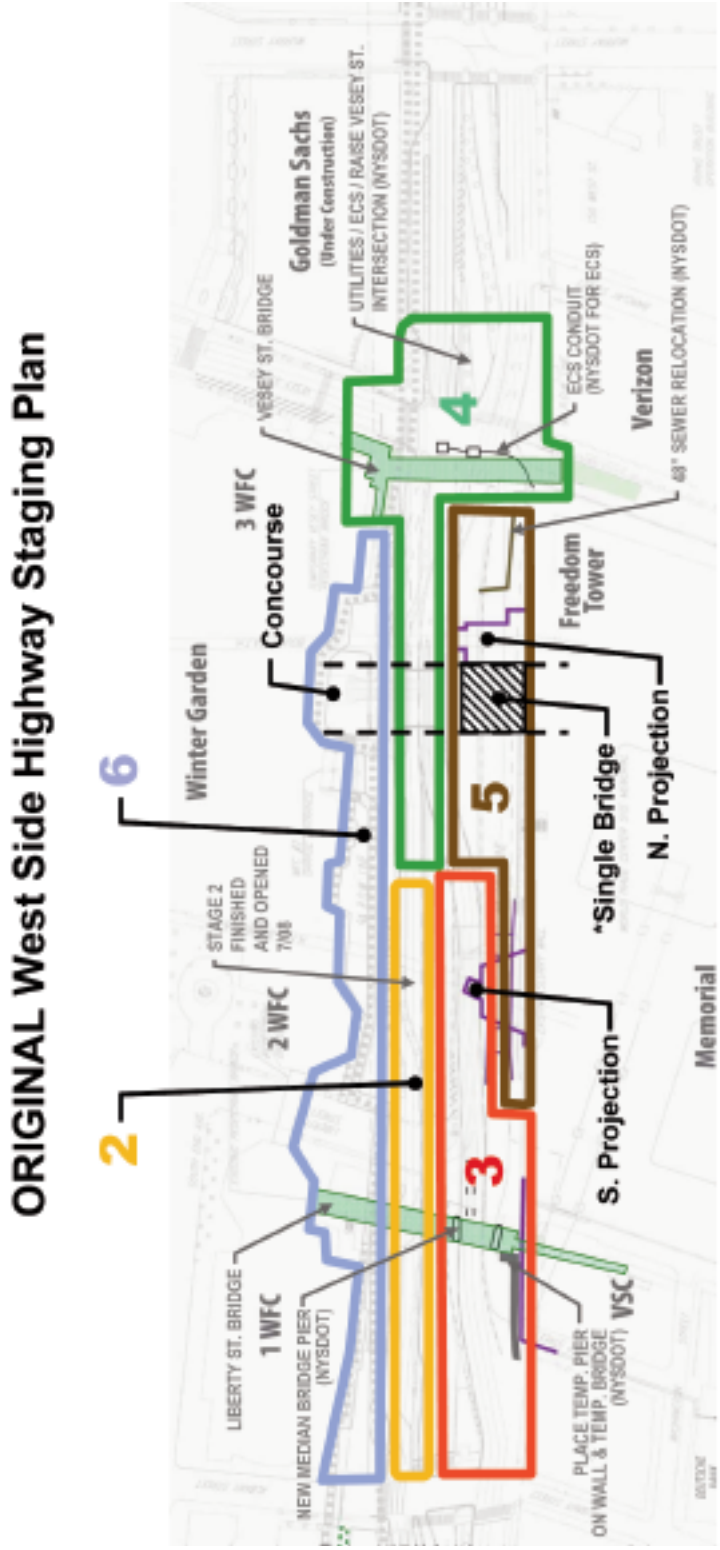


GRAPHIC 18

Vehicle Security Center (Phase I, II and III)



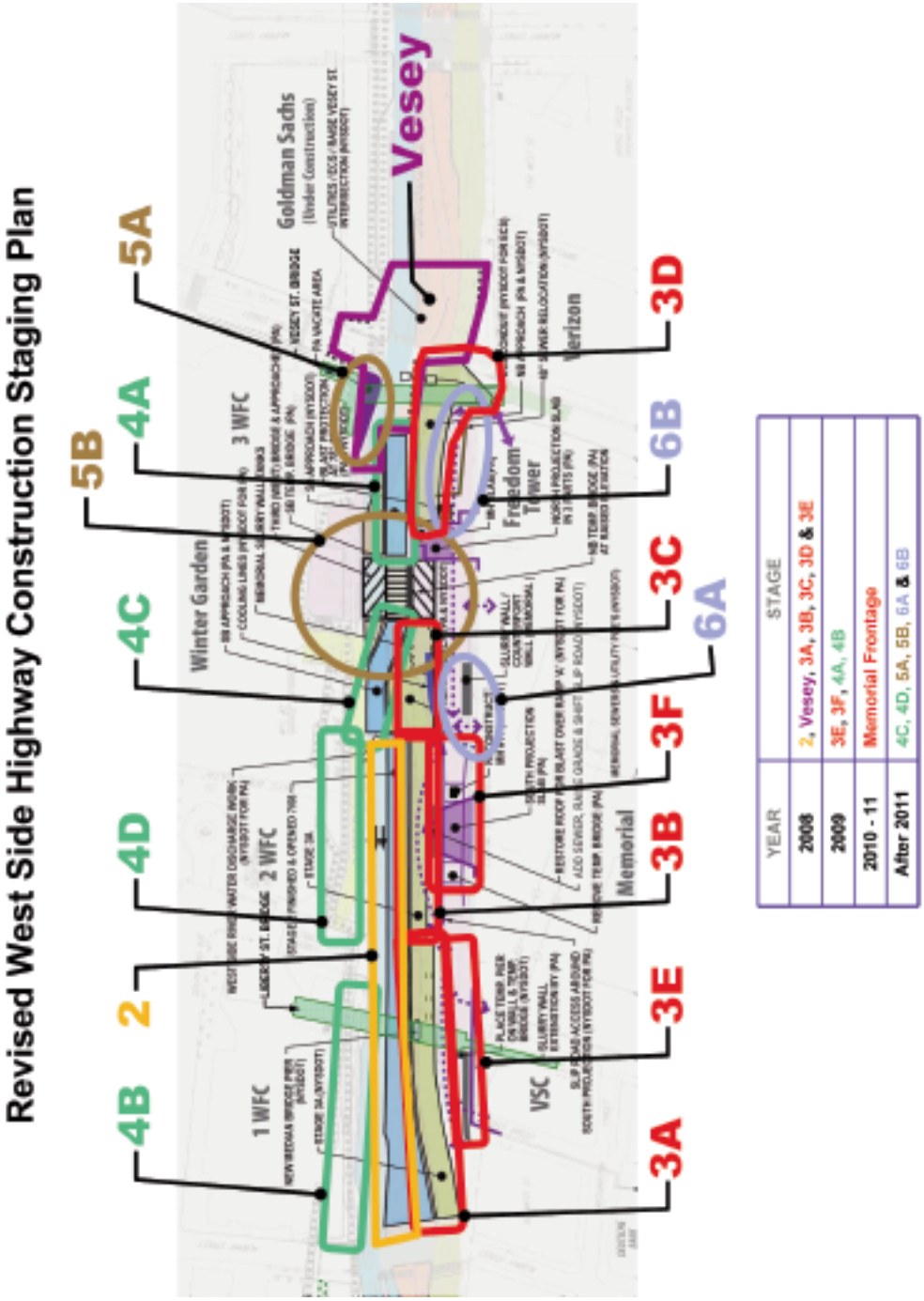
GRAPHIC 19



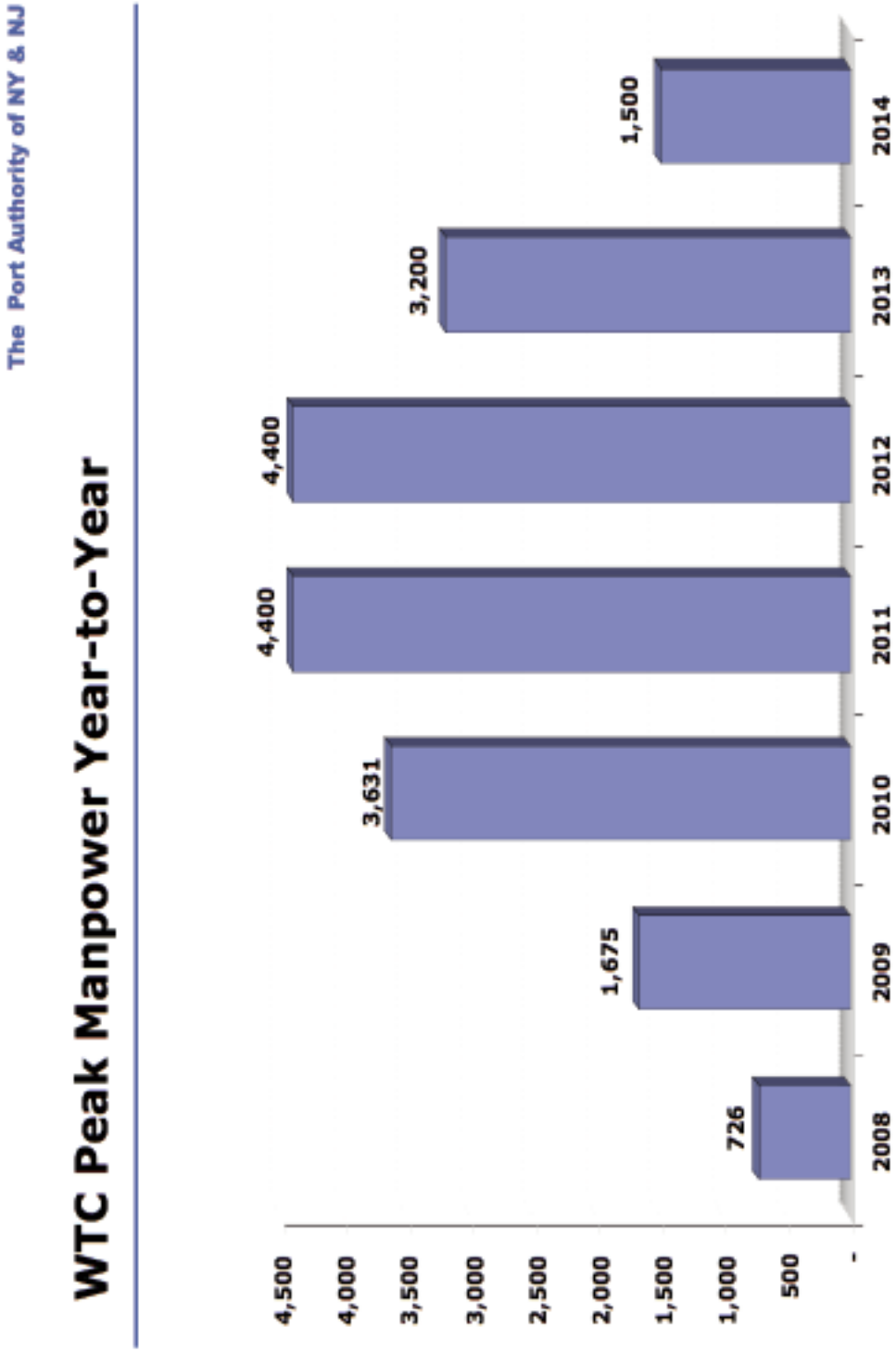
YEAR	STAGE
2008	2, 3
2009	4, 5, 6

*Original PANY&NJ plan included one temporary bridge over the Concourse construction with new West Side Highway (NY 9A) utilities staged around the bridge

GRAPHIC 20


Revised West Side Highway Construction Staging Plan
5A
4A
5B
4C
4D
2
4B
3A
3E
3B
3F
3C
6A
6B
3D
Vesey
Goldman Sachs
(Under Construction)
3 WFC
Winter Garden
2 WFC
1 WFC
VSC
Memorial
Freedom Tower
Verizon
YEAR
STAGE
2008
2, Vesey, 3A, 3B, 3C, 3D & 3E
2009
3E, 3F, 4A, 4B
2010 - 11
Memorial Frontage
After 2011
4C, 4D, 5A, 5B, 6A & 6B

GRAPHIC 21


The Port Authority of NY & NJ
WTC Peak Manpower Year-to-Year
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
-
726
1,675
3,631
4,400
4,400
3,200
1,500
2008
2009
2010
2011
2012
2013
2014

THE PORT AUTHORITY OF NY & NJ

January 31, 2012

The Honorable Chris Christie
Governor
State of New Jersey
State House
Trenton, NJ 08625

The Honorable Andrew M. Cuomo
Governor
State of New York
State Capitol
Albany, NY 12224

Dear Governors:

In response to last year's toll and fare increase, on August 18, 2011, you charged the Board of Commissioners of the Port Authority of New York and New Jersey to undertake a comprehensive review and audit of the entire agency, covering its finances, operations, and ten-year Capital Plan. On September 19, 2011, a Special Committee of the Board was organized to oversee that directive, and thereafter it retained the international firms of Navigant Consulting, Inc. and Rothschild Inc. to assist in this effort.

We present herewith the Phase I Interim Report. It is the Special Committee's intent that this Report together with our subsequent final report will present a thorough assessment of the Port Authority's current business model, finances, and operations, as well as provide corrective recommendations and measures. The findings and recommendations of the Report will be presented to the Port Authority's Board for consideration and appropriate action.

We note that the Report finds an "organization at a crossroads" and indicates that the Port Authority needs a top-to-bottom overhaul of its management structure. Navigant's preliminary review revealed, in their assessment, "a challenged and dysfunctional organization suffering from a lack of consistent leadership, a siloed underlying bureaucracy, poorly coordinated capital planning processes, insufficient cost controls, and a lack of transparent and effective oversight of the World Trade Center program that has obscured full awareness of billions of dollars in exposure to the Port Authority."

As can be seen in the Report, the World Trade Center redevelopment costs grew from an estimate of approximately $11 billion in 2008 to a current estimate of approximately $14.8 billion, with the estimated net cost to the Port Authority after third-party reimbursements growing from approximately $6 billion to approximately $7.7 billion.

Given that enormous burden, we are committed to taking the steps necessary to mitigate the Port Authority's exposure at the World Trade Center site by:

- Establishing new financial and management controls, and value engineering all possible aspects of the World Trade Center project. This crucial step should help

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New York, NY 10003
T: 212 435 7000

limit or mitigate the approximately $1 billion of potential incremental cost exposure identified in the Report;

- Maximizing the recovery of costs spent on behalf of third-party stakeholders and strictly limiting any new financial commitments related to increased scope and third-party work. As noted in the Report, the Port Authority already needs to recover approximately $1.6 billion from public agencies and private entities, such as the National September 11 Memorial & Museum;
- Leveraging private sector expertise. The Port Authority has made advances in this direction by forming a joint venture with the Durst Organization on Tower 1 and actively negotiating a joint venture with Westfield on the retail components of the World Trade Center site. As suggested by the Report, the Port Authority underestimated approximately $1 billion of costs that were subsequently identified by the involvement of experienced, private partners. There may have been an opportunity to mitigate some of these costs had they been identified earlier; and
- Pursuing the feasibility of third-party capital sources to fund the commercial aspects of the site. Alternative methods of funding the infrastructure needs of the Port Authority may come from monetizing certain assets at the World Trade Center site.

The amount of debt at the end of 2001 ($9.1 billion) grew to $19.5 billion at year-end 2011, and is expected to increase further to approximately $20.8 billion by the end of 2012. This significant increase in the agency's debt load will remain a burden for years to come.

Gross compensation at the Port Authority has grown in the last five years by approximately 19%, from $629 million to $749 million, primarily as the result of "add-on" compensation such as overtime, unused vacation exchange and "longevity" programs. During this same timeframe, the cost of benefits for employees increased by approximately 35%, from $341 million to more than $458 million.

These findings underscore the Special Committee's objective of finding ways of lowering operating costs and increasing operational efficiencies across the agency. The Special Committee is strongly committed to bringing employee compensation and benefits in line with appropriate public employee benchmarks and has already asked our executive management team to examine the following measures:

- Requiring contributions to healthcare. If implemented for all employees, these contributions would result in expected savings of approximately $103.8 million over the course of the next four years;

- Eliminating "add-on" compensation programs, such as unused vacation exchange and "longevity." The estimated annual savings for eliminating these programs for non-represented employees is approximately $9.1 million;
- Implementing a merit driven compensation program;
- Imposing stronger controls on overtime; and
- Revising vacation and other compensated time policies.

Aside from these findings and recommendations, the Report includes preliminary observations on the Port Authority's current $25.1 billion Capital Plan and underlying capital planning process. The majority of that capital, more than $18 billion, is planned for assets excluding the World Trade Center site, reflecting significant state-of-good-repair and other needs of our core transportation assets. Yet the Report observes that the capital planning process does not necessarily align with the agency's overall priorities. Line functions promote projects to maintain their own asset base, while management roles and responsibility for oversight of the planning and project execution process are not clearly defined. Furthermore, senior management lacks key performance metrics to drive accountability for the execution of the Capital Plan.

The next phase of the Special Committee's work will further the detailed review of the hundreds of projects in the Capital Plan. However, it is clear that the Port Authority must refocus its organization and processes to increase the speed of project delivery and reduce project costs. Already, our executive management team is focusing on various steps to achieve these goals, including:

- Streamlining pre-construction approval processes;
- Reducing "soft costs" associated with project development;
- Requiring financial department review of all transactions before they are brought to the Board; and
- Improving communications internally to foster better collaboration and decision-making for critical projects.

These important steps, together with other improvements such as greater use of electronic systems to improve management of our real estate and leasing contracts, and improving the timely collection of revenues owed to us, will improve the value to the agency, and to the public, of the capital dollars we spend.

The above findings, along with the others in the Report, make abundantly clear something that we already knew: we must now move to a new era for the Port Authority. In 2011, the Board had already begun this process by implementing significant changes to

reinvigorate the agency. For example, in the past months it has moved forward in a proactive way with positive changes in governance and transparency by:

- Posting online the compensation of all employees of the Port Authority and committing the agency to quarterly updates;
- Implementing the elimination of the non-revenue component of the Port Authority's E-ZPass program for certain employees and retirees;
- Hiring the first new independent auditor for the agency in 31 years;
- Strengthening the Port Authority's internal Enterprise Risk Management System to allow the Board to better anticipate and mitigate potential problems;
- Establishing an Insurance Working Group to examine the Port Authority's insurance practices and costs; and
- Approving Preliminary Operating and Capital Budgets for 2012 expressly subject to any measures adopted by the Board as a result of the Special Committee's review.

Beyond these recent steps and the aforementioned commitments, much more needs to be done. The Special Committee's continued review will serve as the vehicle for this change, and as we move into Phase II with the guidance of Navigant and Rothschild, the principal objectives will remain the same: to reduce costs, improve efficiencies, and fulfill the Port Authority's mission as the engine for economic growth and job creation in the New York/New Jersey region. We look forward to your continued support.

Respectfully,

THE SPECIAL COMMITTEE OF
THE BOARD OF COMMISSIONERS
OF THE PORT AUTHORITY OF
NEW YORK AND NEW JERSEY

David Samson
Chairman

Scott Rechler
Vice-Chairman

William "Pat" Schuber
Commissioner

Jeffrey Lynford
Commissioner

Phase I Interim Report

Presented to:

The Special Committee of the Board of Commissioners of

THE PORT AUTHORITY OF NY & NJ

January 31, 2012

Presented by:

NAVIGANT

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I. EXECUTIVE SUMMARY

The Port Authority of New York and New Jersey (the "Port Authority") is a complex organization, comprised of billions of dollars of vital infrastructure and transportation operations as well as significant real estate holdings. Navigant Consulting, Inc.'s ("Navigant") preliminary review revealed a challenged and dysfunctional organization suffering from a lack of consistent leadership, a siloed underlying bureaucracy, poorly coordinated capital planning processes, insufficient cost controls, and a lack of transparent and effective oversight of the World Trade Center (the "WTC") program that has obscured full awareness of billions of dollars in exposure to the Port Authority.

The organization is at a crucial crossroads. The Port Authority must re-affirm its core mission, and support it with a viable long range strategic and capital plan and an organization with renewed focus on operating efficiency and effectiveness, in order to sustain its relevance as a primary contributor to the economic growth of the region in the 21st Century. A significant undertaking will be required including both organizational and financial realignments to properly position the agency to address the challenges inherited by the recently appointed leadership. The following represents certain preliminary findings associated with the Phase I report commissioned by the Special Committee of the Board of Commissioners of the Port Authority at the request of the Governors of New York and New Jersey.

PRELIMINARY ORGANIZATIONAL DESIGN & OPERATIONAL ASSESSMENT

✧ ***The Port Authority must conduct a meaningful top-to-bottom organizational redesign focused on operating efficiencies and rooted in clearly defined roles and responsibilities, transparency, accountability, and aligned incentives***

- The Port Authority is a long standing bureaucracy that is inherently resistant to change, lacks effective collaboration between its strategic businesses, and would benefit from the effective development of a shared support services function.
- Promotion within the organization is primarily based on seniority, with little evidence of advancement or compensation being tied to performance. As a result, the organization has a concentration of long tenured senior and middle management employees.
- The magnitude of growth in size and cost of the security apparatus warrants an in depth review of its efficiency and relative effectiveness, as is currently being conducted.
- Overtime and other forms of "add-on" compensation resulted in an additional $20,559 per employee in 2010. Overtime expenses alone topped $85 million in 2010.
- Total "add-on" compensation, when combined with all other benefits, results in incremental average cost per employee equivalent to approximately 70% of base salary, a relatively high fringe benefit rate.
- 93% of employees make no contribution to their health care; by contrast, 100% of New York State and New Jersey State employees contribute to health care.
- Total cost of compensation and benefits for the average active Port Authority employee is estimated to exceed $143,000 annually.

- In addition to the scrutiny and curtailment of rapidly growing "add-on" compensation and benefit costs, represented labor contracts (and the current application of related practices) merit a detailed review with consideration of potential modifications to work rules to remove impediments to productivity and efficiency gains.

INITIAL COST REVIEW OF WTC PROGRAM

✧ ***WTC costs have grown significantly and gross costs will likely exceed approximately $14.8 billion, an increase of $3.8 billion since the last forecast in 2008. The Port Authority's net funding obligation has grown from approximately $6.0 billion to approximately $7.7 billion, before consideration of additional potential net cost exposures of approximately $800 million***

- The Port Authority was unable to produce supporting detail and source documents for the growth in cost estimates previously reported by prior Executive Directors to the Board of Commissioners and the Governors. Moreover, prior budgets for the WTC project did not include estimated tenant improvement and leasing costs associated with the commercial (*i.e.,* at One World Trade Center) and retail space at the WTC, thus understating the expected cost at completion.
- Total project costs have grown significantly from a previously reported $11 billion to approximately $14.8 billion, a $3.8 billion increase since the 2008 reforecast. Moreover, Navigant has identified additional potential exposures of approximately $1 billion that must be mitigated by the Port Authority to avoid further escalation in gross program costs.
- The gross cost increase of approximately $3.8 billion is primarily driven by: (i) the scope evolution of the WTC Transportation Hub ("Hub") in response to the mandate to open the National September 11 Memorial and Museum (the "Memorial") by September 11, 2011, (ii) anticipated allowances to commercialize One World Trade Center ("1 WTC") and the retail spaces, (iii) projects performed by the Port Authority on behalf of third-parties at the site (*i.e.,* related to the Memorial, existing subway operations, the campus security plan, and the Performing Arts Center), as well as, (iv) increases in financing and insurance expenses.
- Exposure to third-parties (where the Port Authority has performed work for other parties and expects to be reimbursed in the future) now total an estimated $1.6 billion and represent the primary area of cost escalation since the 2008 reforecast. The most notable exposures are seen in: (i) the proposed Memorial project (which, by some estimates, has grown to a total project cost of approximately $1 billion), (ii) the $300 million campus security plan developed by the City of New York, and (iii) the $200 million of work required to physically support the anticipated Performing Arts Center at the site. Assuring the collectability of these funds, particularly in instances such as the Memorial where funding obligations are already in dispute, must be a key priority of the Port Authority. In the face of uncertainty of collections, the Port Authority should enforce strict controls and curtail development of non-essential third party requests.

- The Port Authority has significant, additional, potential cost risks (*i.e.,* above the $800 million identified in the Navigant report) relating to contingent financing commitments associated with other WTC projects.
- The Port Authority must implement enhanced transparency and accountability protocols to ensure the WTC redevelopment is completed without further cost overruns. Roles, responsibilities, and oversight need to be re-evaluated as the WTC program evolves from construction execution to that of an operating asset of the agency.
- The post traumatic effect from September 11, including the loss of 84 employees, cannot be underestimated. Nonetheless, in the face of this tragedy long-tenured, dedicated, career service professionals provided interim stability. However, in the course of the next decade the Port Authority has been consumed with the additional responsibility for the rebuilding of the WTC. The opening of the Memorial represents an opportunity to restore the Port Authority's focus on its primary mission.

PRELIMINARY CAPITAL PLANNING ASSESSMENT

✧ ***The Port Authority needs to align its capital strategy with its mission and objectives***

- Exposure to debt has more than doubled over the past ten years, from approximately $9.1 billion in 2001 to approximately $19.5 billion at the end of 2011, and future cash flow from operations alone is not sufficient to fund its ongoing capital projects.
- The Port Authority has expanded beyond its stated mission as a transportation infrastructure organization and, by fate or design, has also become a major real estate developer and asset owner with investments that dwarf its past holdings. The Port Authority must structure its organization, use its internal resources, and, as appropriate, use its private sector prowess.
- The capital planning and execution function lacks a clear leader, does not have consistent reporting mechanisms, and fails to effectively address the challenges facing the Port Authority. There is a lack of proper accountability for development, construction and asset management to the Executive Director. A full review of organizational design of capital planning and implementation is warranted.

II. NATURE OF ENGAGEMENT & SCOPE

In August 2011, in response to a Port Authority requested, and subsequently approved, toll and fare increase for its bridges and tunnels, and the PATH system, the Governors of New York and New Jersey requested a comprehensive review of the Port Authority. Consequently, in September 2011, the Port Authority established a Special Committee of the Board of Commissioners (the "Special Committee") to retain independent consultants and advisors to conduct a full review of the Port Authority's past and current governance, and management practices (the "Review"). Pursuant to an agreement dated as of November 23, 2011, the Special Committee retained Navigant to assist the Port Authority in readying the requirements of the Review. The broad scope of the Review is to include but is not limited to the following:

- A comprehensive analysis of the Port Authority's ten-year capital plan (the "2011 Capital Plan"), in an effort to reduce the size and cost of non-revenue producing projects, reprioritizing existing projects and establishing new priorities, and the most effective way to finance the same;
- A thorough review of the Port Authority's capital projects and spending over the past ten years to determine the causes and full extent of, as well as potential remedies to address, cost escalations of the Port Authority's projects, with a focus on the WTC site;
- A top-to-bottom review of the Port Authority's organizational structure and effectiveness, staffing levels, compensation, benefits, and financial management, including accounting, audit, financing, consulting and other contractual practices and agreements, all done to further lower costs and increase efficiencies within the Port Authority; and
- Establishment of a Project Management Office ("PMO") to coordinate activities associated with the Review.

In addition to Navigant, the Port Authority also engaged Rothschild, Inc. ("Rothschild") to assist in meeting the requirements of the Review. Rothschild's focus is to advise the Port Authority on evaluating effective financing strategies of the existing and new capital priorities.

Navigant's engagement is divided into two phases ("Phase I" and "Phase II").

Pursuant to the engagement terms with the Port Authority, the scope of Phase I consists of the following:

- Establishment and staffing of a PMO which would coordinate activities with regards to Navigant's scope of work in Phase I (as well as oversight, coordination, assimilation and integration of related work streams performed by third parties);
- Preliminary organizational design and operational assessment focused on a review of compensation and benefit cost structures;
- WTC cost review in consultation with the Special Committee; and
- Initiation of capital projects assessment in consultation with the Special Committee.

Pursuant to the engagement terms with the Port Authority, the scope of Phase II of Navigant's engagement will include the following:

- PMO Activities – Direct oversight, coordination, assimilation and integration of Phase II activities from both Navigant and third party consultants or advisors as appropriate;
- Organizational and operational assessment of the Port Authority for focus areas identified in consultation with the Special Committee; and
- Completion of capital projects review in consultation with the Special Committee.

The purpose of this report is to deliver Navigant's interim findings and recommendations with regards to the three identified work streams in Phase I, subject to the qualifications of **Appendix – C**. Further details on the anticipated Phase II scope of work can be found in **Section X**.

III. GENERAL APPROACH

Navigant conducted an initial meeting with the Special Committee and select members of Port Authority management in early December 2011. At that time, an information request was submitted to the Port Authority addressing the specific areas identified for focus in Phase I as well as providing additional information that will be useful in Phase II. To date, Navigant has reviewed numerous documents from the Port Authority. In addition, Navigant has conducted many meetings and interviews with all levels of Port Authority employees as well as certain members of the Board of Commissioners and the Special Committee.

COMPENSATION & BENEFITS REVIEW

Navigant conducted initial meetings with the Port Authority's Chief Administrative Officer and Human Resource departments. Subsequent to the meetings, information requests were sent in order to facilitate the review of key documents and other pertinent information. Navigant reviewed multiple documents, conducted numerous in person and telephonic interviews as well as performed detailed analyses of base pay, overtime, "add-on" compensation, healthcare costs, and other benefit analyses. The findings of these analyses were used in a benchmarking review using selected public and private peer groups.

INITIAL COST REVIEW OF THE WTC PROGRAM

Navigant reconstructed the historical costs of the WTC program using the chronology of periodic Port Authority presentations by prior Executive Directors and management to the Board of Commissioners, project cost reports current as of October 2011, related documents, and the findings of interviews to provide the Special Committee with the analysis of past spending at the WTC site. Furthermore, Navigant preliminarily and independently analyzed the Port Authority's estimated cost to complete for its reasonableness.

PRELIMINARY CAPITAL PLANNING ASSESSMENT

Navigant conducted meetings with key Port Authority staff involved in capital planning and began preliminary analysis of its organization and processes. In addition, Navigant compiled various reports of the Port Authority into a single database that allowed for analysis of the composition of the 2011 Capital Plan. Navigant also reviewed the projects in the 2011 Capital Plan by classification, to better understand the amount, maturity and priority of the portfolio of capital projects.

IV. BACKGROUND

The Port Authority has endured significant adversity over the last 20 years. From the WTC bombing in February 1993 to the September 11 terrorist attacks, the Port Authority has always responded swiftly. After the February 1993 bombing, the Port Authority restored the WTC to full function within a remarkable two month time span. However, the devastation and destruction of the September 11 attacks were unprecedented. The loss of life included the Port

Authority's Executive Director and 83 of its employees, causing a significant emotional toll on the psyche of the organization. The events of September 11 became a patriotic rallying point to demonstrate to the world that New York, the nation's largest city and heart of its financial sector, could respond and rebuild in the face of this adversity, in defiance of the intended intimidation and threat by the terrorist culprits.

The Port Authority accepted the monumental and crucial responsibility of what has now become the symbol of the country's resolve – to rebuild the WTC. The events of September 11 placed an unexpected and tremendous burden on the Port Authority, consuming considerable resources and attention in support of the redevelopment efforts. The distortive impact of this event has created a ripple effect that has been felt throughout the organization a decade later, including tumultuous changes in its leadership, intensive focus, and dedication to one of the largest infrastructure and development projects in the country, as well as extraordinary growth of its security apparatus.

Consequently, as the scope and design of the WTC have evolved, particularly in response to the national symbolic objectives and security concerns that have permeated the development, the required costs of rebuilding have correspondingly expanded. The objective of completing the Memorial by the ten-year anniversary of September 11 became a public mandate to reflect the profound national symbolism of the WTC's timely resurrection. To meet this timeline, the Port Authority had to incur significant costs related to the acceleration of the WTC construction program. The level of dedication by the Port Authority, from daily involvement of certain members of its Board of Commissioners, to on site construction personnel, has been unwavering. By the time of its completion, in addition to third party funding, the Port Authority will likely spend over $7.7 billion dollars of its own capital in this historic endeavor. The recent opening of the Memorial on September 11, 2011 marked the end of an extraordinarily difficult decade for the agency and the beginning of a new chapter in its history.

Given the strong leadership evidenced by the current Governors of New York and New Jersey, and their appropriate and intense focus on responsible government, increased transparency, organizational efficiency and fiscal responsibility, the Port Authority now has a window of opportunity to drive the transformational changes fundamental to addressing the challenges of the organization. With the relatively recent appointments of a new Chairman, Vice-Chairman, several Commissioners, Executive Director and Deputy Executive Director, the Port Authority has a reinvigorated focus.

The organization's new leadership appears intent on driving the change necessary to best position the Port Authority to meet the challenges of the 21st Century and to progress from its "business as usual" approach. A major theme in this endeavor is increased transparency and accountability throughout the organization. This is evident by the recent initiatives already undertaken by the Board of Commissioners, under the leadership of the new Chairman, including but not limited to:

- Appointment of new, independent auditors;
- Focus on improvements in the capital planning and project management processes;

- Strengthening of the Port Authority's internal Enterprise Risk Management System, permitting early intervention by the Board of Commissioners through proactive issue identification;
- Review of policies and procedures in order to address growing overtime expenditures;
- Pursuit of benefit program reform including health care contributions, vacation exchange and pension design;
- Demonstration of its commitment to full transparency through the initiation of complete disclosure on compensation of all employees;
- Creation of an insurance working group to better analyze and improve upon the Port Authority's current risk management policies;
- Fully embracing the top-to-bottom organizational review being facilitated by Navigant and Rothschild in pursuit of actionable interventions to drive operating and capital deployment efficiencies and developing ways to enhance the financing of its 2011 Capital Plan; and
- Approving preliminary operating and capital budgets for 2012 expressly subject to any measures adopted by the Board of Commissioners as a result of the Special Committee's review.

This interim report is being issued in response to limited areas of initial inquiry that the Special Committee of the Board of Commissioners has mandated.

V. PORT AUTHORITY OVERVIEW

The Port Authority is a complex organization, now employing over 6,900 people and generating revenues of almost $4 billion. The Port Authority's current mission is defined as follows:

"To identify and meet the critical transportation infrastructure needs of the bi-state region's businesses, residents, and visitors; providing the highest quality, most efficient transportation, and port commerce facilities and services that move people and goods within the region, providing access to the rest of the nation and to the world, while strengthening the economic competitiveness of the New York-New Jersey Metropolitan Region".

The Port Authority has a vast array of asset holdings segmented into aviation, port commerce, PATH (*i.e.,* rail transit), tunnels / bridges / terminals, the WTC, and various real estate development assets as identified in **Table 1**.

Table 1 – Port Authority Core Functions

CORE FUNCTIONS:	KEY FACILITIES:
AVIATION	
• Manages & operates NY / NJ airports • Manages related security apparatus • Manages operation & maintenance contracts for JFK & EWR • Manages parking contracts • Manages utility and energy contracts • Develops & maintains passenger terminals • Maintains runway infrastructure	• JFK Airport • LaGuardia Airport • Newark Airport • Stewart Airport • Teterboro Airport
PORT COMMERCE	
• Handles leasing & lease administration • Manages related security apparatus • Planning & development alternatives for land use • Oversees capital programs including waterway development • Manages NY Greenville Cross Harbor Rail Freight Program • Manages development of new MOTBY	• Howland Hook Marine Terminal / Port Ivory • Brooklyn Port / Red Hook • Port Newark • Port Elizabeth • Port Jersey • Greenville Yard
PATH	
• Manages 24/7 operation of trains, passenger services and rail yards • Manages related security apparatus • Manages all of PATH assets & infrastructure including railcar fleet, power, signals & commuter services • Delivery of capital program • Safety & Security program management • Manages all revenue programs (*e.g.* ,fare collection, & vendor contracts)	**NY Stations** • 9th Street • 14th Street • 23rd Street • 33rd Street • Christopher Street • WTC **NJ Stations** • Exchange Place • Grove Street • Harrison • Hoboken • Journal Square
TUNNELS, BRIDGES AND TERMINALS	
• Operates all Port Authority tunnels, bridges & terminals • Manages related security apparatus • Traffic management of all vehicular crossings, bus terminals and pedestrian flows • Emergency response at all tunnels, bridges & terminal assets • Manages and staffs cash toll collection booths and all electronic payment systems • Maintenance of all TB&T infrastructure • Delivery of capital program	• Holland Tunnel • Lincoln Tunnel • George Washington Bridge • Bayonne Bridge • Goethals Bridge • Outerbridge Crossing • Port Authority Bus Terminal • George Washington Bus Station
WORLD TRADE CENTER	
• Development, design, construction & coordination of WTC site in accordance with myriad of development agreements & stakeholders (MTA, NYSDOT, Silverstein Entities & Affiliates, Memorial, etc.) • Manages security apparatus • Manages retail and tenant leasing of 1 WTC • Design & construction of WTC transportation HUB • 1 WTC Construction • Vehicular Security Center • Common Site infrastructure • Construction of September 11 memorial • Coordinate the design and construction of SPI towers 2,3 & 4 • Performing Arts Center ("PAC")	• 1 World Trade Center • HUB • 9/11 Memorial & Museum • Central Chiller Plant
REAL ESTATE DEVELOPMENT	
• Leases & manages over 1.1 million sq ft in NY & NJ • Significant real estate owner and developer • Works with state development agencies in bringing underutilized development industrial sites to shovel ready status • Once online, the Port Authority will manage leasable space of approximately 3 million square feet as well as 0.5 million square feet of retail space at the WTC	• Newark Legal & Communication Center • Teleport • Essex County Resource Recovery Facility • Bathgate Industrial Park • Industrial Park at Elizabeth • Port Authority Bus Terminal Air Rights • Moynihan Station

In addition to its responsibilities related to two tunnels, four bridges, five airports, six seaports, and the PATH system the Port Authority currently:

- Manages over 1 million square feet of leased space in 11 facilities;
- Manages a 100-acre high-tech business park in Staten Island;
- Owns multiple industrial parks;
- Owns and serves as developer of two large waterfront projects; and
- Owns Essex County Resource Recovery (NJ's largest waste-to-energy facility).

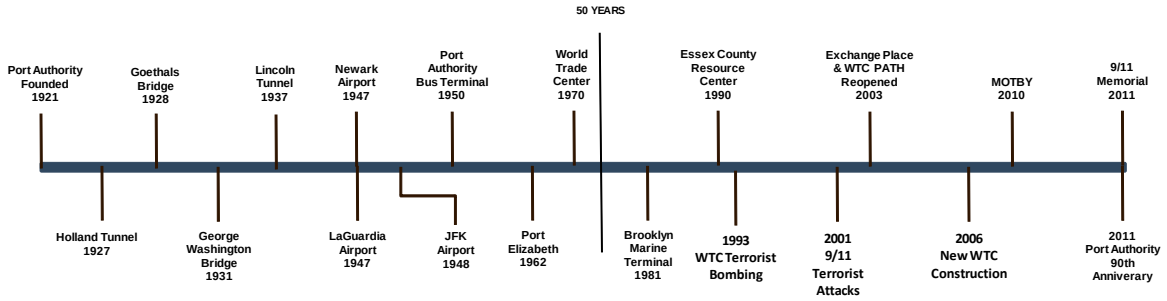
Once online, the Port Authority will manage leasable space of approximately 3 million square feet as well as 0.5 million square feet of retail space at the WTC.

Observations & Findings

✧ ***The Port Authority infrastructure continues to age and deteriorate***

The Trans-Hudson bridges and tunnels were built over 70 years ago. While many facilities at the airports and ports were constructed more recently, much of that infrastructure also dates back half a century or more (**Figure 1**). Going forward, the Port Authority facilities will require significant capital investment to maintain, secure, and enhance its assets.

Figure 1 – Port Authority Key Historical Milestones



Over the next ten years, the Port Authority has budgeted approximately $25.1 billion for capital spending. Of this amount, approximately $15 billion has been earmarked for state of good repair, security, mandatory capital expenditures and system enhancement projects.

✧ ***Historically, revenue and operating cash flow has been primarily generated by Port Authority tunnels, bridges, and airports***

When investments in facilities are taken into consideration, PATH, Ferry Services, and Port Commerce have required significant allocations of funds (**Table 2**).

Table 2 - Cumulative Net Income by Line Department (Inception – 2010)

($mm)	Invested in Facilities	Gross Operating Revenues	Operating Expenses	Allocated Expenses	D&A	Net Interest Expense	PFCs, Grants & Other[2]	Net Income / (Loss)	Operating Cash Flow ("OCF")[3]	OCF less Invested in Facilities
Inception - 2010[1]:										
Tunnels, Bridges & Terminals	$ 4,544.5	$ 19,126.8	$ 8,672.5	$ 1,650.6	$ 1,917.1	$ 1,337.6	$ (77.4)	**$ 5,626.6**	$ 8,803.8	$ 4,259.3
PATH	5,493.4	2,250.9	5,154.9	902.0	1,611.0	812.1	(1,179.0)	**(5,050.1)**	(3,806.0)	(9,299.4)
Ferry Service	134.9	1.8	44.6	2.4	10.4	13.0	(3.7)	**(64.9)**	(45.2)	(180.1)
Access to Regions Core ("ARC")	131.7	-	79.4	-	2.5	2.8	-	**(84.7)**	(79.4)	(211.1)
Air Terminals	13,400.7	37,243.6	22,077.3	1,907.7	5,815.5	2,231.4	(3,187.8)	**8,399.6**	13,258.7	(142.0)
Port Commerce	3,617.1	4,176.0	2,574.2	217.5	1,438.3	780.4	(35.7)	**(798.7)**	1,384.3	(2,232.7)
Economic / Waterfront Development	480.2	1,912.1	1,689.7	25.1	269.0	25.4	(2.4)	**(94.7)**	197.3	(282.9)
World Trade Center	3,601.5	7,193.0	4,010.6	299.7	749.2	711.9	(1,122.9)	**2,544.6**	2,882.7	(718.8)
PA Insurance Captive Entity	-	0.6	8.6	-	-	(11.1)	-	**3.1**	(8.0)	(8.0)
Regional Development Programs	1,322.9	-	129.3	-	1,068.4	658.4	-	**(1,856.0)**	(129.3)	(1,452.1)
Other	1,477.1	2,062.3	497.8	-	-	1.3	-	**1,563.1**	1,564.5	87.4
Total	**$ 34,204.0**	**$ 73,967.2**	**$ 44,938.7**	**$ 5,004.9**	**$ 12,881.4**	**$ 6,563.1**	**$ (5,608.9)**	**$ 10,187.9**	**$ 24,023.5**	**$ (10,180.6)**

Notes:

1) *Financials are provided from the date a particular Port Authority asset started to generate financial result.*
2) *Passenger Facility Charges ("PFCs") were established in 1992 and account for the vast majority of PFCs, Grants & Other.*
3) *Operating Cash Flow ("OCF") reflects Net Income / (Loss) plus D&A, Net Interest Expense, and excludes PFCs, Grants & Other, which are generally not considered operating in nature.*

- ✧ ***During the last ten years, Port Authority cash flows were insufficient to fund the capital expenditure program***

In the last ten years, the total outstanding debt of the Port Authority has increased from approximately $9.1 billion in 2001 to approximately $19.5 billion as of December 2011, mainly in support of the capital program (**Table 3** and **Figure 2**).

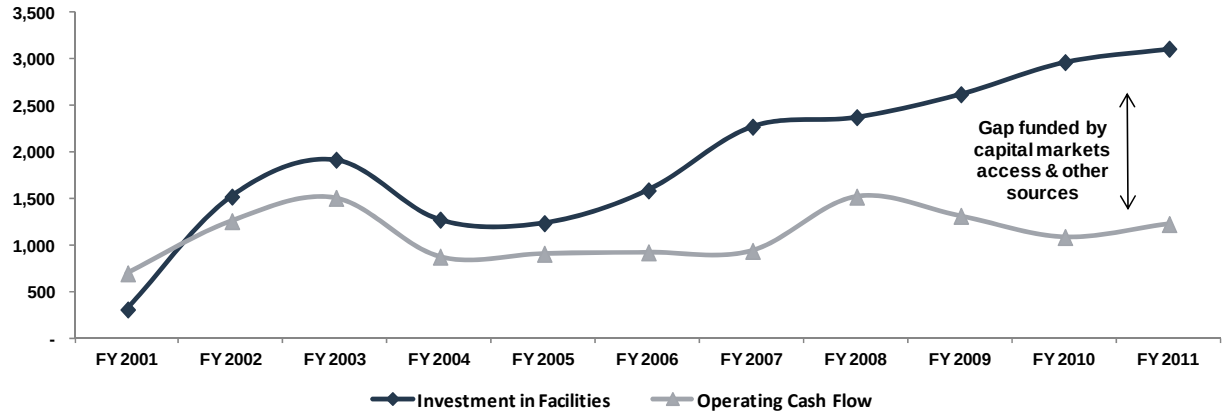
Table 3 – Summary Financial Trends by Year (2001 – 2011)

($mm)	Invested in Facilities[1]	Gross Operating Revenues	Operating Expenses	Allocated Expenses	D&A	Net Interest Expense	PFCs, Grants & Other[2]	Net Income / (Loss)	Operating Cash Flow ("OCF")[3]	OCF less Invested in Facilities	Total YE Outstanding Debt
Fiscal Year:											
FY 2001	$ 311.4	$ 2,742.9	$ 1,894.4	$ 149.8	$ 442.8	$ 193.7	$ (153.6)	**$ 215.8**	$ 698.7	$ 387.3	$ 9,059
FY 2002	1,522.7	3,258.0	1,839.1	159.9	435.2	238.9	(155.1)	**740.0**	1,259.1	(263.7)	9,335
FY 2003	1,918.5	3,446.3	1,788.2	149.1	521.1	277.8	(172.9)	**883.0**	1,509.0	(409.5)	9,756
FY 2004	1,275.2	2,864.8	1,846.4	139.9	614.2	332.8	(220.1)	**151.5**	878.5	(396.8)	10,961
FY 2005	1,237.6	3,000.7	1,952.3	139.0	686.7	316.8	(256.0)	**161.9**	909.4	(328.1)	10,984
FY 2006	1,589.3	3,038.5	1,974.7	140.0	724.3	319.9	(639.0)	**518.6**	923.8	(665.5)	12,330
FY 2007	2,272.9	3,191.6	2,071.5	180.4	691.9	246.9	(1,301.9)	**1,302.9**	939.7	(1,333.3)	12,751
FY 2008	2,375.2	3,987.4	2,282.4	183.2	715.5	496.6	(584.3)	**894.1**	1,521.8	(853.4)	13,037
FY 2009	2,621.5	3,771.9	2,253.3	202.1	786.9	329.3	(646.1)	**846.4**	1,316.6	(1,305.0)	14,450
FY 2010	2,966.0	3,689.7	2,411.1	190.0	865.5	499.3	(623.2)	**346.8**	1,088.5	(1,877.5)	16,309
FY 2011E	3,110.0	3,815.3	2,377.1	210.6	944.1	208.7	(654.1)	**728.9**	1,227.6	(1,882.4)	19,502
Total	**$ 21,200.3**	**$ 36,807.0**	**$ 22,690.6**	**$ 1,843.9**	**$ 7,428.2**	**$ 3,460.7**	**$ (5,406.3)**	**$ 6,790.0**	**$ 12,272.5**	**$ (8,927.8)**	**$ 19,502.1**

Notes:

1) *A significant portion of investments in facilities is attributable to the WTC.*
2) *Passenger Facility Charges ("PFCs") were established in 1992 and account for the vast majority of PFCs, Grants & Other.*
3) *Operating Cash Flow ("OCF") reflects Net Income / (Loss) plus D&A, Net Interest Expense and excludes PFCs, Grants & Other, which are generally not considered operating in nature.*

Figure 2 – Operating Cash Flow Available for Investment in Facilities (2001 – 2010)



- ✧ ***While future operating cash flow is expected to be bolstered by revenue increases primarily from scheduled fares, fees and toll increases from tunnels, bridges and PATH, continued access to capital markets will likely be required***

Over the next ten years, the Port Authority is projecting Net Operating Revenues (*i.e.*, defined by the Port Authority as gross operating revenues minus operating expenses), to grow from approximately $1.2 billion in 2011 to approximately $3.0 billion in 2020, a compounded annual growth rate of approximately 9.3%. Furthermore, the Port Authority is projecting an operating

margin improvement of approximately 50% over the same period, driven mainly from scheduled fare and toll increases in 2014 and some modest growth in facility traffic. However, given the capital program currently presented by the Port Authority, continued borrowing in the capital markets is expected to be required, with outstanding indebtedness forecasted to rise from $19.5 billion in 2011 to $25.2 billion by 2020.

Preliminary Recommendations & Next Steps

- Detailed contribution analyses for revenue and non-revenue producing projects need to be conducted on all Port Authority business segments to determine potential revenue enhancements and cost savings initiatives to improve cash flow.
- The long range forecast model assumptions should be reviewed and analyzed to better understand the validity of assumptions supporting expected margin improvement over the next ten years.
- Sensitivity analyses should be conducted around "best case", "worst case", and "likely case" scenarios for the entire portfolio of projects to understand related financial impacts of the 2011 Capital Plan, once finalized by the Special Committee and Board of Commissioners.
- The Port Authority should develop a comprehensive analysis of state of good repair ("SGR") projects to understand capital requirements for transportation infrastructure integrity.
- Return on asset and/or return on invested capital concepts should be considered in evaluating feasibility of future capital projects, as well as the allocation of capital across the various operating segments.

VI. PRELIMINARY GENERAL ORGANIZATIONAL OBSERVATIONS

While the completion of a comprehensive review of organizational design and effectiveness will be addressed in Phase II, the following preliminary observations are warranted:

- ***The Port Authority has expanded its areas of involvement in support of economic development over the last several decades, which continues to evolve***

While the Port Authority's tunnels, bridges, and airports continue to contribute the vast majority of cash flow within the organization, over recent decades the Port Authority has become a significant real estate developer and asset manager with its own expansive security force, a posture that warrants further evaluation as the demands of the WTC development approaches conclusion. For example, the Port Authority is also the owner of a resource recovery facility, which converts waste to energy. Furthermore, in large part as a reaction to the WTC bombing in February 1993, and the events of September 11, the Port Authority has assembled a sizeable security apparatus including a police force numbering over 1,700 employees.

As the Port Authority moves into the 21st century, it is imperative to assure alignment with industry trends in technology, commerce, and other areas of growth in order to ensure its

competitive advantages to stimulate further economic development and prosperity in the region.

- ***The Executive Director position, the defacto CEO, has turned over seven times in the last ten years***

With such turnover at the Executive Director level, it is difficult for any significant strategic initiatives, goals and objectives to be realized (**Table 4**). Organizations typically become inwardly focused and tend to run adrift in the absence of leadership continuity.

Table 4 – Executive Director Tenure

#	Executive Directors	Tenure
1	Patrick J. Foye	2011 - Current
2	Christopher O. Ward	2008 - 2011
3	Anthony Shorris	2005 - 2008
4	Kenneth J. Ringler, Jr.	2004 - 2005
5	Joseph J. Seymour	2001 - 2004
6	Neil D. Levin	2001
7	Robert E. Boyle	1997 - 2001

Additionally, review of the Port Authority organizational structures over the last ten years show a number of significant changes. Capital planning and project delivery, for example, had five different "owners" during this period. Capital planning and project delivery, a critical area of focus within the Port Authority, has suffered from a lack of consistency in management and leadership.

- ***The non-appointed senior career services professionals of the Port Authority have an unusually long tenure, averaging 24 years of service***

The senior management organization is very respectful, cordial, and appears to have a high level of dedication and commitment to the Port Authority's mission. In addition, senior management possesses a critical knowledge base and skills that needs to be transferred through integrated training programs to junior staff. In the absence of appointed leadership continuity driving collaboration and accountability, it is only natural for such a long tenured work force to develop a self-protective culture.

- ***The Port Authority is a siloed organization***

With chronic leadership changes, bureaucratic organizations will often inadvertently reinforce the barriers to strategic business unit collaboration, as well as the ability to obtain operating efficiencies derived through shared services. Non-appointed, career service professionals often will adopt strategies that protect control, and perpetuation, of their functional areas of responsibility. The Port Authority resident culture reflects many of the characteristics associated with this phenomenon. Examples include the capital planning process, security apparatus, and the existing WTC construction organization.

- ***The relatively recent appointments of a new Chairman, Vice Chairman, several Commissioners, Executive Director and Deputy Executive Director, provide the impetus for renewed focus and governance in driving future Port Authority strategy***

In the aftermath of September 11, the Port Authority's mission was in large part redirected to the rebuilding efforts around the WTC site. The organizational toll on the Port Authority during the last decade cannot be underestimated. Under the previous Executive Director, trust and confidence between the Board of Commissioners and its executive management reportedly deteriorated; as a result, the Board of Commissioners adopted roles and responsibilities in daily operations and management atypical for a governing board. The loss in confidence was largely ascribable to sentiments by the Board of Commissioners that they were not being timely presented with meaningful and reliable information to make informed decisions. While the response of the Board of Commissioners may be understandable given the circumstances, its new leadership has recognized the importance of restoring an elevated focus on the Port Authority's broader vision, mission and the revitalization of its strategies, supporting policies and oversight as it advances to meet its challenges.

The Port Authority would likely benefit from a meaningful organizational redesign to focus on its strategic business units and cost saving shared services functions. To be successful, entrusted appointed senior leadership needs effective command and control to manage change and drive accountability throughout the organization. Career service management must proactively communicate reliable and relevant information in proper context so that appointed leadership is best positioned for effective decision making. Management and represented/non-represented employees must collaborate on the manner and means that will allow the Port Authority to operate with the highest levels of productivity and efficiency. Migration from a culture based on tenure to one based on meritocracy will be essential to its continued success.

- ***The Port Authority is a transportation infrastructure asset manager and must deploy its capital with proper attention to preservation of infrastructure integrity***

The capital constraints of the organization may necessitate a top-down budgeting process. However, a comprehensive analysis of need with a standardized method of prioritizing capital spend is equally required. The Port Authority is an asset manager that owns and manages billions of dollars of infrastructure and must devote a significant portion of its capital to support the state of good repair of this portfolio as well as provide for new investments in the system with discipline. A systematic evaluation of needs must be conducted to balance the capital capacity constraints of the Port Authority with the imperatives of the operating businesses, while appropriately providing for contingencies in an aging asset base. In addition, while the Port Authority has made progress in identifying a hierarchy to better manage the stewardship of capital, effective command and control over planning processes and disciplined project delivery must be established.

- ***The Port Authority needs to further develop tools to drive accountability***

The Port Authority should consider aligning its key operating departments as strategic business units ("SBUs"). As SBU's, quantifiable metrics should be developed, measured and consistently

monitored to drive accountability in achieving the Port Authority's mission and specific operating objectives. The Executive Director and Board of Commissioners are developing a "dashboard" that provides quick feedback and status of financial and operational performance, key initiatives, and capital program delivery.

- ✧ ***The Port Authority's compensation structures must be aligned with the mission statement and related goals and objectives to ensure appropriate targets are achieved***

Compensation structures need to be aligned throughout the Port Authority organization including management and all levels of represented and non-represented employees. Consideration should be given to adopting "at risk" elements of management compensation that are contingent upon the achievement of operating objectives.

VII. PRELIMINARY COMPENSATION AND BENEFITS ASSESSMENT

SCOPE

Navigant has been asked to perform an assessment of the organizational design and operations of the Port Authority, with an initial focus on labor costs, including both compensation and benefits. Findings from Navigant's review are meant to provide a framework for recommendations that can ultimately be implemented as a series of parallel initiatives beginning in 2012. The scope of the labor costs assessment included benchmarking compensation and benefits by major job categories and reviewing benefits packages against prevailing practice in the public and private sector.

METHODOLOGY

The benchmarking exercise included review of compensation and benefits for the State of New York and the State of New Jersey and significant public authorities in the New York City metropolitan region. In addition, with respect to compensation benchmarking of the Port Authority's four largest line departments, five to seven public sector agencies and five to ten private sector companies were initially identified and reviewed for as potential peer comparables. Key business attributes of each potential peer were carefully scrutinized (*e.g.,* size of operation, number and age of facilities, operator vs. infrastructure provider, etc.). Ultimately, a smaller subset of peer groups was selected for each line department of the Port Authority based on review of these attributes (please refer to **Appendix – A** for details).

To complete the initial review of compensation and benefit costs of the Port Authority, Navigant reviewed numerous documents (including union labor contracts), conducted multiple in-person and telephonic interviews and discussions, as well as performed detailed analyses of base pay, overtime, "add-on" compensation, healthcare costs, and other benefits analyses.

The following provides Navigant's preliminary observations, findings, and recommendations with respect to (i) employee headcount, (ii) compensation, (iii) benefits, and (iv) represented employee contracts.

PRELIMINARY GENERAL OBSERVATIONS

- The Port Authority's actual headcount as of November 2011 totaling 6,913 was relatively flat when compared to the 2001 headcount of 6,954. While the line department and staff services headcount levels have actually decreased, this has been offset by growth of over 27% in the security function in an apparent protracted reaction to the events of September 11.

- The overall organizational structure of the Port Authority is heavily concentrated in senior and middle management. This structural characteristic in large part is driven by the long-tenured nature of the employee workforce that has been promoted based on seniority and not necessarily merit. In part, the broad middle management of the organization is attributable to the large number of highly skilled engineers required to support its asset management and development responsibilities. As a byproduct of this historical trend, comparison of the average compensation of the Port Authority to its peer group reveals that the Port Authority, when evaluating average employee compensation costs, is at the top of average pay ranges.

- However, further analysis reveals that the average compensation of the most senior, as well as the top 25 positions within line departments is at the median or below the peer group. Thus, the fact that the average employee compensation resides at or above the Port Authority's peer group is ascribable to the very broad middle and senior management group of the organization, and not the compensation of the most senior personnel.

- From 2006 to 2010, total gross compensation at the Port Authority grew from $629.3 million to approximately $749.3, respectively. Of this amount, base salaries grew from $507.6 million to $581.1 million, a compounded annual growth rate of only 2.7%. However, other amounts of compensation, (*i.e.,* "add-on" compensation) such as pay associated with the vacation exchange program and certain longevity programs grew by compounded annual growth rates of 10.6% and 5.5%, respectively. Overtime, the largest percentage of "add-on" compensation represents 23% of the total base pay for represented employees. Moreover, "add-on" compensation and benefits for all active employees when combined and taken as a percentage of base salary is approximately 70%. These "add-on" compensation costs are relatively rapid growing and tend to obfuscate actual total costs per employee being absorbed by the Port Authority.

- Benefits have increased approximately 35%, from $340.7 million in 2006 to over $458.8 million in 2010, driven by growth in healthcare and the population of retirees that drives up pension costs and other post employment benefits ("OPEB"). When combined, compensation and benefits per active employee grew to an estimated **$143,060** by 2010.

- In an effort to reduce these high costs, the Board of Commissioners is actively pursuing policy changes related to healthcare contributions, vacation policies, as well as "add-on"

compensation and incentive programs. Current initiatives being evaluated include, but are not limited, to:

- Increase in health care benefit contributions, which if implemented would result in expected savings over the next four years of approximately $103.8 million.
- Elimination of longevity and unused vacation exchange days payout for non-represented employees; based on preliminary review of payroll files, annual costs for these programs were approximately $9.1 million in 2010.

- It is important to note that the represented labor force, at approximately 68% of total, is the largest part of the Port Authority employee base. The Board of Commissioners recognizes it will be critical to work collaboratively with both represented and non-represented employees to improve efficiency and productivity. In furtherance of that objective, expired union contracts are being carefully evaluated not only for unit labor costs and benefits, but also with particular focus on work rule modifications that would be constructive in advancing the efficiency and effectiveness of the Port Authority's operations, prior to collective bargaining negotiations.

Phase II of Navigant's engagement, which is expected to be completed by late June 2012, will include an organizational design review and specific recommendations to further enhance the actions of the Board of Commissioners. The following interim report is in response to the Special Committee's requested areas of initial focus and provides Navigant's preliminary observations, findings, and recommendations with respect to (i) employee headcount trends, (ii) compensation benchmarking, (iii) benefits benchmarking, and (iv) represented employee's contract considerations.

EMPLOYEE HEADCOUNT

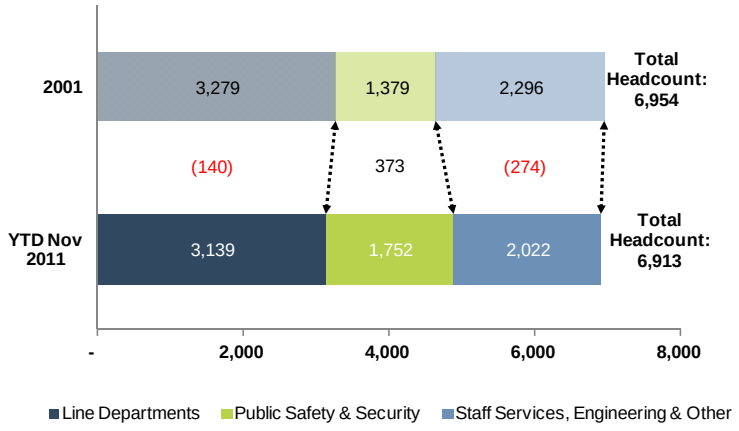
The total employee headcount has remained relatively flat over the last decade (from 6,954 in 2001 to 6,913 as of November 2011).

Observations & Findings

✧ ***Headcount mix has shifted from line departments and staff services to public safety***

From 2001 to 2010, line department headcount declined by 4.3% (from 3,279 to 3,139) and staff services, engineering & other headcount declined by 11.9% (from 2,296 to 2,022) (**Figure 3**). However, public safety headcount increased by 27.1% (from 1,379 to 1,752). The growth in public safety is in response to September 11 and heightened security efforts throughout the Port Authority organization.

Figure 3 – Staffing Allocation Trend (2001 – YTD Nov 2011)



✧ ***Port Authority manages headcount to "authorized" vs. "actual"***

Managing headcount to an annually budgeted, authorized number (approximately 7,200 in 2006) can result in delayed intervention in a recessionary environment. The Port Authority's actual headcount increased from 6,918 to 7,200, or 4.0%, during the recession of 2008 and 2009 before ultimately declining in 2010. The Port Authority would have benefited from an expedited review and timely adjustment to authorized headcount going into the recession. However, the adjustment to authorized headcount was not made until 2009, and the actual headcount reduction was not implemented until 2010, primarily through retirement incentives (**Table 5**).

Table 5 – "Actual" vs. "Authorized" Staffing Trends (2006 - YTD Nov 2011)

(#'s in 000's, except Headcount)	2006	2007	2008	2009	2010	Nov 2011
Total Year End Actual Headcount	**6,935**	**6,918**	**7,200**	**7,163**	**6,848**	**6,913**
YOY Change (#)	*(31)*	*(17)*	*282*	*(37)*	*(315)*	*65*
Total Authorized Staffing	**7,181**	**7,128**	**7,127**	**6,977**	**6,977**	**6,777**
YOY Change (#)	*(13)*	*(53)*	*(1)*	*(150)*	*-*	*(200)*
Actual Workforce Greater Than / (Less Than) Auth.	**(246)**	**(210)**	**73**	**186**	**(129)**	**136**
% Variance	*(4%)*	*(3%)*	*1%*	*3%*	*(2%)*	*2%*

✧ ***Productivity levels at Aviation, Tunnels, Bridges and Terminals, and Port Commerce appear to have increased since 2001, while PATH appears to have decreased***

The slight headcount reduction and increased traffic at Aviation, TB&T, and Port Commerce suggests a level of productivity increase, and likely reflects a combination of technology and the fixed aspect nature of individual facility labor requirements. PATH was the only line department where actual headcount increased during this period, while traffic essentially remained flat, implying lower productivity.

✧ ***Redundant support services exist in multiple areas of the organization***

A number of areas exist within the Port Authority where certain functions are partially replicated in both line departments as well as administrative departments (*e.g.,* elements of Human Resources, Risk Management, Finance, Technology, Planning & Development, Real Estate and Security).

Preliminary Recommendations & Next Steps

- Focus on real-time, actual, as well as authorized, headcount to more proactively manage size of labor force.
- The significant headcount increase in public safety & security should be further analyzed in the context of a special security report being prepared by The Chertoff Group.
- Identify useful productivity metrics to determine appropriate staffing levels for non-represented and represented employees.
- Review redundant areas of support services to determine the most effective organizational design and identify opportunities for cost savings.

COMPENSATION

Since 2006, the total gross compensation increased from $629.3 million to $749.3 million (before capitalized labor), a compounded annual growth rate increase of 3.6%. As a percentage of revenue, it has essentially remained flat at 21%. In the same period, base salary has increased from $507.6 million to $581.1 million, a compounded annual growth rate increase of 2.7%. However, longevity and unused vacation exchange days payout grew at a compounded annual growth rate of 5.5% and 10.6%, respectively (**Table 6**).

Table 6 – Total Compensation Trend (2006 – 2010)

($ In 000's)	2006	2007	2008	2009	2010	2006-2010 CAGR
Year-end Headcount	6,935	6,918	7,200	7,163	6,848	-0.3%
Revenue	**$3,038,538**	**$3,191,626**	**$3,527,552**	**$3,552,243**	**$3,634,023**	**3.6%**
Employee Compensation						
Base	507,623	524,927	546,431	575,957	581,099	2.7%
Overtime	86,763	96,025	103,234	88,560	85,376	-0.3%
Longevity	11,863	12,290	12,800	14,942	15,514	5.5%
Unused Days Payout	8,851	10,567	9,869	12,218	14,626	10.6%
Other Additional Comp.	20,193	23,069	31,226	35,953	25,270	4.6%
Gross Compensation, before Accruals	**$635,293**	**$666,879**	**$703,560**	**$727,629**	**$721,885**	**2.6%**
As a % of Revenue	***21%***	***21%***	***20%***	***20%***	***20%***	
Accrued Payroll and Other Accrued (1)	(6,038)	17,465	7,776	7,931	27,425	NA
Total Compensation, Gross	**$629,255**	**$684,343**	**$711,336**	**$735,560**	**$749,310**	**3.6%**
As a % of Revenue	*21%*	*21%*	*20%*	*21%*	*21%*	
Capitalized Labor, Compensation (2)	($83,904)	($86,975)	($94,773)	($108,327)	($115,327)	6.6%
Total Compensation, Net (on P&L)	**$545,352**	**$597,369**	**$616,562**	**$627,234**	**$633,983**	**3.1%**
As a % of Revenue	***18%***	***19%***	***17%***	***18%***	***17%***	

Notes:

(1) Amounts earned by employees during a given year that are not expected to paid during the same year.
(2) Labor costs in support of capital project spending.

In 2010, the average compensation of Port Authority employees, excluding costs of benefits, was $105,416 (base salary of $84,857 plus "add-on" compensation of $20,559). "Add-on" compensation is comprised of overtime, longevity payments, unused vacation exchange days payout, and other compensation together comprising approximately 24% of base salary (**Table 7**).

Table 7 – Total Compensation & Benefits Trend per Active Employee (2006 – 2010)

(Whole $, unless otherwise noted)	2006	2007	2008	2009	2010	2006-2010 CAGR
Year-end Headcount	6,935	6,918	7,200	7,163	6,848	-0.3%
Revenue *($ in 000's)*	**3,038,538**	**3,191,626**	**3,527,552**	**3,552,243**	**3,634,023**	**3.6%**
Average Employee Compensation						
Base	$73,197	$75,878	$75,893	$80,407	$84,857	3.0%
Overtime	12,511	13,880	14,338	12,364	12,467	-0.1%
Longevity	1,711	1,776	1,778	2,086	2,265	5.8%
Unused Days Payout	1,276	1,527	1,371	1,706	2,136	10.8%
Other Additional Comp.	2,912	3,335	4,337	5,019	3,690	4.9%
Total Average Compensation (1)	**$91,607**	**$96,398**	**$97,717**	**$101,582**	**$105,416**	**2.8%**
Total Employee Comp. as a % of Revenue	*21%*	*21%*	*20%*	*20%*	*20%*	
Average Health Benefit per Employee (2)	16,318	$18,042	$18,488	$20,757	$23,380	7.5%
Average Pension, OPEB, & Other Benefits Cost per Employee (3)	11,419	12,333	10,941	11,610	14,264	4.5%
Total Compensation & Benefits per Employee	**$27,737**	**$30,376**	**$29,429**	**$32,367**	**$37,645**	**6.3%**
Total Compensation & Benefits Expense per Employee	**$119,344**	**$126,773**	**$127,145**	**$133,948**	**$143,060**	**3.7%**

Notes:

1) *Calculated before the allocation of capitalized labor and payroll accruals*
2) *Primarily comprised of health insurance, but also includes vision, dental, life, and long-term disability insurance, for active employees only.*
3) *Calculated taking the total Pension, OPEB & Other Benefits cost and applying a pro-rata percentage based on active employees versus both active and retired.*

Other additional compensation is comprised of retroactive payments, one-time payments (*i.e.*, those made annually in a lump sum, such as grievance awards, attendance incentives, uniform allowances and lump sum merit increases), and miscellaneous payments such as short term disability payments.

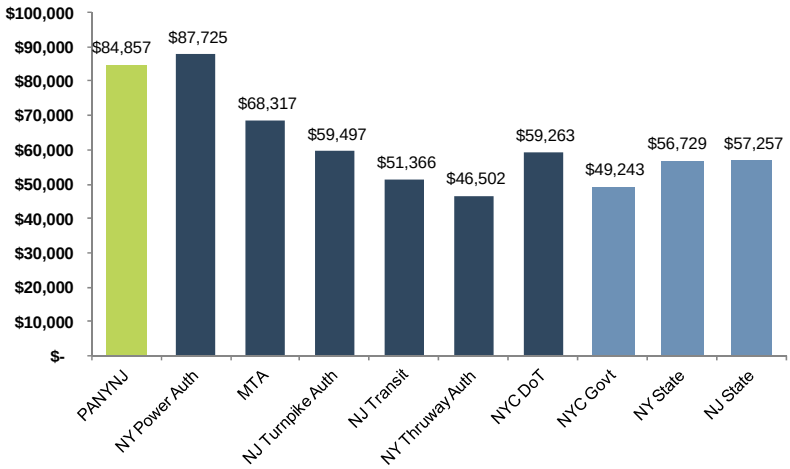
The health related benefit costs per employee (excluding retirees) were $23,380 (for detail see **Table 15**). Pension, OPEB, and other benefits combined to approximately $14,264 (active employee estimate, assuming same costs per active vs. per retired). In the aggregate, the estimated, average, total cost of compensation and benefits for a Port Authority employee was $143,060 (**Table 7**). In total, approximately 70% of base salary is comprised of "add-on" compensation and benefits (active employees only).

Observations & Findings

- ✧ ***The average base salary for Port Authority's employees, as well as the salaries of the top 25 employees, are amongst the highest relative to peer group***

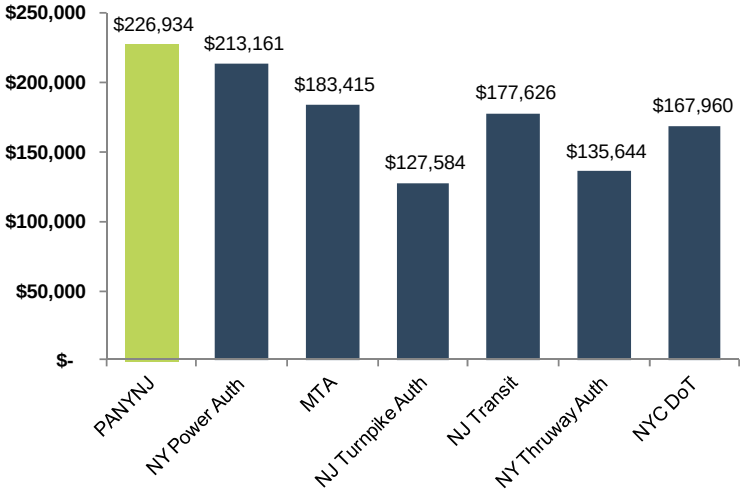
Except for New York Power Authority, the average base salary of $84,857 for the Port Authority is higher than New York and New Jersey state employees and other peer group public authorities in the metropolitan region (**Figure 4**).

Figure 4 - Average Employee Base Salary by Public Agency & Authority (2010)



Furthermore, the average of the top 25 base salaries of $226,934 at the Port Authority is the highest when compared to the average top 25 salaries of all other public authorities in the metropolitan region (**Figure 5**).

Figure 5 - Top 25 Employees Average Base Salary by Public Authority (2010)



While the Port Authority seems to be compensated higher than other public peers, it is important to note the complexity of the Port Authority's operations (*i.e.,* operating in transit, construction, asset management, etc.) in comparison to other organizations, such as New Jersey Transit (*i.e.,* only operating in transit). Likewise, the Port Authority believes, due to the complex nature of the organization, many employees tend to be highly educated and specialized (*i.e.,* engineers, career professionals), therefore commanding higher compensation. In this regard, the New York Power Authority exhibits a similar employee profile (primarily engineering staff), yielding higher compensation, on par with the Port Authority.

- ✧ ***The average of the top 25 base salaries, as well as the salary for the senior position, at the Port Authority's four largest line departments compared to the Port Authority's peer group (both public authorities and private sector companies) reflects that the Port Authority is competitive and tends to fall in the median range***

The average salary for ***Aviation*** line department employees is highest among its peer group, even when compared to the private sector. However, the most senior position, as well as the top 25 salaries, falls between those of their public sector peers, and are significantly below the Port Authority's private sector peers (**Table 8**).

Table 8 - Port Authority Benchmarking Among Peers, Aviation

			All Employees	25 Salaries	Highest Position	
		Aviation	Average	Average	Name	Salary
1	Public	Port Authority of NYNJ, Aviation (NYC)	$81,035	$168,476	Director	$230,022
2	Public	Chicago O'hare (Chicago)	$67,793	$126,709	Comm. of Aviation	$179,109
3	Public	Los Angeles World Airports (LA)	$60,623	$190,086	GM	$326,856
4	Private	BAA Airports Limited (UK)	$59,625	NA	CEO	$1,504,661
5	Private	Aeroports de Paris (France)	$51,020	NA	Chairman & CEO	$480,926
6	Public	Hartsfield-Jackson (Atlanta)	NA	NA	NA	$221,000

The average salary of ***Tunnels, Bridges & Terminals ("TB&T")*** employees ranks second among its peer group. Average compensation for the top 25 highest paid employees, as well as the top position, align in a similar fashion to the average salaries for all employees, and appears to be within range of its peers (**Table 9**).

Table 9 - Port Authority Benchmarking Among Peers, TB&T

			All Employees	Top 25 Salaries	Highest Position	
		Tunnels, Bridges & Terminals	Average	Average	Name	Salary
1	Public	Bay Area Toll Authority (San Francisco)	$82,430	$166,611	Executive Director	$271,794
2	Public	Port Authority of NYNJ, TB&T (NYC)	$71,752	$148,558	Director	$193,414
3	Public	MTA Bridge & Tunnel Authority (NYC)	$67,063	$153,117	President	$205,000
4	Public	New York Thruway Authority (Albany)	$46,502	$135,644	Executive Director	$165,709
5	Private	Cofiroute (France)	$45,906	NA	CEO	$218,415
6	Public	Delaware River Port Authority (Philadelphia)	NA	NA	NA	NA
7	Private	Macquarie Atlas Roads Group (Australia)	NA	NA	NA	NA

Average salaries for employees of the ***Port Commerce*** line department are second highest in comparison to the peer group, and the highest excluding North Queensland Port Corp. (a private sector company). However, average salaries for the top 25 highest paid employees, as well as the most senior individual, fall much lower than any of their peers (**Table 10**).

Table 10 - Port Authority Benchmarking Among Peers, Port Commerce

			All Employees	Top 25 Salaries	Highest Position	
		Port Commerce	Average	Average	Name	Salary
1	Private	North Queensland Port Corp. Ltd. (Australia)	$93,446	NA	CEO	$297,489
2	Public	Port Authority of NYNJ, Port (NYC)	$90,954	$144,510	Director	$216,320
3	Private	Port of Taraunga (New Zealand)	$85,926	$206,100	EE #1	$558,807
4	Public	Port of Long Beach (LA)	$64,176	$160,851	Executive Director	$336,692
5	Public	Port of Los Angeles (LA)	$61,140	$235,706	General Manager	$307,751
6	Public	Port of Corpus Christie (TX)	NA	NA	NA	NA

Average salaries for employees of ***PATH*** are competitive to the peer group and PATH's compensation is very competitive with the MTA, the operator of the New York City subway system. Due to fare structure, size of operation, and geographical reach, private sector companies were excluded from the peer group (**Table 11**).

Table 11 - Port Authority Benchmarking Among Peers, PATH

			All Employees	25 Salaries	Highest Position	
		Rail Transit	Average	Average	Name	Salary
1	Public	MTA (NYC)	$72,514	$173,902	President	$229,000
2	Public	PATH (NYC)	$71,654	$141,424	Director and GM	$215,020
3	Public	Chicago Transit Authority (Chicago)	$61,772	$152,248	President	$198,000
4	Public	Massachussets Bay Trans. Auth. (MA)	NA	$121,887	General Counsel	$170,523
5	Public	SE Penn Transit Authority (Philadelphia)	NA	NA	NA	NA
6	Public	Port Authority Transit Corp (Philadelphia)	NA	NA	NA	NA

- ✧ ***Overtime, longevity, and unused vacation exchange days payout and other compensation increase base pay by approximately 25%***

In 2010, average "add-on" compensation per recipient was $22,866 with an average of $20,559 per employee (6,157 employees received some form of "add-on" compensation in a total headcount of 6,848 employees). The Port Authority's "add-on" compensation is a long established practice and is a material contributing cost in overall compensation (**Table 12**).

Over the years, the Port Authority has utilized "add-on" compensation programs, excluding overtime, as incentives (*i.e.,* retention, merit and productivity) to supplement base pay of non-represented employees. For example, the "Longevity IIB" program was authorized in 2008 by the Executive Director for non-represented staff with 25 or more years of service in recognition of satisfactory performance and contribution to the Port Authority over time. While management received little or no increase in base pay, total compensation did indeed increase as a result of the program. Longevity I was a targeted retention program offered in 2003, for the purpose of retaining certain key executives post September 11 for at least three years. At inception, the program was expected to last only three or four years and was not intended to become a permanent feature of the compensation plan.

Table 12 – "Add-on" Compensation for Non-Represented & Represented Employees (2010)

	Non-Represented Employees			Represented Employees			Total Port Authority		
	No. of Recipients	Avg. per Recipient	Total $	No. of Recipients	Avg. per Recipient	Total $	No. of Recipients	Avg. per Recipient	Total $
Overtime	463	$10,681	$4,945,153	4,689	$17,153	$80,430,635	5,152	$16,571	$85,375,788
Longevity	720	3,174	$2,285,245	3,576	3,699	13,228,617	4,296	3,611	15,513,862
Unused Vacation Exchange Days	603	11,381	$6,862,969	1,150	6,751	7,763,359	1,753	8,344	14,626,328
Other	448	3,843	$1,721,564	4,180	5,634	23,548,753	4,628	5,460	25,270,317
Total (1)	**1,388**	**$11,394**	**$15,814,931**	**4,769**	**$26,205**	**$124,971,364**	**6,157**	**$22,866**	**$140,786,295**
% of Total Recipients	*23%*	*NA*	*11%*	*77%*	*NA*	*89%*	***100%***	***NA***	***100%***
Total Headcount (2)			*2,193*			*4,655*			***6,848***
Recipients as a % of Total Headcount			*63%*			*100%*			***90%***
Add-on Comp. per Employee			*$7,212*			*$26,847*			***$20,559***

Notes:

1) *Total Recipients does not equal the sum of the parts above; many employees receive multiple types of "add-on" compensation and would be double counted by simple sum alone.*
2) *Total headcount is a year-end number and can be less than total recipients, since headcount fluctuates during the year.*

100% of the represented employees have material elements of "add-on" compensation, largely ascribable to cumulative terms and work rules embedded in union contracts. Approximately 60% of non-represented employees also benefit from these programs (**Table 13**). Most of these programs emerged over the course of the last decade (see **Appendix – B** for detailed descriptions of various compensation programs). Ongoing costs will be further evaluated during Phase II.

Table 13 – Existing "Add-on" Compensation Programs for Non-Represented Employees

Program Type	Program Description	Year of Inception	Active Participants
Merit	• FICA Benefit[1]	1969	14
	• Contractual Death Benefit	1989	1
	• Management Excused Days	2001	17
	• High Potential Program	2008	204
	• High Potential Program	2009	296
Career Service	• Service Incentive Confidential Clerical	1993	43
	• Longevity Police Superior	n/a	22
	• Career Service Plan 40+	2003	5
	• Career Service Plan 25+ Longevity II	2008	642
Retention	• Death Gamble - GTLII	2001	24
	• WTC Retention Program	2000	47
	• Parity / Retention Program - Longevity I	2003	3
Productivity	• Vacation Exchange	1975	533
	• Cumulative Retirement Days - Police Superiors Only	n/a	22

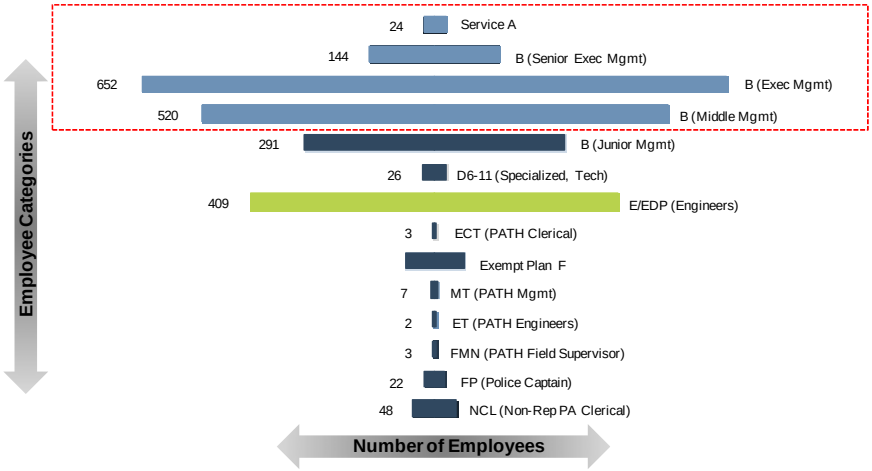
Note:

1) *Benefit program initiated in lieu of a base salary increase in 1969 that allowed for additional pay equal to the amount of FICA liability in that year. Currently, there are 14 eligible employees.*

- ✧ ***The organizational structure of non-represented employees of the Port Authority is a diamond shape, reflecting a very broad middle and upper management with limited span of control***

The general practice of promoting employees based on seniority has resulted in a diamond shaped organizational structure for non-represented employees, with approximately 60% (1,340 out of 2,216 employees) classified in the highest four salary band categories (*i.e.*, Service A, Senior Executive Management, Executive Management, and Middle Management). Furthermore, a majority of these employees are also in the top third of the salary range within their respective categories (**Figure 6**).

Figure 6 – Number of Non-Represented Employees by Employee Group



The Human Resources department plans to propose a new compensation program for management and engineering staff to increase mobility and encourage lateral moves across the organization while simultaneously flattening the compensation bands.

- ✧ ***The existing performance merit increase program of the Port Authority is not effective in rewarding, retaining, and motivating high performers***

Traditionally, the Port Authority has lacked effective performance review processes, as well as reward programs for high performers. The existing performance merit increases do not distinguish between high, average, or poor performers and have essentially become a form of cost of living adjustment. Typically, the difference between merit increases for a high performer vs. an average performer has been 1.5% to 2.0% of base salary, thus not providing much incentive. Accordingly, the Port Authority has, from time-to-time, relied on some form of "add-on" compensation to replace ineffective and insufficient performance merit increases.

Preliminary Recommendations & Next Steps

- ➢ Evaluate the costs of pension, OPEB, and other benefits for active vs. retired employees and require a segregation of these benefits.

- Eliminate the "FICA Benefit" (FICA is the Port Authority term used for additional pay, apart from base pay, equal to the amount of their FICA liability) and "Longevity" programs for non-represented employees. The annual savings, based on 2010 costs, from eliminating longevity and unused vacation exchange days "add-on" compensation for non-represented employees would be approximately $9.1 million.
- The Special Committee of the Board of Commissioners should consider eliminating all other remaining "add-on" compensation as shown in **Table 13** for non-represented employees.
- Implement an incentive driven compensation program that ties meaningful rewards to achievement of performance objectives, targets, and key initiatives.
- Overtime reduction should become a policy focus of the Port Authority.
- Conduct a departmental review of proper span of control for management personnel and re-evaluate tenure vs. merit based pay policies.
- Work rules established under collective bargaining agreements should be re-evaluated and collaborative efforts between management and union representatives should address impediments to enhanced productivity and efficiency.
- Evaluate the financial impact of the Human Resource department's proposed new compensation program and implement as indicated.

BENEFITS

Since 2006, the overall employee benefits expense (including both active and retired employees) has increased 35% (from $340.7 million to $458.8 million) even though actual head count has decreased by 1.3% (from 6,935 to 6,848 employees). This trend is largely due to continued rising costs of health insurance, and a growing population of retirees that drive increases in healthcare, OPEB, and pension expenses (**Table 14**).

Table 14 – Trends in Employee Benefit Expenses (2006 – 2010)

($ in 000's)	2006	2007	2008	2009	2010	2006-2010 CAGR
Year-end Headcount (1)	6,935	6,918	7,200	7,163	6,848	-0.3%
Revenue	**$3,038,538**	**$3,191,626**	**$3,527,552**	**$3,552,243**	**$3,634,023**	**3.6%**
Employee Benefits						
Health (2)	183,089	201,490	218,221	240,650	256,818	7.0%
Pension	89,623	88,992	90,447	88,368	123,249	6.6%
OPEB	24,938	33,496	17,695	24,058	34,665	6.8%
Other (S.S and Other Insurance)	43,092	48,687	48,264	53,776	44,098	0.5%
Total Employee Benefits	**$340,742**	**$372,665**	**$374,627**	**$406,852**	**$458,830**	**6.1%**
Total Employee Benefits as a % of Revenue	*11%*	*12%*	*11%*	*11%*	*13%*	

Note:

1) *Represents only active employees as of December 31st; however, benefits include amounts for retirees as well.*
2) *Primarily comprised of health insurance, but also includes vision, dental, life, and long-term disability insurance.*

Unfortunately, rampant cost escalation in the area of benefits has been a common experience in the public sector. Both Governor Cuomo and Governor Christie have proposed multiple initiatives designed to: (i) stop the apparent abuse of sick and vacation benefits or supplemental compensation, (ii) curtail the rapid rise in health care benefits by mandating greater employee

contribution, and (iii) address underfunding and eliminate abuses in pension practices. The following are some of the policy reforms being promoted by the States of New Jersey and New York that should be supported and/or emulated by the Port Authority.

- Create new health plans that would offer fewer benefits at lower prices, including at least one high-deductible plan.
- All public employees would pay a percentage of their health care premiums in a tiered system based on salaries.
- In New Jersey, police and firefighters would contribute an additional 1.5% of their salaries toward pensions, for a total of 10% and non-uniformed public workers would contribute an additional 2.0% of their salaries, for a total of 7.5%.
- In New Jersey, phase out the practice of distributing cash payouts for sick days.
- In New Jersey, limiting cash payouts for unused vacation exchange days.
- In New York, introduction of Tier 6 to the pension system to ease long term costs (see p. 34 for detail).

Observations & Findings

✧ ***Only 7% of the Port Authority's active employees provide contributions towards their healthcare costs; they contribute at rates well below the market norm, and they have access to health plans that offer more benefits than New York and New Jersey state employees***

For 2010, total medical insurance (health and dental) expense was $147.5 million for total active employees (**Table 15**). Port Authority employee contributions totaled less than 1% at $1.5 million of aggregate employee contributions, with less than 10% of employees currently contributing, compared to 100% of employees contributing for the States of New York and New Jersey (**Table 16**).

Table 15 - Breakout of Health Benefit Expenses by Employee Type (2010)

($ in 000's)	Non-Rep	Rep	Total Active Employees	Retirees	Total Recipients
Health	$46,855	$87,016	**$133,871**	$83,861	**$217,733**
Dental	4,757	8,835	**13,592**	8,486	**22,078**
Total Medical Insurance	**$51,612**	**$95,851**	**$147,463**	**$92,347**	**$239,811**
Employee Contributions	*1,475*	-	*1,475*	*1,682*	*3,157*
As a % of Total Cost	2.9%	0.0%	**1.0%**	1.8%	**1.3%**
Life Insurance	4,426	8,219	**12,645**	3,930	**16,575**
LT Disability	-	-	**-**	433	**433**
Total Health Related Benefits	**$56,038**	**$104,070**	**$160,108**	**$96,710**	**$256,818**
Year-end Headcount	*2,193*	*4,655*	***6,848***	*7,314*	***14,162***
Total Cost per Employee	*$25,553*	*$22,357*	***$23,380***	*$13,223*	***$18,134***

Table 16 – Port Authority Health Benefit Contribution vs. States of NY and NJ

	Port Authority		New York State		New Jersey State
	Non-Represented	Non-Represented (varies by Union)	Non-Represented	Non-Represented (varies by Union)	All Groups
Health Related Benefits	• 0% if hired pre-July 1st, 2005 • 10% (single) and 18% (dependent) of premiums for those hired post-July 1st, 2005	• 0% for all employees	• Pay grade 9 and below : 12% (single) and 27% (dependent) • Pay grade 10 and above: 16% (single) and 31% (dependent)	• Same as Represented • CSEA & PEF Unions	• 1.5% - 35% of premiums based on annual salary and coverage levels

In addition, the Port Authority's employees enjoy access to health plans that offer superior benefits, with lower deductibles and lower out-of-pocket costs, in comparison to the state agencies of New York and New Jersey.

- ✧ ***The Human Resource department is ready to propose to the Board of Commissioners initiatives to reduce healthcare costs for both active represented and non-represented employees***

The largest, controllable benefit expenses at the Port Authority are those related to providing healthcare related benefits for both active and retired employees. The Human Resource department's new initiative would require every employee of the organization to contribute (up to 35% but not less than 1.5% of salary) towards their health care premiums in a tiered system based on salaries. In addition, the Port Authority plans to offer HMO, PPO, and High Deductible plan options to reduce overall plan costs as well as lower the cost to employees. The expected savings over the course of the next four years is approximately $103.8 million. Reduced health plan benefits will have direct effect on other post-employment benefit costs for retirees as well (**Table 17**).

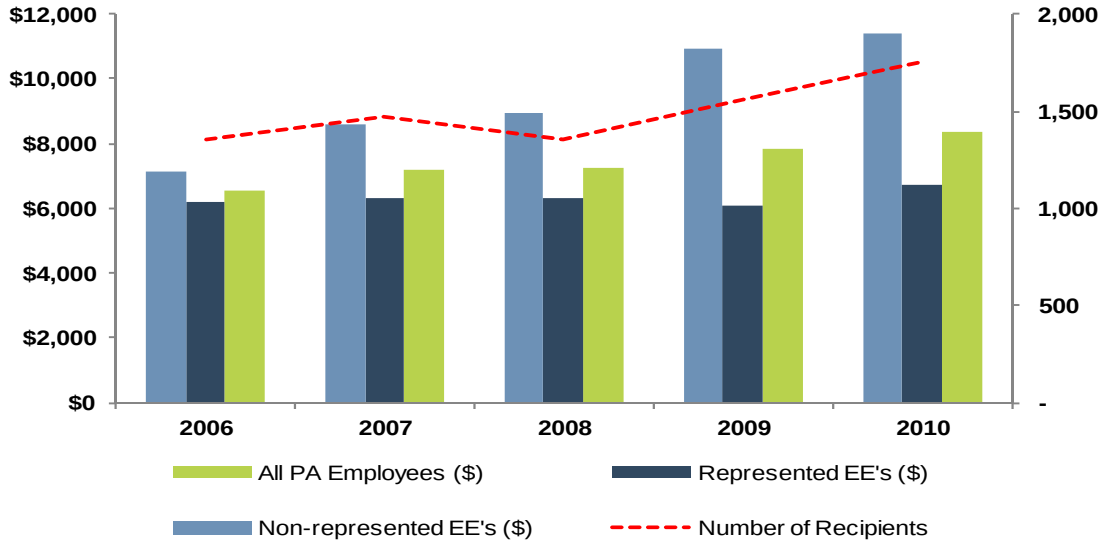
Table 17 - Expected Savings from Health Care Initiatives

($ in millions)	Year 1	Year 2	Year 3	Year 4	Total Savings
Employee Contribution Rate Changes					
Non-Represented	$3.0	$6.1	$9.5	$13.1	$31.7
Represented	5.1	10.5	16.2	22.2	$54.0
Total Savings from Rate Changes	**$8.1**	**$16.6**	**$25.7**	**$35.3**	**$85.7**
Health Plan Redesign					
Selection of UHC "Choice Plus Pro" Plan	5.9	0.0	0.0	0.0	$5.9
Alternative Low er Cost Options	3.0	2.4	2.4	2.4	$10.2
Passive Dental PPO	2.0	0.0	0.0	0.0	$2.0
Total Savings from Redesign	**$10.9**	**$2.4**	**$2.4**	**$2.4**	**$18.1**
Total Expected Savings from Initiatives	**$19.0**	**$19.0**	**$28.1**	**$37.7**	**$103.8**

✧ ***The vacation exchange program and "banking of days" has led to significant costs***

Since 2006, the cost of cashing out vacation days has increased 64%, from $8.9 million to $14.6 million, mainly from non-represented employees (from $7,100 per employee in 2006 to $11,400 per employee in 2010). Furthermore, the true cost of these payments is a multiple of the initial payout costs since they are included in the calculation for the determination of pension payments if they are incurred during the "pensionable period" (*i.e.,* three years prior to retirement) (**Figure 7**).

Figure 7 – Average Cost of Vacation Day Exchange & Banking of Days, per Employee (2006 – 2010)



A review of paid-time-off and cash-out policies of the Port Authority vs. the States of New York and New Jersey reveals that the Port Authority offers less of a vacation allowance, is more liberal on cash exchange of unused vacation exchange days, and does not allow cash payout or accrual of sick days (**Table 18**).

Table 18 - Paid Time Off and Cash-Out Policies of Port Authority vs. States of NY & NJ

	Port Authority		New York State		New Jersey State
	Non-Represented	Represented (varies by Union)	Non-Represented	Represented (varies by Union)	All Groups
Paid Vacation Days	• After 1 year, 17 days increasing to a maximum of 35 days after 30 years (43 days max for Senior Executives)	• After 1 year: 10-18 days (depending on union group) • After 5-26 years: 27-39 days (depending on union group)	• After 1 year, 26 days increasing to a maximum of 38 days after 35 years	• After 1 year, 31 days increasing to a maximum of 43 days after 35 years	• After 1 year, 30 days increasing to a maximum of 43 days after 20 years
Paid Sick Days	• Employees can take sick days based on a calculation dependent on tenure. In no case can employees receive cash for these days or accrue them	• Employees can take sick days based on a calculation dependent on tenure. In no case can employees receive cash for these days or accrue them	• 200 hour max sick bank, payout available upon retirement • Banked sick leave can be used to offset the cost of monthly insurance premiums upon retirement	• 200 hour max sick bank, payout available upon retirement • Banked sick leave can be used to offset the cost of monthly insurance premiums upon retirement	• $15,000 max sick payout upon retirement
Vacation Carryover	• A maximum of 10 days per year, w ith no more than 1 year current allow ance in total carryover (2 years for pre-9/11 hires)	• Up to one year of allotment • PATH allow s no carryover	• 40 days max	• 40 days max	• No limit
Vacation Payout upon Separation	• 1 year's allow ance max payout, if hired after 9/11 (see above for allow ances) • 2 year's allow ance max payout, if hired before 9/11 (see above for allow ances)	• One year of allow ance or no limit in a few circumstances (see above for allow ances) • PATH allow s no payout	• 30 day max payout and 200 hours max sick bank	• 30 day max payout and 200 hours max sick bank	• 1 year's allow ance max payout and $15,000 max sick payout upon retirement (see above for allow ances)
Vacation Exchange (1)	• If perfect attendance and 30 days or more allow ance, can exchange all but15 days • If perfect attedance and few er than 30 days allow ance, can exchange all but 10 days • Payments are bi-w eekly and pensionable	• Varies greatly based on Union • PATH allow s no exchange • Payments are made in lump sums and not pensionable	• Employees up to Grade 24 can exchange 3 or 6 days for $500 or $1,000 credit to offset health insurance costs	• Employees up to Grade 24 can exchange 3 or 6 days for $500 or $1,000 c credit to offset health insurance costs	• N/A

Note:

1) *Vacation days, when exchange, are considered unused vacation exchange days compensation.*

- ✧ ***The Port Authority has made certain modifications to the vacation allowance and policies for cashing out unused vacation exchange days, and is contemplating additional actions to conform closely to New Jersey's policy reform***

The Port Authority's vacation exchange policy was extended for 2012; however, it was amended with the following changes:

- Neither the Executive Director nor Deputy Executive Director will be eligible.
- Employees with at least 30 days of vacation allowance can exchange all but 15 days.
- Employees with fewer than 30 days can exchange all but ten days.
- Attendance requirements to be eligible for this exchange remain unchanged.

In addition, the Port Authority's Human Resource department has proposed (but has not yet implemented) a revised vacation allowance, effective January 1, 2012, that would provide a maximum of 27 vacation days for general non-represented employees and 30 for senior executive management (down from 35 days and 42 days, respectively). However, this revision will only apply to new hires going forward and all employees already at or past the 27 and 30 vacation day milestones will be grandfathered in and retain their current allotment. Furthermore, in 2013, the Human Resource department recommends vacation exchange payments be made in lump-sum, rather than bi-weekly, which would mean that these payments will no longer be "pensionable".

- ✧ ***The State of New York has proposed a new bill to introduce a Tier 6 into the pension system in an attempt to significantly cut back long-term expenses to employers and mitigate abuse by their employees***

If passed, the bill would add a new pension tier for all new employees of the New York State and local governments, as well as those covered by New York City pensions. The Port Authority's full-time employees are required to join one of two cost-sharing defined benefit pensions plans, the New York State and Local Employees' Retirement System or the New York State and Local Police and Fire Retirement System. Key changes in this tier relate to increasing employee contributions and retirement ages, disallowing overtime as part of base salary, setting stronger anti-salary-spiking mechanisms, and eliminating provisions around the cashing out of sick days for additional service credit upon retirement.

Preliminary Recommendations & Next Steps

- ➢ Implement reforms, as proposed by the Port Authority, requiring contribution from all non-represented and represented employees and offering health plans with less expansive and costly coverage.
- ➢ Uniformly apply shortened vacation schedules to all employees (*i.e.*, not only to new hires going forward).
- ➢ Significantly reduce allowed vacation exchange days or eliminate the program for all employees of the Port Authority.

- Eliminate the delineation between employees for cashing in vacation days upon separation so that all employees have the value of one year of vacation allowance as a maximum (*i.e.,* eliminating the extra year of allowance for employees hired before September 11).
- Endorse the current proposed bill that allows the inclusion of a Tier 6 into the New York State pension system for both civilian and police and fireman that would have a significant positive impact on the long-term pension cost.
- Evaluate the feasibility of changing the structure of the existing pension plan, ultimately pursuing defined contribution plans in place of defined benefit programs.

REPRESENTED EMPLOYEES CONTRACT CONSIDERATIONS

The Port Authority union contracts cover approximately 4,691 personnel, or 68%, of the Port Authority's 6,913 actual employees. The vast majority of these contracts has either expired or will expire in 2012. Navigant conducted a preliminary review of key terms and conditions of six primary union contracts related to salary, health and life insurance benefits, vacation and paid time off, other compensation incentives, as well as historical past practices often used to establish implied benefits. In addition, work rules that could have an impact on impeding productivity or by driving additional compensation (*i.e.,* overtime and related benefits) were considered.

Observations & Findings

- ***Complex work rules subject to inconsistent application can often lead to excessive overtime and compensation for certain represented employees***

In 2010, the Port Authority's total overtime expenses were $85.4 million. Approximately 95% ($80.4 million) was earned by represented employees and 42% ($33.6 million of $80.4 million) was related to public safety. The top ten overtime earners in public safety averaged 105.4% of their base salary. The Port Authority implemented a number of initiatives to reduce overtime in Public Safety and it appeared that the Port Authority was making a good progress in 2009 and 2010, after peaking in 2008. However, this positive trend was reversed by November 2011 as overtime had increased 23% over the prior full year (up to $41.4 million from $33.6 million). Police work rules are complicated and appear to create significant staffing challenges and inefficiency (*e.g.,* alteration from regularly scheduled duty tours, or regularly assigned facility automatically results in an extra four hours of pay in addition to pay at straight time rate for the full tour) (**Table 19** and **Table 20**).

Table 19 - Top 10 Overtime Recipients, Public Safety (2010)

	Title	Base Salary	Overtime	OT as a % of Base
1	Police Sergeant	$103,964	$132,286	127.2%
2	Police Sergeant	103,964	129,043	124.1%
3	Police Sergeant	107,911	126,338	117.1%
4	Police Sergeant	107,911	123,884	114.8%
5	Police Lieutenant	124,098	112,467	90.6%
6	Police Sergeant	103,964	104,916	100.9%
7	Police Sergeant	100,960	104,687	103.7%
8	Police Sergeant	103,964	102,340	98.4%
9	Police Sergeant	99,375	100,406	101.0%
10	Police Lieutenant	129,449	98,310	75.9%
		$1,085,560	**$1,134,677**	**Avg: 105.4%**

Table 20 - Public Safety Overtime (2006 – YTD Nov 2011)

	Overtime ($s)	YoY (%)	Count	Per Recipient	YoY (%)
2006	$44,075,892	NA	1,577	$27,949	NA
2007	$49,781,632	12.9%	1,633	$30,485	9.1%
2008	$52,663,459	5.8%	1,857	$28,359	(7.0%)
2009	$38,364,269	(27.2%)	1,777	$21,589	(23.9%)
2010	$33,644,953	(12.3%)	1,723	$19,527	(9.6%)
YTD Nov 2011	$41,405,876	23.1%	1,688	$24,530	25.6%

Preliminary Recommendations & Next Steps

- Conduct analysis necessary to evaluate the current work rules as applied and practiced with the assistance of special labor counsel and establish priorities, in collaboration with represented labor, to focus on improved efficiency and productivity.
- Work rules and contractual obligations should be evaluated and potentially modified to effectively manage the police department productivity and efficiency and to control overtime.
- Evaluate effectiveness of command and control function of public safety & security in light of what appears to be chronic excessive overtime, as well as other apparent inefficiencies.
- Carefully consider findings of the pending Chertoff Report in evaluating current costs and practices relative to the effectiveness of the security apparatus.

VIII. INITIAL COST REVIEW OF WTC PROGRAM

BACKGROUND

From June to November 2008, the Port Authority conducted a comprehensive analysis to determine what the true scope and design of the WTC Program was expected to be, including the related impact of the mandate to complete the Memorial by September 11, 2011. As a result of this effort, the Port Authority was required to materially alter the phasing of construction, redesign major elements of the WTC program resulting in an increase in cost, as well as balance the needs of a variety of disparate functions and stakeholders (both public and private). Furthermore, given the high level of integration of the various projects at the site, the Port Authority was often required to perform significant work for other agencies and third parties in an effort to deliver on expectations. As the WTC program has evolved, the Port Authority has

also absorbed the increased costs of financing and insuring the projects at the site, at no minor expense. In addition, efforts to accurately reflect the cost of marketing, leasing and improving the retail and office elements of the site with the input of the Port Authority's commercial partners were not made until recently, further increasing the estimated cost of the WTC program. It is important to note, however, that these total project costs are off-set, in part, by anticipated reimbursements from certain parties and sources of outside the Port Authority, including the Federal Transit Administration and insurance carriers, among others.

SCOPE & METHODOLOGY

Navigant reviewed numerous documents and conducted in excess of 50 hours of interviews with members of the WTC construction staff, select management of the Port Authority and other persons with direct knowledge of the history of construction at the site. From this foundation, Navigant reconstructed the historical costs of the WTC program using the chronology of periodic presentations by prior Executive Directors and management to the Board of Commissioners, project cost reports current through October 2011, related documents, and other communications of the Port Authority (**Table 21**).

Table 21 – Periodic WTC EAC Comparison (Dec 2006 – Current Estimate)

($mm)	December 2006	January 2008	November 2008	May 2010	February 2011	Current Estimate
Project Title:						
WTC Transportation Hub	$ 1,921	$ 2,442	$ 3,200	$ 3,291	$ 3,440	$ 3,737
1 World Trade Center	2,478	2,877	3,100	3,190	3,190	3,949
9/11 Memorial (PA)	785	195	195	195	195	195
Vehicular Security Center 1	472	478	633	667	667	698
Site Infrastructure	1,048	1,255	1,525	1,563	1,661	1,965
WTC Retail	1,337	1,301	1,450	1,550	1,550	1,722
Streets and Utilities	-	254	254	274	274	334
Cortlandt St. #1 Station	-	-	-	150	150	150
Performing Arts Center	-	-	-	-	-	182
9/11 Memorial (3rd Party)	-	-	-	-	-	833
Contingency	-	-	600	600	352	352
Additional Finance Expense	-	-	-	-	-	352
NYPD Campus Plan	-	-	-	-	-	300
NYSDOT	-	-	-	-	-	20
Total	**$ 8,041**	**$ 8,802**	**$ 10,957**	**$ 11,480**	**$ 11,479**	**$ 14,789**
Reimbursements / Funding	(4,490)	(4,490)	(5,016)	(5,016)	(5,016)	(7,076)
Net Program Cost to the Port Authority	**$ 3,551**	**$ 4,312**	**$ 5,941**	**$ 6,464**	**$ 6,463**	**$ 7,713**

Reconstructing the WTC program historical costs and the interim Estimates at Completion (the "EAC") through various sources was necessary because the Port Authority's staff were unable to produce supporting detail and source documents, for any of the presentations, prior to February 2011, that traced historical cost growth previously reported by prior Executive Directors to the Board of Commissioners and, at times, the Governor of New York. To assess the reasonableness of the EAC of the WTC program, Navigant evaluated the record of each component project to identify the level of cost risk associated with delivering the project within current expectations.

Taken together, Navigant's analysis reveals that cost growth at the WTC is primarily caused by: (i) the commitment to open the Memorial by September 11, 2001, (ii) work for third-parties that was required due to the inter-related nature of structures at the site (*e.g.,* portions of the Performing Arts Center ("PAC") foundation that are integral to underground infrastructure including the Vehicle Security Center ("VSC")), and (iii) the omission in prior budgets of allowances for the marketing, leasing and tenant improvements for the commercial office and retail space at 1 WTC and Retail projects.

These findings are summarized in an EAC prepared by Navigant through a review of project cost reports, documented change orders and allowances for known exposures represented in the records of the Port Authority (the "Current Estimate"). In addition, the Current Estimate was subjected to a qualitative risk analysis. Navigant identified areas of cost risk through project cost reports, relevant documents and probability assessed these items through interviews with knowledgeable project participants. From this basis, Navigant developed a range of possible scenarios and selected a probable outcome to report incremental risk or potential exposure to the Current Estimate.

Observations & Findings

- ***The evolution of design and the challenges the Port Authority faced to deliver the Memorial by September 11, 2011 resulted in the November 2008 reforecast from $8 billion to $11 billion***

In December 2006, the program for the WTC was estimated at approximately $8 billion. In November 2008, as a result of a focused effort by the Port Authority to understand the evolution of the project, the impact of the commitment to open the Memorial plaza by September 11, 2011, and to systematically reforecast the WTC program, the EAC was increased to approximately $11 billion (the "November 2008 Forecast"). The November 2008 Forecast revealed that the approximately $3 billion increase was largely due to impacts from changes in scope and the evolution of design. An integral component of the design evolution was the coordination amongst the program stakeholders to timely deliver the subterranean structures and infrastructure prior to certain key dates and within expected costs. Accordingly, the largest variances occurred in the more complex projects at the site, including: (i) the WTC Hub at approximately $1.3 billion, (ii) 1 WTC at approximately $0.6 billion, and (iii) below grade site infrastructure at approximately $0.5 billion (**Table 22**).

Table 22 - Periodic WTC EAC Comparison (Dec 2006 – Nov 2008)

($mm)	December 2006	November 2008	Variance $[1]	Variance %
Project Title:				
WTC Transportation Hub	$ 1,921	$ 3,200	$ 1,279	*66.6%*
1 World Trade Center	2,478	3,100	622	*25.1%*
9/11 Memorial (PA)	785	195	(590)	*-75.2%*
Vehicular Security Center 1	472	633	161	*34.2%*
Site Infrastructure	1,048	1,525	477	*45.5%*
WTC Retail	1,337	1,450	113	*8.5%*
Streets and Utilities	-	254	254	*0.0%*
Contingency	-	600	600	*0.0%*
Total	**$ 8,041**	**$ 10,957**	**$ 2,916**	***36.3%***
Reimbursements / Funding	(4,490)	(5,016)	(526)	*11.7%*
Net Program Cost to the Port Authority	**$ 3,551**	**$ 5,941**	**$ 2,390**	***67.3%***

Note:

(1) Positive variance reflects increased costs.

- ***Site-wide coordination in the accelerated development of the WTC program has required the Port Authority to perform work for other agencies and entities resulting in further expansion in the scope that increased the $11 billion reforecast to a Current Estimate of $14.8 billion***

The Current Estimate for the WTC program is approximately $14.8 billion. This increase of approximately $3.8 billion since the November 2008 Forecast was not primarily driven by cost growth in the original scope of the WTC program. Rather, this increase stems from additional projects being performed by the Port Authority on behalf of other agencies and parties (approximately $1.57 billion). In large part, this work was necessary to advance inter-related elements of the site and assure the opening of the Memorial by September 11, 2011. Simultaneously, the Port Authority has begun to refine the program associated with the commercialization of the site. A recently developed budget for the leasing and operation of the Retail and 1 WTC projects performed in conjunction with the Port Authority's operating partners, The Durst Organization Inc. ("Durst") and Westfield Group ("WDC"), reflected an increase of approximately $1 billion in the Current Estimate. Lastly, additional and typical finance and insurance expenses on a more costly program occurring over a longer duration of approximately $0.6 billion are included in the Current Estimate. The balance of the increase is driven by scope changes related to site-wide infrastructure (approximately $0.3 billion), and project execution costs (approximately $0.3 billion). These impacts occur throughout various components of the program. The following table presents the variance in costs from November 2008 to the Current Estimate by individual project (**Table 23**).

Table 23 - Periodic WTC EAC Comparison (Nov 2008 – Current Estimate)

($mm)	November 2008	Current Estimate	Variance $[1]		Variance %
Project Title:					
WTC Transportation Hub	$ 3,200	$ 3,737	$ 537	(2)	*16.8%*
1 World Trade Center	3,100	3,949	849	(3)	*27.4%*
9/11 Memorial (PA)	195	195	-		*0.0%*
Vehicular Security Center 1	633	698	65	(4)	*10.3%*
Site Infrastructure	1,525	1,965	440	(5)	*28.9%*
WTC Retail	1,450	1,722	272	(6)	*18.8%*
Streets and Utilities	254	334	80	(7)	*31.5%*
Cortlandt St. #1 Station	-	150	150		*0.0%*
Performing Arts Center	-	182	182	(8)	*0.0%*
9/11 Memorial (3rd Party)	-	833	833		*0.0%*
Contingency	600	352	(248)		*-41.3%*
Additional Finance Expense	-	352	352		*0.0%*
NYPD Campus Plan	-	300	300		*0.0%*
NYSDOT	-	20	20		*0.0%*
Total	**$ 10,957**	**$ 14,789**	**$ 3,832**		***35.0%***
Reimbursements / Funding	(5,016)	(7,076)	(2,060)		*41.1%*
Net Program Cost to the Port Authority	**$ 5,941**	**$ 7,713**	**$ 1,772**		***29.8%***

Notes:

(1) Positive variance reflects increased costs.
(2) Superstructure concrete and steel (~$150 million), trade contractor performance (~200 million), and financial expense (~$100 million).
(3) Redevelopment budget for commercialization (~$700 million) and financial expense (~$100 million).
(4) Financial expense and schedule acceleration (~$65 million).
(5) Site-wide infrastructure scope (~$300 million) and Redevelopment requirements at PMF/Commercial Parking (~$100 million).
(6) Redevelopment budget for commercialization (~$275 million).
(7) Church St. (~$50 million).
(8) Budget to bring structure to grade.

- ***Third-party funding commitments and various sources of external capital have, or are expected to, limit the Port Authority's cost for the WTC program to $7.7 billion before accounting for further risk exposure identified in Navigant's review***

The Port Authority is performing a set of projects for other agencies and entities for which it has contractual or oral commitments for reimbursement. For example, the Current Estimate includes: the Cortlandt St. Station development being performed at the request of the MTA, work in process for the 9/11 Memorial Foundation (the "Memorial Foundation"), certain sub-grade work that will benefit the PAC and similar infrastructure commitments for other agencies. Given the Current Estimate, the Port Authority's net cost for the WTC program would be approximately $7.7 billion, representing approximately $14.8 billion of total gross costs, less approximately $7.1 billion in reimbursements by third parties and funding provided by insurance proceeds, public funds and private sources.

Delivery of the WTC program at this net cost assumes full reimbursement of third party funding commitments. The reimbursement of these funding commitments is subject to ongoing discussions with various stakeholders and may be subject to dispute and collection risk. To

mitigate the financial impact of nonperformance by other stakeholders, the Port Authority may choose to establish certain financial reserves.

In addition, subject to the requirements of existing contractual agreements, the Port Authority may elect to curtail development of third-party elements and limit the exposure of the Port Authority to only that project scope necessary for the overall advancement of the program. For example, the Port Authority has significant third party stakeholder exposure on the Memorial. While the Port Authority's original financial commitment was estimated at $195 million out of a total project cost of $500 million, the design and scope of the project have evolved such that some estimates indicate the project may now cost approximately $1 billion. The Memorial Foundation and the Port Authority are already disputing significant costs related to the construction impacts of the Memorial, and total exposure to the Port Authority is now estimated at approximately $300 million. The Memorial Foundation is relying heavily on private fundraising efforts in a recessionary environment, calling into question the Port Authority's ability to collect on funds both committed and expended for the benefit of the Memorial Foundation. Consistent with the approach outlined above, the Port Authority has elected to significantly reduce the construction personnel deployed on the museum portion of the Memorial project and limit the agency's exposure, ensuring that only certain construction continues prior to the resolution of the cost reimbursement dispute.

- ***Navigant's review of the reasonableness of the Current Estimate suggests the potential for incremental cost exposure to the Port Authority of $0.8 billion or $8.5 billion of total funding by the Port Authority for completion of the WTC program***

The Current Estimate has been prepared consistent with industry protocols; however, based on a preliminary risk analysis there may be potential total project cost exposure of approximately $1 billion. This potential for program level cost growth may increase the net obligation (*i.e.,* after expected reimbursements from third parties) of the Port Authority by $0.8 billion, to $8.5 billion in total expenditures funded by the Port Authority for completion of the WTC program.

The principal drivers of the potential program level increase are: (i) anticipated costs, and the associated impact on contingency, stemming from continued evolution of the Retail project (approximately $0.4 billion); (ii) cost of work for third parties, most notably for the New York Police Department ("NYPD") and scope changes to Cortlandt Street Station (approximately $0.2 billion) both expected to be reimbursed by third parties as previously described; and (iii) soft cost escalation, extra work, and delay mitigation costs in the completion of the Hub (approximately $0.2 billion). The remaining approximately $0.2 billion is comprised of miscellaneous elements, such as incremental finance expense, additional design and coordination for site infrastructure work, trade contractor financial deficiency, and design costs in the VSC (**Table 24**). Again, tactics for the mitigation of a portion of these risks include enforcement of reimbursement commitments, establishing reserves or curtailing certain work within the program.

Table 24 – WTC Current Estimate and Potential Exposure

($mm)	Current Estimate	Potential Exposures Amount $	Potential Exposures Amount %
Project Titles:			
WTC Transportation Hub	3,737	213 (1)	*6%*
1 World Trade Center	3,949	10 (1)	*0.3%*
9/11 Memorial (PA)	195		
Vehicular Security Center 1	698	10 (2)	*1%*
Site Infrastructure	1,965	210 (3)	*11%*
WTC Retail	1,722	452 (1)	*26%*
New Projects	1,499	87 (4)	*6%*
Streets and Utilities ($334)			
Cortlandt St. #1 Station ($150)			
Performing Arts Center ($182)			
9/11 Memorial (3rd Party) ($833)			
Other Costs			
Program Contingency	352		
Additional Financial Expense	352	46	*13%*
WTC TOTAL	**14,469**	**1,028**	***7%***
3rd Party Stakeholder - Add'l Potential Exposure:			
NYPD Campus Plan	300		
NYSDOT	20		
Total with 3rd Party Stakeholders	**14,789**	**1,028**	***7%***
Reimbursements / Funding	(7,076)	(212)	*3%*
Net Program Cost to the Port Authority	**7,713**	**816**	***11%***

Note:

(1) Potential for underfunded contingency.
(2) Potential acceleration costs.
(3) Potential scope changes for Chiller Plant, VSC and Security.
(4) Potential exposure to contractor non-performance.
(5) Potential cost growth for Streets, Cortlandt Station and PAC.

✧ ***The Port Authority may have other cost risk in the form of contingent liabilities***

Based on the Port Authority's bond offering statement disclosures, it appears the Port Authority has made certain financial obligations in connection with certain WTC site bond financings of up to $600 million of gross credit support on other projects at the WTC site, $400 million of which are reimbursable by the State of New York and New York City, leaving $200 million of net exposure. In addition, in November 2011, $1.2 billion of Liberty Bonds were issued to finance the private development at the Tower 4 site. The Port Authority, in addition to being a future major tenant at the building, has agreed to provide credit support for this financing through a complex arrangement of interest rate support, rent deferrals, and rent-free periods. Estimating the outcome of these arrangements is speculative, as multiple events need to transpire for the obligations of the Port Authority to be triggered, therefore, Navigant has not included a provision for these figures in the Current Estimate or in any potential exposures. Further research and analyses relating to the underlying contracts that document these commitments will be conducted in Phase II of Navigant's work.

Preliminary Recommendations & Next Steps

- Identify a single candidate reporting to the Executive Director with the sole responsibility to manage the successful construction, completion, and commercialization of the WTC.
- Reevaluate the roles, responsibilities, requisite experience, and appointments of the WTC Sub-committee as the WTC evolves from a focus on construction execution to asset management.
- Perform a comprehensive forensic construction cost audit of the entire WTC program to validate the costs expended, the Current Estimate and to identify any additional exposure items.
- Conduct a focused review of the development budget associated with asset management and the future operations of the 1 WTC and the Retail project that involves all constituents.
- Pursue reimbursement from third parties for completed work and any pending commitments for work conducted in good faith.
- Prior to committing to, or initiating, any additional work requests from other agencies and parties, secure contractual evidence of funding commitments as well as reimbursement capacity.
- Assess the contingent liabilities of the Port Authority and risk-assess same in the EAC for the WTC program.
- Unless intended to create construction efficiencies or produce direct cost reductions, freeze design to the extent possible.
- Prepare a comprehensive risk register, probability assess beneficial or adverse outcomes on a continuous basis to increase the accuracy of the EAC based on contemporaneous information.
- Evaluate current WTC related insurance programs for cost effectiveness and counterparty credit risk for existing coverage.
- Perform sensitivity analysis on optimistic, pessimistic and probable case scenarios to understand cost impacts on the EAC and in particular the adequacy of contingency.
- Integrate development and construction budgets, providing a holistic reporting of the WTC program in a standardized format on a monthly basis to the Executive Director and Board of Commissioners.
- In light of the influence of the WTC on the capital needs and execution resources of the Port Authority, perform a detailed impact evaluation analysis on the 2011 Capital Plan.
- Evaluate potential monetization of the income producing elements of WTC as an alternative form of capital for the Port Authority.

IX. PRELIMINARY CAPITAL PLANNING ASSESSMENT

BACKGROUND

The 2011 Capital Plan is comprised of more than 900 projects totaling approximately $25.1 billion. Of this, approximately $18.2 billion is planned for the Port Authority's assets excluding the WTC site (approximately $6.9 billion). Of note, while addressing the capital needs of the WTC site in the period from 2002 - 2010, the Port Authority invested approximately $13 billion in its other assets.

SCOPE & METHODOLOGY

Continuing from the work conducted on the WTC, Navigant performed a preliminary review of the composition of 2011 Capital Plan and the capital planning process.

Navigant considered documents and conducted interviews with select management of the Port Authority. In addition, Navigant prepared a database of all projects in the 2011 Capital Plan and attended meetings of the Capital Planning Oversight Committee (the "CPOC").

Observations & Findings

- ***The Port Authority needs to assure that the long-range capital strategy aligns with its mission and objectives***

The Board of Commissioners recognizes that, in light of the demands of the WTC and the impact of the recessionary environment, the Port Authority does not strategically allocate capital by business unit or in concert with the overall objectives of the organization. Rather, line functions promote projects that maintain a particular asset base and fit within an internally mandated budget constraint. Many of the projects in the 2011 Capital Plan are in initial planning stages and are approved in their entirety when the total scope, budget and potential impacts are not yet mature. This approach further constrains the ability of the Port Authority to reassess priorities and alignment with a dynamic capital strategy. The Port Authority needs to assure that the strategy for the allocation of capital aligns with the mission and objectives of the organization for the 21st century. In Phase II, Navigant will evaluate with the Special Committee the actions necessary to re-position the capital strategy of the agency for the coming decade.

- ***The initial review of the capital planning and execution process indicates that roles and responsibilities may not be clearly defined***

The current management oversight of the execution of the Capital Plan is performed by the CPOC. While CPOC is conceptually a sound approach, the execution falls short of industry practice as it lacks a clear leader, is managed by committee, does not have consistent reporting mechanisms or a communication protocol, and is unfocused without an agreed-upon materiality threshold for items under discussion. In addition, the observed inconsistency in the command and control structure did aggravate the timely communication of challenges by the

Executive Director to the Board of Commissioners. Lack of accountability of development, construction and asset management functional leaders to the Executive Director exacerbates this condition. A review of the organizational design of the capital planning and execution functions within the Port Authority will be an area of focus in Phase II of Navigant's work.

- ***Performance metrics limited to budget compliance can impede an effective capital project planning and execution process***

The most successful organizations create a capital plan, construct a conforming budget and monitor progress against key performance metrics, where budget compliance is just one of several measures. The Port Authority should consider expanding the methods by which it monitors project performance and create the opportunity to proactively address areas of under-performance. To maximize effectiveness, such an initiative would require change management within the organization as a comprehensive definition of execution would become the measure of performance. Phase II of Navigant's work will address this organizational concept.

Preliminary Recommendations & Next Steps

- Phase II should include, but not be limited to:
  - An evaluation of the formation of a Capital Projects Office that reports directly to the Executive Director. This office would be responsible for the development and execution of the capital plan and effective communication of same. Navigant anticipates that a Capital Projects Office would be led by a single, senior executive.
  - An analysis of the unconstrained needs of the Port Authority against the 2011 Capital Plan to identify areas of potential risk.
  - A review of recent execution performance against the previous capital plan developed in 2007 and updated in 2008.
  - An assessment of proposed projects in the 2011 Capital Plan for, non-income producing assets to evaluate the benefit of same; this does not include projects intended for safety and security of infrastructure assets.
  - A study of the feasibility of monetizing non-core assets to provide an alternative form of capital for the funding of transportation infrastructure.
- Establish a task force to develop a long-range capital strategy that aligns with the Port Authority's evolving mission and objectives.
- Institute a systematic method for prioritizing project needs within constrained capital capacity and conduct annual assessments.
- Develop a protocol to measure and assess execution progress against performance metrics; address areas of under-performance against goals.
- Continue critical review of all projects in the 2011 Capital Plan.

X. OVERVIEW OF PHASE II

PHASE II – ORIGINAL MANDATE

In conjunction with the Review, Phase II of Navigant's engagement is expected to be completed and the report delivered by end of June 2012. Pursuant to Navigant's existing engagement and as discussed with the Special Committee during the interview process, Phase II will include (as refined by mutual agreement):

Project Management Office

- Oversight and coordination of organizational review and operational assessment.
- Oversight and coordination of finalization of WTC cost review.
- Coordination of ten-year Capital Plan Review through Rothschild.

Organizational Design and Operational Improvement

- Review business segment operating budget.
- Review Contract Service expense category to reduce costs.
- Review Material, Equipment and Other expense categories to reduce costs.
- Summarize findings and recommendations into a strategic framework.

Finalization of WTC Cost Review

- Review of avoidance costs.
- Assessment of accuracy of design and construction cost-to-complete, including timeline of completion.
- Identify key drivers of variances in project costs and record lessons learned for mitigation in future endeavors.

Capital Projects Assessment

- Complete preliminary rank order prioritization.
- Complete scorecards for designated capital projects with support of Port Authority personnel.
- Establish a dynamic evaluation methodology for ongoing update of capital projects and planning processes.
- Identification of considerations with regard to financing implications and alternatives.

PHASE II – ADDITIONAL RECOMMENDATIONS

Areas of importance for further review have been identified and recommended in the Phase I report that are not included in the engagement scope and terms of the original Phase II mandate of Navigant's consulting arrangement. A preliminary list of those groups by related work stream is detailed below:

Organizational Design and Operational Assessment

- Facilitate the Board of Commissioners' evaluation of the Port Authority's vision, mission, and strategy to meet the challenges of the 21st century.
- Develop and recommend pay for performance incentive systems.
- Assist the Board of Commissioners in its evaluation of the Port Authority's overtime and "add-on" compensation policies.
- Conduct detailed analysis of union contract work rules (in conjunction with special counsel and business segment managers), the current application of same, and the potential corrective actions to remove impediments to productivity and efficiency, and establish a foundation of focus on expired union contract terms and develop specific recommendations for incorporation in same.
- Review, analyze, and recommend consolidation of certain duplicate shared service functions, identify the expected annual cost savings and develop a detailed implementation plan supporting same.
- Review OPEB and make recommendations regarding potential benefit modifications for retirees.
- Assist in the development of executive "dashboard" to reliably and timely report status of key financial and operational performance metrics.
- Identify key revenue enhancements, including lessee pass-through cost collection, opportunities and assist in the development and implementation of enforcement strategies.

WTC Cost Review

- Perform a comprehensive forensic construction cost audit of the entire WTC program to validate the costs expended, to identify additional exposure items, and provide potential mitigation strategies.
- Evaluate contractor exposures including status of current claims.
- Develop and implement strategies with regards to reimbursements from third parties for completed work and any pending commitments for work conducted in good faith.
- Evaluate WTC related insurance programs for cost effectiveness and counterparty credit risk.
- Integrate development and construction budgets, providing a holistic reporting of the WTC program in a standardized format on a monthly basis to the Executive Director and Board of Commissioners.

Capital Projects Assessment

- Develop a mechanism to more reliably determine levels of state of good repair necessary to ensure Port Authority infrastructure integrity.
- Implement a comprehensive reorganization of the capital planning and execution function, identifying key leaders, roles, responsibilities, processes, and mechanisms for tracking progress on cost, risk management as well as delivery.
- Perform a study of the feasibility of monetizing non-core assets to provide an alternative form of capital for the funding of transportation infrastructure.

XI. APPENDIX – A

DEFINED PEER GROUP

Public (*i.e.*, State Agencies, etc.)	Private Sector (incl. Publicly Traded Co.)	Notes
Public Authorities and State Agencies		
1) New York Power Authority 2) Metropolitan Transit Authority (MTA) 3) New Jersey Turnpike Authority 4) New York Thruway Authority 5) New York City Department of Transportation 6) New York City Government 7) New York State Government 8) New Jersey State Government	• **NA:** Private Sector peers were "not applicable" given this group was focused on public authorities and agencies in the New York and New Jersey region	• Key attributes include being a public authority or state agency with jurisdiction in major New York and New Jersey metro regions • Must have responsibility in the areas of transportation, real estate, or economic development (preferably the former) • If possible, focus should be on authorities/agencies that DO NOT receive tax revenue
Tunnels, Bridges & Terminals		
9) MTA Bridge & Tunnel Authority (NY City) 10) Bay Area Toll Authority (San Francisco, CA) 11) Delaware River Port Authority of PA & NJ 12) New York Thruway Authority (NY State)	1) Macquarie Atlas Roads Group (Australia) 2) Cofiroute (Germany, France, UK, USA)	• Key attributes of peers should include operation of both bridges and tunnels (age of assets is also pertinent) • Operation of toll roads is applicable, but less so if operations are highly concentrated in such activities. • Older assets at a peer align more comparably to the Port Authority's assets (*i.e.*, bridges built in 1920s-30s). • Delaware River Port Auth, though much smaller in size, was selected due to it being a bi-state authority with ties to New Jersey, as well as a focus on transportation
PATH Rail System		
1) Massachusetts Bay Transportation Authority (Boston, MA) 2) Southeastern Pennsylvania Transportation Authority (Philadelphia, PA) 3) Delaware River Port Authority of PA & NJ (Western NJ) 4) MTA (NY City) 5) Chicago Transit Authority	• **NA:** Private sector peers are **not comparable** due to: ➢ Different fare structure (not flat-fee; instead, based on distance traveled) ➢ Compensation systems in foreign companies is different than in the U.S., namely for the PA, which limits comparability ➢ Private ownership of rail systems does not occur in the U.S.	• Key attributes of peers should include a flat-fee fare structure and the absence of any federal or state taxpayer subsidies, with location in a major metro with high traffic volume • Age of assets were considered as this will yield a larger staff of maintenance and engineering employees • Delaware River Port Auth, though much smaller in size, was selected due to it being a bi-state authority with ties

Public (*i.e.*, State Agencies, etc.)	Private Sector (incl. Publicly Traded Co.)	Notes
	• Privately owned and operated commuter rail systems in Tokyo, Hong Kong, Berlin and Taiwan were identified but eliminated from peer group for reasons noted above.	to New Jersey, as well as a focus on transportation
Aviation		
1) Chicago O'Hare International Airport (ORD) 2) Los Angeles World Airports (LAWA) 3) Hartsfield-Jackson Atlanta International Airport (ATL)	1) Aeroports de Paris (France) 2) BAA Airports (United Kingdom)	• Key attributes of peers should include a high volume of international passenger and aircraft traffic in major cities, and focused execution of airport infrastructure operations (not including retail and concession activities, baggage handling, or other airline and passenger services). • If possible, peers should operate multiple facilities, whether commercial or private.
Port Commerce		
1) Port of Los Angeles (California) ***2)*** Port of Long Beach (California) ***3)*** Port of Corpus Christie (Texas)	***1)*** Port of Tauranga Ltd (New Zealand) – NZSE: POT ***2)*** North Queensland Ports Corporation Limited (Northeastern Australia), a Government Owned Corporation *Note*: The defining characteristics of GOCs are that they have a distinct legal form and they are established to operate in commercial affairs. While they may also have public policy objectives, GOCs have financial objectives to satisfy shareholders with ROI and dividends. (Source: Wikipedia, citation needed)	• Key attributes of peers are that their activities be focused on port infrastructure operations and coordinating capital investment in port facilities. Secondarily, peers with similar geographic size and volume would also comparable. • Port operations like stevedoring, cargo handling and towage services, among many others, are activities performed by Port Authority lessees and do not provide a basis of comparison with the Port Authority.

XII. APPENDIX – B

EXAMPLES OF "ADD-ON" COMPENSATION

Pay Category	Pensionable	Description[1]	# Staff
Fica Benefit Bi-Weekly Payout	Yes	As an offset and in lieu of a base salary increase in 1969, this program allowed employees to opt for additional pay, apart from base pay, equal to the amount of their FICA liability in that year. Currently 14 employees remain who receive this pay.	14
Vacation Exchange	Yes	As a program, initially authorized by the Board in April 1976, current employees with perfect attendance may opt to prospectively exchange their upcoming year's vacation for cash to be paid in bi-weekly increments. Employees can exchange all but 10 vacation days from their annual allotment. Service A employees had no attendance requirement up to 2012.	533
Longevity Clerical	Yes	Originally authorized in 1993, this is a career service payment for non-represented clerical staff to encourage retention and reward sustained satisfactory performance. After 5 years the employee receives an annual incentive payment of $500 in bi-weekly increments, which increases every 5 years to a maximum of $2500 after 40 years of service.	43
Group Term Life II (Death Gamble)	Yes	As a retention mechanism, in 2002 Tier 1 employees were provided with additional life insurance coverage to address a potential reduction in benefit that could occur for beneficiaries of Tier 1 employees currently eligible for retirement, but who choose to continue to work at the Port Authority. The earnings offset the imputed value of that additional life insurance.	24
Longevity I (Retention Program-2003)	Yes	A targeted retention incentive payment offered in 2003, at the then Executive Director's discretion, for the purpose of retaining certain key executives post 9-11 for at least three years. Pay is currently received by three key executives.	3
Longevity IIA (40+ Yr Career Service Plan)	Yes	A career service payment authorized in 2003 for non-represented staff not on a longevity schedule and having 40 or more years of service. Payment in recognition of their four decades of sustained satisfactory performance and contribution to the Agency.	5
Longevity IIB (25+ Yr Career Service Plan)	Yes	A career service payment authorized in 2008 for non-represented staff with 25 or more years of service in recognition of their sustained satisfactory performance and contribution to the Agency over time. Longevity IIA, the 40-year plus longevity program, was rolled up into this program same year.	642
For Police Superiors Only			
Longevity FP (Police Superior Longevity)	Yes	Payment made to Police Superiors in recognition of their years of experience. Police Superior longevity is a flat rate based on Detective Lieutenant longevity and years of police service, starting with one year of police service and currently topping out at 30 years police service with a current annual rate of $20,020.	22
Cumulative Retirement Days	Yes	An incentive for Police Superiors to maintain perfect attendance throughout their careers.	22

Note:

(1) *Descriptions have been provided by the Port Authority HR department for various programs listed above.*

XIII. APPENDIX – C

NAVIGANT REPORT QUALIFICATIONS AND DISCLAIMER

THIS CONFIDENTIAL REPORT HAS BEEN PREPARED FOR THE SPECIAL COMMITTEE OF THE BOARD OF COMMISSIONERS OF THE PORT AUTHORITY IN CONNECTION WITH NAVIGANT'S PHASE I WORK PURSUANT TO THE AGREEMENT, DATED AS OF NOVEMBER 23, 2011, BY AND BETWEEN NAVIGANT AND THE PORT AUTHORITY. THIS REPORT CONTAINS INFORMATION RELATED TO THE PORT AUTHORITY AND IS BEING PROVIDED ON A STRICTLY CONFIDENTIAL BASIS. THE CONTENT OF THIS REPORT IS NOT TO BE USED FOR ANY OTHER PURPOSE AND, EXCEPT AS MAY BE REQUIRED BY LAW OR ANY OTHER REGULATORY OR GOVERNMENTAL AUTHORITY HAVING JURISDICTION OVER THE PORT AUTHORITY, CANNOT BE DISTRIBUTED WITHOUT THE WRITTEN CONSENT OF NAVIGANT AND MAY NOT, IN ANY CASE, BE RELIED UPON BY ANY THIRD PARTIES WITHOUT NAVIGANT'S PRIOR WRITTEN CONSENT.

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Phase II Report

Presented to:

The Special Committee of the Board of Commissioners of

THE PORT AUTHORITY OF NY & NJ

September 2012

Presented by:

NAVIGANT

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I. EXECUTIVE SUMMARY

✧ ***With revitalized Agency leadership, the establishment of a foundation of Key Operating Principles, thoughtful corporate governance and organizational design modifications, meaningful operating improvements are underway***

The Port Authority is in the midst of a significant transformation. The Board of Commissioners, including the recently appointed Chairman and Vice Chairman, the Executive Director, and the Deputy Executive Director, are individually and collectively taking a proactive approach and are evidencing the resolve to drive change at all levels within the organization. If properly implemented, this change will help the Agency rid itself of years of inefficiency. Nevertheless, the challenges and opportunities of the Port Authority over the next 10 years are enormous, including:

- Prioritizing, funding, and effectively executing over $11.4 billion in deferred capital projects that are not presently included in the $26.9 billion preliminary 2011 – 2020 Capital Plan but are necessary for the cost effective operation of the Agency's assets;
- Funding, without direct return, the public benefit of continued investment in commuter rail and maritime transportation systems (*i.e.,* PATH and Port Commerce), that are central to the movement of people and goods, yet, absent federal or state subsidies commonly received by sector peers, represent business models with projected ongoing materially negative cash flows;
- Completing the WTC Program, a project of national significance and regional economic vitality, within its estimated cost and maximizing cost recovery; and,
- Seizing the momentum of recent governance changes and organizational design improvements to successfully implement a variety of performance improvement initiatives.

✧ ***Over the past five years, the Aviation line department has been the only positive free cash flow contributor to the Port Authority but now has some of the largest upcoming capital expenditure needs. In addition, the Interstate Transportation Network's (Tunnels, Bridges and Terminals, PATH and the Ferry Service), ("ITN"), operating cash flow is insufficient to cover its own capital expenditure needs***

Aviation and ITN combined with Port Commerce and expenditures for economic and regional development produced approximately $700 million in free cash flow over a five year period ending in 2011, which amounts to an average of approximately $140 million per year. This figure is well below the sums required to fund critical line department capital projects that have been deferred or limited because of capital constraints of the Agency.

- ✧ ***The toll increases scheduled to go into effect over the next three years are necessary to meet the funding requirements of the Port Authority's Preliminary 2011 – 2020 Capital Plan presented below, and combined with the pursuit of further non-toll, non-fare, revenue enhancements, as well as Agency-wide cost structure improvements, will be critical to maintain ongoing transportation infrastructure in a "State of Good Repair"***

Table 1 – Preliminary 2011 – 2020 Capital Plan, by Year

($ billions)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Capital Plan + Incremental WTC Costs ($27.8B):	$ 2.9	$ 4.0	$ 4.6	$ 4.3	$ 3.0	$ 2.3	$ 2.2	$ 1.7	$ 1.4	$ 1.5	$ 27.8
Base Case:											
Capital Capacity:	$ 2.9	$ 4.0	$ 4.6	$ 4.3	$ 3.4	$ 2.7	$ 2.7	$ 2.1	$ 1.9	$ 2.0	$ 30.4
Excess / (Shortfall):	$ -	$ (0.0)	$ (0.0)	$ (0.0)	$ 0.4	$ 0.4	$ 0.5	$ 0.4	$ 0.5	$ 0.5	$ 2.6
Cumulative:	*$ -*	*$ (0.0)*	*$ (0.0)*	*$ (0.1)*	*$ 0.3*	*$ 0.7*	*$ 1.2*	*$ 1.6*	*$ 2.1*	*$ 2.6*	
Downside Case:											
Capital Capacity:	$ 2.9	$ 3.9	$ 3.4	$ 3.3	$ 2.4	$ 1.3	$ 1.8	$ 1.7	$ 1.4	$ 3.5	$ 25.6
Excess / (Shortfall):	$ -	$ (0.1)	$ (1.1)	$ (1.0)	$ (0.6)	$ (1.0)	$ (0.4)	$ -	$ -	$ 2.0	$ (2.2)
Cumulative:	*$ -*	*$ (0.1)*	*$ (1.2)*	*$ (2.2)*	*$ (2.8)*	*$ (3.8)*	*$ (4.2)*	*$ (4.2)*	*$ (4.2)*	*$ (2.2)*	

The Port Authority's preliminary 2011 – 2020 Capital Plan of $26.9 billion grows to approximately $27.8 billion once the incremental WTC costs (EAC of $14.8 billion) are added to the Preliminary 2011 – 2020 Capital Plan. **Table 1** examines two scenarios, including the Base Case and Downside Case. The Base Case is the current Port Authority forecast. The Downside Case is the Port Authority Base Case modified in coordination with the Agency's Finance staff to include considerations for volume declines and softening of the economic environment. In these situations, the Base Case shows capital capacity availability to fund a portion of the deferred projects mentioned in the Report. In the Downside Case, however, capital capacity is constrained. In either case, however, even with the toll increases enacted, the Port Authority will require careful prioritizing of spending, and implementation of the identified performance improvement initiatives, to ensure the region's infrastructure needs are met. Further emphasis on financial forecast sensitivities are necessary to properly evaluate effective contingency planning under various scenarios, such as a longer than expected regional economic recovery leading to revenues lower than forecast.

- ✧ ***Absent the recent and scheduled toll increases, the Port Authority would need to significantly reduce its Preliminary 2011 – 2020 Capital Plan, compromising the ability to maintain infrastructure assets in a "State-of-Good-Repair"***

Table 2 – Preliminary 2011 – 2020 Capital Plan, by Year, without Toll or Fare Increases

($ billions)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Capital Plan + Incremental WTC Costs ($27.8B):	$ 2.9	$ 4.0	$ 4.6	$ 4.3	$ 3.0	$ 2.3	$ 2.2	$ 1.7	$ 1.4	$ 1.5	$ 27.8
Base Case:											
Capital Capacity:	$ 2.9	$ 4.0	$ 2.9	$ 2.9	$ 2.4	$ 1.0	$ 0.8	$ 0.7	$ 2.2	$ 2.3	$ 22.0
Excess / (Shortfall):	$ -	$ (0.0)	$ (1.7)	$ (1.4)	$ (0.6)	$ (1.3)	$ (1.4)	$ (1.0)	$ 0.8	$ 0.8	$ (5.8)
Cumulative:	*$ -*	*$ (0.0)*	*$ (1.7)*	*$ (3.1)*	*$ (3.7)*	*$ (5.0)*	*$ (6.4)*	*$ (7.4)*	*$ (6.6)*	*$ (5.8)*	

The Port Authority has estimated that it would have to reduce its capital plan by nearly $6 billion if the planned toll increases are not enacted. This would result in necessary projects being deferred, delayed, or cancelled altogether, many of which are required to maintain key facilities in a state of good repair.

✧ ***While the Port Authority's preliminary 2011 – 2020 Capital Plan totaled $26.9 billion in capital expenditures, there is an additional $17 billion of known projects***

$26.9 billion is included in the preliminary Capital Plan for 2011 – 2020 and an additional $6.0 billion is expected beyond the 2020 budget period to complete projects initiated during the period. **Table 3** lists the key projects associated with the preliminary Capital Plan for 2011 – 2020.

Table 3 - Preliminary Capital Plan for 2011 – 2020 Key Projects

($ in millions)		PANYNJ Capital Needs						
Project Title	***Line Department***	***Mandatory***	***Security***	***State of Good Repair***	***System Enhancing Projects***	***State & Regional Projects***	***Revenue Producing Projects***	***Total***
LGA Redevelopment[1]	Aviation	-	-	175	300	-	605	1,080
EWR Terminal A Redevelopment[1]	Aviation	-	-	-	-	-	817	817
JFK Rehabilitation of Runway 4L-22R	Aviation	-	-	440	-	-	-	440
Runway Safety Area (RSA) Improvements	Aviation	269	-	-	-	-	-	269
JFK Delta Terminals 3 & 4 Redevelopment	Aviation	-	-	-	-	-	215	215
AirTrain (Primarily EWR)	Aviation	39	11	67	64	-	20	201
SWF Rehabilitation of Runways 9-27 and 16-34	Aviation	-	-	148	-	-	-	148
EWR Rehabilitation of Runways 4-22	Aviation	-	-	48	-	-	-	48
Subtotal	**Aviation**	**308**	**11**	**878**	**365**	**-**	**1,657**	**3,219**
Bayonne Bridge Navigational Clearance Program	TB&T	-	-	-	1,246	-	-	1,246
Lincoln Tunnel Access Project	TB&T	-	-	1,800	-	-	-	1,800
George Washington Bridge Suspender Cable Replacement	TB&T	-	-	715	-	-	-	715
Lincoln Tunnel Helix Project	TB&T	-	-	395	-	-	-	395
Goethals Design-Build-Finance-Maintain Program[2]	TB&T	-	-	176	-	-	-	176
Subtotal	**TB&T**	**-**	**-**	**3,086**	**1,246**	**-**	**-**	**4,332**
Signal Replacement Program	PATH	-	-	498	-	-	-	498
Tunnel Mitigation	PATH	-	254	-	-	-	-	254
Purchase of Railcars	PATH	-	-	238	-	-	-	238
Harrison Station Platform Elongation	PATH	-	-	-	206	-	-	206
Ductbank Tunnels Under-River	PATH	-	189	-	-	-	-	189
Grove St. Station Modernization	PATH	160	-	-	-	-	-	160
Substation - Washington St.	PATH	-	-	156	-	-	-	156
New Railcars for 10-Car Operations	PATH	-	-	-	147	-	-	147
Tunnel Floodgate	PATH	-	119	-	-	-	-	119
Railcar Overhaul Program	PATH	-	-	111	-	-	-	111
Subtotal	**PATH**	**160**	**562**	**1,004**	**353**	**-**	**-**	**2,078**
Port Jersey Marine Terminal Global Terminal Development	Port Commerce	-	-	-	-	-	159	159
Cross Harbor Development	Port Commerce	-	-	-	-	-	124	124
Port Newark Port Street Capacity and Corbin St. Ramp Improvement	Port Commerce	-	-	-	108	-	-	108
Port Jersey Marine Terminal ExpressRail Intermodal Facility	Port Commerce	-	-	-	-	-	102	102
Elizabeth North Ave Corridor Improvements	Port Commerce	-	-	-	66	-	-	66
Port Jersey Marine Terminal Access Improvements	Port Commerce	-	-	-	53	-	-	53
Subtotal	**Port Commerce**	**-**	**-**	**-**	**226**	**-**	**384**	**611**
Subtotal - Line Department Main Projects	**All**	**469**	**573**	**4,968**	**2,190**	**-**	**2,041**	**10,240**
Remaining 378 Smaller Projects	Aviation	282	423	1,897	484	-	206	3,292
Remaining 226 Smaller Projects	TB&T	10	90	1,864	274	-	140	2,378
Remaining 119 Smaller Projects	PATH	8	88	759	122	-	-	978
Remaining 95 Smaller Projects	Port Commerce	240	10	460	184	-	186	1,079
Subtotal - Remaining Line Dept. Smaller Projects	**All**	**541**	**611**	**4,980**	**1,064**	**-**	**531**	**7,728**
World Trade Center Program	WTC	3,350	500	-	40	140	2,870	6,900
Capital Infrastructure Fund	CIF	-	-	-	-	990	-	990
Regional Programs	SRP	-	-	-	-	950	-	950
Development	Development	-	-	10	20	-	-	30
Subtotal - Other Capital Programs	**All Other**	**3,350**	**500**	**10**	**60**	**2,080**	**2,870**	**8,870**
Total Value of Projects in 2011 Capital Plan		**$ 4,359**	**$ 1,684**	**$ 9,958**	**$ 3,314**	**$ 2,080**	**$ 5,442**	**$ 26,838**
Subtotal - Value of Projects Funded Beyond 2020	**All**	**310**	**40**	**3,460**	**1,320**	**140**	**770**	**6,040**
Total Value of Funded Projects	**All**	**$ 4,669**	**$ 1,724**	**$ 13,418**	**$ 4,634**	**$ 2,220**	**$ 6,212**	**$ 32,878**

Notes:

1) *Includes only the PFC funded portion of the project*
2) *Includes only land acquisition*

Unmet needs of $11.4 billion have been identified, of which over 50 percent are required to maintain facilities in a State of Good Repair.

✧ ***Significant change at the Port Authority is already underway***

To date, the Port Authority completed or has underway over 50 distinct reform initiatives that range from addressing appropriate compensation and benefits structures, to the more profound measures of adopting Key Operating Principles and revamping of its organizational design.

Numerous key findings and resulting recommendations have been identified that primarily relate to revenue enhancements, monetization of asset value, and cost savings opportunities. One-time benefits identified are preliminarily estimated to be in the hundreds of millions of dollars, mainly from evaluation of strategic alternatives from certain real estate assets as well as the review of air right developments over certain Port Authority infrastructure assets. Recurring annual benefits associated with these recommendations, which require significant further diligence and execution planning, range between $159.7 million and $339.8 million (the sum of Non-Toll/Non-Fare Revenue Enhancement Initiatives), **Table 4**, and Cost Containment Initiatives**.** Some of these initiatives have been suggested under previous leadership but failed to materialize for various reasons. Yet the significant opportunity and focus of current leadership warrants further exploration of these opportunities (see **Table 5**).

Table 4 – Non-Toll / Non-Fare Revenue Enhancement Impact

$ in Millions	One Time ($)		Annually ($)		Investment ($)	Annually ($)
Non-Toll Revenue Enhancement Initiatives	Low	High	Low	High	Capex (One-Time)	Opex (Ongoing)
Summary, by Line Department						
Aviation			$15.8	$25.7	$90.0	$0.0
TB&T			$23.0	$101.0	$0.0	$0.4
Port Commerce			$19.0	$24.3	$21.0	$8.0
PATH			$6.1	$13.8	$37.5	$0.0
Grand Total - 4 Line Segments			**$63.9**	**$164.8**	**$148.5**	**$8.4**
Real Estate & Development (1),(2)	Estimates in excess of $100MM		$0.0	$0.0	$0.0	$0.0
Total Revenue Enhancement Initiatives			**$63.9**	**$164.8**	**$148.5**	**$8.4**

Notes:

1) *Real Estate & Development initiatives include strategic evaluation of air rights over Dyer St as well as the North Wing of the Port Authority Bus Terminal; The current value of the potential development of these air rights is speculative at best as significant cost considerations must be included to support infrastructure necessary for project completion; Air right valuation is currently under review by Port Authority management*
2) *The Executive Director announced that the Port Authority will explore the strategic alternatives for the Newark Legal Center as well as the Teleport*

Table 5 – Cost Containment Initiatives

($ in millions) Cost Containment Initiatives	Savings Annually ($) Expected	Savings Annually ($) High End	Investment ($) Capex (One-Time)	Annually ($) Opex (Ongoing)
Summary, by Line Department				
Aviation	$2.2	$2.2	$5.0	$0.0
TB&T	$0.0	$0.0	$0.0	$0.0
Port Commerce	$9.6	$12.0	$45.0	$0.3
PATH	$0.7	$0.7	$0.3	$0.2
Grand Total - 4 Line Segments	**$12.4**	**$14.9**	**$50.3**	**$0.4**
Other				
Procurement (1)	$9.7	$20.5	$3.0	$0.1
Capital Planning & Execution (2)	$28.0	$84.0	$0.0	$0.0
Employee Benefits	$35.8	$35.8	$0.0	$0.0
Work Rules for Represented Employees (3)	$9.9	$19.8	$0.0	$0.0
Total Cost Containment Initiatives	**$95.8**	**$175.0**	**$53.3**	**$0.4**
Grand Total: Revenue Enhancement plus Cost Containment (4)	**$159.7**	**$339.8**	**$201.8**	**$8.8**

Notes:

1) *Further studies need to be performed to determine the cost savings impact of Procurement Department recommendations*
2) *Potential cost savings from reductions in soft costs for the preliminary 2011 Capital Plan (not creditable to net income)*
3) *Work rule changes or modifications will likely yield significant cost savings; However, they will require unilateral actions in some cases and new collective bargaining agreements in others; A significant amount of the savings would likely come from a reduction in overtime; In 2011, $64 million of the $99 million in overtime came from Public Safety and PATH; Targeting a 10 percent to 20 percent reduction in overtime would yield the Port Authority $9.9 million to $19.8 million in savings*
4) *Total savings of $159.7 million and $339.8 million represents 6.2% and 13.3%, respectively of 2012 budgeted expenses*

- ***Even with the revenue from the planned toll increases, the Port Authority is potentially at risk of not satisfying certain Ratings Agency metrics as early as mid-2014. Furthermore, to the extent that a near to intermediate term recession occurs, or the economic recovery underway stalls, the point at which these metrics may not be satisfied could be accelerated. Prompt and successful implementation of the performance improvement initiatives is therefore critical***

Given tight credit metrics and an ambitious capital plan with many critical projects, the revenue and cost containment initiatives identified above should be prioritized and plans put in place with a level of urgency. In addition, the Port Authority should conduct revised sensitivity analyses utilizing most recent economic trend data and develop contingency plans accordingly. Contingency plans should include accelerated performance improvement initiatives, potential re-prioritization of capital spending as well as pursuit of alternative sources of capital to support its infrastructure investment.

- ***The Port Authority has a unique opportunity to recruit and select key management leadership positions (e.g., Chief Operating Officer, ("COO"), Chief Financial Officer, ("CFO"), Chief of Capital Planning, Execution and Asset Management, and other senior management positions) to support the Board of Commissioners, Executive Director and Deputy Executive Director that will be vital to the successful transformation of the Agency***

In pursuing the placement of these positions, strong consideration should be given to providing competitive compensation relative to the private sector and Agency peers, with strong incentive based components for achieving the specific and documented targeted performance improvement initiatives. Competitive compensation with aligned incentives will be key to attracting the best talent and reinvigorating the Agency's performance profile.

- ***Significant work remains, and the continued absolute resolve of the Agency's leadership will be required to ensure timely implementation***

Leadership recognizes difficult decisions are required to prioritize and allocate resources. The Port Authority's "roadmap to transformation" is driven by key initiatives that are detailed in this report including:

- Full implementation of the recently approved restructuring of the Board of Commissioners' Corporate Governance;
- Adoption, throughout the Agency, of the Key Operating Principles established by the Special Committee;
- Incorporation of the organizational design changes that will facilitate cross-functional communication and break-down existing silos within the agency;
- Centralization of command and control under a Chief Security Officer with careful consideration and thoughtful pursuit of the Chertoff Group's recommendations for enhancements to the security apparatus;
- Relentless focus with designated oversight, requisite resources, and accountability standards to ensure successful implementation of revenue enhancement and cost containment initiatives across all line and staff departments; and,
- More effective and efficient delivery of capital projects, including leveraging third-party expertise and capital when it results in more efficient execution, to meet the current and future needs of the Agency.

II. OVERVIEW

BACKGROUND

✧ ***The Port Authority region is one of the most diversified areas of the nation and serves as one of the world's major economic hubs***

The Port Authority region is a center of international banking and commerce as well as entertainment, news media and manufacturing. Known as the Port District, the region includes the five New York boroughs of Manhattan, Brooklyn, Queens, Staten Island and the Bronx; the New York counties of Nassau and Westchester; and parts of nine northern New Jersey counties of Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset and Union. This region can be further defined by the following statistics:

- 3,900 square miles;
- Population of 18 million;
- 8.6 million jobs;
- Gross regional product of more than $1.0 trillion, which would rank 15th among world-wide economies, and is the single largest metropolitan region in the U.S.; and,
- 27 Fortune Global 500 companies are headquartered in New York and New Jersey generating in excess of $1.5 trillion in global revenues.

✧ ***Since the Agency's beginnings in 1921, the Port Authority has undergone remarkable evolution, expanding dramatically in scope and breadth***

The Port Authority was originally created to address traffic congestion in the New York harbor during World War I that challenged both the private and public sector. Authorized by legislation, today the Agency's portfolio of infrastructure assets is vast, including airports, tunnels, bridges, bus terminals, rail services, and port commerce facilities that serve a crucial role in bi-state commerce and regional economic growth. These assets serve a central role in enabling employment and generating revenue for the New York-New Jersey Metropolitan Region and beyond.

Figure 1 benchmarks the Port Authority's operating departments, as compared to other similar transportation infrastructure related agencies.

Figure 1 – Port Authority - Key Asset Benchmarking 2011

- ✧ ***The Port Authority's mission statement represents the vital role and economic contribution the Agency makes in support of the economies of New York and New Jersey***

"To identify and meet the critical transportation infrastructure needs of the bi-state region's businesses, residents, and visitors; providing the highest quality, most efficient transportation, and port commerce facilities and services that move people and goods within the region, providing access to the rest of the nation and to the world, while strengthening the economic competitiveness of the New York-New Jersey Metropolitan Region."

According to a Port Authority study, as recently as 2009, air passengers and cargo generated $16.8 billion in wages and $48.6 billion in sales to the region and supported nearly 415,000 jobs; while Port Commerce activity supported over 269,000 jobs in the region, $11.2 billion in wages, and over $36 billion in sales. Nearly 240 million vehicles passed through and over Port Authority tunnels and bridges in 2011, and, over the same period, more than 150 million passengers traveled by way of PATH and Port Authority Bus Terminals across the bi-state region.

CURRENT LANDSCAPE

- ***The Port Authority faced unprecedented challenges in the first decade of the 21st century. Change in its core transportation businesses is challenging the operating margins of the Line Departments just as the Agency nears the later stages of the useful life for many of its core assets. This tension of weak to modest economic growth and declining operating margins in the face of growing capital needs is a central challenge***

A majority of the Port Authority assets have been in operation for more than half a century. Many facilities such as the airports, tunnels, bridges and terminals are capacity constrained and nearing the end of their useful lives. A focus on ensuring the State of Good Repair ("SGR") of existing infrastructure assets, combined with the demand for disciplined capital spending, is an absolute necessity to advance safety, security and quality service to a diverse group of stakeholders. The Port Authority's organizational structures must be better aligned to meet this challenge.

Over the next 10 years (*i.e.,* during the preliminary 2011 – 2020 Capital Plan budget period), the Agency's needs are significantly greater when compared to the prior 10 years, in large part attributable to deferred maintenance capital expenditures. **Table 6** below presents the average age of each of the Port Authority's core infrastructure assets.

Table 6 – Average Age of Facilities, Historical Capital Spend and Anticipated Investment

($ in millions)	Aviation	TB&T	PATH	Port Commerce
Average Age of Facilities	**52**	**75**	**72**	**57**
Capital Spend 2001 - 2010	$ 6,077	$ 2,071	$ 1,345	$ 2,334
Unconstrained 2011-2020 Capital Plan	$ 11,910	$ 14,520	$ 5,330	$ 3,290

- ***While the Port Authority has generated operating cash flow from 2007 – 2011 of approximately $5.4 billion, the Agency was laden with over $7.8 billion in net capital requirements creating a cumulative free cash flow shortfall of approximately $2.5 billion***

Table 7 depicts historical operating cash flows and free cash flow from 2007 – 2011 segmented by Line Department and by Facility.

Table 7 – Cumulative Cash Flows by Facility 2007 – 2011

($ in Millions)	Cumulative 2007 - 2011 Gross Revenue	Expenses	Operating Cash Flow [1]	PFCs, Grants & Other	CAPEX	Free Cash Flow [2]
Aviation						
LGA	$ 1,559.7	$ (1,160.2)	**$ 399.5**	$ 368.5	$ (495.1)	**$ 272.9**
JFK	4,876.8	(3,232.8)	**1,644.0**	629.0	(1,283.5)	**989.5**
Newark	3,681.3	(2,036.5)	**1,644.8**	419.2	(732.8)	**1,331.2**
Teterboro	171.2	(94.1)	**77.1**	48.5	(129.0)	**(3.4)**
Stewart	36.5	(71.0)	**(34.5)**	16.4	(58.3)	**(76.5)**
Heliports	7.6	(5.9)	**1.7**	0.1	14.5	**16.3**
Total Aviation	**10,333.1**	**(6,600.6)**	**3,732.5**	**1,481.7**	**(2,684.2)**	**2,530.0**
INTERSTATE TRANSPORTATION NETWORK:						
TB&T						
Holland tunnel	580.4	(346.8)	**233.7**	2.4	(95.0)	**141.1**
Lincoln Tunnel	742.9	(452.5)	**290.4**	5.2	(129.1)	**166.5**
GW Bridge	2,110.2	(531.9)	**1,578.2**	2.9	(242.1)	**1,339.0**
Bayonne Bridge	136.0	(112.4)	**23.6**	0.7	(52.8)	**(28.4)**
Goethals Bridge	577.9	(123.1)	**454.8**	0.7	(79.5)	**376.0**
Outerbridge Crossing	519.0	(116.7)	**402.3**	0.7	(13.1)	**389.9**
GW Bus Station	6.6	(38.2)	**(31.6)**	0.2	(12.1)	**(43.6)**
PA Bus Terminal	167.2	(486.4)	**(319.1)**	36.3	(196.6)	**(479.4)**
Total TB&T	**4,840.2**	**(2,207.9)**	**2,632.2**	**49.1**	**(820.3)**	**1,861.1**
PATH	**547.4**	**(1,565.9)**	**(1,018.5)**	**69.3**	**(1,360.8)**	**(2,310.0)**
Ferry Service	**0.9**	**(13.5)**	**(12.6)**	**4.2**	**(79.7)**	**(88.1)**
Total Interstate Transportation Network	**5,388.4**	**(3,787.3)**	**1,601.1**	**122.7**	**(2,260.8)**	**(537.0)**
Port Commerce						
Port Newark	408.3	(347.6)	**60.7**	10.9	(388.5)	**(316.9)**
Port Elizabeth	516.0	(139.3)	**376.7**	3.2	(411.0)	**(31.2)**
Brooklyn Marine Terminal	25.9	(56.2)	**(30.3)**	(0.2)	4.1	**(26.5)**
Red Hook	15.8	(30.0)	**(14.3)**	0.0	(1.0)	**(15.3)**
Howland Hook	80.1	(49.5)	**30.6**	0.3	(190.8)	**(159.8)**
NYNJ Rail	3.7	(14.6)	**(10.9)**	5.1	(15.5)	**(21.3)**
Port Jersey	52.9	(94.6)	**(41.7)**	-	(141.9)	**(183.6)**
Total Port Commerce	**1,102.7**	**(731.8)**	**370.8**	**19.2**	**(1,144.6)**	**(754.5)**
World Trade Center	**380.6**	**(614.6)**	**(234.0)**	**3,252.6**	**(6,181.1)**	**(3,162.5)**
Other						
Total Regional & Economic Development:[3],[4]	501.1	(566.5)	(65.5)	2.3	(422.8)	(486.0)
Port Authority Captive Insurance Entity	0.0	(12.5)	**(12.4)**	-	(29.6)	**(42.0)**
Total Other	**501.1**	**(579.0)**	**(77.9)**	**2.3**	**(452.4)**	**(527.9)**
Grand Total	**$ 17,706.0**	**$ (12,325.8)**	**$ 5,380.1**	**$ 4,878.5**	**$ (12,752.6)**	**$ (2,494.0)**

Notes:

1) *Operating cash flow is defined as gross revenues less operating & maintenance expenses and allocations*
2) *Free cash flow is defined as operating cash plus PFCs, grants & other, less capital expenditures*
3) *Includes Essex County Resource Recovery Facility, Newark Legal Recovery Center, Teleport and other real estate development projects*
4) *Amount includes state and regional programs and funds for the Capital Infrastructure Fund*

With the exception of the WTC, which has been funded mainly through the issuance of debt and third-party reimbursements, such as insurance and FTA grants, Aviation was the only positive free cash flow contributor to the organization over the past five years. It is important to note, however, that Aviation is embarking upon significant capital projects in the next few years to revitalize its asset base.

Table 8 below shows the relative free cash flow, per Line Department, for every $1.00 of revenue received (including Passenger Facility Charges "PFCs", Grants & Other).

Table 8 – Key Metrics by Line Department: 2007 - 2011

	Aviation Per Passenger	TB&T Per Vehicle	PATH Per Passenger	Port Commerce Per Container	Cumulative Per Unit
Revenue:	$ 22.46	$ 7.96	$ 1.48	$ 42.57	$ 74.47
Free Cash Flow :	$ 4.47	$ 3.00	$ (3.11)	$ (28.33)	$ (23.97)
Margin %	19.9%	37.7%	-210.1%	-66.5%	-32.2%

Aviation operations generated, on average, over $20.00 in revenue per passenger and over $4.00 in free cash flow per passenger from 2007 – 2011. Tunnels, Bridges & Terminals ("TB&T") on average generated over $7.50 of revenue per vehicle, with free cash flow of approximately $3.00 after accounting for its capital expenditures. PATH alone produced a loss of $3.11 for every passenger carried. It should be noted that losses at mass transit systems like PATH in the United States are typical. For example, the MTA, Chicago Transit Authority, Massachusetts Bay Transit Authority, SE Penn Transportation Authority, Bay Area Rapid Transit (San Francisco) are all systems that operate in a significant deficit position. In addition, the Port Authority receives no Federal or State subsidies, while MTA, NJ Transit and most other major systems in the United States receive substantial external financial support.

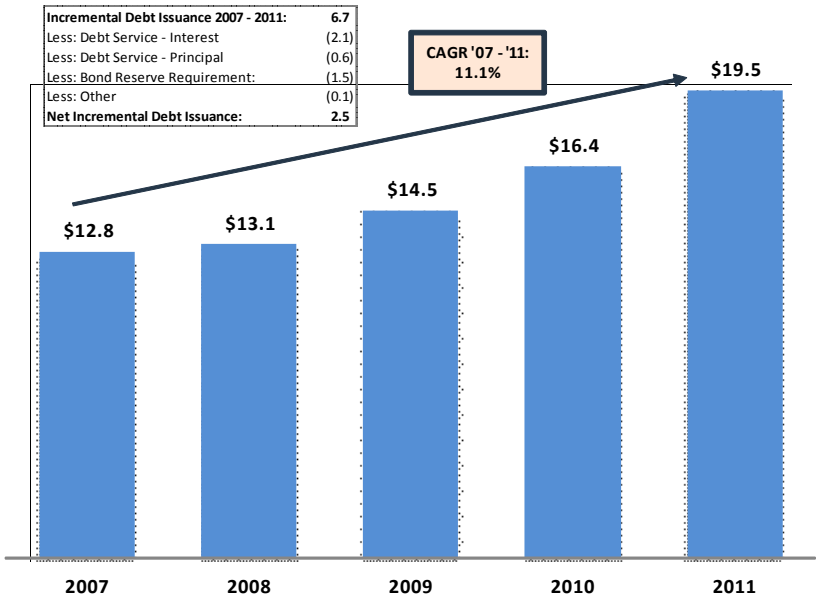
Given the integrated nature of the cross state transportation solutions, TB&T, PATH, and the Ferry service are reported with the Port Authority on a consolidated basis as the ITN. For the five year period, ITN combined had negative free cash flow of approximately $537 million. In addition, ITN is facing enormous near-term capital needs.

Port Commerce produced a loss in excess of $28.00 per container given that its income revenue stream from tenant rentals is insufficient to offset large, recurring capital projects, such as dredging, that are required to support operations.

- ✧ ***In order to finance capital needs, the Port Authority has relied on debt issuance to bridge the funding gap***

From 2007 – 2011, debt balances have grown significantly at a Compounded Annual Growth Rate ("CAGR") of 11.1 percent (see **Figure 2**).

Figure 2 – Total Outstanding Debt 2007 – 2011 ($ billions)



ACHIEVEMENTS AND INITIATIVES UNDERWAY

The recently appointed Chairman, Vice Chairman, Executive Director, Deputy Executive Director as well as the other Commissioners acknowledge the adversities that face the Port Authority and have taken action to address them.

- ✧ ***Over the course of the last year, the Board of Commissioners and senior management has taken a proactive approach to reinvigorate the agency***

Over 50 initiatives have commenced in this key period of transition in areas such as:

- Corporate Governance
- Organizational Design
- Employee Benefits
- Capital Planning & Execution
- Operational Performance Improvements within Line and Staff Departments
- Public Safety and Security

Highlights of recent achievements and initiatives that have commenced in this key period of transition are detailed in **Appendix – D: Achievements & Initiatives Underway**.

These initiatives, and the spirit of collaboration and cooperation from the Port Authority's employees in the preparation of this report, evidence the organization's focus and commitment to drive performance improvement.

To reinforce this determination, the Chairman, Vice Chairman and Special Committee, in collaboration with the Executive Director and Deputy Executive Director, have defined a set of

key operating principles to guide and define the conduct of the Agency in the execution of its responsibilities and mission:

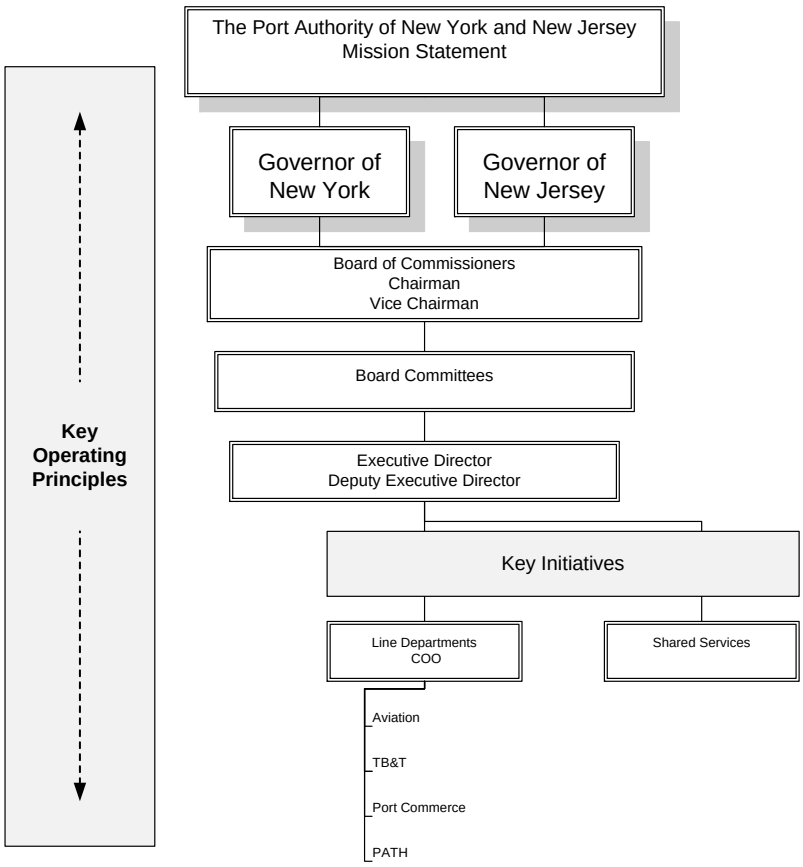
KEY OPERATING PRINCIPLES

Table 9 – Key Operating Principles

Key Operating Principles of The Port Authority of New York & New Jersey
The Agency must pro-actively communicate, be transparent in its decision making, and set clear expectations with the New York and New Jersey state governments, local municipalities, related agencies and the public it serves;
The Agency must make protecting the assets and constituents the highest of priorities throughout all of its operations;
The Agency must develop an operating structure to enable its talented professionals to execute and maximize performance;
The Agency must strive to align incentives amongst all its employees, management and labor, to achieve its mission;
The Agency must continually evaluate opportunities for revenue enhancement from non-toll sources, improved productivity, better collection efforts and cost effective execution in delivery of its services to minimize the monetary burden on its constituents;
The Agency must continue to provide timely, relevant, reliable and succinct analysis, including historical and expected performance metrics, to ensure the Board of Commissioners, in exercising its oversight responsibilities, can make fully informed decisions and drive accountability;
The Agency must review and continuously refine each of its business unit's strategic and capital plans, with emphasis on actionable and measureable goals and objectives;
The Agency must continually evaluate and utilize innovative and creative ways to efficiently deploy its capital, effectively manage the assets that it is entrusted to develop and support, and hold itself accountable for delivering measured performance;
The Agency must collaborate to capture the value of its employees' collective knowledge and experience, and optimize the use of its resources to provide shared services support to the line functions; and,
The Agency must manage enterprise risk through consistent identification, education, and execution of mitigation strategies, while measuring its performance against its goals.

A set of operating principles can only provide guidance to the organization and meaningful change will require a level of support and cooperation throughout the chain of command in the Agency. The chart below shows a representative view of all the interdependencies inherent throughout the Port Authority organization (see **Figure 3**).

Figure 3 – Key Operating Principles Chart of Interdependencies



Port Authority leadership and Line Departments have identified, evaluated, and provided further recommendations that serve to enhance corporate governance and organizational design. Key initiatives that drive measureable change are presented in greater detail herein.

III. APPROACH & METHODOLOGY

Navigant met with appropriate management personnel, issued various information requests, and conducted structured interviews with all levels of Port Authority staff, often involving personnel across multiple departments on a particular topic area. Various documents reviewed have been considered in the development of this report. In addition, review sessions and discussions were conducted with members of the Board of Commissioners and the Special Committee. Site visits were conducted as appropriate. Navigant summarized its findings and recommendations in this report (subject to the limitations set forth in **Appendix – E: Report Qualifications & Disclaimer**), referred to hereinafter as the Phase II Report.

ORGANIZATIONAL DESIGN & EFFECTIVENESS

To evaluate corporate governance and organizational design structures and practices, Navigant reviewed the existing Port Authority By-Laws as well as board minutes and actions undertaken during board sessions. In addition, Navigant conducted multiple meetings with the Chairman, Vice-Chairman and members of the Special Committee as well as held numerous discussions with the Executive Director and Deputy Executive Director. Navigant also considered industry best practices to provide a perspective of the appropriate balance between the structures utilized by public versus private enterprises.

OPERATIONAL ASSESSMENT

Navigant facilitated meetings with the heads of each Line Department, including selected key personnel, as well as critical support services departments, including Procurement, Law, and Engineering. Subsequent to such meetings, further information requests were made with the purpose of understanding key issues and opportunities as it related to revenue enhancement, cost containment, and operational efficiency. Additionally, follow-up meetings were held to probe specific areas for improvement through collaborative work sessions with each department. Where appropriate, Navigant toured the Line Department facilities to establish first-hand knowledge of the respective operations and related issues.

WTC COST REVIEW

To finalize the WTC Program Estimate at Completion ("EAC"), initiated in Phase I, Navigant facilitated working sessions with World Trade Center Construction ("WTCC"), World Trade Center Redevelopment ("WTCRD"), Finance, and key private sector partners to reach consensus on the baseline cost budget. Formal risk modeling efforts were employed to achieve increased levels of confidence in the total EAC presented in the Interim Report. These calculations are bolstered by project specific risk registers that allow for probability assessments to be made on identified exposures. Finally, a series of collaborative meetings of all project participants resulted in a qualitative validation of the technical analyses.

CAPITAL PLANNING ASSESSMENT

Navigant interviewed Capital Planning executives, Project Directors, Project Managers within Line Departments, Engineering department management, senior personnel in Management and Budget Department, ("MBD") and various professionals that report directly to the CFO, to better understand the evolution of the Capital Planning function within the Port Authority and determine current roles and responsibilities as it relates to the development and execution of the capital plan. Subsequently, Navigant reviewed the "Unconstrained Needs" analysis that formed the foundation of the preliminary 2011 – 2020 Capital Plan and identified "Unmet Needs" by asset type and business line. Navigant personnel toured various facilities, including the WTC site, to have direct knowledge of intended improvements and planned investments. Additionally, Navigant worked collaboratively with MBD and individual Line Departments to develop an integrated forecast model to assess the impact on the capital capacity of the Agency of performance under various financial and operational scenarios. In addition, Navigant evaluated the targeted benefits of revenue enhancements, cost reductions and alternative financing strategies in mitigating funding shortfalls.

IV. CORPORATE GOVERNANCE

OVERVIEW

As the Governors of New York and New Jersey have mandated an enterprise-wide review of the Agency to drive transformational change and achieve material productivity and efficiency enhancements, the Board of Commissioners is leading by example and has examined its own effectiveness in its stewardship of the Agency.

The Port Authority was created out of the premise that neither federal, state and local governments nor the private sector could address the long standing harbor congestion in the late 1800's and early 1900's. Both states of New York and New Jersey became convinced that a regional focus was the only real solution. What was born was a proud, public agency that extends across geopolitical boundaries. The formative legislation envisioned that there will always be a need for effective collaboration and consensus to lead this organization through the challenges encountered in pursuit of the Agency's mission.

The Port Authority essentially is a public "joint-venture" between the two states, both with common, yet also potentially disparate, interests. By tradition, and acts of legislation, the Chairman and Deputy Executive Director are each appointed by the Governor of New Jersey, and the Vice Chairman and Executive Director are each appointed by the Governor of New York. Each respective Governor appoints six members of the Board of Commissioners. The Governors each retain veto rights of the minutes of the Board of Commissioners by which all major decisions of the Agency are approved. While this veto right exists, it has not been exercised in recent history. The relationship between the Executive Director and Deputy Executive Director lacks definition; yet by virtue of their presence in the same box of the formal organization charts, it suggests an equality of authority. In the absence of collaborative communication, concerted efforts to build bi-state consensus, and reasoned approaches to resolution of conflicted interests, this duality of control can readily lead to challenges. Given this structural reality, the current Executive Director and Deputy Executive Director conscientiously demonstrate a mutual commitment to effective, coordinated management that is vital to the overall success of the organization.

Thus, the focus from an organizational design and effectiveness perspective should be to ensure that rules of engagement and the appointed professionals' relationships are devoted to the success of the joint venture and the mission it was created to execute. Indeed, it can be argued that it is this duality of control, inherent in the design of the executive leadership and Board of Commissioners that allows the Agency to be effective by making consensus necessary in operations and governance. A portion of this Report focuses on providing recommendations to establish rules of engagement to further facilitate effective consensus and decision making, while efficiently utilizing the resources available to the Agency in the furtherance of its mission.

As previously reported, several factors, including responses to the crisis of September 11, 2001, the subsequent rapid turnover of multiple Executive Directors, and lack of confidence in the prior Executive Director, has led the Board of Commissioners to necessarily insert itself into

many aspects of the Port Authority operations. That landscape has changed dramatically, and the relationship between the Chairman/Vice-Chairman and Executive Director/Deputy Executive Director is serving to provide a crucial supporting foundation to the desired transformation of the organization. The committee composition of the Board of Commissioners provides an important element in that effort. It should be noted that the appointments to the Board of Commissioners of the Port Authority are unpaid, highly accomplished public servants who dedicate considerable time on a regular basis to provide insight, private sector expertise, analytical thought, and oversight to Port Authority matters.

The Board of Commissioners at its most recent meeting approved a wide-ranging restructuring of the board committees to underscore and reinforce the change underway at the Agency. These changes will allow for more active committees with regular meetings that have clear, focused charters to better align the Board of Commissioners with the needs of the Agency for the foreseeable future.

CURRENT COMMITTEE CONFIGURATION

The Port Authority has seven "By-Law" committees, (*i.e.*, those that were established under the By-Laws of the Port Authority) and two "ad-hoc" committees that were created in 2007 to address discreet issues of Agency interest.

The committees met an average of five times in 2011, with a majority of meetings taking place in public session. The Operations Committee was the most active with 10 meetings. On the other hand, the ad-hoc Labor Committee has not met since fulfilling its principal objective in 2007 and 2008 to address wage and benefits policy for non-trade unskilled labor service. Overall, the Committees were assigned approximately 132 items from the Board of Commissioners in 2011 (see **Table 10**).

Table 10 – Summary of "By Law" Committee Responsibilities

Committee	Current Responsibilities
Governance & Ethics	Oversight over Governance / Ethics Activities Develop and Maintain Agency Code of Ethics Review Independence and Objectivity of the Board of Commissioners Monitoring of Committees Legal / Compliance Oversight Executive Director Performance Reviews
Audit	Establish Accounting Policies & Procedures / Oversee Compliance Selection / Review / Monitoring of Auditors Oversight over Annual Audit Review Annual Financial Statements Review / Establish Procedures for Inspector General Report Review

Committee	Current Responsibilities
Capital Programs and Agency Planning	Lead Development of Capital / Strategic Plan Review Long-Term Planning for the Development of New Facilities Including Related Studies Continual Review of Line Department Maintenance and Capital Needs Supervision Over Preparation of Economic Development Studies
Operations	Oversight Over All Operation / Maintenance of Facilities Procurement Related to Operational Aspects of the Agency Direct Sale of Port Authority Owned Property Oversight of Personnel Related Matters
Finance	Approve Selection of Depositories Approve Investments and Reinvestments thereof Approve Insurance Policies and Surety Bonds Oversight of Financial Affairs of the Port Authority
Construction	Oversight of All Port Authority Construction Matters Oversight of Agreements / Contracts for Property Acquisition Oversight of Agreements / Contracts for Construction Materials
Security	Oversight of Security Requirements Oversight of Security Recommendations

To evaluate the current corporate governance structure and evaluate its effectiveness, Navigant conducted a series of discussions with members of the Special Committee and the Executive Director, Deputy Executive Director and Secretary of the Board. Navigant also reviewed the By-Laws of the Agency to understand the historical basis of the committee configurations as well as documentation detailing board activities. Finally, Navigant compared the Agency to prevailing board governance strategies in both public agencies and in the private sector.

OBSERVATIONS & FINDINGS

- ***By necessity, the Board of Commissioners have become increasingly active in the day-to-day operations of the Agency***

The rapid turnover of Executive Directors over the last decade as well as the Board of Commissioners' lack of confidence in the prior Executive Director compelled the commissioners to become increasingly involved in the day-to-day operations of the Agency. In 2011, the Board committees had over 132 assigned action items, much that was transactional in nature. Now, the Board of Commissioners' challenge as the governing body is to ensure keen focus on the strategic priorities of the Agency, and to provide well informed guidance, insights and direction to management, and hold the Agency ultimately accountable for its measured results.

- ***Priorities have evolved. Focused committees drive transformational change and require reliable, relevant, and timely information to fulfill their fiduciary duties***

The Port Authority operates in a unique context. The Board of Commissioners is ultimately accountable to the Governors, who appoint the Commissioners, while the respective state legislatures may make changes at the Port Authority if identical legislation is passed by both

states. Further, each of the Governors also possesses an effective veto right over the actions of the Board.

In recent years, boards of directors in the private and public sector have evolved significantly from being reactive advisors, often serving the specific interests of the Chief Executive Officer or elected executive branch official, to providing proactive oversight requiring timely, reliable, and relevant information to support decision making and ensure accountability. Private sector corporate governance, and its public counterpart, has trended toward greater transparency and candor with outside stakeholders. This market environment provides a unique opportunity for the Board of Commissioners to adopt private and public sector best practices in its effort to enhance the execution of its oversight responsibilities and fiduciary obligations, and the Board of Commissioners has already made tremendous progress. A number of the initiatives recently championed by the Board of Commissioners can be found in **Appendix – D: Achievements & Initiatives Underway**.

- ✧ ***At its most recent board meeting, the Board of Commissioners reorganized its Committee structures to better align with the Agency's long term objectives. The restructuring maintains certain existing committee functionalities while consolidating related duties to more effectively manage the continuum of oversight responsibilities***

The consolidation of certain committees is based on functionalities, priorities and goals. Committees with clear charters will better harness the expertise of the Commissioners, direct the efforts of staff, create a more focused environment for decision making, and allow more effective oversight and accountability. Several changes implemented are highlighted in **Table 11** below.

Table 11 – Highlights of Approved Committee Changes

Committee Changes	Description
Consolidate/repurpose the "Capital Programs and Agency Planning", and the "Construction" committees, into a new "Capital Planning, Execution and Asset Management Committee" ("CPEAM")	Capital planning, execution and asset management are a continuum of responsibilities that are inclusive of engineering and project management. This new committee is designed to ensure a level of cohesive oversight and accountability for components of capital projects delivery and the ongoing maintenance of the agency's diverse infrastructure and real estate asset base.
Existing stand-alone WTC subcommittee (with its current responsibilities) to be subsumed into the newly formed CPEAM committees a separate sub-committee	Construction of the downtown redevelopment project is moving toward completion. Thus, asset management, versus development and construction, is the evolving priority of focus for the success of this endeavor.
Expand focus of the Finance Committee	In collaboration with the CPEAM, the Finance Committee will include evaluation of innovative debt and other alternative financing strategies, as well as review of related insurance matters. The current insurance working group becomes a standing sub-committee.
Eliminate other inactive subcommittees	Integration of remaining functionality into appropriate primary By-Law Committee (e.g. Labor into Operations).
Broaden the defined responsibilities of certain By-Law committees	Examples include moving compensation and employment agreement discussions into Operations; Enterprise Risk Management into Audit, etc.

Committee Changes	Description
Create sub-committee under the Operations Committee to address Regulatory, Government, Inter-Agency, and Community Relations	Create new sub-committee under the Operations Committee to address communications with regards to regulatory, federal, state and local issues as well as community relations. Enables a comprehensive, Agency-wide approach to these issues and better transparency with various governmental and sister agencies.
Enhance Security Committee	Priority given as a result of recommendations from the Chertoff report, that were subsequently approved by Board of Commissioners creating the Chief Security Office function.

In addition to the revised structure of the Board Committees, the following actions will be implemented:

- **The Board of Commissioners will schedule and conduct a full annual strategic planning session** to provide dedicated focus on long term agency mission, goals and objectives, and development and review of strategic plan for achieving same.
- **The Board of Commissioners will develop charters** for each committee articulating the guidelines for meetings, revised responsibilities, authorities, and objectives to align with priorities and needs of the Agency.
- **The Board of Commissioners will work with the Port Authority senior management to establish and/or revitalize performance dashboards** designed to monitor performance and progress on Agency key initiatives. Dashboards will be tracked by each relevant Committee and consolidated for regular review by the full Board of Commissioners.
- **The Board committees will create structured points of connectivity** between certain committees to ensure effective communication and coordination (*e.g.*, CPEAM quarterly meeting with Finance Committee, and/or make reciprocal appointments of each Chair as member of the reciprocal committee).
- **The Board of Commissioners will evaluate sequenced scheduling** to allow for more frequent committee meetings as well as effective and informed reporting to full Board (*e.g.*, monthly committee and then quarterly full Board meetings).
- **The Board of Commissioners will make critical success factors** a priority for governance effectiveness. These include:
    - Developing and articulating a clear strategic plan;
    - Ensuring committees are relevant, focused and disciplined;
    - Maintaining transparency, conducting ongoing measured performance monitoring, and driving accountability;
    - Continuing to appoint committee chairs and members with requisite expertise and experience;
    - Identifying committee chair and member responsibilities with clarity;
    - Providing designated senior management staff participation and appropriate analytical support; and,
    - Facilitating well informed decision making.

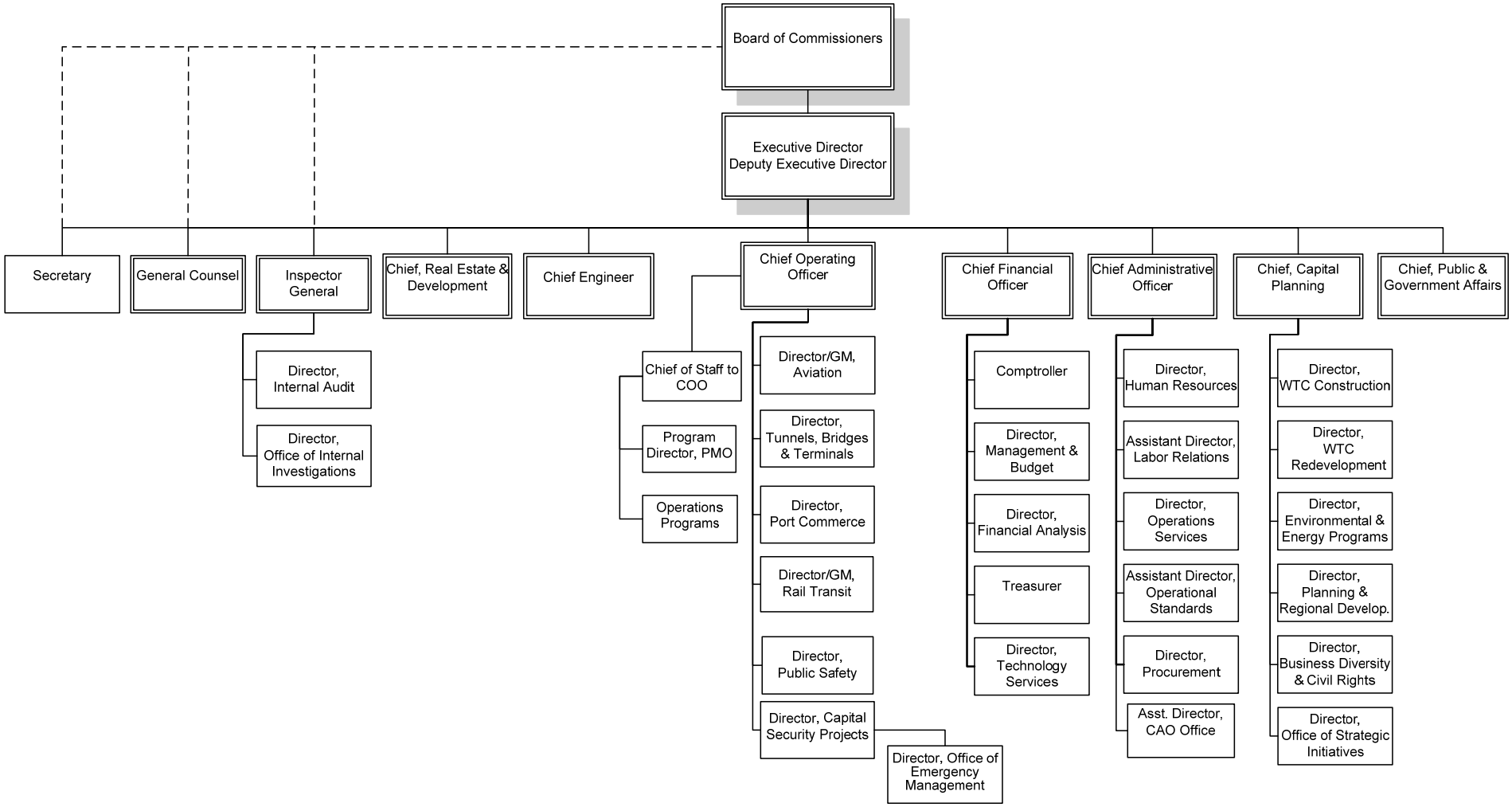
V. ORGANIZATIONAL DESIGN & EFFECTIVENESS

CURRENT ORGANIZATIONAL STRUCTURE OVERVIEW

With key operating principles and a more efficient structure of corporate governance, the alignment of the Agency organizational structure to these constructs is required to fulfill the expectations of the Board of Commissioners.

The Interim Report contained a number of observations related to the Port Authority's current organizational structure (see **Figure 4**). The Port Authority's culture has traditionally fostered strong loyalty among its employees with a high level of dedication and commitment to the Port Authority's mission. It has produced strong line and staff department leaders with a deep knowledge base and skills. However, a significant number of appointed leadership changes resulted in a lack of continuity necessary to drive collaboration and accountability. As a result, in the past the organization had elements of a siloed culture where department chiefs' and directors' priorities seemed to have shifted to protecting their functional areas of responsibility. In addition, core functions such as capital planning had been restructured and reorganized multiple times without follow through on critical implementation of functionality, fostering instability in the organization. Historically, all of these factors have inhibited communication and effective collaboration between Line Departments and the staff departments required to support them (*i.e.,* the shared services functions).

Figure 4 – Current Organizational Structure



OBSERVATIONS & FINDINGS

- ***Line Departments would benefit from shared service functions that are better aligned to achieve efficiency and cross-functional communication, as well as to eliminate redundant structures within the organization***

The Port Authority's organizational structure currently utilizes a combination of divisional (*i.e.*, Line areas: Aviation, Port Commerce, TB&T, PATH) and centralized, staff/functional (*i.e.*, staff areas: Finance, Human Resources, Engineering, Public Relations/Marketing, Legal, Procurement, Capital Planning, etc.) departments. The Agency's Line Departments are semi-autonomous units with certain shared services being provided by the staff/functional departments. A staff/functional department structure for shared services allows a relatively efficient specialization of labor, reduction in duplication of work, and economies of scale. The Port Authority would benefit from an improved staff/functional department relationship with the Line Departments that are the core of the Agency.

The Agency's existing organizational model is an early stage matrix management structure that combines divisional and functional departmentalization to gain the advantage of both sources of input. A matrix structure, if properly executed, is a flatter model and should allow for quicker response times because information is exchanged more rapidly under this rubric than a hierarchical organization. To avoid potential role ambiguity and conflicts, the positions with dual reporting structures should have a direct reporting relationship to Line Departments with an indirect reporting relationship to staff/functional departments. However, to date, these expected benefits have not been fully realized at the Port Authority, so further refinement (with enhanced clarity of roles, responsibilities, and reporting relationships) should yield marked improvements.

- ***The Port Authority would benefit both from an Agency-wide strategy document to focus and align all Line Departments and shared service functions as well as a key initiative plan with necessary specificity for implementation***

The last strategic plan prepared by the Port Authority dates back to 2006, well prior to the profound recession of 2008-2009. There have been multiple new appointments since then including: Chairman, Vice-Chairman, a majority of the Commissioners, as well as the Executive Director and Deputy Executive Director. Additionally, the recent retirements of the Chief Operating Officer and Chief Administrative Officer, and announced retirement of the Chief Financial Officer provide a unique window to shape the organization and properly position it for its future.

- ***The Port Authority has made great strides at initial development of operational and financial scorecards/dashboards, but should enhance them to include specific quantifiable objectives to ensure accountability for their achievement at all levels of the organization***

The office of the Acting COO has been in the process of developing dashboards for use by Line Departments in measuring their performance. These dashboards must be expanded to capture the status of key initiatives and be tailored with appropriate levels of supporting detail for each of Agency's constituencies including the Board of Commissioners, Executive Director and Deputy Executive Director as well as Line Departments and staff support functions.

The Agency is proficient in producing enormous amounts of data with respect to its businesses and operations. However, the data could be better organized to quickly view the status of operations. Accordingly, reports reviewed by directors and executive staff should be succinct and focus the recipient on the relevant information necessary to make business decisions efficiently, address problems, and exploit opportunities.

- ***The opportunity exists for current compensation to be better aligned with the objectives of enhanced productivity and efficiency, while differentiating between merit and tenure***

The current classification strategy for employee and compensation policies was implemented in the late 1980's. Incentives were historically non-monetary rewards (*e.g.,* enhanced vacation allowances, generous health benefits, and post-retirement medical, among others). Historically, over 70 percent of Port Authority management employees have been rated excellent or exceptional through internal performance reviews, defying conventional performance rating distribution guidelines. This general practice led to promoting employees based on seniority and an organizational structure with very broad middle and upper management ranks.

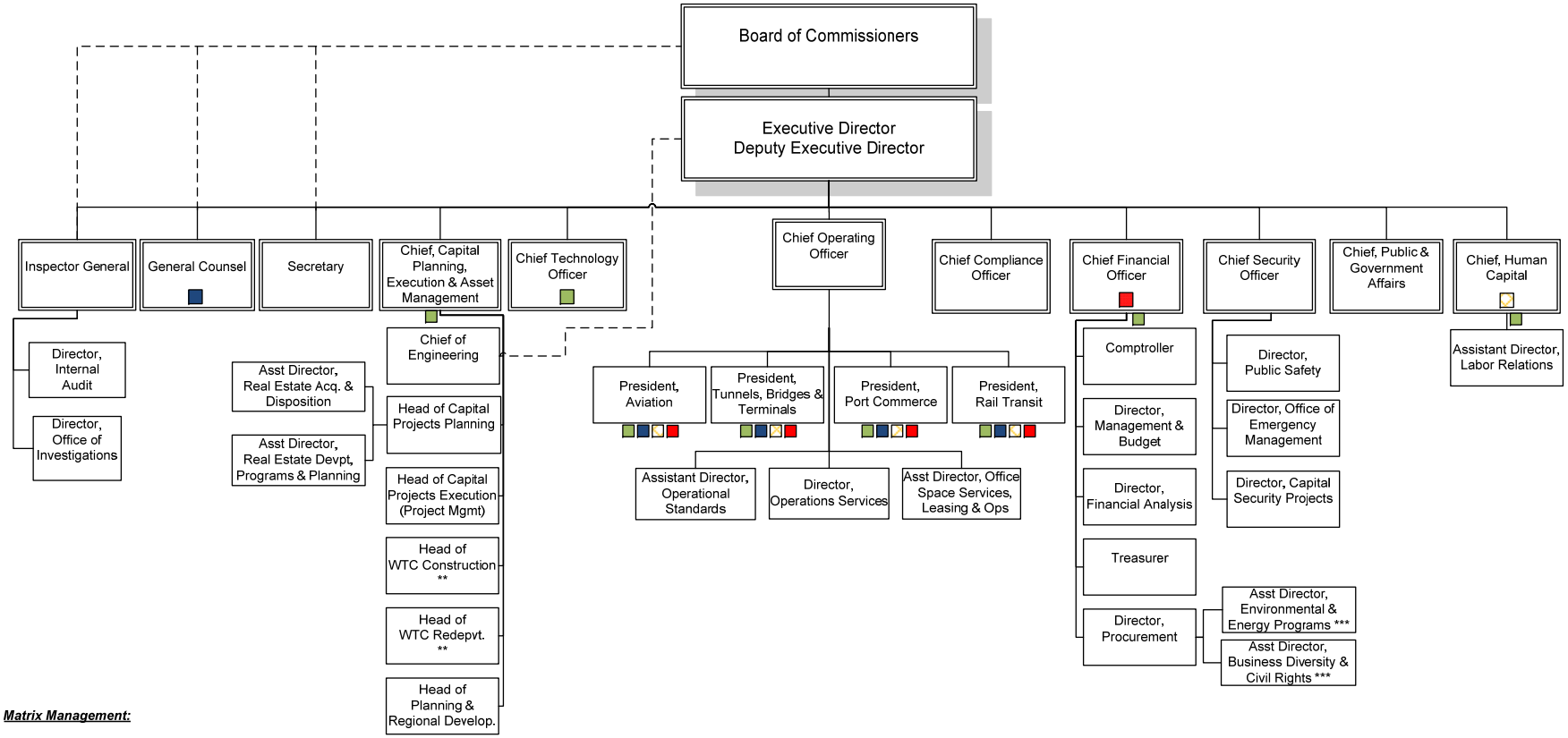
- ***Employee mobility is critical to provide clear paths to alternative career opportunities across both the Line Departments and shared service functions***

Given the headcount reductions and limited hiring since 1995, there has been more of a focus on financial incentives to support vertical movement rather than career enhancing lateral growth. As a result, the Port Authority must identify business-driven programs that can attract, retain, and motivate a world-class workforce, given the expected higher rates of retirement and attrition in the next several years.

RECOMMENDATIONS

Figure 5 is a preliminary organizational design proposed to improve accountability, enhance capital delivery efficiency, and facilitate coordination among Line and Staff Departments.

Figure 5 – Preliminary Draft Organizational Chart



Matrix Management:

- *A dedicated legal resource, within each Line Department, will report directly to the Line Department head with a dotted line reporting to General Counsel*
- *A dedicated HR resource for each Line Department, centralized within HR, will report the Director of HR with a dotted line reporting to the Line Departments*
- *Each Line Department currently has a dedicated financial resource with oversight provided by the CFO and Management & Budget Department*
- *The reconstituted Chief Technology Officer role will have dedicated IT representatives to be identified in the functional areas marked with a green box. These representatives will consist of existing staff in those areas who currently function in IT related roles. These individuals will assist in the better use and efficiency of IT systems currently being used throughout the agency*

** WTC Construction and WTC Redevelopment will become separate line department once project is in service
*** Would contain only procurement related function. Remaining functions would be centralized under Chief Compliance Officer

Proposed organizational changes are as follows:

- Enhance the role of **COO** to allow for full authority and power to lead and direct Line Departments, and maintain continuity in the face of inevitable turnover of the politically appointed Executive Director and Deputy Executive Director.
- **Elevate Line Director titles** (Aviation, TB&T, Port Commerce, and Rail Transit) to President to reflect the true nature of their profit and loss responsibility, and accountability for the deployment of capital. Agencies such as the MTA have Presidents over their key operating organizations.
- **Fully implement Chief Security Officer** organization as recommended by the Chertoff Group, to serve as a centralized point of command and control of the security apparatus of the Agency.
- **Eliminate the Chief Administrative Officer** role and reassign Procurement to CFO and Operational Services & Operational Standards to office of COO to provide critical analytical support and conduct "deep dives" at the Line Departments, as necessary.
- **Elevate Director of Human Resources to Chief of Human Capital** and expand responsibilities to include Labor Relations. Given the significant importance of human resources to the Port Authority, especially in light of the significant succession planning issues that exist, it is critical that the Human Resource Department have a direct line to the Executive Director and Deputy Executive Director. In addition, given the complex nature of the existing union relationships, work rules and necessity for consistent compliance over all line departments, it is logical to include Labor Relations within the Human Resources department. Lack of centralized compliance has led to many of the existing work rule issues. The Port Authority should also retain outside counsel to assist in the ongoing collective bargaining negotiations.
- **Create a centralized Chief of Capital Planning, Execution and Asset Management** who would have authority, responsibility and accountability for the continuum of capital deployment – from planning and engineering design through execution – to drive accountability for on-time / on-budget delivery. The department would consist of the following direct reports:
  - **Head of Capital Projects Planning** that would lead the "planning" function by guiding the development of the capital plan during the fiscal year as well as periodic updates. He/she would have the following direct reports, which are portions of responsibility that currently exist within the Chief of Real Estate and Development:
    - **Assistant Director, Real Estate Acquisition & Disposition –** Guides all capital project related acquisition or disposition of Port Authority real estate.
    - **Assistant Director, Real Estate Development Programs & Planning –** Currently serves as a liaison with certain key projects such as Moynihan Station, redevelopment of the George Washington Bridge terminal, and the Port Authority Bus Terminal, with particular emphasis on real estate matters.
  - **Chief Engineer** would serve as construction manager for all of the related capital projects but fall under centralized accountability with an indirect, dotted-line reporting relationship to the Executive Director/Deputy Executive Director.

- **Head of Capital Projects Execution –** This individual would serve as the project management arm and coordinate all project management activities inside and outside the various line departments. Personnel would likely be sourced from the existing COO organization that includes a Program Director, Project Management Office, and Operations Programs.
- **Director, WTC Construction and Director of WTC Redevelopment** would remain under Office of Capital Projects until construction is complete, at that time the two areas would become a single line department under the Chief Operating Officer.

- **Create a Chief Technology Officer** position to better define technology strategy given the growing importance of technology for enhanced productivity and efficiency within the Agency. The need to migrate the Agency's technology environment toward current and future industry standards and best practices requires a significant allocation of time and resources. The Port Authority currently has a myriad of systems with varying degrees of functionality. It is critical those systems be inventoried and managed centrally.
- **Assimilate roles and responsibilities of the existing Real Estate department** to the specific functional areas within the COO support staff and to the Capital Planning, Engineering & Execution function. Eliminate existing Chief role, splitting remaining roles and responsibilities as follows:
  - **Office Space Services & Property Management** is recommended to move under the COO.
  - **Leasing & Operations** is recommended to move under the COO.
  - **Real Estate Asset Acquisition and Disposition** is recommended to move under CPEAM.
  - **Development, Programs and Planning** is recommended to move under the Office of Capital Projects Planning, Execution & Asset Management.
- **Further centralize procurement** by assimilating relevant aspects of the existing Department of Environmental and Energy Programs, and Department of Business Diversity and Civil Rights into the procurement function.
- **Eliminate the Office of Strategic Initiatives,** rationalizing redundancies between Planning and Regional Development and departments within the CFO organization**.** Functionality would be absorbed by Planning and Regional Development.
- **Establish a Chief Compliance Officer** that would have the responsibility to lead and coordinate the Port Authority's compliance efforts. This would include the design and implementation of internal controls, policies and procedures to assure compliance with applicable local, state and federal laws, regulations and third party guidelines. Responsibilities would also include managing audits and investigations into regulatory and compliance issues, and responding to requests for information from regulatory bodies. It is expected that this position would create a centralized repository for all compliance related issues.
- **Assimilate the Office of Environmental & Energy Programs and the Office of Business Diversity & Civil Rights** into the Chief Compliance Officer, Procurement, and CFO as follows:

- Office of Environmental & Energy Programs
  - Energy Procurement (Procurement);
  - Energy Management (CFO);
  - Compliance and Due Diligence (Chief Compliance Officer);
  - External Environmental Programs (Chief Compliance Officer); and,
  - Sustainability Initiatives (Chief Compliance Officer).
- Office of Business Diversity & Civil Rights
  - Maintenance of minority, women-owned, small and disadvantaged business enterprise program (Procurement);
  - Policy Development & Reporting (Chief Compliance Officer); and,
  - Civil Rights / Title VI Compliance (Chief Compliance Officer).

➢ **Create matrix management hubs** around certain shared service functions including finance, human resources, legal and information technology to encourage cross-collaboration, operating efficiencies and enhanced client service levels. This would entail having representatives from each of the aforementioned areas have dotted line relationships with Line Departments and certain other staff functions.

➢ **Support and accelerate changes in compensation structures** to allow for greater ease of movement for employees between and across Line Departments and staff functions for both promotions and lateral movements.

➢ **Complete development of dashboards** throughout the organization to regularly monitor and measure progress, timely identify negative variances, and quickly institute corrective actions.

- The office of the Acting COO is in process of developing dashboards in collaboration with the Line and Staff Departments of the Agency. The critical aspect for dashboard development includes achieving agreement on the relevant and reliable metrics at a summary level as well as the constructs of supporting detail for each Line and Staff Department.
- **Dashboards must address** user needs and have the following attributes:
  - Customized to respective levels within the Port Authority;
  - Timely distribution in order to take proactive remedial actions;
  - Ability to review supporting details to enhance diagnosis of issues;
  - Visibility and tracking of historical trends;
  - Data relevance and flow in support of objectives; and,
  - Focus on metrics that can be impacted by operating interventions.

➢ **Create leadership committees** at the Chief and Line Director level to focus on proactive problem solving and resolving impediments to Agency objectives.

- As the de-facto Office of the CEO of the Port Authority, the Executive Director and Deputy Executive Director should oversee three related committees: **the Operating Management Committee, the Executive Committee, and the Capital Planning Council (the "CPC")**, to direct and lead the organization to accomplish its goals and objectives. Effective councils invite full expression from respective members and unify their efforts in responding to organizational needs and objectives.

- As the aforementioned senior positions are filled, strong consideration should be given to providing competitive compensation relative to the private sector and Agency peers, with strong incentive based components for achieving the targeted performance improvement initiatives. Competitive compensation with aligned incentives will be key to attracting the best talent and reinvigorating the Agency's performance profile.
- **The Port Authority would benefit from establishment of a Key Initiatives Implementation Plan** to develop and monitor specific Agency objectives, the respective status, assigned responsibility, due dates, and next steps. An illustrative Key Initiatives Implementation Plan can be found in **Appendix – A: Key Initiatives Implementation Plan**

VI. LINE DEPARTMENT REVIEW – AVIATION

OVERVIEW

On the basis of system-wide passenger traffic, the Port Authority airports are collectively the busiest in the world. The New York Metropolitan Region's population density, industry activity, link to global markets, and wealth of cultural and entertainment venues, make it a priority market for regional, domestic, and international airlines. As a critical gateway for passengers and cargo, the Port Authority airports handled 1.2 million flights, 106 million passengers, and 2.3 million tons of cargo in 2011. Also in 2011, traffic in and out of the Port Authority's three major airports supported over 435,000 jobs, representing approximately $20 billion in annual wages, and contributed to over $55 billion in sales revenue for enterprises in the region. The Aviation Department's core functions include:

- Providing general management oversight for the region's five airports;
- Developing, managing, and maintaining passenger terminals, runways, and cargo facilities in compliance with FAA regulatory standards;
- Negotiating agreements and handling tenant relationships with airlines that rent passenger terminal gates and cargo space, as well as retail merchants and concession providers;
- Supervising outsourced contract services for various operational and maintenance activities; and,
- Managing security (including police and emergency response) and coordinating with the Transportation Security Administration ("TSA").

The Aviation Department derives revenue from four major sources: (i) leasing terminal and gate space to airlines, (ii) leasing cargo, retail, and restaurant facilities, (iii) charging flight fees to recover the cost to the Aviation Department of common elements of the airports used by all airlines, and (iv) parking, utility pass through, and other fees.

Airline passenger traffic through the region has increased 30 fold since the 1940s when the Port Authority gained jurisdiction over its three major airports: JFK, Newark & LaGuardia. In addition, increasingly stringent regulatory requirements under Part 139 of Title 14 of the Code of Federal Regulations ("Part 139") have added to the Aviation Department's workload, while at the same time the workforce has remained generally flat over the past five years. In addition to FAA compliance matters, regular operations, and maintaining a state of good repair (approximately 49 percent of the preliminary 2011 – 2020 Capital Plan, as shown in **Table 12** below), the Aviation Department is currently focused on a number of revenue producing capital projects. Approximately 39 percent of the Department's $6.5 billion preliminary 2011 – 2020 Capital Plan is devoted to such initiatives. The two largest of these initiatives are the redevelopment of the Central Terminal Building at La Guardia (LGA) and Terminal A at Newark (EWR), which on a combined basis, account for 30 percent of the preliminary 2011 – 2020 Capital Plan.

Table 12 – Aviation Preliminary 2011 – 2020 Capital Plan

$ in millions		Aviation Capital Plan Needs						
Project Grouping	**# of Sub-Projects**	**Mandatory**	**Security**	**State of Good Repair**	**System Enhancing Projects**	**Revenue Producing Projects**	**Totals**	**%**
LGA Redevelopment[1]	9	$ -	$ -	$ 175	$ 300	$ 605	$ 1,080	17%
EWR Terminal A Redevelopment[1]	9	-	-	-	-	817	817	13%
JFK Rehabilitation of Runway 4L-22R	1	-	-	440	-	-	440	7%
Runway Safety Area (RSA) Improvements	6	269	-	-	-	-	269	4%
JFK Delta Terminals 3 & 4 Redevelopment	1	-	-	-	-	215	215	3%
AirTrain (Primarily EWR)	15	39	11	67	64	20	201	3%
SWF Rehabilitation of Runways 9-27 and 16-34	1	-	-	148	-	-	148	2%
EWR Rehabilitation of Runways 4-22	2	-	-	48	-	-	48	1%
Subtotal - 44 Projects	44	308	11	878	365	1,657	3,219	49%
Remaining 378 Projects	378	282	423	1,897	484	206	3,292	51%
Total Value of Aviation Projects in 2011 Capital Plan	**422**	**$ 591**	**$ 434**	**$ 2,775**	**$ 849**	**$ 1,862**	**$ 6,511**	**100%**
Value of Projects Funded Beyond 2020		60	-	220	410	310	1,000	
Total Value of Funded Projects		**$ 651**	**$ 434**	**$ 2,995**	**$ 1,259**	**$ 2,172**	**$ 7,511**	
Value of Unfunded Projects		30	260	1,980	2,110	10	4,390	
Unconstrained Aviation Capital Projects		**$ 681**	**$ 694**	**$ 4,975**	**$ 3,369**	**$ 2,182**	**$ 11,901**	

Notes:

1) *The preliminary 2011 – 2020 Capital Plan has only the PFC related components associated with the Central Terminal Building at LGA and Terminal A at EWR. Total project costs for the two approximate $5.4 billion*

Several projects are funded in whole or in part by PFCs. PFCs were first authorized by Congress in 1990, and originally allowed commercial airports controlled by public agencies to collect fees up to $3.00 for every enplaned passenger. Currently, airports can charge up to $4.50 per enplaned passenger. Since the rate ceiling is not indexed to inflation, the real value of this funding source has eroded significantly during the past 22 years. Airports use these fees to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition. The Airports Council International has approached Congress to recalibrate PFC rates, among other PFC reforms. PFCs are included below Net Operating Revenue in **Table 13**.

FINANCIAL RESULTS

Aviation is the largest line segment in terms of revenue and total operating cash flow ($2.2 billion and $1.1 billion, respectively, in 2011) and is second largest based on headcount (with 964 personnel). **Table 13** is a summary of cash flow generated by the Department after considering both inflows from grants and outflows from capital projects. Growth in revenue has outpaced growth in expenses while amounts invested in facilities have decreased. As a result, free cash flow has more than doubled since 2007 (refer to **Table 13** below), which has positioned the Department for its next cycle of major capital projects.

Table 13 – Aviation Annual Financial Trend

Aviation Financial Summary ($ in millions)	Actual 2007	2008	2009	2010	2011	Budget 2012	CAGR '07 to '12
Revenue	$1,918.0	$2,025.9	$2,043.1	$2,125.0	$2,221.2	$2,219.9	3.0%
Expenses	(1,245.0)	(1,346.2)	(1,306.1)	(1,317.7)	(1,385.6)	(1,396.1)	2.3%
Net Operating Revenues	673.0	679.7	737.0	807.3	835.6	823.8	4.1%
% of Gross Revenue	*35.1%*	*33.5%*	*36.1%*	*38.0%*	*37.6%*	*37.1%*	
Grants, Contributions, AIP & PFCs	304.1	313.3	287.4	303.4	273.5	287.4	-1.1%
Operating Cash Flow	977.1	993.0	1,024.4	1,110.7	1,109.1	1,111.2	2.6%
Invested in Faciilities	(673.0)	(631.2)	(658.1)	(504.7)	(217.3)	(452.4)	-7.6%
Free Cash Flow	**$304.1**	**$361.8**	**$366.3**	**$606.0**	**$891.8**	**$658.8**	**16.7%**
% of Gross Revenue	*15.9%*	*17.9%*	*17.9%*	*28.5%*	*40.1%*	*29.7%*	
Annual Change		*19.0%*	*1.3%*	*65.4%*	*47.1%*	*(26.1%)*	
Non Represented Employees	201	243	245	239	228	263	
Represented Employees	765	763	801	775	736	779	
Total Employees	966	1,006	1,046	1,014	964	1,042	

As shown in **Table 14** below, the primary source of revenue is rental fees charged for commercial use of airport space and services (*e.g.*, airlines' use of terminals, cargo handling services, restaurant and retailer space, advertising space). Rental revenue is largely fixed, based on multi-year contracts with airlines and other tenants. The 4.1 percent annual rental revenue increase since 2007, despite the decline and rebound of passenger traffic, is the result of escalation clauses in existing agreements, and the market based rental rate increases previously negotiated with airlines that reflects the attractiveness of the New York market.

Table 14 – Aviation Revenue Trend & Components

Aviation Financial Summary ($ in millions)	Actual 2007	2008	2009	2010	2011	Budget 2012	CAGR '07 to '12
Rentals: Terminal/Cargo, Concession & Other (1)	$841.3	$916.3	$936.3	$980.8	$1,047.6	$1,030.0	4.1%
Flight Fees (2)	547.0	569.8	597.7	615.2	633.9	645.4	3.4%
Parking, Utilities & Other Fees (3)	529.7	539.8	509.5	529.0	539.7	544.5	0.6%
Total Revenues	**$ 1,918.0**	**$ 2,025.9**	**$ 2,043.5**	**$ 2,125.0**	**$ 2,221.2**	**$ 2,219.9**	**3.0%**
Annual change		5.6%	0.9%	4.0%	4.5%	-0.1%	
Total PA Gross Revenue (from FRAP report)	3,191.6	3,527.6	3,552.2	3,634.0	3,815.0	4,131.6	
Percent of Total PANYNJ Revenue	60.1%	57.4%	57.5%	58.5%	58.2%	53.7%	
Key Operating Statistics (000)							
Passengers (4)	109,069	106,214	101,482	103,691	105,518	108,385	-0.1%
Total Cargo-tons (4)	2,620	2,343	1,921	2,207	2,261	2,451	-1.3%
Total Plane Movements (4)	1,271	1,249	1,181	1,168	1,185	1,274	0.0%

Notes:

1) *Terminal, Cargo & Other Rental includes revenue from the lease of space for advertising, retail and restaurant activities. It also includes revenue from Special Project Bonds ("SPB") associated with terminals at LGA and JFK. Revenue from SPBs is expensed for debt service on a dollar-for-dollar basis*
2) *Flight Fee reflects reimbursements from airlines that cover airport operating and capital expenses used to maintain and improve the Public Aircraft Facilities (common airside areas used by all airlines) and an allocation of Agency expenses*
3) *The New York airports sell electricity, water, and chilled and hot water for temperature control at terminals. These are reflected as utility revenue*
4) *Passenger traffic has rebounded to near peak, pre-recession levels, but plane movements are down, in part because airlines have been using fewer aircraft to optimize utilization. Cargo volume remains suppressed since the recession, but shows evidence of slow recovery*

The Port Authority airports also charge flight fees to airlines (*i.e.*, "landing fees" or "take off fees") that reimburse the airports for the expense of building and maintaining common airside areas used by the airlines. The flight fee level of approximately $7.00 per thousand pounds landed reflects old airport facilities, the cost of labor and supplies in the New York Metropolitan area, and current traffic demand.

OBSERVATIONS & FINDINGS

- ***Maintaining compliance with regulatory standards is crucial. Meeting progressively stringent requirements without adding headcount is increasingly difficult and expensive***

The FAA mandates that airports meet an exhaustive list of operational and safety standards to maintain their certification under Part 139. Non-compliance with this certification could result in serious financial and operational consequences. Although the airport facilities have received improved Part 139 inspection reports, they have historically struggled to fix violations in a timely manner, primarily as a result of budgetary constraints leading to insufficient maintenance staff, and a lack of inventory of the necessary parts, such as lights and signs. To properly align the workload associated with Part 139, the Department estimates that it needs additional personnel for enhanced oversight, training, wildlife management and safety management compliance. The net incremental cost would be mostly absorbed in flight fees paid by airlines, and may generate savings from overtime, with further efficiencies from avoiding redeployment of labor.

Part 139 also requires runway safety areas ("RSAs") at both ends of every runway. RSAs are an incremental stretch of pavement or an Engineered Materials Arrestor System ("EMAS") that provides additional room in the unlikely event an aircraft overruns or undershoots a runway. Ten of the Port Authority airports' 26 runway ends still must be made compliant. The Aviation Department expects to invest nearly $500 million system-wide to meet Part 139 criteria for RSAs by the FAA's 2015 deadline.

Beyond Part 139 initiatives, the Aviation Department has been limited in areas of preventive maintenance and major works projects due to the capital constraints of the Agency. As a result, emergency and corrective work on critical assets primarily consumes staff and budget resources.

- ***Airport infrastructure is significantly aged (averaging 52 years old). Budgeted upgrades and replacement projects require $6.5 billion of additional capital through 2020***

Signs of age at older terminals are obvious, and cause the airports to rank among the worst in the country in terms of customer satisfaction.[1] Buildings are nearing obsolescence, infrastructure is deteriorating, and maintenance needs are mounting. The worsening condition

[1] 2010 surveys by Zagat & JD Power & Associates.

of assets translates to escalating operating costs. Critical projects at the main airports include Delta's expansion of Terminal 4 at JFK to replace Terminal 3, the Central Terminal Building at LGA, and Terminal A at EWR. These modernization efforts will significantly improve traveler service levels.

- ***The Port Authority airports are already operating at or near capacity due to FAA-imposed caps on the number of hourly take-off and landing combinations, or "slot control." To grow further will require technological innovation, regulatory modifications, and/or physical expansion***

Slot control is designed to limit delays by reducing the volume of aircraft using the region's airspace and airports. Even though the Aviation Department has invested heavily in delay reduction technology (both ground and airspace management systems) and has improved on-time performance at its airports, the caps remain in place. Adding back just one slot per hour per airport would translate into approximately $6 million in additional Agency revenue and 1.3 million incremental passengers annually. The estimated economic impact to the region would be approximately $680 million in sales, 5,300 jobs, and $250 million in wages.[2]

The FAA's NextGen program is an initiative of new technologies and operational and procedural changes that provides precision and flexibility to remove many of the airspace constraints imposed by the geographic proximity of the region's airports. Phase I of NextGen is being deployed by the FAA over the coming years through 2018, and could add the capacity for approximately 20 flights per hour (system-wide, cumulatively across EWR, LGA and JFK), that could amount to an estimated 26 million more passengers and $125 million of incremental revenue annually.[2]

REVENUE ENHANCEMENT OPPORTUNITIES

Between aviation-specific and ancillary operations, the Aviation Department has potential for a variety of income streams. With some incremental investment to activate underutilized assets, the Department could generate approximately $15 million to $25 million annually in revenue from new access fees and rentals that are in various early stages of planning and analysis.

- ***Incremental rental revenues could be derived from redeveloped cargo and hotel facilities at JFK***

Aviation's JFK cargo redevelopment initiative seeks to provide strategic replacement of its aging asset base, and increase cargo capacity in a modernized environment. Due to successive years of constrained expense budgets, the Aviation Department has not had the resources to actively market its cargo facilities, many of which are old, obsolete, or vacant. In June 2011, the Aviation Department conducted a study of the current level of demand and market trends

[2] Based on data provided by the Aviation Department and third party commercial aviation consultancy firm Landrum & Brown.

affecting cargo at JFK, and developed a strategic plan to address cargo challenges facing the airport. While the study did not include specific dollar amounts of cost and benefit to the initiative, it outlined a number of issues, identified major categories of cost and benefit, and highlighted the need to initiate and accelerate marketing efforts to promote existing and redeveloped cargo facilities.

The planned redevelopment would begin on the north side of the airport and spread to the other three cargo areas, each a mini "campus" on JFK grounds. Revenue would be derived from multi-year ground rents or leases, for which preliminary estimates are used to project the potential revenues noted in this report.

Aviation has selected developers for two hotels at JFK, one on the former Ramada hotel site, and another on the site of the existing TWA Terminal site (where a lease is currently being negotiated with the selected developer). Capital to construct each hotel is expected to be approximately $100 million to $115 million, and would be provided by the tenant. Revenue from each site would be generated from a minimum lease payment and percentage share of gross hotel revenue. The start dates for development are uncertain pending agreement among the City of New York and various labor unions. Construction is expected to take up to 30 months in each case.

- ***The Agency incurs significant costs to support third-party commercial beneficiaries that access its airports (i.e., off-airport parking operators, etc.). Similar to other airports nationally, the Agency should recoup a portion of its costs through market-based access fees charged to these third-party commercial beneficiaries***

Off-airport parking operators use airport infrastructure (*i.e.,* roads), and benefit from access to the airport and travelers without making any current contributions to the support costs. This creates an unfair advantage over the on-site operators who pay fees designed to assist the airports recover a portion of their costs.

Since early 2010, Aviation has discussed various revenue sharing arrangements with off-airport parking operators. Contemplated structures would involve either a percentage share of revenue or a per-parking-space fee at lots near EWR. The fee would offset erosion of the Agency's revenue from on-airport parking. Currently, 11 out of 17 off-airport parking operators have added $4.00 to $6.00 surcharges to their rates, but are not yet forwarding proceeds on to the Port Authority. This is an area of controversy due to perceived inequity in the situation.

The Aviation Department should consider increasing the AirTrain fare at JFK to garner additional annual revenue from existing ridership volumes, net of revenue sharing arrangements with the airlines. AirTrain fares are only charged to travelers connecting from the airport to rail-based public transportation off-airport, such as MTA or Long Island Railroad. The revenue increase would contribute to the expenditures associated with anticipated AirTrain component upgrades, and ultimate replacement given the system is approaching the second half of its useful life.

COST CONTAINMENT OPPORTUNITIES

Given budgetary constraints, the Aviation Department has successfully limited spending by refining the procurement of contract services, mothballing and/or demolishing old buildings and reducing electricity use. As a result, total contribution, or productivity, per employee has steadily increased (*i.e.,* 2.6 percent per year, on average).

- ***Aviation could further reduce costs by: (i) better managing maintenance routines, and (ii) outsourcing more landside electrical work***

In order to enhance productivity, the Aviation Department could replace its Maintenance Management Information System ("MMIS") with one of several systems currently available "off the shelf," and update its maintenance routines at each airport to achieve overtime savings, workload optimization, and better asset tracking that could reduce operating expenses by an estimated $2 million per year. Assuming an initial capital outlay of $5 million for the system (like those currently used by the third-party EWR and JFK AirTrain operators), return on investment over 10 years would be approximately 35 percent. Improved tracking of airfield electrical repairs could also shorten electrical outages and further facilitate compliance with FAA regulations (Part 139). This type of asset management should be carefully coordinated with a reconfigured CPEAM.

Aviation could reduce labor costs by outsourcing more landside electrical work (*i.e.,* re-lamping and other low-tech tasks). Cost savings would come in the form of reduced overtime costs, savings from not having to pay fully burdened payroll expenses, and reduced delays because Aviation Department electricians will be able to focus on airside needs. This recommendation pertains primarily to electricians due to their relative contribution in meeting FAA compliance requirements.

RECOMMENDATIONS

- Increase department headcount as appropriate to ensure compliance with FAA regulations, provided that the incremental costs are recoverable through flight fees
- The Port Authority should appropriately evaluate and prioritize Aviation's capital needs given its major relative contribution but deteriorating asset base
- Collaborate with other major airports to petition the FAA to recalibrate PFCs to an inflation-adjusted level that would appropriately support critical, non-revenue producing infrastructure projects to the benefit of the region
- Actively support industry efforts to engage in slot control reform, and move forward on technological innovations such as NextGen
- Similar to other major airports, the Port Authority should evaluate increases to commercial access fees
- Advance plans to both enhance cargo capacity at JFK and promote existing facilities at JFK for additional revenues
- As part of an Agency-wide effort, implement new asset management system to better track and improve the cost to maintain the Aviation Department's $14 billion in assets

VII. LINE DEPARTMENT REVIEW – TUNNELS, BRIDGES & TERMINALS

OVERVIEW

TB&T manages and maintains six interstate vehicular crossings and two interstate bus terminals that are at the foundation of the transportation network that drives the economic engine of the New York-New Jersey region. These facilities serve as the critical links, combined with PATH, in the Interstate Transportation Network that unifies the economies of the two states into a single world-class economic center, and fosters a quality of life and competitive cost of doing business that sets the region apart. Annually, 460 million passengers and $326 billion of freight traverse these facilities, making them some of the nation's busiest and most efficient transportation assets.

Statistics on age, revenue and volume for TB&T facilities are summarized in **Table 15** below:

Table 15 – TB&T Summary Statistics

(millions)	Tunnels, Bridges & Terminals		
Facilities	***Year opened***	***2011 Revenue***	***2011 Volume (1)***
Bayonne Bridge	1931	$ 30.0	3.5
Goethals Bridge	1928	131.8	13.1
George Washington Bridge	1931	468.8	52.4
Holland Tunnel	1927	132.0	16.8
Lincoln Tunnel	1937/1945/1957 (three tubes)	164.0	20.6
Outerbridge Crossing	1928	115.6	14.9
Port Authority Bus Terminal	1957	35.5	2.3
George Washington Bus Station	1963	1.1	0.3
		$ 1,079.0	124.0

Notes:

1) *Volume for bridges and tunnels measured by eastbound vehicle traffic and for bus terminals by bus movements (bus passengers at the PABT and at the GW Bus Station are 64.6 million and 4.6 million, respectively)*

Many of the facilities were hailed as engineering marvels when constructed, however, the majority are now over 80 years old and require significant capital to safely operate and keep pace with demand. There is a significant backlog of projects due to past deferral of maintenance capital expenditures. Over $14.6 billion of capital projects have been identified for TB&T: $6.7 billion are accounted for in the preliminary 2011 – 2020 Capital Plan, $3.6 billion are funded for the period beyond 2020, and $4.3 billion are unfunded (see **Table 16** below).

Table 16 – TB&T preliminary 2011 – 2020 Capital Plan

($ millions)	TB&T Capital Needs					
Project:	**Mandatory**	**Security**	**SGR**	**System Enhancing Projects**	**Revenue Producing Projects**	**Total**
Bayonne Bridge Navigational Clearance Program[1]	-	-	-	1,246	-	$ 1,246
Lincoln Tunnel Access Project	-	-	1,800	-	-	1,800
George Washington Bridge suspender cable replacement	-	-	715	-	-	715
Lincoln Tunnel Helix Project	-	-	395	-	-	395
Goethals Design-Build-Finance-Maintain Program[2]	-	-	176	-	-	176
Subtotal	$ -	$ -	$ 3,086	$ 1,246	$ -	$ 4,332
Remaining 226 smaller projects	10	90	1,864	274	140	2,378
Total value of TB&T Projects in 2011 Capital Plan	**$ 10**	**$ 90**	**$ 4,950**	**$ 1,520**	**$ 140**	**$ 6,710**
Value of projects funded beyond 2020	-	-	2,830	730	-	3,560
Total value of funded projects	**$ 10**	**$ 90**	**$ 7,780**	**$ 2,250**	**$ 140**	**$ 10,270**
Value of unfunded projects	10	120	2,630	1,490	-	4,250
Unconstrained TB&T Capital Projects	**$ 20**	**$ 210**	**$ 10,410**	**$ 3,740**	**$ 140**	**$ 14,520**

Notes

1) *Raising the Bayonne bridge is for the benefit of Port Commerce*
2) *The expenditures are for land acquisition funds. The PA plans to attract private sector capital to fund the rest of the project*

To fund, in part, the capital needs of the Port Authority assets, tolls were increased in September 2011, the first increase since 2008, and only the third since 2001. For automobiles, E-Z Pass tolls in peak hours increased from $8.00 to $9.50 (approximately 80% of drivers); cash tolls increased further, from $8.00 to $12.00 (approximately 20% of drivers). E-Z Pass tolls are scheduled to increase by $0.75 in each December from 2012 – 2015, with the cash tolls increasing by a dollar in each instance.

FINANCIAL RESULTS

Table 17 – TB&T Revenue Elements & Key Operating Statistics

Tunnels Bridges and Teminals	Actual					Budget
Revenue Summary ($ in millions)	2007	2008	2009	2010	2011	2012
Revenue						
Tolls	707.6	948.8	966.8	964.7	1,033.0	1,340.2
Bus Related	13.9	14.7	14.7	14.4	16.3	16.0
Parking	9.2	9.5	9.8	10.8	10.3	10.5
Other	19.9	18.3	18.0	19.9	19.4	19.0
Total Revenues	**$ 750.6**	**$ 991.4**	**$ 1,009.3**	**$ 1,009.9**	**$ 1,079.0**	**$ 1,385.7**
Annual change		32.1%	1.8%	0.1%	6.8%	28.4%
Key Operating Statistics (000)						
# of Vehicles in Tunnels	39,191	37,808	36,857	37,251	36,419	37,466
# Vehicles in Bridges	87,813	85,917	84,643	83,955	82,731	84,049
Total Vehicles in Bridges & Tunnels	**127,004**	**123,725**	**121,500**	**121,206**	**119,150**	**121,515**
Annual change		-2.6%	-1.8%	-0.2%	-1.7%	2.0%
Bus Movements at PABT	2,169	2,225	2,240	2,220	2,264	2,309
Bus Movements at GWBBS	305	324	295	300	307	313
Total Bus Movements	**2,474**	**2,549**	**2,535**	**2,520**	**2,571**	**2,622**
Annual change		3.0%	-0.5%	-0.6%	2.0%	2.0%

The vast majority of TB&T's revenue comes from tolls (97 percent of the 2012 budget). Bus related revenues are modest and parking and other miscellaneous revenue account for the remainder. As shown in **Table 18** below, revenue increased significantly when the tolls increased: March 2008 and again in September 2011, and is forecast to further increase in 2012 when the full year impact is felt. Otherwise revenue has been relatively flat, slightly above the modest negative growth in vehicle volume in tunnels and bridges that was reflective of uncontrollable factors including the recession and the related decrease in employment. Vehicle traffic is budgeted to increase by 2.0% in 2012, however through the first six months, actual traffic was down 2.3% versus 2011 due to the elastic effects of the September 2011 toll increase and sluggish economic recovery in the sectors that are important to travel demand at the bridges and tunnels.

Table 18 – TB&T Components of Free Cash Flow at TB&T

Tunnels Bridges and Teminals	Actual					Budget
Cash Flow Summary (millions)	2007	2008	2009	2010	2011	2012
Revenues	$ 750.6	$ 991.4	$ 1,009.3	$ 1,009.9	$ 1,079.0	$ 1,385.7
Expenses	435.8	436.6	436.8	437.8	461.0	459.5
Net Operating Revenues	**314.8**	**554.8**	**572.5**	**572.1**	**618.0**	**926.2**
Net Operating Revenue margin	41.9%	56.0%	56.7%	56.7%	57.3%	66.8%
Grants, Contributions	13.2	6.8	2.4	20.5	6.2	1.7
Operating Cash Flow	**328.0**	**561.6**	**574.9**	**592.6**	**624.2**	**928.0**
Invested in Facilities:	154.5	178.9	175.1	140.6	171.3	627.5
Free Cash Flow	**$ 173.5**	**$ 382.7**	**$ 399.9**	**$ 452.1**	**$ 452.9**	**$ 300.4**

TB&T is the second largest Line Department in terms of revenue and operating cash flow ($1.1 billion and $624 million, respectively, in 2011). As shown in the table above, TB&T has been able to keep expenses relatively steady despite increasing revenues, and as a result its net

operating revenue margin has increased meaningfully over the last five years, from 41.9 percent in 2007 to a budget of 66.8 percent in 2012. TB&T generates a significant and growing amount of operating cash flow: $328 million in 2007 increasing to $928.0 million budgeted in 2012. Despite this growth, the capital invested in TB&T facilities remained in the range of $140 million to $180 million for 2007 through 2011; in 2012 investment in facilities is budgeted to increase to $627.5 million principally due to access projects underway at the Lincoln Tunnel.

It is logical to consider TB&T and PATH together, as they form the nucleus of the Port Authority's NY-NJ ITN.

Table 19 – Interstate Transportation Network Cash Flow

Interstate Transportation Network (1)	Actual					Budget	CAGR
Financial Summary ($ in millions)	2007	2008	2009	2010	2011	2012	'07 to '12
Revenue	$850.2	$1,102.6	$1,115.5	$1,119.8	$1,200.2	$1,526.9	12.4%
Expenses	(708.3)	(731.3)	(738.7)	(825.0)	(783.6)	(797.6)	2.4%
Net Operating Revenues	142.0	371.4	376.9	294.8	416.6	729.3	38.7%
% of Gross Revenue	*16.7%*	*33.7%*	*33.8%*	*26.3%*	*34.7%*	*47.8%*	
Grants & Contributions	15.2	12.1	8.9	52.8	41.8	36.4	19.1%
Operating Cash Flow	157.2	383.4	385.7	347.6	458.4	765.7	37.3%
Invested in Faciilities	(344.7)	(420.8)	(508.8)	(468.1)	(538.4)	(1,102.5)	26.2%
Free Cash Flow	**($187.5)**	**($37.4)**	**($123.1)**	**($120.4)**	**($80.0)**	**($336.7)**	**12.4%**

Notes:

1) *ITN includes TB&T, PATH and the Trans-Hudson Ferry; These numbers do not include the ARC project which was discontinued in October 2011 or items related to the World Trade Center HUB, both of which are items that have been included in past Port Authority ITN documentation*

The tunnels and bridges, bus terminals, PATH trains and Ferry service are all related as they operate to provide access between New York and New Jersey. On a consolidated basis, they generate positive net operating revenue, but negative free cash flow due to the required investments in facilities to meet demand and maintain State of Good Repair. Net operating revenue is budgeted to increase from $416.6 million in 2011 to $729.3 million in 2012 largely due to the toll increase. However, free cash flow is still budgeted to be negative $336.7 million due to the high capital costs required to maintain and secure the network's infrastructure.

OBSERVATIONS & FINDINGS

- ***$6.7 billion of projects are included in the preliminary 2011 – 2020 Capital Plan to renovate TB&T's assets and maintain SGR***

The majority of the TB&T assets were built in the 1920s and 1930s. Significant investment is now required to renovate these structures, extend their useful lives, and maintain SGR. In response, the Port Authority has included $6.7 billion in its preliminary 2011 – 2020 Capital Plan as shown in **Table 20**:

Table 20 – Projected Investments in TB&T Facilities & Projected Cash Flow

	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	10 year
($MM)	Actual	Proj.	Proj.	Proj.	Proj.	Proj.	Proj.	Proj.	Proj.	Proj.	Total
Operating Cash Flow	$ 624.2	$ 916.0	$ 1,035.8	$ 1,161.1	$ 1,315.4	$ 1,460.6	$ 1,464.7	$ 1,444.1	$ 1,481.6	$ 1,618.6	$ 12,522.1
Total Invested in Facilities	171.3	625.5	755.7	922.8	945.2	1023.4	712.9	574.4	459.4	505.8	6,696.4
Free Cash Flow	**$ 452.9**	**$ 290.4**	**$ 280.1**	**$ 238.3**	**$ 370.2**	**$ 437.2**	**$ 751.8**	**$ 869.7**	**$ 1,022.1**	**$ 1,112.9**	**$ 5,825.6**
Cummulative cash flow		**$ 743.3**	**$ 1,023.5**	**$ 1,261.8**	**$ 1,632.0**	**$ 2,069.2**	**$ 2,821.0**	**$ 3,690.6**	**$ 4,712.8**	**$ 5,825.6**	**n/a**

In the 10 years ending 2020, TB&T is projected to generate approximately $12.5 billion of operating cash flow: $6.7 billion will be invested in its facilities which will leave $5.8 billion in free cash flow before interest expense. This cash flow, along with the execution of various non-toll non-fare revenue enhancements, and operating cost reductions, will be necessary to fund the $3.6 billion of projects identified for beyond 2020 and the $4.3 billion of projects that are currently unfunded.

✧ ***Due to cost cutting efforts, for over eight years TB&T has not met its target of preventative maintenance routines, and this could be expected to ultimately lead to more costly emergency repairs***

One consequence of keeping expenses flat over the last several years is that routine preventative maintenance has been cut back to offset other contractual expense increases, such as material and labor: in 2011, only 64 percent of all preventative routines were completed and only 76 percent of all "**priority**" preventative routines were completed. The cumulative effect of performing less than 80 percent of the routines is the increased risk of costly emergency repairs. In 2012, TB&T has $88 million budgeted for these routine maintenance expenses. Management currently estimates that it would likely cost an incremental $5 million to reach the Port Authority's 80 percent target.

✧ ***Continued effort is required to address transportation capacity limitations and optimize trans-Hudson travel. Solutions include: differentiated toll structures, further adoption of technologies, and improved bus network efficiency***

TB&T's crossings and terminals are at capacity during peak hours and will not be able to accommodate growth in traffic demand that will accompany economic growth in the region. Resulting congestion costs billions of dollars annually in lost productivity. Given that the bridges and tunnels are physically constrained, limited options exist to expand capacity. Solutions will require:

- Increased throughput achieved by coordinating transportation modes;
- Enhanced roadway management (signing, striping, coning, construction coordination etc.);
- Adopting new technologies (e.g. intelligent transportation systems such as traffic monitoring and incidence response capacities); and,
- Instituting pricing incentives to spread demand.

Improvements to the trans-Hudson bus systems include:

- Renovations to the Port Authority Bus Terminal ("PABT");
- Additional staging and bus loading capacity in New York City; and,

- Improvements to the network west of the Hudson River.

✧ ***Over the next three years, the Port Authority must implement the scheduled annual toll increases at the bridges and tunnels to ensure adequate funding of critical ITN and specific TB &T capital projects. At the end of the three year phase-in, the proposed toll increases will generate approximately $300 million of necessary incremental revenue annually***

The press and many elected officials were apparently critical of the magnitude of the September 2011 toll increases. However, as seen in **Table 21**, when comparing the cost of a roundtrip crossing, TB&T's tolls are in-line or lower than the tolls charged on the MTA New York bridges.

Table 21 – TB&T Comparative Tolls

Roundtrip Crossing	Automobile		Five-axle Truck	
	Cash Toll	EZ-Pass	Cash Toll	EZ-Pass
Port Authority TB&T	$ 12.00	$ 9.50	$ 65.00	$ 50.00
New York MTA (1)	$ 13.00	$ 9.60	$ 70.00	$ 47.26

Notes

1) *Robert F. Kennedy Bridge, Verrazano Bridge, Bronx-Whitestone Bridge, Throgs Neck Bridge, Brooklyn-Battery Tunnel and the Queens Midtown Tunnel*

The Port Authority needs to better educate the public that its tolls are comparable with the tolls for the major MTA crossings. These users also need to be informed of the cost to modernize TB&T's facilities and that the proceeds of increases are vital to fund Port Authority infrastructure projects. Informed public opinion and proactive addressing of misperceptions are necessary to mitigate the risk of the rescissions of scheduled future toll increases.

NON-TOLL/NON-FARE REVENUE OPPORTUNITIES

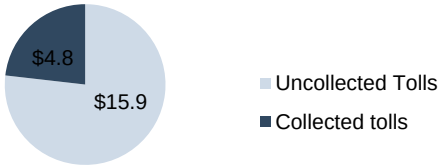
Initial revenue opportunities identified for TB&T range from approximately $20 million to $100 million annually.

✧ ***TB&T property could be used to generate an estimated $1 million to $2 million in additional annual advertising revenue***

In June, 2011, the PABT's façade was transformed by a massive, state-of-the-art digital screen that projects high-resolution graphics, animated text and video at the corner of 8th Avenue and 42nd Street. The Port Authority receives approximately $400,000 per year plus a percentage of revenue over certain thresholds for this screen. There are numerous other areas where advertising can be displayed without risking motorist distraction and related safety concerns. The Port Authority has an exclusive contract with the outdoor advertising company JC Decaux ("Decaux"), who could help the Port Authority advance a series of outdoor advertising displays on buildings, billboards, banners, light poles and other surfaces, and could potentially underwrite the capital cost of the projects.

- ✧ ***Toll violation recovery efforts should be strengthened through increased staffing and supportive legislative actions to enhance enforcement, in order to generate an estimated $2 million to $4 million of additional revenue annually***

Figure 6 – TB&T: Toll Violations (2011)



In 2011, the agency experienced over 2.6 million toll violations, or approximately 2 percent of total traffic. This represented approximately $20.7 million of unpaid tolls, as shown in **Figure 6** above. Utilizing TB&T's existing multi-step collections approach, they collected approximately $4.8 million of the $20.7 million (and collected an additional $7.2 million in administrative fees). However, a significant portion remained: approximately $15.9 million in unpaid tolls and additional associated fees. A material share of the uncollected tolls and fees could likely be captured with two additional full-time staff positions (in addition to the 1.5 full-time equivalents managing the process now), costing approximately $350,000. More analysis is required to calculate expected additional recoveries but a range of $2 million to $4 million annually appears reasonable, which would far outweigh the additional cost. The success in collecting violations should also be bolstered by legislative support in New York and New Jersey to strengthen penalties and to secure interagency agreements for reciprocity across state lines. The agency promoted its collection efforts through its "wall of shame" earlier this year.

- ✧ ***The Port Authority should evaluate alternative plans to help fund further investments in the bus terminals, which have significant capital needs***

Commuter bus carriers are charged a $2.40 departure fee per bus. This compares to $43.90 charged to long-distance bus carriers. As a result of the unequal rates, while commuter bus carriers represent 85 percent of the traffic, they only represent 15 percent of the revenue. In 2001, the Board approved a plan that initiated a five-year schedule to increase rates charged to commuter carriers to achieve parity. The rates were calculated such that at the end of the five-year period they would cover the bus terminal's operating costs (net of public safety costs and interest costs). However, in an effort to encourage the general economic growth of the region, the increases were subsequently suspended. As a result, in 2011 the bus terminal lost $62 million of net operating revenue.

RECOMMENDATIONS

- Review all options to achieve the Port Authority's targeted completion rate of preventative maintenance routines
- Develop a marketing campaign to educate the public on the costs to modernize TB&T's assets and engender public support for critical infrastructure revitalization efforts
- Initiate discussions and set goals to capture incremental revenue from additional advertising
- Enhance personnel to pursue toll violators and toll revenue recovery
- Initiate discussions with appropriate legislative bodies and government agencies to create tools to enforce toll violations
- Review fees charged to bus carriers and develop a plan of action to reduce the loss at the bus terminals

VIII. LINE DEPARTMENT REVIEW – PATH

OVERVIEW

The Port Authority Trans Hudson Corporation ("PATH") became a wholly owned subsidiary of the Port Authority in 1962 as a result of legislation passed by New York and New Jersey that authorized the development and operation of the original World Trade Center, and acquisition of the Hudson and Manhattan Railroad ("H&M").

PATH's core function is to manage the 24/7/365 operation of trains, passenger services, rail yards, signal systems, and the related safety and security programs in support of over 250,000 passenger trips every day. In 2009, PATH ranked 20th and 24th out of the top 50 largest transit agencies in the United States based on passenger trips and passenger miles, respectively.[3] PATH is an important alternate and complementary mode of transportation that relieves congestion for commuters that drive across the Agency's bridges and tunnels. PATH's revenue is primarily based on flat fares with numerous quantity purchase discount options. PATH also derives a small amount of revenue from advertising and retail leases primarily at the Journal Square Transportation Center in Jersey City, New Jersey. Unlike other transit systems, PATH receives no federal or state subsidies.

PATH is currently focused on increasing capacity in anticipation of rising passenger volumes associated with the opening and further build out of the WTC and development around the Harrison and Exchange Place stations. Ongoing capacity-related projects include station platform extensions to allow 10 railcar trains (vs. currently eight railcar trains) and signal system modernization. In addition, PATH recently replaced 350 railcars for its entire fleet of trains. PATH's preliminary 2011 – 2020 Capital Plan includes $3.1 billion for continued investment in its facilities. The key items are shown in **Table 22** below:

[3] *Source: American Public Transportation Association 2011 Fact Book*

Table 22 – PATH Preliminary 2011 – 2020 Capital Plan

($ millions)	PATH Capital Needs						
Project	Mandatory	Security	State of Good Repair	System Enhancing Projects	Revenue Producing Projects	Total	%
Signal Replacement Program	-	-	498	-	-	498	16%
Tunnel Mitigation	-	254	-	-	-	254	8%
Purchase of Railcars	-	-	238	-	-	238	8%
Harrison Station Platform Elongation	-	-	-	206	-	206	7%
Ductbank Tunnels Under-River	-	189	-	-	-	189	6%
Grove St. Station Modernization	160	-	-	-	-	160	5%
Substation - Washington St.	-	-	156	-	-	156	5%
New Railcars for 10-Car Operations	-	-	-	147	-	147	5%
Tunnel Floodgate	-	119	-	-	-	119	4%
Railcar Overhaul Program	-	-	111	-	-	111	4%
Subtotal	160	562	1,004	353	-	2,078	68%
Remaining 119 Smaller Projects	8	88	759	122	-	978	32%
Total value of PATH Projects in 2011 Capital Plan	**$ 169**	**$ 650**	**$ 1,763**	**$ 475**	**$ -**	**$ 3,057**	**100%**
Value of projects funded beyond 2020	-	20	110	30	-	160	
Total value of funded projects	**$ 169**	**$ 670**	**$ 1,873**	**$ 505**	**$ -**	**$ 3,217**	
Value of unfunded projects	-	20	1,560	530	-	2,110	
Unconstrained PATH Capital Projects	**$ 169**	**$ 690**	**$ 3,433**	**$ 1,035**	**$ -**	**$ 5,327**	

FINANCIAL RESULTS

Compared with the three other major Line Departments, PATH is the smallest in terms of revenue ($121 million in 2011). However, PATH is largest based on headcount (1,220 in 2011) primarily because of an emphasis on using in-house staff to complete PATH's highly technical maintenance and capital projects during the few, short windows of time (approximately four hours a day) permitted during continuous train operations. Other than AirTrain feeder service to public transit at JFK and EWR, PATH is the only Port Authority Line Department that provides rapid transit public transportation. Consistent with numerous other rapid transit rail systems in the United States (all of which have high fixed costs), PATH operates at a loss (Net Operating Revenue in **Table 23** below). Over the past five years, modest fare increases with relatively flat operating expenses and growing grants and contributions have reduced PATH losses to approximately $129 million of negative operating cash flow, or ($1.65) per passenger, by 2012.

Table 23 – PATH Annual Financial Trend

PATH Financial Summary ($ in millions)	Actual 2007	2008	2009	2010	2011	Budget 2012	CAGR '07 to '12
Revenue	$99.4	$111.1	$106.1	$109.7	$121.1	$141.0	7.2%
Expenses (1)	(266.9)	(290.3)	(300.9)	(385.7)	(322.1)	(303.1)	2.6%
Net Operating Revenues	(167.5)	(179.2)	(194.8)	(276.0)	(201.0)	(162.1)	-0.6%
% of Gross Revenue	*(168.5%)*	*(161.3%)*	*(183.6%)*	*(251.6%)*	*(165.9%)*	*(115.0%)*	
Grants & Contributions (2)	2.0	2.7	5.3	32.3	35.1	32.9	75.0%
Operating Cash Flow	(165.5)	(176.6)	(189.5)	(243.7)	(165.9)	(129.3)	-4.8%
Invested in Faciilities (2)	(158.2)	(227.8)	(326.3)	(307.4)	(341.0)	(351.5)	17.3%
Free Cash Flow	**($323.7)**	**($404.4)**	**($515.8)**	**($551.2)**	**($506.9)**	**($480.7)**	**8.2%**
% of Gross Revenue	*(325.7%)*	*(364.0%)*	*(486.1%)*	*(502.4%)*	*(418.5%)*	*(340.9%)*	
Annual Change		*24.9%*	*27.5%*	*6.9%*	*(8.0%)*	*(5.2%)*	
Non Represented Employees	163	164	172	171	173	173	
Represented Employees	934	925	1,014	1,050	1,047	1,042	
Total Employees	1,097	1,089	1,186	1,221	1,220	1,215	

Notes:

1) *2010 expenses include $88 million associated with certain WTC Transportation Hub design write-offs*
2) *Invested in Facilities and Grants & Contributions figures in the table above exclude amounts for WTC Transportation Hub*

Unlike PATH, most other public transportation providers around the country are subsidized (*e.g.*, MTA, NJ Transit, Chicago's RTA, and San Francisco's BART). PATH is supported by surplus cash flow generated mainly by TB&T, its sister Line Department in the ITN.

Approximately 95 percent of PATH revenue is derived from train fares, as shown in **Table 24** below. Most passengers take advantage of discounted fares, as illustrated by an average fare of $1.50 in 2011 despite a full fare of $2.00 (before the September 2011 $0.25 fare hike). Fare increases are reflected in 2008, 2011 and 2012, driving the 7.7 percent growth rate in fare revenue. Other revenues have remained relatively flat.

Table 24 – PATH Revenue Trend & Components

PATH Financial Summary	Actual 2007	2008	2009	2010	2011	Budget 2012	CAGR '07 to '12
Farebox	$92.6	$105.5	$100.9	$104.7	$114.7	$134.3	7.7%
Advertising	1.8	1.8	1.2	1.5	1.5	2.2	4.1%
Retail	1.4	1.3	1.4	1.2	1.7	1.6	2.7%
Other (Parking, Bus & Intercompany Rent)	3.6	2.5	2.6	2.3	3.2	2.9	-4.2%
Total Revenue	**$99.4**	**$111.1**	**$106.1**	**$109.7**	**$121.1**	**$141.0**	**7.2%**
Annual Change		11.8%	-4.5%	3.4%	10.4%	16.4%	
Percent of Total PANYNJ Revenue	3.1%	3.1%	3.0%	3.0%	3.2%	3.4%	
Key Operating Statistics							
Total Passengers (000s)	71,594	74,956	72,281	73,912	76,556	78,400	1.8%
Passenger Weekly Average (000s)	242	253	243	247	256	265	1.9%
Average Fare	$1.29	$1.41	$1.40	$1.42	$1.50	$1.71	5.8%
24-Hour On-time Performance	97.6%	96.5%	96.7%	97.0%	98.0%	98.0%	NA

PATH is on pace to set a new record for ridership for the second consecutive year. Through June 2012, passenger volume of 39 million trips was approximately four percent favorable to 2011 results. Year to date results put PATH on pace to meet or exceed budgeted 2012 volume of 78.4 million passenger trips, up from the record 76.6 million logged in 2011.

PATH has kept expense increases (2.6 percent annual growth, **Table 23**) to a minimum relative to overall revenue increases (7.2 percent annual growth, **Table 24**), but has gradually increased represented headcount to support capital programs since 2007 (2.2 percent annual growth, from 934 in 2007 to 1,042 in 2012).

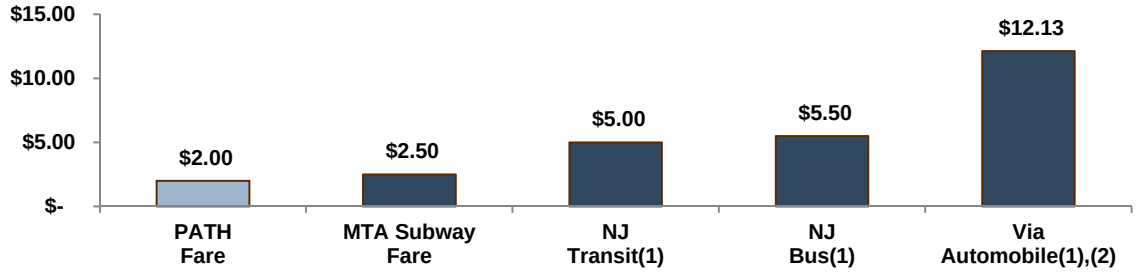
OBSERVATIONS & FINDINGS

- ***PATH offers its passengers a high standard of on-time performance for a relatively low flat fare, one that is far below the level necessary to cover operating expenses***

Since transit pricing is not market based, PATH operates at a significant loss. Breakeven performance is not feasible under the currently contemplated fare structure and total expenses aligned with maintaining 98 percent on-time performance. As an indication of the futility of breaking even, in 2011 the $128 million labor expense alone exceeded total revenue of $121 million. To break even in 2011, the average blended fare price would have needed to be $4.12 (versus $1.50 actual), or passenger traffic would have needed to be nearly triple (210.7 million versus 76.6 million actual), neither of which appears realistic in the current environment.

PATH is attempting to reduce its losses with scheduled annual fare increases of $0.25 for the next three years that will bring the undiscounted full fare to $2.75 by October 2014. **Figure 7** below provides a comparison of PATH fares to other forms of transportation in the area.

Figure 7 – PATH vs. Other Modes of Transportation



Notes:

1) *Estimated cost per 15-mile trip from Newark, NJ to Manhattan*
2) *Automobile cost is comprised of $9.50 E-ZPass toll plus $2.63 in fuel; daily parking is not included*

Though PATH has analyzed certain distance-based and on/off-peak pricing strategies in the past, the Agency currently does not have plans to implement such policies. Despite certain drawbacks, alternative fare structures remain potentially important and may need to be explored again in the future to balance the need for revenue growth with policies PATH's public ridership will support. Express service and zone premiums could also be implemented. However, each has offsetting complexities such as track capacity management, and relatively narrow zone demarcations as compared with distance-based systems in other cities that have more track miles than PATH.

- ***PATH is adding capacity because of anticipated demographic changes that are expected to increase passenger volume in lower Manhattan and New Jersey by approximately 3 percent per year on average through 2020***

Growth of approximately 3 percent annually through 2020 is expected due to the opening and remaining build out of WTC facilities as well as development around the Harrison and Exchange Place stations. An enhanced signaling system will increase capacity by allowing trains to run at closer intervals. Upgrading PATH's antiquated signaling system is also a matter of maintaining a State of Good Repair, and is required by federal regulations. PATH is also in the midst of a project to lengthen train platforms at the six stations on the Newark to WTC line to accommodate 10-railcar trains up from eight (a 25 percent increase in capacity). PATH recently replaced its entire fleet of railcars (the last of 350 new railcars was delivered in early 2012). The new fleet will increase capacity by reducing outages to help PATH uphold its on-time performance standards while continuing to meet strict maintenance requirements.

Spending of $1.1 billion is budgeted in the preliminary 2011 – 2020 Capital Plan for signal and platform modifications that will increase system capacity. Anticipated increases in passenger volume and scheduled fare increases will contribute a cumulative incremental $1.1 billion in revenue by 2023, plus approximately $130 million annually thereafter.

NON-FARE REVENUE ENHANCEMENT OPPORTUNITIES

Given PATH already has scheduled fare increases planned through 2014, ancillary revenue generation opportunities remain important. The identified advertising and real estate development opportunities could yield $6 million to $14 million in incremental revenue after approximately $38 million in one-time capital expenditures.

- ***Potential exists for PATH to generate additional recurring revenue by leveraging railcar and train station property for appropriate display advertising***

The PATH rapid transit system consists of 13 stations across 13.8 miles of rail both above ground and underground. Across that span, brand marketers could achieve impressions from more than 250,000 passenger trips every weekday that provide a captive audience for various advertising messages. Although PATH derived approximately $1.5 million, or 1.5 percent of its revenues, in 2011 from advertising, and is on pace to reach $2.2 million in 2012, the opportunity exists to expand this revenue source.

PATH's locations are attractive to advertisers due to commuter traffic volume and the length of time commuters spend during each trip. Incremental initiatives like themed advertising dedicated to one advertiser prominently displayed at a single PATH station for a defined period of time, adding advertisements to schedules and other printed material, or railcar wrapping could generate additional advertising revenue at minimal incremental cost to PATH.

- ***PATH stations in New Jersey along the corridor between Newark and both Exchange Place and Hoboken are in attractive areas that offer retail, residential, and parking development opportunities***

Weekday commuter ridership growth at the PATH Harrison Station, coupled with significant new development in the area around the station, is expected to increase public parking demand in the vicinity over the next 10 years. In early 2012, PATH conducted a study that found an existing 100 parking space shortfall will worsen to over 2,000 spaces in the next 10 years. The Agency's Real Estate Development group is in the process of discussing parking development with the City of Harrison and private, third party developers. Alternative deal structures include a possible public-private partnership or selling the land outright contingent upon the buyer developing more parking infrastructure.

RECOMMENDATIONS

- Pursue railcar wrapping and short-term, themed advertising by station to boost revenue
- Implement already scheduled annual fare increases to offset operating losses and funding of critical capital projects
- Move forward with evaluating parking options for the Harrison station
- Conduct further economic analysis to drive operating efficiencies and consider raising fares via palatable pricing strategies related to distance traveled or on/off-peak hour travel
- In support of PATH's planned demand growth and related capacity expansion, further due diligence and analysis is required to understand and validate non-elective capital spending, and evaluate potential alternative financing scenarios
- Consider alternative methods and other subsidies to offset ongoing operating losses

IX. LINE DEPARTMENT REVIEW – PORT COMMERCE

OVERVIEW

The Port of New York and New Jersey ("Port"), operated by the Agency's Port Commerce Department, is the third largest port facility by volume in the United States, exceeded only by the port facilities in Los Angeles and Long Beach, California. It is a major component of, and contributor to, the regional economy: in 2010, over 269,000 jobs representing nearly $11.2 billion in annual wages were supported by enterprises related to the Port. These same enterprises paid nearly $5.2 billion in federal, state and local taxes.

Port Commerce's business is highly competitive, distinguishing it from the other three Line Departments in the Port Authority. Commercial users of port services are very sensitive to price, speed and reliability. However, the Port's locations provide a significant advantage due to their proximity to the high population density in the surrounding areas. Shippers are able to reach 20 percent of the U.S. population within eight hours and 30 percent within 48 hours.

Port Commerce does not directly handle cargo itself. Rather, as a landlord port, it leases space to terminal operators that handle cargo and it provides the infrastructure necessary for port operations. More specifically, its responsibilities include:

- All operations, marketing, security, environmental compliance, and infrastructure asset management at the Port facilities;
- The leasing and administration of all Port Commerce Department property;
- The planning, development, management and delivery of the department's major capital programs. This includes project support and technical assistance for marine terminal development and Port-wide rail operations; and,
- The development and implementation of environmental policy and initiatives.

Port Commerce has seven facilities in New York and New Jersey listed in **Table 25**. The facilities are almost fully leased, with scarce unused acreage.

Table 25 – Port Commerce Facilities, Locations & 2011 Revenue

($ in millions)	Port Commerce	
Facilities	***Location***	***2011 Revenue***
Elizabeth	Elizabeth, NJ	$119.8
Port Newark	Newark, NJ	73.0
Howland Hook	Staten Island, NY	15.0
Port Jersey Marine Terminal	Bayonne & Jersey City, NJ	14.9
Brooklyn Marine Terminals	Brooklyn, NY	6.4
Red Hook	Brooklyn, NY	5.4
NYNJ Rail LLC	Jersey City, NJ	1.8
		$236.5

Approximately $3.3 billion of capital projects have been identified for Port Commerce: $1.7 billion are in the preliminary 2011 – 2020 Capital Plan, $1.0 billion are expected to be funded for the period beyond 2020, and $0.6 billion are currently unfunded. The components of the capital plan are shown in **Table 26** below.

Table 26 – Port Commerce Preliminary 2011 – 2020 Capital Plan

(millions)	Port Capital Needs					
Project	***Mandatory***	***Security***	***SGR***	***System Enhancing Projects***	***Revenue Producing Projects***	***Total***
Port Jersey Marine Terminal Global Terminal Development	-	-	-	-	$ 159	$ 159
Cross Harbor Development	-	-	-	-	124	124
Port Newark Port Street Capacity and Corbin St ramp improvement	-	-	-	108	-	108
Port Jersey Marine Terminal ExpressRail Intermodal Facility	-	-	-	-	102	102
Elizabeth North Ave Corridor improvements	-	-	-	66	-	66
Port Jersey Marine Terminal Access improvements	-	-	-	53	-	53
Subtotal	0	0	0	226	384	611
Remaining 96 smaller projects	240	10	460	184	186	1,077
Total value of Port Commerce Projects in 2011 Capital Plan	**240**	**10**	**460**	**410**	**570**	**1,688**
Value of projects funded beyond 2020	180	0	300	210	350	1,040
Total value of funded projects	**420**	**10**	**760**	**620**	**920**	**2,728**
Value of unfunded projects	20	50	340	150	-	560
Unconstrained Port Capital Projects	**$ 440**	**$ 60**	**$ 1,100**	**$ 770**	**$ 920**	**$ 3,288**

FINANCIAL RESULTS

The majority of Port Commerce's revenue (approximately 70 percent) comes from lease income generated from marine terminal tenants (**see Table 27**). These are primarily fixed rate contracts, with relatively small but growing volume-based components that are reflected in the "Container Throughput" line item.

Table 27 – Port Commerce: Revenue Trend & Key Operating Statistics

Port Commerce	Actual					Budget
Revenue Summary ($ in millions)	2007	2008	2009	2010	2011	2012
Revenues						
Marine Terminals Tenants	146.9	157.2	161.3	168.7	164.9	180.7
Container Throughput	4.5	3.9	9.9	16.0	26.6	30.5
ExpressRail Lift Charges	15.3	18.1	15.8	20.1	4.4	-
Cargo Facility Charge	-	-	-	-	22.9	30.3
Other	69.2	22.1	18.9	18.4	17.7	0.0
Total Revenues	**$ 236.0**	**$ 201.3**	**$ 205.9**	**$ 223.1**	**$ 236.5**	**$ 241.5**
Percentage change		*-14.7%*	*2.3%*	*8.4%*	*6.0%*	*2.1%*
Key Operating Statistics (000)						
Containers TEU *(twenty foot equivalent units)*	5,298	5,249	4,562	5,292	5,503	5,918
Percentage change		*-0.9%*	*-13.1%*	*16.0%*	*4.0%*	*7.5%*
International waterborne vehicles	790	724	440	493	388	502
Percentage change		*-8.4%*	*-39.2%*	*12.0%*	*-21.4%*	*29.5%*
Waterborne bulk commodities *(in metric tons)*	4,396	4,556	4,470	3,133	3,767	3,473
Percentage change		*3.6%*	*-1.9%*	*-29.9%*	*20.2%*	*-7.8%*

In 2011 Port Commerce instituted a Cargo Facility Charge ("CFC") which is a cost recovery fee that, over time, funds rail and roadway infrastructure investments, and 25 percent of security operating costs. In 2012 it amounts to $4.95 per container and it is expected to generate approximately $30 million. The rationale behind the charge is that user beneficiaries should contribute to fund port improvements. Port Commerce is the only port in the country with this fee. The Department is actively working at the federal level to encourage legislation for this fee to be adopted at other ports to level the competitive field.

As shown in **Table 28**, total revenue decreased in 2008 as a result of the general economic slowdown that caused cargo volume to decline. As revealed in **Table 27** the number of international waterborne vehicles (*i.e.,* new automobile shipments) declined sharply in 2009 and again in 2011. The initial decline was due to the dramatic recessionary impact on the auto industry, and was further aggravated by a combination of the Japanese tsunami, and Hyundai and Kia Motors' relocation of operations to the port of Philadelphia, in itself a reduction of 85,000 units.

Table 28 – Port Commerce: Components of Free Cash Flow

Port Commerce	Actual					Budget	Actual
Cash Flow Summary ($ in millions)	2007	2008	2009	2010	2011	2012	2007-2011
Total Revenues	$ 236.0	$ 201.3	$ 205.9	$ 223.1	$ 236.5	$ 241.5	$ 1,102.7
Total Expenses	112.6	143.5	127.2	163.4	185.1	178.8	731.8
Net Operating Revenues	**123.4**	**57.7**	**78.6**	**59.7**	**51.4**	**62.7**	**$ 370.8**
Grants, Contributions	3.7	0.4	2.3	4.2	8.6	50.2	19.2
Operating Cash Flow	**127.1**	**58.1**	**80.9**	**63.8**	**60.0**	**112.9**	**$ 390.1**
Invested in Facilities	285.5	184.1	156.1	302.9	216.0	345.9	1,144.6
Free Cash Flow	**$ (158.3)**	**$ (126.0)**	**$ (75.2)**	**$ (239.1)**	**$ (156.0)**	**$ (233.0)**	**$ (754.5)**

Port Commerce is the third largest Line Department in terms of revenue and operating cash flow ($236.5 million and $60.0 million respectively, in 2011). Port Commerce generates positive operating cash flow, but has substantial negative free cash flow after accounting for its capital expenditures. For the five year period ended 2011, operating cash flow was $390.1 million and investments in facilities totaled $1.1 billion; therefore free cash flow was negative $754 million.

OBSERVATIONS & FINDINGS

- ✧ ***Port Commerce faces fundamental challenges: (i) it operates a primarily fixed rental model with limited ability to recapture the majority of its capital expenditures; (ii) it is not subsidized by federal or state dollars, but yet it is tasked with making capital investments without prospects for direct returns that otherwise benefit the region; and (iii) it has to comply with certain federal laws, which makes a true market based approach to pricing difficult***

Due to the major infrastructure investments required to maintain a competitive, modern port, it will be difficult for Port Commerce to ever generate free cash flow after capital expenditures under its current business model. While it does collect a CFC that over time will recover costs related to rail and road infrastructure, it does not recover other major critical capital project costs, such as dredging and raising the Bayonne Bridge. In the current environment, it is not possible to charge for those costs and remain a competitively priced East Coast port. Other ports that it competes with face the same challenge but most receive government subsidies to fund major capital projects, as shown in **Table 29**. The ports of Los Angeles and Long Beach, California are exceptions to this. They operate without continuing programmatic subsidies. Two principal reasons they are able to do this are:

- Higher volume (these two ports are contiguous and on a combined basis handled 150 percent more total equivalent unit volume than Port Commerce did in 2011)

- Higher per acre lease rates driven by:
  - Proximity to active Far East exporters; and,
  - A different business model where they own more of the port infrastructure such as cranes and transport equipment, which allows them to command higher rates.

Despite these differences, Port Commerce should carefully review and evaluate market alignment of the tenant leases as they come up for renewal in future years.

Table 29 – Government Funding at Comparable Ports (update)

Comparable Ports	*Examples of Government funding*
Georgia Ports Authority	State recently committed $250 million to finance dredging the Savannah River and the Port of Savannah Harbors and Channels are maintained at a depth of 55 feet by the federal government due to the presence of a US Navy base Various tax incentive programs, including one which offers a $25 tax credit per TEU
Port of Houston Authority	Approximately $50 - $60 million annually as part of an ad valorem tax from Harris County taxpayers.
Port of Miami	State and City recently committed $450 million to finance a new tunnel connecting the Port of Miami with the roadway network State recently committed $77 million to finance dredging the Port of Miami harbor
Port of Seattle	Approximately $70 million annually from a surcharge that is part of Kings County real estate taxes
South Carolina State Port Authority	State recently committed $300 million to finance dredging the Port of Charleston
Virginia Port Authority	$30 -$35 million annually from the State Commonwealth Port Fund which derives its money from a 4.2% allocation of the State of Virginia Transportation Fund

REVENUE ENHANCEMENT OPPORTUNITIES

Identified revenue opportunities for Port Commerce range from approximately $20 million to $25 million annually.

✧ ***New business initiatives that would reduce as many as 360,000 waste trucks annually from the trans-Hudson crossings and New Jersey roads, as well as preventing considerable wear and tear on these infrastructure assets by barging containerized municipal solid waste to the Howland Hook intermodal rail facility ("Howland Hook") and to the Greenville Yard ("Greenville") to be in turn transported by rail to landfill facilities, would present more cost effective transport for the City, a revenue opportunity for Port Commerce***

The waste in question is currently being trucked from New York City through New Jersey to landfills outside the region. In the alternative it will be sent by barge from waste transfer stations in New York City to Howland Hook and Greenville where it will be transported to its final destination by rail. The initiatives are scheduled to commence in 2014. This will be more economical for the City of New York and eliminate wear and tear to road infrastructure associated with as many as 360,000 municipal waste trucks annually. As much as $4 million of related toll revenue will be lost, but congestion and maintenance capital expenditures associated with road repair will also be reduced.

✧ ***Continued efforts are needed to increase Port cargo volume. A 10 percent increase in container volume would generate approximately $15 million in additional revenue***

The majority of Port Commerce's land is already leased and therefore there is only a modest opportunity to generate additional revenue from adding tenants. However, the tenants have

significant unused capacity, and therefore revenue can be generated by increasing their cargo volume. Port Commerce currently receives approximately $27.00 per container that travels through the port ($21.95 per container under the tenant lease and $4.95 from the CFC). In 2011 container volume was 5.5 million. Therefore, a 10 percent increase would equate to 550,000 additional containers and approximately $15 million of revenue.

A position should be added as an economic development specialist for warehouses and distribution facilities in close proximity to Port Commerce's ports. This strategy has been executed successfully in Savannah, Georgia, where the port has attracted nearby warehouses and supply chain infrastructure for companies such as Home Depot and Bed Bath & Beyond which in turn increases volume at its port. This position should coordinate efforts with the relevant Economic Development offices in New York and New Jersey and evaluate and implement successful marketing strategies to attract greater user volume.

In addition, an in-depth analysis currently underway should be completed to determine whether to institute a monetary incentive for new cargo. For example, the port at Long Beach, California recently instituted a $20.00 per container incentive to mitigate the risk that some ships will use the expanded Panama Canal to bypass it for East Coast ports. Though this incentive reduces profitability, the offsetting volume induced is still accretive given the fixed cost nature of the business.

Since 2009, Port has lost a significant amount of auto processing business, with international waterborne vehicles declining from 724,000 in 2008 to 388,000 in 2011. Rebuilding this business segment should be a top priority.

COST CONTAINMENT OPPORTUNITIES

- ***Develop an aggressive plan to staunch the losses at the Red Hook Container Terminal ("Red Hook") in Brooklyn, that absent intervention is currently projected to lose over $100 million over the next 10 years***

Red Hook could lose over $100 million over the next 10 years largely because most inbound containers it receives need to be barged across to New Jersey where there are rail connections, and that cost is borne by Port Commerce. Port Commerce needs to attract more customers with cargo that will be consumed in Brooklyn and other areas east of the Hudson River and therefore not need to be barged across to New Jersey. A recent success has been the addition of Phoenix Beverage, a large beverage distributor whose products stay in New York. If the losses at Red Hook are not curtailed, consideration should be given to attempting to transfer the operation of the facility to a third party with potential for operating efficiencies, or closing it due to its financially unsustainable losses.

- ***Evaluate upgrading the utilities at the marine terminals to drive further operating efficiencies and save up to $1 million per year***

Port Commerce should evaluate the most cost effective ways to upgrade the utilities at its facilities in order to reduce operating costs (*i.e.,* save leakage from water distribution systems,

upgrade electrical distribution system to turn back over to the local utility, and improve fire protection systems). Initial estimates suggest that upgrading the water distribution systems could save over $700,000 per year, upgrading the electrical distribution system at Port Jersey to include meters could save over $200,000 per year, and upgrading the fire protection systems at piers 9B and 11 in Brooklyn could save $20,000 to $100,000 per year.

- ***Consider retaining an in-house attorney with a specialty in maritime law to save up to $1 million per year***

Hiring an attorney in-house with a specialty in maritime law would be cost effective, allow for quicker response times, and provide consistent legal interpretations. Over the last five years, the Port Authority has paid outside counsel an average of $10 million per annum. Initial estimates suggest an in-house maritime attorney could reduce outside legal expenses by up to $1 million per year. The attorney's primary focus would be on lease issues and other routine items; litigation support would continue to be outsourced to outside counsel.

RECOMMENDATIONS

- Aggressively work to align lease rates with market when tenant agreements expire
- Continue to pursue the opportunities to barge containerized waste, including securing the necessary leases
- Add an economic development specialist to attract warehouses and supply chain infrastructure in proximity to facilities and drive volume growth of containers shipped
- Provide further support of an in-depth analysis to determine the profitability and risks of instituting a monetary incentive for new cargo through the Port
- Continue to aggressively market new tenants for the Red Hook facility to drive down the operating losses and evaluate the feasibility of a commercially viable business plan, or alternatively consider divestiture or shuttering of the facilities
- Selectively upgrade utility infrastructure where it will provide a positive return on investment
- Evaluate feasibility of obtaining appropriate federal and or state tax subsidies to contribute to the significant infrastructure development costs that will benefit the entire economic region
- Hire an in-house attorney with expertise in maritime law to reduce annual legal expense

X. WORLD TRADE CENTER PROGRAM

OVERVIEW

The World Trade Center program ("WTC") is a highly complex development of inter-related, capital projects managed by the Port Authority, including the following:

- One World Trade Center Tower ("1 WTC");
- Vehicular Security Center ("VSC");
- streets and utilities surrounding and traversing the site;
- commercial and retail development; and,
- Transportation Hub, in part, a Federal Transit Administration ("FTA") funded project.

The integration of the site requires numerous other projects associated with common infrastructure supporting appurtenant facilities, building systems, operations and parking. In addition, the Port Authority is managing the execution of work on behalf of other stakeholders, such as, the National September 11 Memorial and Museum ("Memorial") for a private foundation, the Performing Arts Center ("PAC") for a private foundation, and the No. 1 Subway Line, Cortlandt Station, for the MTA (together the entirety of these projects is the "Program").

The Interim Report prepared an Estimates at Completion ("EAC") through a review of project cost reports, documented change orders and allowances for known exposures represented in the records of the Port Authority (the "Current Estimate"). In addition, the Current Estimate was subjected to qualitative risk analysis to develop a range of potential incremental financial exposure to the Current Estimate. As reported in the facts, figures and tables in the Interim Report, the EAC was estimated to be approximately $14.8 billion with approximately $1 billion of identified potential exposures **(see Table 30**). Importantly in the Interim Report, Navigant identified the net cost to the Port Authority, at approximately $7.7 billion, with potential additional exposures of approximately $0.8 billion. As reported by the Port Authority, there have been no authorized, material scope changes to the Program since the release of the Phase I Interim Report dated January 31, 2012 by Navigant (the "Interim Report"). Detailed analyses re-affirm the gross Program estimate at completion and net cost to the Port Authority as provided in the Interim Report.

Table 30 – WTC Estimate and Potential Exposure (per Phase I Interim Report)

January 31, 2012 Interim Report ($ Billion)	Program Estimate	Potential Exposures	
Project Titles:			
WTC Transportation Hub	$ 3.74	$ 0.21	(1)(4)
1 World Trade Center	3.95	0.01	(4)
Vehicular Security Center 1	0.70	0.01	(2)
Site Infrastructure	2.17	0.22	(3)
WTC Retail	1.72	0.45	(3)(5)
Streets and Utilities	0.33	0.03	(5)
Cortlandt St. #1 Station	0.15	0.05	(5)
9/11 Memorial			
9/11 Memorial (PA)	0.20		
9/11 Memorial (3rd Party)	0.83		
Campus Security Plan	0.30		
Program Contingency	0.35		
Additional Financial Expense	0.35	0.05	
WTC TOTAL	**$ 14.79**	**$ 1.03**	
Reimbursements / Funding	(7.08)	(0.21)	
NET PROGRAM COST TO PA	**$ 7.71**	**$ 0.82**	

Notes:

1) *Potential for underfunded contingency*
2) *Potential acceleration costs*
3) *Potential scope changes for Chiller Plant, VSC and Security*
4) *Potential exposure to contractor non-performance*
5) *Potential cost growth for Streets, Cortlandt Station and PAC*

As part of its Phase II work, Navigant was asked by the Special Committee to affirm the findings included in the Interim report. To confirm the findings of the Interim Report, significant efforts have made by the Port Authority to complete a comprehensive and collaborative risk assessment of the Program. Prudent, and industry standard, risk modeling efforts were employed to achieve increased levels of confidence in the total EAC, that is, the total cost of the development of the site under the current program. These calculations are bolstered by project specific risk registers that allow for qualitative probability assessments on identified exposures. In addition, Navigant reviewed numerous documents and conducted multiple interviews with members of the WTC construction staff, select management of the Port Authority and other persons with direct knowledge of the history of construction at the site. The collectability of expected reimbursements from third parties is based on interviews and representations by Port Authority personnel. The entirety of this work now forms the basis of standardized monthly reporting protocol and reflects the Agency's ongoing efforts to ensure consistent monitoring of the cost of the Program (see **Table 31**).

Table 31 – WTC EAC and Potential Exposure
(Current Risk Modeled Estimate with noted Variance to Interim Report)

Current Risk Modeled Estimate ($ Billion)	Program Estimate	Potential Exposures	
Project Titles:			
WTC Transportation Hub	$ 3.74	$ 0.26	(1)(2)
1 World Trade Center	3.95	(0.11)	(2)(3)
Vehicular Security Center 1	0.70	0.02	(2)
Site Infrastructure	2.17	0.41	(2)(4)
WTC Retail	1.72	0.39	(3)
Streets and Utilities	0.33	(0.08)	(3)(4)
Cortlandt St. #1 Station	0.15	0.14	(2)
9/11 Memorial			
9/11 Memorial (PA)	0.20		
9/11 Memorial (3rd Party)	0.83	0.02	(2)
Campus Security Plan	0.30		
Program Contingency	0.35		
Additional Financial Expense	0.35	0.05	
WTC TOTAL	**$ 14.79**	**$ 1.09**	
Reimbursements / Funding (5)	(7.38)	-	
NET PROGRAM COST TO PA	**$ 7.41**	**$ 1.09**	

Exposure Variances from Interim Report:

1) *Program Estimate includes approximately $200 million of soft, hard and acceleration costs identified by, and incurred by, the Port Authority associated with the deck over and landscaping changes related to the Memorial; these costs have been carried in the Program Estimate since 2008*
2) *Potential exposures driven largely by a change in estimating methodology that required an increase in contingency to achieve a greater than 70% certainty of completing the identified project at the Program Estimate after use of no more than the available contingency amount*
3) *Decreased or mitigated exposures resulting in reduced contingency reserves that were included in the Interim Report.*
4) *Scope transfer between projects (i.e., transfer of Church Street from "Streets and Utilities" to "Site Infrastructure").*
5) *Additional Net Reimbursements / Funding related to increased recognition of insurance proceeds offset by reductions in anticipated third party reimbursements*

SUMMARY OF KEY FINDINGS

- These detailed analyses re-affirm the gross Program estimate at completion as provided in the Interim Report of approximately $14.8 billion with potential additional exposures of up to approximately $1.1 billion (see **Table 31**);
- The net cost to the Port Authority is $7.4 billion to $8.5 billion. Net cost represents the gross cost after funding of insurance proceeds and reimbursement by third parties, occasioned by work performed on their behalf (see **Table 31** and **Table 32**);
- The Port Authority has identified, or is in the process of identifying, substantive actions that will deliver the Program within the expected range of the EAC;
- The Port Authority has instituted greater transparency and consistency in the reporting of the EAC that has resulted in the reliable identification of proposed scope additions and budget increases. The improvements in reporting and the

existing controls environment allow for orderly analysis, acceptance, modification or denial of the proposed scope changes; and,

- The certainty of reimbursement by third parties continues to improve with nearly 90 percent of anticipated funds received or committed as of this Report. The Port Authority reports that active negotiations are in process to recover remaining amounts due from third parties.

OBSERVATIONS & FINDINGS

✧ ***The Port Authority has taken actions vastly improving the transparency and frequency of EAC reporting including a collaborative, cross-disciplinary process for identifying and validating costs and potential impacts***

In light of focus of senior management and the Board of Commissioners on cost growth at the WTC, Navigant notes meaningful change in the Agency's certainty, transparency and consistency in the reporting of the EAC since the Interim Report:

- Agency communication on WTC costs is vastly improved. The WTC Construction ("WTCC") and WTC Redevelopment ("WTCRD") departments, in conjunction with the applicable departments within Finance at the Port Authority, have integrated the components of the WTC into a single comprehensive estimate of gross costs that together create the EAC. This process necessarily involved frequent, interactive working sessions of all project stakeholders, including insights of private sector partners, to vet the accuracy of estimates and avoid errors of duplication or omission;
- A Port Authority working group comprised of member of the WTCC, WTCRD and Finance departments, has formulated and adopted a standard method of reporting cost estimates to the Board of Commissioners. This leading practice approach creates a consistent means of documenting change and identifying areas of risk for all interested parties related to this complex endeavor; and,
- The Port Authority has completed a thorough and collaborative risk assessment of the WTC. The EAC has been prudently evaluated through the utilization of industry leading modeling techniques to assess the probability of delivering the WTC within the range identified in the Interim Report and this Report.

Quantitative probability and sensitivity analysis performed on the identified risks and exposures to the EAC allow for an assessment of the adequacy of available contingency. Formal risk modeling tools were employed to achieve conventional levels of confidence (*e.g.*, minimum of 70 percent statistical probability in achieving the current estimate together with potential exposures) to each project within the WTC and associated adjustments were made to project-level contingency budgets.

These analyses affirm the WTC's range of gross cost and net cost as presented in the Interim Report. Specifically, as indicated in **Table 31**, the potential exposures increased by less than $60 million, or less than 0.4 percent, from the findings of the Interim Report.

- ***The Port Authority has implemented numerous initiatives that have enhanced the internal controls environment and the reliability of gross and net cost forecasts***

In the Interim Report, Navigant was critical of the documentation quality, accuracy of estimates, and transparency of communication surrounding the EAC. The summary below lists certain recommendations and actions that stemmed from the Interim Report and a brief description of the constructive response by the Port Authority to each:

Table 32 – Port Authority Response to Phase I Recommendations

Phase I Interim Report Recommendation	Port Authority Response
Perform a comprehensive forensic construction cost audit of the entire WTC program to validate the costs expended, the Current Estimate and to identify any additional exposure items.	*The Port Authority has directed a review of select larger contracts as a component of continuous risk management.*
Conduct a focused review of the development budget associated with asset management and the future operations of the 1 WTC and the Retail project that involves all constituents.	*The Port Authority has analyzed the commercialization aspects of the 1WTC and Retail projects in order to validate the capital investment required to execute commercialization strategies leveraging the expertise of commercial partners.*
Pursue reimbursement from third parties for completed work and any pending commitments for work product conducted in good faith.	*The Port Authority has entered into structured negotiations to ensure that firm commitments are in place with each third-party stakeholder.*
Prior to committing to or initiating any additional work requests from other agencies and parties, secure adequate evidence of funding or reimbursement capacity.	*The Port Authority has restricted any further commitments to perform work on behalf of third-parties absent a specific scope of work and subject to firm and clearly documented funding obligations.*
Assess the contingent liabilities of the Port Authority and risk-assess same in the EAC for the Program.	*The Port Authority has evaluated the potential impact of contingent liabilities in the EAC of the Program, as discussed in more detail in this Report.*
Unless intended to create construction efficiencies or produce direct cost reduction, freeze design to the extent possible.	*The Port Authority has not implemented any unplanned scope changes since the Interim Report. The recently adopted cost reporting format for the WTC includes a section for the consistent reporting of any new scope making necessary transparent and constructive dialogue in the ultimate disposition of a specific item.*
Prepare a comprehensive risk register, probability assess beneficial or adverse outcomes on a continuous basis to increase the accuracy of the EAC based on contemporaneous information.	*The Port Authority has developed risk registers for each project and performed an industry recognized risk probability assessment of the EAC that affirmed the findings presented in the Interim Report.*
Perform sensitivity analysis on best, worse and likely scenarios to understand related cost impacts on the EAC and in particular whether or not adequate contingencies are available.	*Through the performance of the risk assessment, the Port Authority confirmed the adequacy of the contingency levels incorporated in the Interim Report EAC at a minimum of 70 percent probability level for the major projects comprising over 85 percent of the Program's EAC.*

Phase I Interim Report Recommendation	Port Authority Response
Integrate development and construction budgets and a holistic reporting of the Program in a standardized format on a monthly basis to the Executive Director who shall take ultimate responsibility to the Board of Commissioners for Capital Plan performance.	*At the Agency's direction, Navigant worked with the WTCC, WTCRD and Finance Departments to develop monthly EAC reporting protocols to increase transparency and allow for early determination and, where feasible, corrective actions for negative EAC variances. Distribution of these reports to the Executive Director and Board of Commissioners has begun.*

✧ ***Certainty of third-party reimbursement has shown improvement with nearly 90 percent of anticipated funding now received or committed through substantive documentation***

As indicated in **Table 33**, the certainty of reimbursement by third parties, and the implications on the net cost of the WTC for the Port Authority, continues to improve. Assuming that reimbursements from third parties are secured consistent with Port Authority expectations, the net cost to the Port Authority will be approximately $7.4 billion.

Approximately $2.7 billion of insurance proceeds and approximately $2.6 billion of federal government grants that have been received by, or are under the terms of specific contracts with, the Port Authority. Together, these two sources represent approximately $5.3 billion, or just over 70 percent, of the total expected reimbursement. An additional $1.4 billion of funding from various agencies has been received, or confirmed through contractual agreement, bringing the balance of verified third-party funding to $6.7 billion, or approximately 90 percent of anticipated reimbursements as represented by the Port Authority. The remainder, or $0.7 billion, is being closely monitored by the Port Authority with active negotiations in process to recover these amounts.

The following table presents the current status of the WTC Program and depicts the gross costs and net obligations of the Port Authority through the anticipated completion of the Program. Of note, just over 60 percent of third party reimbursements have been collected and applied to the Program. As a result, approximately $5.0 to $6.0 billion (*i.e.*, accounting for the range of EAC exposure) of remaining funds to be applied to the Program is the direct responsibility of the Port Authority.

Table 33 – WTC Incurred and Forecast Costs (Gross and Net)

Current Risk Modeled Estimate ($ billion)	Program Estimate	Expended thru 2011	Remaining Baseline	Potential Exposures	Remaining w/ Exposures
WTC Total Program Estimate	**14.79**	**7.13**	**7.66**	**1.09**	**8.74**
Reimbursements / Funding	(7.38)	(4.75)	(2.63)	-	(2.63)
NET PROGRAM COST TO PA	**7.41**	**2.38**	**5.03**	**1.09**	**6.11**

Table 34 conservatively presents the capital needs over time including potential exposures. These amounts will be reflected and accounted for in the future capital planning of the Agency.

Table 34 – WTC Funding Requirements to Date and Through Completion (Annually)

Current Risk Modeled Estimate ($ Billion)	Expended thru 2011	Remaining w/ Exposures	2012	2013	2014	2015	2016+
WTC Total Program Estimate	**7.13**	**8.74**	**2.94**	**2.85**	**1.87**	**0.63**	**0.46**
Reimbursements / Funding	(4.75)	(2.63)	(0.53)	(0.75)	(0.70)	(0.45)	(0.20)
NET PROGRAM COST TO PA	**2.38**	**6.11**	**2.41**	**2.10**	**1.17**	**0.18**	**0.25**

- ✧ ***Agreements related to the development of Towers 4 and 3 create potential liabilities for the Port Authority; continued monitoring is recommended***

Under the terms of a municipal financing structure, the Port Authority has agreed to provide credit support on Liberty Bonds issued for the development of Tower 4 at the WTC. The Port Authority provides this credit support, in large part, through deferral of lease income allowing the property developer to focus on operating expense deficits, certain capital expenditures, and limited construction and leasing overruns, as well as interest payments on debt. Because these subsidized amounts would remain due from the property developer and have an accrued interest feature, the exposure to the Port Authority is in the form of timing differences through the deferral cited above. Above all, this structure motivates the continued development of the site that is in the interests of all constituents.

The construction of the office portion of Tower 3 is conditioned upon realizing certain private-market triggers. In order to encourage continued restoration of the site, the achievement of these hurdles triggers an investment by the Port Authority for the construction of the tower. The State of New York and City of New York have also agreed to participate in this prospective venture. Repayment to the Port Authority is made from future tower cash flows, prior to the property developer receiving any profit from building operations or capital events/investments. Taken together, given that the development of Tower 3 is contingent upon achievement of hurdles that signal market health and investment viability and because of the priority position the Port Authority holds for repayment of any invested funds, the contingent liabilities associated with Tower 3 are unlikely to result in material risk.

RECOMMENDATIONS

- ➢ Given the significant remaining Program work to be committed and funded (i.e., approximately 30 percent and 50 percent against the current EAC of $14.8 million, respectively), the Port Authority should continue the monthly practice of the rigorous risk assessment, probability and sensitivity analysis, and prudent modeling methods substantially similar to those recently completed. This methodology should be applied across all Program elements
- ➢ The Port Authority has worked collaboratively to develop a comprehensive reporting package to track the progress of the EAC and status of various potential risk exposures. The Port Authority should continue this practice on a monthly basis until project completion to ensure all relevant stakeholders are informed on the progress of the Program, and early corrective interventions can be pursued if variances from expectations begin to emerge

- Given the numerous integrated projects with various stakeholders, the Port Authority should continue to assess, as well as consistently, reliably and timely document, the methodology and impact of cost allocations on the cost performance of specific projects within the Program
- The Port Authority must continue to closely monitor the final negotiation and ultimate resolution of any current disputed or undocumented amounts related to recoupment of WTC costs from third-parties. Once finalized, the Port Authority should report any negative variances from expectations and actively track full compliance with these obligations

XI. SHARED SERVICE REVIEW – PROCUREMENT

OVERVIEW

The Procurement Department ("Procurement") is a crucial hub for sourcing products and services that support Port Authority operations and capital projects. In 2011 alone, the department was responsible for awarding 2,225 contracts with total value of $2.4 billion.

As a public agency, the Procurement Department's core values have been to ensure competition, integrity, transparency, and cost control. However, over the years, Procurement's role has become increasingly more complex, in terms of number and dollar value of awards, in types of solicitations, and in related processes, with fewer employees to handle the increasing workload. As the Agency desires to move quicker in capital deployment and to enhance services levels achieved for client departments, an opportunity exists to reengineer existing controls, processes, policies and authority levels to improve outcomes for both the Procurement Department and its internal clients.

As part of its analysis, Navigant reviewed Procurement award data from 2009 to 2011, totaling over 6,500 awards with a value of approximately $8.0 billion. In order to identify opportunities for increased efficiency in the department's activities, the following factors were analyzed: buying group, solicitation type, origin of request, dollar amount of the award, and number of days from client requisition to contract award.

OBSERVATIONS & FINDINGS

- ***Current approval levels and policies contribute to more lengthy processes that burden Procurement and internal clients. Although less than 10 percent of contracts required approval from the Board of Commissioners, a limited board cycle coupled with multiple approval processes (i.e., checks and balances during the review period), contribute to the contracts approved by the board having the longest time to award and ultimately create added burden on the staff***

Table 35 below details the awards made at various authorization levels, demonstrating that Director Approval is by far the shortest, at an average 26 days from client requisition to award of contract, compared to 96 days at the Board level.

Table 35 – Procurement Awards by Authorization Level (2011)

	2011					
($ in 000's)	# of Awards	$ Amount	% Total	% of $	$ per Award	Avg # of Days
Board Approval	135	$ 1,823,437	6.1%	76.3%	$ 13,507	96.0
Executive Director Approval	59	138,281	2.7%	5.8%	2,344	71.4
Director Approval	2,031	427,611	91.3%	17.9%	211	26.2
Total Procurement	**2,225**	**$ 2,389,329**	**100%**	**100%**	**$ 1,074**	**26.8**

Currently, authorization is based solely on the value of a contract, with no consideration for type of commodity or service required. This often leads to the Board of Commissioners approving standard, low-risk contracts (*i.e.*, cleaning and landscaping services, auto parts, software renewals) that could safely be awarded at a lower authorization level reducing cycle time and resource commitments to the approval process. If such responsibility were delegated to the Executive Director, Procurement clients and internal support departments would realize time efficiencies. Effecting this change will require amendments to the Port Authority's Policies and Procedures, as well as collaboration with the Office of the Secretary ("OSEC"), Law, and senior staff.

Table 36 – Construction Contracts Approved by Director (2011)

	2011		
(Whole $)	# of Awards	Total $ Amount	Avg # of Days
Publicly Advertised Bid	21	$ 18,551,428	32.1
Set Aside	6	2,270,883	37.0
Pre-Qualified	11	16,358,562	36.0
Other	4	10,568,878	54.0
Total	**42**	**$ 47,749,751**	**37.0**

Construction contracts related awards (up to $1.5 million), extensions, and supplements require Agency-wide review and Department Director written approval via a Memorandum of Authorization ("MA") that can range from several weeks to 2 months. Procurement is collaborating with Engineering, Line Departments, and OSEC to streamline approval documentation and delegate approval authority to the program manager, and related dollar thresholds; trends in identified issues were consistent across all departments. Such improvements could shorten delivery time by 30 - 60 days for construction related awards and up to two to three weeks for contract supplements. Further detail regarding such approval recommendations, not directly related to the procurement process, can be found in **Appendix – C: Procurement Dept. Recommendations**.

- ✧ ***Procurement buying group efficiency is tied directly to the number and average value of contracts awarded by each group***

Table 37 below details the number of contracts and associated dollar value awarded by each of the buying groups in 2011. See **Appendix – B: Procurement Buying Groups (Defined)** for descriptions and responsibilities of each buying group.

Table 37 – Procurement Awards Made by Buying Group (2011)

	2011					
($ in 000's)	# of Awards	$ Amount	% Total	% of $	$ per Award	Avg # of Days
Professional Tech. & Advisory	1,158	$ 191,911	52.0%	8.0%	$ 165,726	15.1
Commodities & Services	724	484,220	32.5%	20.3%	668,812	49.2
Technology Services	192	219,596	8.6%	9.2%	1,143,730	39.5
Construction	85	413,786	3.8%	17.3%	4,868,072	42.0
World Trade Center/Federal Proc.	66	1,079,816	3.0%	45.2%	16,360,848	99.6
Total Procurement	**2,225**	**$ 2,389,329**	**100%**	**100%**	**$ 1,073,856**	**26.8**

While the Professional, Technical and Advisory ("PTA") has the shortest timeline to contract an award (15 days), largely due to the pre-approval of the form of contract and viable candidates, even small improvements to process can yield a large savings given volume of agreements issued (1,158 in 2011). A vast majority (88 percent) of PTA awards use a "Call-in Consultant" list. Call-in Engineering agreements are typically awarded on a four-year basis; however, each contract is required to be written, reviewed, and authorized annually. Consideration should be given to allow for contracts to be renewed once over the four year period.

In Commodities & Services, where purchases account for 33 percent of all awards, opportunities for improvement exist as it is the second lengthiest process to award a contract (49 days). Factors influencing these purchases include inadequate client scope delineation, advertising thresholds, and the delegation of authority limits. The Commodities and Services division principally uses the "Lowest Qualified Bid" and "Government Contract" methods of procurement.

- ✧ ***Policies that require use of a publicly advertised solicitation process should be revised to allow for discretionary purchases of lower value commodities and services that would accelerate delivery, and lower costs to execute, while maintaining transparency***

Table 38 – Procurement Awards by Process (2011)

	2011					
($ in 000's)	# of Awards	$ Amount	% Total	% of $	$ per Award	Avg # of Days
Call-in Consultant	1,024	$ 104,029	46.0%	4.4%	$ 101,591	14.8
Other Procurements	103	394,222	4.6%	16.5%	3,827,400	22.0
Government Contracts	288	103,764	12.9%	4.3%	360,292	34.7
Sole Source	245	42,145	11.0%	1.8%	172,022	46.5
RFP	117	1,053,009	5.3%	44.1%	9,000,076	53.1
Pre-Qualified	22	157,043	1.0%	6.6%	7,138,340	57.5
Lowest Qualified Bidder	426	535,116	19.1%	22.4%	1,256,140	61.4
Total Procurement	**2,225**	**$ 2,389,329**	**100%**	**100%**	**$ 1,073,856**	**26.8**

A majority of solicitations using the lowest qualified bidder method (nearly 20 percent of awards) typically use a public advertising process, despite the fact that these processes are the least efficient, requiring 61 days to award a contract. With the exception of government contracts, under current policy, the defined nature of certain purchases makes a publicly advertised solicitation the only authorized means to award a contract for commodities and services, regardless of the relative inefficiency. The current $25,000 threshold (unadjusted for over 20 years), should be re-examined as raising the advertising threshold reduces the number of publicly advertised solicitations, saving commodities and services two to three weeks per solicitation and eliminating related advertising costs. To facilitate this change, the Agency would also need to create more robust vendor lists to more effectively, directly solicit vendors based on type of service or good provided.

For awards that continue to require a publicly advertised process, various improvements such as a shift in the advertising window and use of media will save both time and dollars. Currently, an advertisement is not made until the scope is finalized, and is made both online, as

well as print media, such as newspapers and trade magazines. By advertising prior to the finalization of scope, the Agency may save two to three weeks without compromising the communication of the need to the vendor.

- ✧ ***Operating in a "zero expense growth" environment has limited Procurement's ability to implement new, interactive procurement systems technology that would improve efficiency***

Historically, the Agency has been slow to adopt new technologies due to upfront cost, regardless of the long-term benefits. In the future, technology investments should be considered from a cost/benefit and return on investment rather than a solely cost perspective.

Implementation of a fully integrated E-Procurement system is crucial for the department to complete standardization of documents, process and information across all divisions, as well as enhance communication between Procurement, potential vendors, consultants, contractors, and Agency clients. Procurement has already identified several potential system solutions and the Technology Services Department estimated the potential cost to be up to $2.5 million, with additional staff required to implement. Additionally, the e-commerce initiative will link to the warehouses through mobile applications at an estimate of $500,000 in one-time costs for equipment. Benefits to a fully electronic procurement process include reductions in total procurement cycle, administrative costs per purchase, sourcing cycles, and data errors during bid submission and evaluation.

COST CONTAINMENT OPPORTUNITIES

- ✧ ***Efficient delivery of capital projects is one of the largest opportunities for cost containment at the Port Authority, and the Procurement Department plays a vital role***

Procurement plays an important upfront role in the efficient delivery of capital projects (and ultimately impacts total soft costs included in capital expenditure outlays) through the project authorization process. If the Agency is able to reduce its capital delivery time, resulting in reduced soft costs, the potential cost savings are likely to be substantial (please see additional information regarding capital delivery savings in **Section XV – Capital Plan Assessment & Forecast Review**).

- ✧ ***Improved vendor interaction with the Port Authority will likely reduce overall costs of goods and services procured by the Agency***

The Agency has a reputation for rigorous procurement processes and terms and conditions (insurance requirements, indemnification, liability, etc.) that are perceived to be onerous (not market practices) and difficult to negotiate. Because of this, vendors are anecdotally known to factor in a "Port Authority Premium." While, it is difficult to quantify exactly what the "Port Authority Premium" might be, experience would suggest that it could be 0.5% to 1.0% of annual purchases, excluding Commodities. Eliminating vendors' use of a "Port Authority Premium" could yield potential annual savings of $8.5 million to $19.0 million.

- ✧ ***If identified initiatives are fully implemented, the Procurement Department expects greater efficiency in its ability to provide services to its client departments***

The Procurement Department has been handling a large and growing volume of solicitations with fewer employees and is in the process of implementing more efficient and streamlined processes to increase its capacity (FTE) utilization and to be more responsive to the needs of its client departments. That said, if the identified initiatives are fully implemented, the Procurement Department believes that five (5) FTE reductions in Procurement staff may be feasible. This could mean potential savings of approximately $600,000 in annual salary and benefits.

- ✧ ***Streamlined processes and reduction in average number of days to award contracts should have an associated derivative impact on improving client departments productivity, as expedited delivery of required goods and services will accelerate execution of duties and projects***

Analysis should be performed to further refine quantification of the associated derivative impact on client departments. However, at a minimum, approximately 20 FTEs are dedicated by Line Departments to facilitate procurement processes (i.e. interfacing with Procurement Department, scope development, contract management, board approval process, etc.). The total compensation and benefit costs of 20 FTEs are approximately $3.0 million. If procurement efficiency gains by Line Departments are estimated at 20 percent to 30 percent, the implied potential annual cost savings would be $0.6 million to $0.9 million per annum.

RECOMMENDATIONS

Procurement has identified more than 20 initiatives, and associated recommendations, that, if fully implemented, would markedly improve vendor interaction with the Port Authority, shorten the approval process, eliminate unnecessary administrative tasks, and expedite delivery of products and services to the line and staff departments. After diligent prioritization, based on a combination of factors (*i.e.,* cost to implement, potential cost savings, implementation timeframe), these initiatives should be adopted. A complete list of recommendations is detailed in **Appendix – C: Procurement Dept. Recommendations**. Key recommendations are noted below:

Increase Authority over Standard Contracts & Processes

- ➢ Raise the advertising thresholds and develop more vendor category lists for enhanced direct solicitations for appropriate commodities and services contracts
- ➢ Delegate authority to the Executive Director for routine, low-risk agreements, regardless of the value of the contract

Streamline Processes and Eliminate Redundancy

- ➢ Eliminate annual renewals for Call-in Engineering agreements and require approvals once per contract term (i.e., four years)

- Allow an expedited advertising process during scope finalization and eliminate print advertising to reduce costs
- For value-add procurements, such as bankers, consultants, and other advisors, allow the individual most closely tied to the selected assignment to lead the procurement process (*i.e.,* selection of an aviation consultant should be led by a member of Aviation Department involved in oversight of the assignment)

Implement Latest Procurement Technology to Enhance Processes

- Prepare a phased "Electronic Procurement Management System" plan for a fully integrated approach to electronic document creation; online bid distribution and submission; enhanced vendor, contractor, and consultant communication; integration with SAP and other Port Authority software systems; and utilization of metrics to track Agency procurement efficiencies, and contractor, consultant, and vendor performance

XII. SHARED SERVICE REVIEW – ENGINEERING

OVERVIEW

With over 500 employees, the Port Authority's Engineering Department is responsible for the delivery of architectural, engineering, and construction management services to the Line Departments, as well as ensuring the continued structural safety and compliance of the various Port Authority facilities. Due to the department's expertise and institutional knowledge of the asset base, Engineering is a central participant in developing and delivering the capital plan. As stewards of the capital delivery process, the Department can and should play an important role in reducing soft costs in construction projects.

Despite efforts made by Engineering, COO, and the Capital Planning Oversight Committee, ("CPOC") since 2005 to create a centralized Project Management Department ("PMD") that would eliminate duplication and provide coordinated Agency-wide leadership in project delivery, the critical function never fully developed and the PMD was dissolved with project managers decentralized and dispersed amongst the line departments. This left Engineering fully responsible for Engineering, Architectural Design, and Construction delivery, without the requisite support. Further detail and recommendations are discussed in **Section XV – Capital Plan Assessment & Forecast Review.** Due to the numerous projects in progress or at-hand, current Agency project delivery processes need to be re-examined to facilitate appropriate prioritization, timing, and delivery.

To facilitate review, meetings were held with the Engineering Department, including the Chief Engineer and select management, in order to obtain insight into the current roles and responsibilities the department plays in the delivery of capital projects, and to determine if efficiencies in the process may be realized. Prior to the meetings, Engineering collaborated through various work sessions with the COO, Management & Budget Department, and Line Departments (including security) to perform a critical review of 50 select projects. The result was the identification of several key initiatives that, if enacted, would allow for enhanced facilitation in the execution of Port Authority projects. These considerations were thoroughly reviewed with the department and select, key initiatives are detailed below.

OBSERVATIONS & FINDINGS

- ✧ ***An Agency-wide asset management process should be further developed***

An Agency asset management process will enhance the ability to aggregate and prioritize the numerous capital and operating projects across the Port Authority's facilities. With many Port Authority assets past their useful life, the ability to determine which projects require immediate attention will be a crucial task going forward to ensure the safety and reliability of these assets. In the past few years, the COO's Office has led the preliminary effort to develop an Agency-wide asset management process. It would behoove the Port Authority to re-evaluate who is best suited to oversee the asset management process, as well as dedicate appropriate staff and

funding to Agency-wide asset management that will identify current conditions and forecast the long term investment necessary to improve the state of each facility, inclusive of engineering's programs and industry best practices.

- ***The speed of delivery for capital projects is dependent on project delivery processes, including board authorization, procurement and careful coordination among Engineering, Line Departments, and Construction, to optimize workflow and drive accountability***

Several departments across the agency have met to discuss ideas to improve the speed of delivery for capital projects by allowing for higher delegation of authority at the Executive Director and Director levels. Current capital authorization policies require all projects to pass through a three-step process (*i.e.,* planning authorization, project authorization, and contract authorization), with specific exceptions for State-of-Good-Repair, Mandatory, and Security projects.

While delays in project delivery are certainly attributable to time consuming Board approval, consideration for the full project life-cycle should be given to further identify inefficiencies and drive enhancements to the capital delivery process.

- ***Increased clarity in project definition and scope development, between Line Departments and Engineering, specifically during the project planning phase, will improve project delivery and reduce costs***

There are five defined stages in a project life-cycle: initiation ("pre-stage 1"), conceptual design ("stage 1"), preliminary design ("stage 2"), final design ("stage 3"), and construction and commissioning of the project ("stage 4"). When taking all stages into consideration, there are several points of inefficiency that could be resolved to enhance project delivery.

It is imperative that a robust project initiation process occur, including Engineering's input on project schedules and estimates prior to their inclusion in the Capital Plan. A clearly defined scope outlining financial and operational constraints needs to be established with the consensus of all key stakeholders. An exception would be made for small routine projects being implemented via a streamlined process. In addition, a set list of stage 1 deliverables including an executive summary, conceptual estimate, life cycle cost analysis, preliminary operational staging plans, preliminary hours of work, and a preliminary schedule highlighting project stages and significant milestones, must be delivered with rigor so that a commitment to proceed with the selected alternative can be made at the end of stage 1. Without such, these deliverables become "guesstimates" at best and projects are held to a standard that is not fully grounded in reality, resulting in a lack of appropriate funding and, ultimately, cost overruns.

To better assure projects are delivered within the authorized budget and schedule, there needs to be an understanding and agreement of project risks, and associated financial impacts, between the Line Departments and Engineering before items go before the Board for planning and project authorization. The framework for this is currently in place with the risk assessment program; however, more rigors should be placed in defining risks and providing upfront transparency in items moving forward to the Board.

Another relative point of inefficiency is drawn out during the multiple design reviews throughout stages 1-3 of a project. Currently, designs are sent out for Agency-wide review at 50 percent, 90 percent and 100 percent completion. An all-inclusive review process can add a month to the review and, if the 50 percent and 90 percent stages were reviewed strictly on an "on-board" basis, meaning only those individuals intimately involved in the project participate, more efficient allocation of company resources and expedited delivery of projects could be realized. To date, Engineering has eliminated the 90 percent submission in an effort to expedite project delivery.

- ***Delays in project delivery and execution have led to cost overruns. The Agency would benefit from a revamping of project delivery processes to ensure completion of capital and operating projects on time and on budget***

The timing of project delivery, execution, and, ultimately, costs incurred, can be improved through enhanced schedule management in Engineering. The majority of Port Authority managed construction projects have tight restrictions on contractor hours of work, related to the operational requirements of each facility (*i.e.*, work on tunnels or bridges can only be done in off-peak hours) to minimize the inconvenience to the public. These set hours need to be re-evaluated to determine if hours can be extended without compromising facility operations.

Further efficiency in project delivery can be obtained by mitigating, if not eliminating, scope changes during stages 2-4 of a project. Even when minimal changes are made, a new scope submittal and approval process is required, causing delays in project delivery. This leads to projects completed outside of the authorized budget and schedule. A recent study was conducted comparing hard-costs (*i.e.*, construction, facility forces, and insurance) versus soft-costs (*i.e.*, site acquisition, planning and engineering, project contingencies, general and administrative, and financing expenses) for all projects since 2000; **Table 39** below summarizes the findings.

Table 39 – Construction Costs: Hard vs. Soft (2000 – 2011)

($ in 000s)	< $1.0mm	$1.0mm - $4.9mm	$5.0mm - $9.9mm	$10.0mm - $24.9mm	$25.0mm - $49.9mm	$50.0mm - $99.9mm	$100.0mm - $500.0mm	Total
# of Projects	***111***	***217***	***102***	***81***	***34***	***13***	***14***	***572***
Hard Costs	$38,197	$344,237	$492,787	$924,444	$895,261	$654,571	$1,979,759	$5,329,256
Soft Costs	25,021	199,289	227,834	365,564	258,390	242,659	443,237	1,761,994
Total Costs	**$63,218**	**$543,526**	**$720,621**	**$1,290,008**	**$1,153,651**	**$897,230**	**$2,422,996**	**$7,091,250**
Percent Hard Costs	60%	63%	68%	72%	78%	73%	82%	75%
Percent Soft Costs	40%	37%	32%	28%	22%	27%	18%	25%

The soft cost percentage for projects with a total project value less than $10 million ranged from 32 percent to 40 percent of total project costs, versus 25 percent for larger, more complex projects. While more attention should certainly be given to larger, more complex construction projects, the smaller, simpler projects should have a more efficient process in design, authorization, and delivery, thereby reducing the soft cost percentage. Working with the Line Departments, Engineering has implemented the following recommendations for small scale project delivery to keep soft costs at a minimum and increase efficiency in the project planning

and delivery process: increased use of unit cost contracts, expanded budget and scope for immediate repair contracts, structural integrity program streamlining, expedited Agency authorization processes, and procurement process improvements.

RECOMMENDATIONS

To facilitate and supplement the other recommendations relating to the enhancement of capital project delivery, the following initiatives are recommended. While these recommendations would save significant time in project delivery and costs, total quantification of savings is difficult to determine given that such impact would be realized across multiple Port Authority departments.

- Reorganize the Engineering Department to fall under the purview of the new, centralized Chief of Capital Planning, Execution, and Asset Management Office (refer to **Section V – Organizational Design & Effectiveness** for further detail)

Project Authorization Thresholds

- Increase current authorization thresholds to be managed by the Executive Director to allow projects to advance directly to contract award by increasing limits for the various project categories (State-of-Good-Repair, Mandatory, System Enhancing, and Security), Capital and Operating Major Works Programs (planning related expenditures), discretionary projects, and new initiative.

Project Planning

- Develop rigorous Stage 1 scoping document with key project stakeholders prior to moving forward to next stage by (with the exception of small routine projects) clearly defining financial and operational constraints; limiting design alternatives and review; include preliminary operational staging plans, preliminary hours of work; and assuring project charge codes and funding is available prior to the start of design.

Continue the development of an Agency Asset Management process to better enable decisions as to projects; asset readiness/need to move into capital plan, including evaluation of the best suited department to manage the asset management process; agency vision with clarified roles established for key stakeholders; asset life-cycle expectancy, condition, and rehabilitation analysis; and enhanced methods to incorporate areas such as mechanical and electrical system analysis, roofing and underground utilities into an Agency-wide asset management.

Project Delivery and Execution

- Improve schedule management by allowing for greater flexibility for hours of work whenever possible; limiting and in some cases eliminating scope changes; implementing efficiencies to reduce soft costs for small scale projects; clarifying roles and responsibilities of the key stakeholders in the project delivery.
    - Implement Agency-wide project tracking system; performing risk assessments on all projects in the Capital Plan; and continuing of the Engineering/Procurement initiative to streamline the procurement process as it relates to project delivery.

XIII. SHARED SERVICE REVIEW – LAW

OVERVIEW

The Port Authority's Law Department, managed by the General Counsel, provides centralized legal services for the entirety of the Port Authority, including selection (subject to the approval of the Executive Director) and management of any outside counsel. Within the Law Department are two practice areas: Corporate and Litigation, Risk Management & Corporate Security. In 2011, the Law Department was responsible for processing over 12,000 claims and matters divided evenly between the two practice areas (**Table 40** below shows the number of claims and matters handled by each division).

Table 40 – Claims & Matters Handled by Law Department (2011)

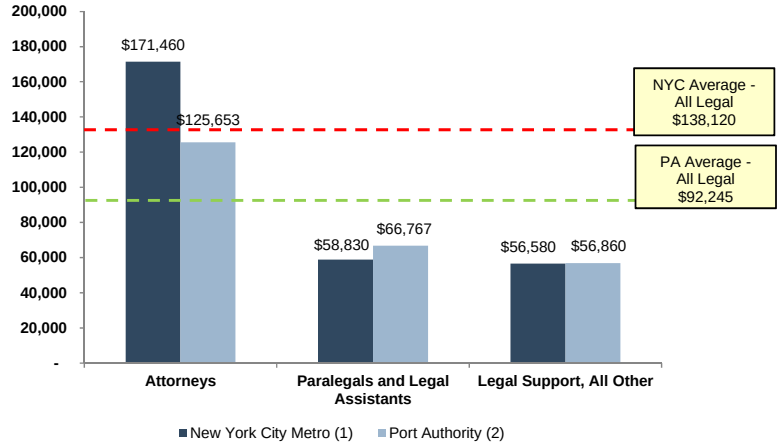
Legal Division	Open	Closed	Total	% Total
Corporate Law				
Business Transactions & Regulatory Compliance	2,633	561	3,194	*25.9%*
Employment Relations	1,366	397	1,763	*14.3%*
Finance	838	193	1,031	*8.4%*
Totals	***4,837***	***1,151***	***5,988***	***48.6%***
Litigation, Risk Management & Corporate Security				
Claims	2,200	765	2,965	*24.1%*
Corporate Security	123	3	126	*1.0%*
Litigation	1,509	180	1,689	*13.7%*
Worker's Compensation	1,196	273	1,469	*11.9%*
Totals	***5,028***	***1,221***	***6,249***	***50.7%***
Outside Counsel (Directly Retained)	87	4	91	*0.7%*
Total Claims Handled in 2011	**9,952**	**2,376**	**12,328**	***100.0%***

The Law Department utilizes "Law Manager," a legal database, to track its activity, including the types of claims, client origination, and legal division responsible; however, it does not cover all legal matters and claims, nor was it designed to track the data required to determine the cost efficiency of the Law Department's work. For example, while the Law Department processed nearly 6,000 matters, the database fails to track several large-scale accomplishments of the Law Department, including:

- Providing bond, disclosure, and tax counsel in connection with the $2.6 billion in Port Authority Consolidated Bonds and $1.0 billion in commercial paper;
- Providing legal and bond counsel supporting the issuance of $1.3 billion in Liberty Revenue Bonds for 1 WTC;
- Led negotiation, document preparation, and closing for the lease of one-million square feet at 1 WTC; and,
- Led the negotiation, document preparation, and closing of the joint venture between the Durst Organization and the Port Authority relating to 1 WTC.

There are 132 employees at the Law Department, including 63 attorneys and 69 supporting staff. An average attorney's cash compensation represents approximately $125,000 with additional $47,000 in benefits for a total compensation of $172,000. Shown in **Figure 8** below, this is low relative to average attorney salaries at the New York City Metro area, suggesting that handling legal matters in-house is likely more cost effective than outsourcing the work (will require some level of profit), provided that the appropriate expertise exists in-house and attorneys are sufficiently utilized.

Figure 8 – Law Department vs. New York City Metro 2011 Compensation



Notes:

1) *New York State Department of Labor Statistics*
2) *Port Authority payroll – 2011; includes base salary and add-on compensation, excludes health, pension, and OPEB benefits*

To facilitate review, meetings were held with the Law Department to review the roles and responsibilities of the Law Department and determine the nature of the various litigation matters and non-litigation (transactional, document preparation, negotiation, regulatory, advisory, compliance) functions handled by each division. Data was also reviewed that detailed all legal matters currently open, as well as those closed over the period of 2009-2011, to develop a more complete picture of the allocation of various activities within the Law Department. A total of nearly 15,000 claims and matters, excluding those related to September 11 inhalation claims, were reviewed and classified by law division, sub-division and claims types (see **Section XIII – Shared Service Review – Law** for more detail).

OBSERVATIONS AND FINDINGS

✧ ***The Law Department must continue to balance enabling business objectives of client departments while protecting the Agency's interests and reducing exposure to future litigation***

Consistent with other public agencies, the Port Authority's Law Department has traditionally served to control risk. While a public-sector framework serves this purpose effectively, it can be

limited in its ability to balance risk vs. opportunity to determine alternative risk-mitigating solutions.

From 2007 to 2008, the Law Department underwent organizational redesign in efforts to streamline the department to better serve its clients, including the appropriate use of outside counsel. However, the client departments still have some perception that the Law Department could do more to provide alternative solutions to business problems rather than reasons not to pursue the goal.

✧ ***The mix of in-house versus out-of-house services needs to be objectively, quantitatively, and qualitatively evaluated for opportunities to improve efficiency and effectiveness***

The Port Authority at present utilizes a blended model where the organization's in-house Law Department has primary responsibility for handling the legal issues that arise, but the Law Department will retain outside counsel on specific matters that extend beyond its expertise or when the volume of cases (*i.e.,* personal/property injury litigation claims) require different capabilities. The department proactively manages outside counsel with an in-house attorney overseeing the respective work to ensure that performance is consistent with expectations. **Table 41** below details the various matters handled by outside counsel in 2011.

Table 41 – Outside Counsel Retained in 2011 ($ in 000's)

Area of Concentration	No. of Firms	No. of Cases	% Total Cases	2011 $'s	% Total $'s
Public Liability	9	28	32%	$ 5,761.9	15%
Transportation	4	7	8%	935.5	2%
Leases/Business Agreements/Terminal Matters	4	34	39%	18,606.8	49%
Audit Committee/Bankruptcy/Captive Insurance	3	3	3%	508.1	1%
Employment and Labor Law	1	7	8%	802.8	2%
Intellectual Property	1	5	6%	297.7	1%
World Trade Center Issues	1	3	3%	11,303.5	30%
Totals	**23**	**87**	**100%**	**$ 38,216.3**	**100%**

With the organizational reform in 2007 and 2008, noted prior, the Law Department issued a Memorandum to provide new guidelines for the appropriate use, selection, and management of outside counsel, with the goal of "achieving a balance of internal and external legal resources to effectively and efficiently advance the Port Authority's business objectives." In addition, the Memorandum indicated whether there are "in-house and outside resources that would produce a more cost-efficient result" and whether "the work may be accomplished less expensively by outside counsel." The Law Department anticipates that, in time, up to half of transactional matters handled by the Law Department may involve retention of outside counsel.

In 2011 the Law Department retained outside counsel for less than 1.0 percent of total volume of work in 2011, and nearly $38.0 million dollars were spent, with approximately 50.0 percent relating to leases, business agreements, and terminal matters. As the Law Department considers increased use of outside counsel, it will be necessary to track both time and cost associated with each case or matter to determine which cases or matters would be more effectively served by outside counsel.

- ***The Law Department is a major shared service expense and currently lacks readily attainable key performance indicators and metrics to reliably evaluate its current service performance***

There is currently insufficient data available to track and measure the internal hours spent working on a case, attorney utilization and their overall productivity. Without having performance metrics, it is difficult to: (i) know whether the Law Department is succeeding at its objectives; (ii) demonstrate the value of the legal function to executive management; (iii) manage internal resources to ensure the Law Department is focusing on the right things; (iv) institute proper "make-versus-buy" decisions; (v) effectively manage external law firms to control costs, (vi) develop useful information about matters and fee arrangements; and (vii) benchmark against past performance as well as other legal departments.

Some of the useful metrics to quantitatively measure performance and efficiency are:

- Overall caseload, matters per lawyer, time spent on matters by type, and trends in types of matters;
- Total and average exposure facing the company per matter, and by type of matter;
- Tracking of total costs (employee and overhead) per matter, and by type of matter; and,
- Average blended rates in total and by matter (use in benchmarking).

Another tool commonly used by in-house legal departments is client satisfaction surveys. This can serve as a communication tool between the client departments and the Law Department, allowing for more direct feedback about service and performance levels. Utilizing a combination of both quantitative and qualitative metrics will ensure the Law Department a higher probability of achieving its objectives.

RECOMMENDATIONS

To ensure that the Law Department is achieving appropriate and efficient outcomes for its client departments, as well as managing risks for the Port Authority, the following should be considered:

- Identify and implement new technology to establish, monitor, and measure performance metrics for the Law Department and communicate to its stakeholders:
  - Determine business objectives and executive management and client department needs;
  - Get buy-in from internal legal team to rigorously collect information and measure performance;
  - Put in place proper information sources and systems to capture required data; and,
  - Continuously improve the accuracy and usability of the information and the processes for sharing information over time.

XIV. SHARED SERVICE REVIEW – REAL ESTATE & DEVELOPMENT

OVERVIEW

Real Estate and Development ("RED") manages a portfolio of the Port Authority's real estate associated with Line Department activities, the Agency-wide Capital Plan, and economic development for the good of the wider region. The group exists to optimize the value of the Agency's assets by performing a wide array of real estate functions in-house including, but not limited to:

- Transit oriented development;
- Arranging for property acquisitions and dispositions;
- Promoting regional economic development;
- Negotiating retail and commercial lease and sales agreements;
- Developing and managing joint ventures and other public and private partnerships;
- Managing retail, industrial and office space; and,
- Coordinating strategy and execution of advertising initiatives.

RED's functions are managed in three broad categories: office space services and property management, asset acquisition and disposition, and leasing and operations. As noted in **Table 42** below, RED is involved in a wide cross section of Agency activities. Accordingly, the portfolio of real estate assets and in-process projects is wide-ranging and complex. RED's interests currently include both transit and non-transit related assets and projects.

Table 42 – Portfolio of Real Estate & In-Process Developments (update table)

NON-TRANSIT OWNED REAL ESTATE	IN-PROCESS DEVELOPMENT PROJECTS
• New ark Legal & Comm Center	Real Estate Initiatives In Support of Transit
• Teleport	• Port Authority Bus Terminal (PABT)
• Essex County Resource Recovery Facility	• George Washington Bridge Bus Station
• Bathgate Industrial Park	• PATH Harrison Station Redevelopment
• Industrial Park at Elizabeth	• Journal Square Redevelopment
• 2 Montgomery Street Office Building	• Washington Street Pow erhouse
	• Goethals Bridge (Right of Way)
	• Bayonne Bridge (Air Rights Deal)
	• West Midtow n Properties Air Rights
	• Portfields Initiative
	• PATH Substations
	Non-Transit Economic Development Initiatives
	• Hoboken South Waterfront Development
	• Queens West Waterfront Development
	• Railroad Property Transactions

Since the events of September 11th that destroyed the main location for Agency office operations, headquarters and support functions have been housed in 12 separate locations, as shown in **Table 43**. RED coordinates space in these locations as well as personnel mobility among locations, which has been administratively cumbersome.

Table 43 – Portfolio of Port Authority Owned and Leased Employee Office Space

NEW YORK LEASED PROPERTIES			
Leased Property	**Landlord**	**RSF**	**Exp Date**
100 Broadway	MM100 Broadway LLC	55,547	12/31/2015
115 Broadway (5,6,7 & 10)	Trinity Centre LLC	76,448	12/31/2016
115 Broadway (8, 9 & 19)	Trinity Centre LLC	61,180	7/31/2015
115 Broadway (14)	Trinity Centre LLC	19,575	3/31/2012
116 Nassau St	Abacus Federal Savings Bank	9,990	1/31/2016
225 Park Ave. S.	225 Fourth, LLC c/o Orda Mgt	224,728	10/31/2016
225 Park Ave. S. (17th Fl)	International Master Publishers, Inc.	9,381	8/11/2016
233 Park Ave. S.	225 Fourt, LLC	80,898	10/31/2016
JFK / KAL	Korean Air Lines Co., Ltd.	2,648	2/24/2012
JFK / KAL (8/11/2003)	Korean Air Lines Co., Ltd.	840	1/2/2012
JFK / KAL (2/1/2009)	Korean Air Lines Co., Ltd.	4,863	1/31/2019
NY Total		**546,098**	

NEW JERSEY LEASED PROPERTIES			
Leased Property	**Landlord**	**RSF**	**Exp Date**
5 Marine View	Hoboken Associates, L.P.	10,608	12/31/2014
Gateway I	Gateway I Newark LLC	1,135	8/31/2016
Gateway Plaza II	Gateway Associates LLC	157,863	8/31/2015
Gateway Plaza III	Prudential Insurance Co. of America	38,354	12/20/2014
777 Jersey Ave	JHR Realty Co. LLC	80,027	12/19/2013
PA Technical Center	Trends Urban Renewal Assn Ltd	305,546	2/29/2020
NJ Total		**593,533**	

PORT AUTHORITY OWNED PROPERTIES	
Property	**SF**
2 Montgomery	83,000
PA Total Owned Properties	**83,000**

In addition to asset-specific activities, the Port Authority works with outdoor media company Decaux on advertising campaigns in support of various Port Authority assets. Advertising requires internal Agency coordination among the RED group and Line Departments. In addition, the Government and Community Relations ("GoCor") group weighs in on advertising content.

As evident from its portfolio of properties, project activities, and core functions, it is clear RED deals with a wide breadth of real estate types and issues with varying levels of complexity. The nature of the Agency encourages RED's scope to go beyond transit-oriented assets and to drive revenue enhancement from existing assets. Often this involves relationships with constituencies having disparate interests including municipalities, special interest groups, private developers, contractors, and other commercial parties. There is a view that RED activities should be streamlined to focus on transit oriented activities.

OBSERVATIONS & FINDINGS

- ***The Agency has non-core assets that are not strategic to the Line Departments and consume capital and management resources***

Over the years, the Port Authority has accumulated a portfolio of diverse, non-core assets (*i.e.,* buildings, leaseholds, lands, etc.). The Port Authority has already taken action recently announcing the restructuring of its interest in the Essex County Resource Recovery facility and is in process of reviewing strategic alternative with regards to Newark Legal Center and Teleport. Many of these assets are not strategic to the business and are immaterial in value relative to core assets, while consuming capital and management resources. The PA has started a review of these non-core assets to analyze the potential for sale.

- ***Consideration should be paid to decentralizing the Office Space Services & Property Management and Leasing & Operations functions within COO/line direct support and Real Estate Acquisition & Disposition and Real Estate Development functions into Capital Planning, Execution and Asset Management***

With reduced emphasis on non-core regional economic development projects and managing economic development facilities; continued divestitures of non-core assets; and currently decentralized leasing and acquisition staff for the Aviation and Port Commerce Departments, the planning and development elements of the RED function may be best served by being incorporated into the new CPEAM function.

The Agency's leasing function (*i.e.,* terminals, retail, advertising, parking, etc.) for the Line Departments has been decentralized since the mid 1970's. In 1999, RED expanded its role to include the management of commercial leasing for TB&T and PATH. Unlike Aviation and Port Commerce departments, leasing is not a core operation for TB&T and PATH.

- ***The Agency has certain adjacent real estate holdings that have value that may potentially be unlocked or monetized via public-private partnerships***

The Port Authority has properties around the PABT and terminus of the Lincoln Tunnel as well as properties around the Journal Square station in Jersey City that offer opportunity for value-added real estate development.

REVENUE ENHANCEMENT OPPORTUNITIES

- ***TB&T property around the PABT in Midtown Manhattan and terminus of the Lincoln Tunnel ("Dyer Avenue") offers the potential opportunity for value-added real estate development that could generate hundreds of millions of dollars over a 10 to 15 year period***

The Port Authority should conduct a thorough market appraisal for the Dyer Avenue corridor air rights. This value is before substantial infrastructure costs that could potentially include building platforms on which to construct the buildings, and expenses to accommodate complex engineering requirements related to issues such as ventilation and security and building over

active roadways and bus facilities. These costs could be significant depending on the type of development pursued and its precise location. A recently contemplated deal for 650,000 square feet of air rights was for $115/square foot after taking into consideration the infrastructure required. This deal fell through in early 2012 due to financing difficulties by the developer. Not all of the air rights may be developed due to complicating factors including zoning approvals and open space requirements. Alternative monetization opportunities may arise to sell the air rights to adjacent property owners that could use these assets to increase the height and density of their buildings.

The air rights above the PABT North Wing also present a development opportunity. When the North Wing was constructed in the late 1970's, it was designed to support an overbuild structure. There is an estimated 1.3 million square feet that has been envisioned to be developed into high-end mixed use property that could generate potential one-time transaction proceeds of hundreds of millions of dollars plus potential ongoing annual revenue. The development may require improvements before a third party real estate developer is able to work with the area. An anchor tenant may also be crucial to advancing the design and construction of the area. An agreement with a developer for the site recently expired and the Port Authority is exploring other alternatives.

- ***PATH property around the Journal Square station in Jersey City offers a potential opportunity for real estate development to take advantage of the rising property values in the area***

A prominent developer in Jersey City has advanced plans for a seven to ten year Journal Square revitalization project based on development of three 40-50 story mixed use buildings with 800 new apartments. Recent Jersey City zoning and tax increment financing incentives mitigate some of the risk and make the project attractive. PATH would benefit from increased passenger traffic and retail activity. Even longer term, in a "phase II" Journal Square renaissance, PATH could engage in a public-private partnership to tear down and rebuild the office space above the transportation center.

RECOMMENDATIONS

- Continue the program of non-core asset divestitures
- Provide oversight and consultative guidance related to major real estate transactions (leases and fee interest acquisition/disposition, and easements, condemnation, etc.)
- Appoint a focused, cross-functional working group within the Port Authority, including Board of Commissioner involvement, for appropriate master planning of the Bus Terminal for purposes of revenue enhancement. Opportunities for enhancement will include:
  - Assessment of the value of Port Authority air rights along Dyer Avenue and the Lincoln Tunnel Expressway (between 9th and 10th Avenues from 30th to 42nd Streets) in today's market. Recommend strategies to maximize value, while enhancing current and future transportation operations; and,

- Execute a renewed solicitation process to secure feasible alternatives to develop the estimated 1.0 million square feet of air rights above the PABT North Wing.

- Investigate the real estate development opportunities around the Journal Square PATH station in Jersey City

XV. CAPITAL PLAN ASSESSMENT & FORECAST REVIEW

OVERVIEW

The preliminary 2011 – 2020 Capital Plan of the Port Authority of New York and New Jersey is a 10-year, approximately $26.9 billion[4] commitment to the maintenance and enhancement of select transportation and other infrastructure in the New York and New Jersey region. The preliminary 2011 – 2020 Capital Plan is the second edition of such an effort by the Port Authority. The first, substantially similar effort to produce a 10-year capital plan for the Agency was released in 2007 ("2007 Capital Plan") for the period 2007 - 2016 that was subsequently revised in 2008 ("2008 Updated Capital Plan").

The preliminary 2011 – 2020 Capital Plan was developed after collection, review, and analysis of the Port Authority's identified "unconstrained" needs of $44.3 billion; that is, initially without regard for the limitations that capital availability would put on a portfolio of projects. A subset of projects totaling $26.9 billion or 61 percent of the Agency's identified, unconstrained needs was selected for inclusion in the preliminary 2011 – 2020 Capital Plan given that the capital capacity of the Port Authority was forecasted to be approximately $2.5 billion per annum.

The preliminary 2011 – 2020 Capital Plan comprises 923 projects[5] that are classified in six descriptive categories:

- "MAND" or Mandatory projects that are required by law, governmental rule or regulation, or by a policy of the Board of Commissioners;
- "SEC" or Security projects that through technical assessment are designed to meet the Agency's Security Plan to reduce the opportunity for and mitigate the impact of terrorist acts against infrastructure assets;
- "SGR" or State of Good Repair projects that are identified through engineering and life cycle assessments to maintain the continuing operation of Port Authority assets ranging from parking lot pavements repair at LaGuardia airport to the suspender ropes replacement at the George Washington Bridge; and,
- "RPP" or Revenue Producing Projects where an investment hypothesis with a positive financial return has been offered by the sponsoring entity to provide system enhancements, improved customer service and/or regional benefits;

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[4] *Although referred to as the $25.1 billion Capital Plan, the preliminary 2011-2020 Capital Plan is actually a $26.9 billion Capital Plan since the Authority included a $1.8 billion adjustment titled "lag." This adjustment factor represents the estimated amount of funds that will not be expended within the horizon of the Capital Plan. Because "lag" is a timing adjustment and not a discount on estimated project costs, this adjustment has been excluded in the analyses of the portfolio of unconstrained needs.*

[5] *The 923 projects had a total estimated cost of $32.9 billion, of which $26.9 billion was planned to be deployed between 2011 and 2020.*

- "SEP" or System Enhancing Projects involve a beneficial impact on the operations of the Port Authority, improved customer service levels, and/or regional benefits but do not yield a positive financial return to the Agency; and,
- "SRP" or State and Regional Projects that advance the objectives of the Port Authority, but may not directly contribute to assets operated by the Agency. Such projects are initiated at the request of one of the two states.

In addition, the Port Authority utilizes a numerical sequence to designate the status of a capital project, as follows:

- Stages 1 and stage 2 represent projects in the planning, feasibility and early design phases of the capital investment lifecycle; and,
- Stage 3 and stage 4 are projects in final design and under construction.

The 2011 Capital Plan includes the World Trade Center program (for more see **Section X – World Trade Center Program** of the report).

In order to further refine the process and relevance of capital planning, the Port Authority is updating its 10-year Capital Plan ("2013 Capital Plan") and establishing a 5-year Capital Program ("2013 Capital Program"), that will serve as a rolling tactical plan, subject to annual performance measurement and verification.

A key element of the formulation of the 2013 Capital Plan and 2013 Capital Program is an enhanced scoring and ranking protocol to establish priorities in capital deployment. This ongoing effort has significantly enhanced the discipline and transparency of the capital planning process, and is a priority for the Agency. The progress of the Port Authority on this key initiative in the short time since the Interim Report is laudable.

In addition to the prioritization of capital projects, the Special Committee has focused on the capacity of the organization to fund known needs under a fiscally-responsible plan. Accordingly, an integrated, dynamic, long-range financial model was prepared that captures the key economic and operating requirements of each Line Department and stress tests capital plan funding capacity (the "Model").

The Model includes GAAP financial statements at a consolidated level as well as individual Line Department and facility-level income statements. The Model serves to provide relevant and timely output for the Agency on revenue, expense and capital funding capacity, financing alternatives, debt service requirements, and provides output on:

- Net revenues;
- Capital needs;
- Debt issuance;
- Debt capacity;
- The ability to comply with statutory bond covenant and ratings agency requirements; and,
- The funding capacity of the Agency.

SUMMARY OF KEY FINDINGS

- Projects related to and classified as SGR are the largest area of exposure for the Port Authority, totaling nearly 40 percent, or approximately 100 projects, of the total unfunded projects and 55 percent, or $6.2 billion, of unfunded costs for the preliminary 2011 – 2020 Capital Plan;
- The Port Authority must integrate the Capital Plan and develop annual budgets in support thereof, allowing appropriate contingency and flexibility for necessary change;
- Meaningful opportunities for cost savings may be realized through scrutiny of the drivers of a capital project's life cycle; and,
- By continuing to develop the capital planning organizational structure and improving upon the existing financial forecast process, the Port Authority is creating a more robust decision-making process for capital project prioritization, execution and implementation.

OBSERVATIONS & FINDINGS

✧ ***The Agency identified over $44.3 billion of known investment needs, of which, $26.9 billion is included in the preliminary 2011 – 2020 Capital Plan; of the remaining unmet needs of $11.4 billion, $6.2 billion is related to SGR and must be addressed in future capital plans***

The preliminary 2011 – 2020 Capital Plan represented the first time that the Port Authority identified projects unconstrained by capital availability or capacity. The Agency identified, through a systematic process, capital needs totaling $44.3 billion. The $44.3 billion of capital needs is comprised of:

- 923 projects totaling $26.9 billion related to spending during the 2011 - 2020 Capital Plan;
- $6.0 billion related spend on these projects that extends beyond the 2011 - 2020 time horizon; and,
- $11.4 billion of known, unmet needs across a range of project classifications, which represent projects in excess of existing capital capacity.

In light of the historical capital limitations of the Port Authority, the development of the preliminary 2011 – 2020 Capital Plan included an independent assessment via a scoring process of each identified unconstrained need, and a subsequent evaluation by the Line Department managers, engineering, the office of the COO, and CPOC..

In summary, capital capacity constraints resulted in the preliminary 2011 – 2020 Capital Plan that included 61 percent of the identified, unconstrained needs of the Agency.

Table 44 – Unconstrained Capital Needs by Category ($ in billions)

	Met Needs					Unmet Needs			Unconstrained Capital Needs			
Category [1]	# Projects	2011-2020 Plan [2]	% of Plan	Beyond 2020	Total Project Costs	# Projects	Total Project Costs	% of Unmet	# Projects	Total Project Costs	Unfunded [3]	% of Unfunded
WTC	22	$6.90	26%	$0.15	$7.05	2	$0.07	1%	24	$7.12	$0.22	1%
Stages 3&4	380	$4.88	18%	$0.37	$5.25				380	$5.24	$0.37	2%
MAND	26	$0.49	2%	$0.06	$0.55	2	$0.04	0%	28	$0.59	$0.09	1%
SEC	45	$0.38	1%	$0.02	$0.40	53	$0.42	4%	98	$0.82	$0.44	3%
SGR	323	$7.40	28%	$3.37	$10.77	108	$6.23	55%	431	$17.01	$9.60	55%
SEP	79	$3.08	11%	$1.39	$4.47	109	$4.46	39%	188	$8.93	$5.85	34%
RPP	36	$1.77	7%	$0.56	$2.33	4	$0.16	1%	40	$2.50	$0.72	4%
SRP	12	$1.95	7%	$0.13	$2.08				12	$2.08	$0.13	1%
All Needs	**923**	**$26.9**	**100%**	**$6.0**	**$32.9**	**278**	**$11.4**	**100%**	**1,201**	**$44.3**	**$17.4**	**100%**

Notes:

1) *Category acronyms abbreviate WTC - World Trade Center, Stages 3&4, MAND - Mandatory, SEC – Security, SGR - State of Good Repair, SEP - System Enhancing, RPP - Revenue Producing, and SRP - State and Regional projects, respectively*
2) *Excludes preliminary 2011 – 2020 Capital Plan (Version #3E) Lag Factor: $1.8 billion*
3) *Includes unmet needs (total of $11.4 billion) and the costs of met needs beyond 2020 (total of $6.0 billion)*

Sources:
Preliminary 2011 – 2020 Capital Plan (Version #3E)
Preliminary 2011 – 2020 Capital Plan TPC to Navigant December 22, 2011
Unmet Needs – Version #3E

SGR projects represent a significant portion of required investment and future Capital Plans and Programs of the Port Authority and must accommodate this need. In fact, most prevalent among the $11.4 billion in known and unmet needs were SGR projects that comprise 39 percent of total projects and 55 percent of total unmet costs (see **Table 44**). In light of the aging and critical nature of the Agency infrastructure, the magnitude of known demands, those identified needs over the next decade, and the likely constraints on the capacity of the organization for the foreseeable future, the need to prioritize the use of capital and source the necessary funding is paramount to maintain the assets and achieve the objectives of the organization.

A review of the unmet needs by Line Department (see **Table 45**) reveals that the greatest requirements are associated with Aviation, $4.4 billion, and TB&T, $4.3 billion.

Table 45 – Unconstrained Capital Needs by Line Department ($ in billions)

	Met Needs					Unmet Needs			Unconstrained Capital Needs			
Line Department	# Projects	2011-2020 Plan [1]	% of Plan	Beyond 2020	Total Project Costs	# Projects	Total Project Costs	% of Unmet	# Projects	Total Project Costs	Unfunded [2]	% of Unfunded
WTC	22	$6.90	26%	$0.15	$7.05	2	$0.07	1%	24	$7.12	$0.22	1%
Aviation	422	$6.51	24%	$1.00	$7.51	125	$4.39	39%	547	$11.90	$5.39	31%
TB&T	232	$6.72	25%	$3.56	$10.28	55	$4.25	37%	287	$14.53	$7.81	45%
PATH	129	$3.06	11%	$0.16	$3.22	71	$2.11	19%	200	$5.33	$2.27	13%
Port Commerce	101	$1.69	6%	$1.03	$2.72	25	$0.56	5%	126	$3.28	$1.59	9%
Regional	11	$0.95	4%	$0.00	$0.95				11	$0.95	$0.00	
Development	5	$0.03	0%	$0.00	$0.03				5	$0.03	$0.00	
Capital Infrastructure Fund	1	$0.99	4%	$0.13	$1.12				1	$1.12	$0.13	1%
All Needs	**923**	**$26.9**	**100%**	**$6.0**	**$32.9**	**278**	**$11.4**	**100%**	**1,201**	**$44.3**	**$17.4**	**100%**

Notes:

1) Excludes 2011 – 2020 Capital Plan 3E Lag Factor: $1.8 billion

2) Includes unmet needs (total of $11.4 billion) and the costs of met needs beyond 2020 (total of $6.0 billion)

Sources:

2011 – 2020 Capital Plan Version #3E

2011 – 2020 Capital Plan TPC to Navigant December 22, 2011

Unmet Needs – Version #3E

- ✧ ***The Port Authority must embrace its capital plans and develop supporting annual budgets that consider appropriate contingencies. The 2008 Updated Capital Plan and supporting annual budgets showed 24 percent of planned projects were under-budgeted and 7 percent of total budgeted dollars were related to projects not anticipated in the plan***

A historical review of the 2008 Updated Capital Plan and associated budgets for FY2009-FY2011 revealed the following (see **Table 46**):

- The Port Authority under-budgeted capital expenditures by $3.4 billion or 24 percent (all planned projects per 2008 Updated Capital Plan less all budgeted projects);
- Only 383 projects of the 545 identified in the 2008 Updated Capital Plan were actually included in the budget and, in total, the 2008 Updated Capital Plan identified projects were under budgeted by 33 percent; and,
- 284 projects that were not included in the 2008 Updated Capital Plan were allocated 7 percent of the budget, or $0.8 billion, during this period, most of which pertain to Aviation.

While there is no clear pattern to these 284 budgeted and unplanned projects it is notable that half of the projects and approximately one-quarter of spend is associated with the Aviation Line Department. While it is not uncommon to realize unidentified and emergent needs in a budget cycle, the amount of originally unplanned needs in the budget reiterates the need to carefully identify, communicate and prioritize the most crucial needs in its capital plan (see **Table 46**).

Table 46 – 2009 - 2011 Budgeted Spend against Capital Plan ($ in billions)

	# Projects	Capital Plan Spend	Budget	% Budget	Capital Plan - Budget	Underbudget Against the Plan
All Planned Projects (per Capital Plan)	**545**	**$14.06**				
- Not Budgeted, Planned Projects	162	$2.69				
Budgeted and Planned Projects	**383**	**$11.37**	$7.64	71%	$3.73	33%
+ Budgeted & Unplanned WTC	11		$0.57	5%		
+ Budgeted & Unplanned ARC Tunnel	1		$1.44	13%		
+ Budgeted & Unplanned for 2009-2011	79		$0.26	2%		
+ Budgeted & Unplanned in Capital Cycle	284		$0.78	7%		
All Budgeted Projects	**758**		**$10.69**		**$3.37**	**24%**

Notes:

1) *Excludes 37 planned projects identified as "Lag Factor"*
2) *Excludes All Facilities Provision for Projects in Development: (category CXXX-001)*
3) *Excludes 2008 and 2012 metrics as the preceding years were planning years: the budgets match the respective plans*

Sources:

2007-2016 Updated Capital Plan
2008-2011 Actual Spending
2011 Actuals by Project

The Agency expended significant capital on projects that were unaccounted for during the planning and budgeting cycles for the period 2008 – 2011 (see **Table 47**). While allotting for certain contingencies, the Agency expended a total of nearly $350 million more than was planned through these reserves. The majority of the spend in this period was on 360 different projects, excluding those at the World Trade Center and Capital Major Works Projects ("CMWP"), that were not included in the 2008 Updated Capital Plan. Again, Aviation represents nearly half of this investment with rehabilitation projects on runways, lighting and support systems predominating the mix; enhanced asset management plans would allow the Agency to better anticipate these demands.

Table 47 – 2008-2011 Unplanned Projects with Actual Spend ($ in billions)

	2008-2011 per 2007-2016 Updated Capital Plan				2011-2020 Capital Plan Version #3E Current Status Total	
	# Projects	Plan	Spend	Spend - Plan	# Projects	Total Remaining Project Costs
Provision for Projects in Development		$0.12				
CMWP Contingency		$0.24				
Unallocated, Planned Spend		$0.36				
Unplanned CMWP with Spend	240	$0	$0.10		240	$0.15
Closed Projects with Adjustments	145	$0	($0.18)		145	$0.02
Unplanned Projects with Spend	360	$0	$0.79		360	$4.48
Unplanned Projects with Spend	**745**	**$0.36**	**$0.71**	**$0.35**	**745**	**$4.65**

Notes:

1) *Excludes World Trade Center*
2) *Excludes Project #CF92-001 formerly known as ARC Tunnel, which was cancelled in October 2011. Commitments now reassigned to represent the Capital Infrastructure Fund*

Sources:

2007 – 2016 Updated Capital Plan

2008 – 2011 Actual Spending

2011 Actuals by Project

Preliminary 2011 – 2020 Capital Plan Version #3E

Unmet Needs – Version #3E

Preliminary 2011 – 2020 Capital Plan TPC to Navigant December 22, 2011

While the identification of new needs, referred to by the Agency as "added starters" to a more limited extent is understandable, the lack of proper identification of needs during the previous planning and programming cycles is evident when an analysis of those unplanned projects that consumed $0.7 billion from 2008 – 2011 include $4.7 billion in total remaining project costs. The impact of needs unidentified during the planning process but included as "added starters" clearly exacerbates the Agency's ability to execute those projects previously included in the Capital Plans.

- ***Execution and delivery of capital projects is equally as important. If the Agency is able to reduce its capital delivery time, resulting in reduction of soft costs, the potential cost savings are likely to be substantial***

Soft costs represent all costs not directly attributable to the construction contract governing a project. Industry sources would suggest that the Port Authority may be able to realize up to a 5 percent improvement on certain types of capital projects from the current level of 25 percent. At these levels, the Port Authority would be exceeding leading practice. By way of illustration, every one-percentage point reduction in soft costs (historically 25 percent of total project costs) represents approximately $348.9 million in savings (from a combination of capital outlay, as well as cost of capital) over a 10 year period, representing approximately $34.8 million of potential savings per annum.

The magnitude of cost savings is a compelling motivation for the Port Authority to focus on optimizing the Capital Planning, Engineering and Execution Office to ensure effective coordination and execution among the departments to achieve a well-functioning complete project life-cycle (*i.e.*, Procurement, Engineering, Construction, and Project Management) (See **Table 48**).

Table 48 – Illustrative Example of Soft Cost Savings ($ in Millions)

($ in Millions)	2011 - 2020 Proposed Capital Plan	Avg. Annual Savings in Capital Outlay[3,4]	Total Savings in Capital Outlay	Avg. Annual Savings on Cost of Capital[3,4]	Total Savings on Cost of Capital	Average Annual Savings	Total Savings
Capital Expenditures[1]	$ 26,900.0						
Hard Costs (Hisotically at 75%)[2]	$ 20,175.0						
Soft Costs (Historically at 25%)[2]	$ 6,725.0						
Potential Savings on Soft Costs:							
Soft Costs at 24%	$ 6,456.0	$ 26.9	$ 269.0	$ 8.0	$ 79.9	$ 34.9	**$ 348.9**
Soft Costs at 23%	$ 6,187.0	$ 53.8	$ 538.0	$ 16.0	$ 159.8	$ 69.8	**$ 697.8**
Soft Costs at 22%	$ 5,918.0	$ 80.7	$ 807.0	$ 24.0	$ 239.7	$ 104.7	**$ 1,046.7**
Soft Costs at 21%	$ 5,649.0	$ 107.6	$ 1,076.0	$ 32.0	$ 319.6	$ 139.6	**$ 1,395.6**
Soft Costs at 20%	$ 5,380.0	$ 134.5	$ 1,345.0	$ 39.9	$ 399.5	$ 174.4	**$ 1,744.5**

Notes:

1) *Preliminary 2011 10-year capital plan of $26.9 billion (excludes 6.0 billion for amounts beyond 2020 and 9.0 billion for WTC and Regional Transportation projects)*
2) *Per study of completed projects from 2000 – 2011*
3) *Assumes capital is deployed evenly over 10 years*
4) *Assumes cost of capital of 5.4%.*

✧ ***Process improvements that have been introduced and embraced by the Agency have led to significant enhancements in the Capital Planning process, particularly in the critical area of project prioritization***

In response to these shortcomings and challenges, the preliminary 2011 – 2020 Capital Plan involved a much higher level of collaboration of various stakeholders and shared service functions within the Agency.

Process improvement suggestions have been adopted to expand the depth and breadth of the scoring, ranking and prioritization process utilized by the Agency in development of the preliminary 2011 – 2010 Capital Plan in 2011, allowing input from all levels of the Port Authority. Lead among these has been increased emphasis on the independent assessment and proper balance of key evaluative criteria, including: (i) asset condition, (ii) operational impact, (iii) implementation readiness, and (iv) execution constraints.

These modifications are well underway. The Agency's planning effort for 2013 has commenced and is utilizing the enhanced scoring and prioritization process for the development of the 2013 Capital Plan and 2013 Capital Program.

- ✧ ***The Port Authority has committed to and initiated ongoing improvements in the development and execution of the Capital Plan and Program by evaluating its existing organizational structure and improving upon the existing financial forecast, which helps guide capital planning capacity decisions***

The Port Authority has acknowledged these challenges and, in an effort motivated by the Interim Report, is actively evaluating the Capital Planning organizational structure, reporting metrics and project controls. **Section V – Organizational Design & Effectiveness** provides a more detailed discussion regarding modifications in the organization of the Capital Planning function.

Finally, the recent decision by the Agency to continue the development and periodic revision of a 10-year capital plan on a three-year cycle and to establish within that plan a more detailed 5-year program that will be revisited every year is consistent with leading industry practice. This vigilance will set the foundation for performance monitoring and give the Agency a more active posture in the management of its asset base.

Key areas for improvement in the Port Authority's existing financial model were identified and remedied through the development of an enhanced forecasting tool that allows for more reliable decision-making on capital capacity and contingency planning under a variety of scenarios.

Upon review of the Port Authority's existing model utilized by the Management & Budget Department ("MBD") to produce the budget and long-range forecast, key areas for improvement and accompanying enhancements were identified that guided the development of the Model including (see **Table 49**):

Table 49 – MBD Model Observations vs. Navigant Model Enhancements

Area for Improvement	Enhancement
• No centralized assumptions tab driving model output	• Clear and identifiable assumptions "command center" to drive model output
• Inability to run sensitivities in integrated model - different scenarios maintained in separate model versions	• Full functionality to toggle multiple sensitivities within one centralized model
• Consolidating model only - line departments kept in separate models	• Centralization of individual line departments and associated facilities and consolidating model into one place
• No long-range balance sheet	• Detailed long-range balance sheet linked up to cash flow and income statement
• No consolidating cash flow statement for three cash / investment funds (Reserve Fund, Capital Fund, and Operating Fund); inability to forecast operating cash fund	• Consolidated long-term cash flow statement capturing all cash funds, inflows and outflows, as well as working capital movements
• Passive calculation of financial income	• Fully linked and automated calculation of financial income
• Standard covenant / rating agency testing disclosure	• Defined tab for comprehensive covenant / rating agency calculations and compliance
• No supporting capital plan details incorporated in the model	• Detailed build-up of all 923 existing proposed capital projects by line department and by facility with ability to run sensitivities on different project mixes
• No tabs summarizing model output	• Color coded output tabs summarizing key model output and financial information

Model enhancements include a greater level of integration of key components at the corporate level and Line Department levels allowing for capital plan capacity assessments under a variety of scenarios. This is evident by the inclusion of integrated financial statements; incorporation of Line Department forecasts into a single, centralized Model; build-up of individual capital

projects by facility-level with the associated flexibility to include or exclude individual projects; and prompt turnaround of produced output driven by various scenarios on an automated basis.

- ***The Port Authority would benefit from more robust sensitivity analysis of the Agency's financial forecasts that project disruptive impacts such as economic recessions.***

Continuous "stress testing of" the Port Authority's business model allows for appropriate contingency plans to be identified that include (i) re-prioritization of capital spending, (ii) revenue enhancement and cost containment initiatives to realign financial performance in a changing environment, and (iii) use of alternative sources of capital to support infrastructure investment.

RECOMMENDATIONS

- The Port Authority must shift focus in the near term to the integrity of its portfolio of assets. The volume of SGR projects that face the Agency for the coming decade and beyond require diligent prioritization of SGR and a cessation of all discretionary projects. The Agency is making meaningful, near-term progress in this regard;
- The capital planning process must acknowledge challenges in historical performance in the Agency's ability to develop and execute a capital plan. The 2013 Capital Plan and Program must account for an overall contingency for emergency projects previously unidentified, other strategic initiatives, or unknown needs on projects already in construction. The status of progress of the 2013 Capital Plan and Program should be comprehensively, reliably, and consistently reported to senior management and the Board of Commissioners;
- The inclusion of a specific project in the 2013 Capital Plan and Program should be consistent with the Agency's ranking and its overall strategy and less dependent on the financial performance of particular Line Departments;
- The Agency must determine to what extent the historical run rate of $1.3 billion in capital delivery per annum is limited by capital capacity, engineering, project management, facility management, and/or operating limitations to maximize capital deployment and reduce soft costs;
- The Agency must enhance its focus on the implementation of capital projects and the establishment of associated governance to monitor and drive execution, effectiveness, and efficiency;
- Financial forecast evaluation should include a range of stress tests and incorporate recessionary impacts as well as support the assessment of revenue enhancements, cost savings opportunities, and financing strategies and ultimate impact on the Capital Plan; and,
- Adopt the Model, including training of key personnel, and utilize this tool to anticipate funding risks.

XVI. IMPLEMENTATION PLAN & NEXT STEPS

Crucial to any restructuring or reorganization is a concise implementation plan to ensure all efforts are targeted at getting to measureable results. It is appropriate for the implementation plan to be shared throughout the organization and existing dashboards be modified to encapsulate each initiative. The implementation plan should be organized to include:

- Action steps;
- Responsible parties;
- Target date;
- Status; and,
- Next steps

Each initiative should be tracked and as many action steps detailed as necessary to complete the task included so that responsible parties are clear on the actions expected and associated timing. The senior management team must oversee and ensure execution of the Key Initiatives Implementation Plan, which includes the following major items:

- Implement effective corporate governance
- Implement organizational redesign
- Create dynamic capital planning, execution and asset management functionality that is fiscally responsible with appropriate prioritization of capital and accountability for return on assets and capital the Port Authority deploys
- Create culture of accountability, meritocracy and transparency
- Complete renegotiation of major collective bargaining agreements
- Reorient financial performance around continual identification of non-toll / non-fare revenue enhancement and cost savings initiatives
- Complete analysis and divestiture of selected non-core assets
- Implement effective Enterprise Risk Management System that is quantifiable and measureable
- Create and implement a marketing and communication plan to effectively connect with all Port Authority constituents
- Development of Agency-wide strategic plan

A detailed work plan associated with initiatives can be found in **Appendix – A: Key Initiatives Implementation Plan**.

XVII. APPENDIX – A: KEY INITIATIVES IMPLEMENTATION PLAN

	Action Steps:	Responsible Party	Due Date	Status
1.	**Implement effective corporate governance**			
	A. Finalize key operating principles for board ratification			
	B. Conduct board survey through designated questionnaire			
	C. Realign committee structures along key agency functionalities			
	D. Establish committee charters			
	E. Establish committee / board meeting schedule dates			
	F. Designate senior management participation and provide appropriate analytical support			
	G. Create performance dashboards, which embody key tenets of the strategic plan and can be effectively deployed throughout the organization			
2.	**Development of Agency-wide strategic plan**			
	A. Commence and agree upon strategic planning process			
	B. Identify all related mandates to the organization ("musts") that the organization needs to address			
	C. Development or reaffirmation of mission statement			
	D. Perform external assessment of Strengths, Weaknesses, Opportunites & Threats ("SWOT")			
	E. Perform internal assessment of SWOT			
	F. Combine external and internal assesment into SWOT analysis			
	G. Identification of strategic issues (fundamental policy questions affecting Agency's mandates, mission, value, stakeholders, revenues, costs, financing requirements, management or organizational design			
	H. Develop ment of action plans/solutions to address strategic issues			
	I. Creation of strategic planning document			
	J. Bi-state agency review			
	K. Internal management review and discussion			
	L. Finalization of strategic planning document			
	M. Board of Commissioner approval			
	N. Creation of performance dashboards, which embody key tenets of strategic plan and objective performance measures, which can be deployed through the organization, from Board level to Line Department / Shared Service			

	Action Steps:	Responsible Party	Due Date	Status
3.	**Implement organizational redesign**			
	A. Create organizational transformation w orking group to establish key priorities of the planned changes, as w ell as timing, including appropriate Board of Commissioner participants			
	B. CSO - Implementation of recommendations from Chertoff Group in support of creation of centralized Chief Security function			
	C. COO - Establish clear roles and responsibilities.			
	D. COO - Develop a recruitment plan including evaluation of existing COO			
	E. COO - Realignment of Public Safety to Chief Security Officer and PMO to Capital Planning			
	F. COO - Assimilation of Operational Standards and Operations Services			
	G. Change Line Department Titles to President			
	H. Elimination of CAO role and consolidation of Procurement and Operational Services			
	I. Elevate Director of Human Resources to Chief of Human Capital and expand responsibilities to include Labor Relations			
	J. Integrate parts of the Office of Environmental & Energy Programs and Office of Business Diversity & Civil Rights into the Chief Compliance Officer, Procurement, and Chief Financial Officer			
	K. Creation of centralized Chief of Capital Planning, Execution & Asset Management			
	L. Creation of Chief Technology Officer role			
	M. Assimilation of Real Estate department into Line Department and Shared Service functions			
	N. Elimination of Office of Strategic Initiatives			
	O. Establishment of Chief Compliance Officer role			
	P. Implementation of Matrix Management w ith Line Departments w ith focus on Human Resources, Finance & Legal			
	Q. Development of outsourcing analysis framew ork around Operational Servcies and Legal Department			
	R. Creation of centralized Chief of Capital Planning, Execution & Asset Management to incorporate planning, engineering, execution and asset management functionalities			

Action Steps:				
4.	**Create dynamic capital planning, execution & asset management functionality that is fiscally responsible with appropriate prioritization of capital with accountability for return on assets and capital we deploy**			
	A. Complete evaluation of capital planning organizational redesign to include planning, execution and asset management functions			
	B. Develop processes and procedures with clear roles and responsibilities as well as accountability measure through key performance metrics i. Redefine capital planning calendar a. Establish parameters for 10-year capital plan and 5-year capital program ii. Review and revise documentation requirements for each step in the capital planning process and redefine critical success factors iii. Redefine scoring templates for SEP / RP projects			
	C. Creation of baseline timetables for delivery with a focus on speed to market			
	D. Determine critical path processes to ensure on-budget execution of capital plan dollars			
5.	**Create culture of meritocracy, accountability, and transparency**			
	A. Implement new compensation philosophy and culture that fosters meritocracy and transparency rather than tenure and entitlement			
	B. Flatten the compensation bands from 12 to 7 broad bands, to make the organization less hierarchical and allow greater flexibility and mobility for career growth and cross functional competency development			
	C. Benchmark and re-price positions based on current market compensation for similar positions (both public and private sectors) to set new base lines.			
	D. Promote career lattice concept and encourage multi-directional movement as a method of career growth, enrichment, and diversification.			
	E. Implement a merit base pay for the top performers through relative rating of Port Authority non-represented employees.			
	F. Educate, empower and support managers to use new compensation philosophy and performance management to differentiate performance among employees (force a normalized distribution)			
	G. Create functioning "Councils" which drive cross-functional problem solving: - Executive Council - Executive Director and "Chiefs" that report to Executive Director - Operating Council - Executive Director, line presidents, and COO - Capital Projects Council - Drive capital plan oversight and implementation led by Chief of Capital Planning, Execution, and Asset Management			

Action Steps:				
6.	**Complete renegotiation of major collective bargaining agreements**			
	A. Develop working team to establish strategy and base analysis parameters			
	B. Retain outside counsel to assist in evaluation / negotiation process			
	C. Schedule introductory meetings with existing labor relations staff			
	D. Identify key goals out of planned negotiation sessions			
	E. Develop comprehensive inventory of compensation and benefits by contract			
	F. Develop comprehensive inventory of work rules and understand application by key facility and key collective bargaining agreement			
	G. Understand grievance process and conduct relevant benchmarks			
	H. Identification of negotiation strategies			
7.	**Reorient financial performance around continual identification of non-toll / fare revenue enhancement and cost savings initiatives**			
	A. Create revenue enhancement and cost containment team to prioritize, evaluate, and implement key initiatives			
	B. Develop key initiatives list by Line Department			
	C. Prioritize and group between revenue enhancement and cost containment			
	F. Segment by line department / shared service organization			
	G. Determine strategies for implementation including: (i) timeline, (ii) costs, (iii) ease of implementation, (iv) external and internal constituency impact, (v) total impact			
	H. Develop detailed work plan for each initiative			
	I. Develop key mileposts, critical success factors, and performance metrics			
	J. Begin implementation of initiative			
	K. Track progress through incorporation on individual strategic dashboards			
	L. Take corrective actions, where necessary			
	M. Complete initiative			
	O. Post-completion tracking to ensure progress is maintained			

Action Steps:				
8.	**Complete analysis and divestiture of selected non-core assets**			
	A. Identification of non-core assets for evaluation of strategic alternatives			
	B. Develop individual asset profiles			
	C. From profile analysis develop list of strategic alternatives			
	D. Develop sensitivity analyses to determine best outcome			
	E. Prepare write-up and summary depicting divestiture strategy and expected outcome			
	F. Obtain board approval for disposition strategy			
	G. Implementation of disposition strategy			
9.	**Implement effective Enterprise Risk Management System that is quantifiable and metric based**			
	A. Create ERM cross-functional team			
	B. Establish ERM planning process			
	C. Completion of internal insurance review			
	D. Study existing risk practices (self-assessment, comprehensive survey of existing risk practices)			
	E. Establish context (both internal and external environmental factors)			
	F. Identify risks by category and / or function with the organization			
	G. Quantify existing goals and targets for achievement			
	H. Identify specific risk events			
	I. Perform Risk Assessments			
	J. Evaluate risk response through determined dashboard			
	K. Implementation of control activities			
	L. Provide information and communication monitoring on a real-time basis			
	M. React and provide assessment / outcome of risk events			
10.	**Create and implement marketing and communication plan to effectively connect with all Port Authority constituents**			
	A. From board committee, create standing working group to provide direction			
	B. Evaluate / inventory existing media plans by line department, Agency focus			
	C. Develop constituency list and identify key areas of focus			
	D. Identify key messaging targets			
	E. Work with outside advertising agency to identify key implementation plan			
	F. Identify Line Department messaging			
	G. Coordinate economic development efforts and communication with adjacent communities and states			
	H. Create consortium of sister agencies to target issues that share commonality			
	I. Implement plan			

XVIII. APPENDIX – B: PROCUREMENT BUYING GROUPS (DEFINED)

Buying Group		Description / Responsibilities
1	**Construction Procurements & Integrity Programs Division**	Promotes a competitive bidding environment to ensure the best price for construction work and manages the bidding and award processes (including minority participation, financial and bonding issues). Outreach efforts with the contracting community have been enhanced to encourage submission of bids and qualify bidders. The Division manages the vendor integrity process for all agency contracts and protests filed by vendors. Staff works with the Office of the Secretary, Law Department and Office of Inspector General on matters relating to integrity, conflicts of interest, and release of FOI information and provides support to the other Divisions in the Department on matters relating to construction.
2	**WTC Site / Federal Programs Compliance Division**	Ensures that all Federally-funded procurement actions, including post-award contract changes, are conducted in compliance with all requisite agency and grant administration guidelines. In furtherance of its mission, the WTC Site/ Federal Programs Compliance Division supports various line departments by providing overall procurement process support and management for Port Authority solicitations and third party solicitations on behalf of the Port Authority. In addition, the Division provides (a) guidance on solicitation package development to ensure that grant compliant terms and conditions are contained within; (b) support during negotiations with contractors/firms on pricing and terms and conditions; (c) management of the change order process for changes to Federally-funded professional services and construction contracts; and (d) compliance audit support. While the Federal Programs Compliance Division is primarily involved with the Federal Transit Administration-funded reconstruction of the World Trade Center Site and all procurements at the site, the division assists other line departments with grants from Federal agencies such as EPA, FEMA, FHWA, FRA, FAA, and HUD.
3	**Technology Services Division**	Handles complex and high dollar Agency-wide and departmental technology procurements, such as access control systems and support, CCTV, hardware/software selection, service level based ongoing application maintenance in addition to state of the art technologies such as biometrics and situational awareness solutions. The group manages technology based procurements for enterprise services handled centrally through Technology Services, individual client department business specific solutions and hybrid procurements that span both technology and other procurement divisions' services. Staff ensures conformance with requisite agency goals in key areas such as Intellectual Property, Information Security, grant management and treatment of confidential and privileged documents. Because of the rapidly changing advances in technology, the security sensitive issues, and its pertinence to all departments, the function is contained in the Director's Office.

Buying Group		Description / Responsibilities
4	**Professional, Technical & Advisory Procurements Division**	Manages the procurement of professional, technical, and advisory services, including procurement methodology, document development, solicitation management, negotiation of contract terms and compensation, proposer debriefings, authorization of consultant expenditures, attends outreach functions as required to familiarize target firms with agency needs, and develops agency guidelines for procurement of consultants on either a project or call-in basis.
5	**The Commodities and Services Division**	Manages commodity procurements and operations, maintenance, customer service, transportation, security guard, janitorial, seasonal, and energy service procurements. The Division implements key initiatives to achieve Minority/Women/Small Business Enterprise ("MWSBE") goals such as set aside and price preference programs and ensures compliance with labor/harmony requirements. The Division reviews solicitation and authorization documents, prepares contract renewal plans, identifies opportunities to buy from government contracts, holds vendor forums and mediates contract disputes.

XIX. APPENDIX – C: PROCUREMENT DEPT. RECOMMENDATIONS

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
1	Revise Advertisement Thresholds and Create Vendor List for Direct Solicitations	• Advertising is required for public solicitations valued at $25,000 or more	• For opportunities valued at less than $250,000, no longer publicly advertise. Competition for such opportunities will ensue from the following steps: 1. Create a vendor list, categorized by type of service and goods with references to previous publicly advertised solicitations from the Authority, and send email notification to those registered within selected commodity & service codes; and, 2. Directly solicit firms on the vendor list for opportunities that were publicly advertised and competitively procured in the recent past. *Note: The above steps ensure that firms will not be disadvantaged by the recommendation and provide vendors with an incentive to register in the vendor database.*	• Reduces the number of publicly advertised bids by 13.5% • Reduces the procurement process by 2-3 weeks for competitive opportunities within threshold	• Timeline – Short • No costs anticipated
2	Shift Timing of Advertisement	• Opportunities are publicly advertised after finalization of solicitation documents	• Publicly advertise an abstract of the scope of work before finalization of solicitation document	• Saves between 2-3 weeks in the post-solicitation procurement process • Develop bidder's list with accurate contact information to facilitate communications	• Immediate implementation • No cost anticipated

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
3	Eliminate Print Advertising for Most Solicitations	• Procurements are advertised in newspapers and other media	• Rely solely on advertising on the Authority's web site • Professional journals and other media used as necessary for unique solicitations	• Saves up to three days per solicitation • Reduce advertising costs by approximately $400,000 annually	• Immediate implementation • No costs anticipated
4	Streamlined Approvals Required for Sole-Source Procurements	• Multiple layers of approval are required for all sole source procurements based on value, which can take 2 to 3 weeks, including justification, validation and approval	• Utilize website for planned procurements on a sole source basis • Marketplace to Affirm of sole source nature of product / services • Cumulative online listing of validated sole source acquisitions	• Transfers sole sources validation to the marketplace • Based on the value of the services for commodities, could reduce time of procurement by to two weeks • Provides transparency • Eliminates the need to re-advertise renewals of validated sole source acquisitions, saving up to two to three weeks	• Timeline: Short • No costs anticipated
5	Approved Alternate Product List *(Currently Underway)*	• Current practice is a multi-layered, paper burdened process to review and approve proposed alternate products before the expiration of an existing contract	• Establish and maintain an Approved Alternate Products list with the potential alternate products evaluated on an ongoing basis	• Timely award of new contracts with approved alternates. • Increasing the likelihood of approved alternate product. • Increased likelihood for price certainty. • Contract award timeframe anticipated to be reduced by a minimum of one month.	• Phased implementation beginning within three months • No costs anticipated
6	Increased Delegation of Authority to the Executive Director for standard purchases	• Authorization is currently based on value and procurement method • Purchases for standard, low-risk commodities and operational services have the same approval as atypical procurements	• Delegate all authorization to the Executive Director for routine services and commodities	• Anticipated to save approximately one month	• Timeline: Short • No costs anticipated

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
7	Streamlined approval process	• Construction contract related awards, extensions and supplements require Agency-wide review and Department Director written approval, usually a 2-month process	• Streamline approval documentation and delegate authority to Program Manager • Reduce necessary reviews	• Savings of up to 1-2 months for construction related awards • Savings of up to two to three weeks for contract supplements of increases authorized within staff authority	• Timeline: Immediate / Short • No costs anticipated
8	Extending Contracts with high-performing vendors	• Public solicitation prior to expiration of a contract	• In cases of documented exceptional contractor performance, negotiate a one-time extension with the incumbent • Develop standard language for new solicitations that will permit such one-time extensions	• Extends relationships with high performing vendors, and favorable pricing previously negotiated • Savings of up to 3 to 6 months by eliminating the typical procurement process • Promotes operational stability and eliminates transitioning and start-up costs • Fosters predictability in operational budgeting • Encourages optimal performance from contracted vendors	• Timeline: Short, three to four months • No costs anticipated
9	Mobility solution for warehouse operation	• Labor intensive, paper laden procedures and non-automated warehouse operation for the receipt of return of goods	• Automate the process through the use of handheld devices linked to Agency's computerized inventory management system	• Streamlined, more efficient operations • Increases inventory accuracy	• Estimated time to implement is four to six months • Estimated cost is approximately $500K for equipment
10	Eliminate the need for Annual Renewals of Consultant Call-In Agreements	• Call-In programs are typically solicited for a 4-year term but require annual contract renewals	• Allow agreements to be awarded for the full programs term	• More efficient administration of Call-In program • Time savings (for Procurement Department only) • Cost Savings (for Procurement Department only: $130,000)	• Immediate implementation • No costs anticipated

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
11	Online Professional Service Firm Questionnaire *(Currently Underway)*	• Ten-step process utilized in reviewing and validating vendors for pre-qualification	• Allow vendor firms to enter their own information into a web based system	• Savings of 300 to 500 hours annually • Savings of $50,000 annually	• Completed BETA testing. Full rollout underway
12	Utilize Lump Sum Structure for Certain Call-in Programs	• The standard, time-intensive process is used for contracts of minimal cost	• Provide for a negotiated, one-time lump sum payment upon completion of the services	• Reduces administrative burden • Incentivizes consultants to assign most qualified staff in an effort to expedite project completion • Expedites invoice review and payment process • Expedites completion of design services	• Immediate implementation • No costs anticipated
13	Centralized Electronic Repository Of Government Contracts	• For each solicitation, Agency buyer conducts research to identify available government contracts • If a government contract is not identified, other lengthier procurement methods are pursued	• Create a full-time Research Associate positions to: 1. Identify applicable government contracts, then create and maintain an electronic repository; and, 2. Research the solicitation library to determine appropriate standards for future solicitations.	• Reduces time to research and identify government contracts • Potentially expands the use of government contracts • Saves time in document generation • Promotes standardization	• Timeline: Short • Cost: Estimated at two FTEs

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
14	Document Management System For Document Integration	• Entire procure-to-pay process is managed by SAP • Accompanying or supporting documents are submitted independently and not through SAP	• Use document management solution(s) to facilitate document attachments in SAP	• Provides secured access control of documents/folders, templates etc. • Provides increased efficiency • Facilitates review by incorporating supporting documents with other materials being reviewed	• Time line - at least six months • Estimated cost: $750K system & implementation and 1 additional part-time procurement FTE
15	Leverage Competition amongst active Government Contracts	• Buyer identifies firms that have government contracts for the desired goods/services, and solicits proposals • Similar to the evaluation process for RFPs, proposals are reviewed and evaluated through multiple steps	• Accelerated procurement from qualified firms holding government contracts • Pricing only solicited from best qualified firms	• Savings of up to two months	• Immediate implementation – already piloted on two procurements successfully. • No costs anticipated
16	Remove constraints in piggybacking on Government Contracts	• Procurement can piggyback only on contracts between vendors and other public entities. Procurement cannot piggyback on its own contracts	• Permit "piggybacking" on the Authority's active contracts on a limited basis according to specifically defined guidelines and criteria	• Use of commonly known Standardized Terms & Conditions will save considerable time	• Immediate implementation • No costs anticipated
17	Electronic Procurement	• On-line vendor registration system requires nightly interfaces • Public Solicitations are posted on-line and received via paper mail • Public Bid openings are in person • Bid results are posted on the PA website • This multi-step process involves emails and data entry to produce solicitation documents	• Develop of a comprehensive e-commerce strategy for the Authority 1. Identify & implement a comprehensive, interactive online bidding solution addressing key procurement areas; and, 2. Implement Electronic Solicitation Document Formation. Leverage proven technology to develop and store electronic documents including workflow, version management and SAP integration.	• Significant improvements in efficiency & procurement cycle time, enhanced transparency and flexibility to quickly adapt procurement processes to changing business environments • Seamless integration with the Agency's existing financial & document management systems, where appropriate and practical, will also support obtaining optimal results from these tools	• *This is a major undertaking in breath and complexity* • Time line-anticipated is between 6 months and 1 year depending upon solution • Cost to be determined but anticipated up to $ 2.5 million. Cost will vary depending on scope/phase & product; from cost incurred by vendors • Dedicated staff and services will be required to detail requirements and implement comprehensive solutions to address the various procurement types and processes

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
18	RFP Management – Distribution Proposal Submission /Receipt and Evaluation process	• Proposals of varying lengths are received via mail and disseminated via mail to stakeholders in the PA. • Multi-step, multi-participant paper-based RFP response and evaluation process. • Distribution process is partially electronic with documents posted on line.	**Interim -** • Require electronic copies of proposals. • Disseminate to participants electronically. • Where possible, restrict the length of proposals. **Longer Term -** • Select a flexible web based RFP management system with both external and internal components. • Implement in a phased approach.	• Time savings of approximately 1 week in processing the distribution of proposals. • Contributes to the PA's environmental goals (less paper), and provides proposers with time and materials savings. • Page limitations will reduce the review time. • Easier access & collection of internal and external documents. • Faster submission and review time. • Cost reductions achieved through collaboration & maintenance of a single source of all relevant project data.	Phased Implementation: Anticipated for Phase 1 • Short -3-6 months to implement. • Cost: Approximately $200K for standalone system and resources.
19	Distributing Construction Contracts Documents (Drawings & Bid books) *(Pilot Programs are Ongoing)*	• Drawings are printed (per contract) and distributed manually via mail and/or picked up after payment is submitted.	• Use third party reprographer with secure on-line web portal allowing contractors to view & order, and pay directly for documents online. • Allow electronic takeoffs of construction documents eliminating the need for paper distribution.	• Time savings in the distribution and printing process. • Security features can be incorporated. • Actual printing cost assigned to the potential contractors.	• Timeline – Short. • No costs anticipated. • Pilot projects have been carried out in last few years, and will continue
20	Reverse Auctions Underway	• Reverse auctions were first used in 2010 for to procure electricity. This was done through a specific third party specializing in reverse auctions for energy.	• Use a web based service for reverse auctions. • For industry specific areas i.e., utility (electric/gas/fuel), use 3rd party auctioneer. • For any other one time, large, purchase of commodities (i.e., IT equipment etc.) use a reverse auction process.	• 1-2 % savings on estimated electricity usage for NJ facilities. • Increased process efficiencies & time savings. • Real time market pricing & increased competition.	• Anticipated timeline – Short. • Reverse auction could be either fee-based, or an in-house solution can be developed. • Estimate $100K for system and resources.

Item or Rank	Title of Proposal	Current Practice	Recommendation *(Description of Proposed Change)*	Benefit *(Note Key Facts and Quantifiable Results: Time Saved, $ Saved, etc.)*	*Subject to Approvals Anticipated Timeline & Cost to Implement *(Capital Investment $, FTEs, etc.)*
21	Fleet Vehicle Auctions *(Currently Underway)*	• Currently fleet vehicles & equipment for auction are staged & then transferred to third party auctioneer's lot. • Auctions occur 2-3 times a year. • The process & contract administration is manual & paper based.	• Use third party auctioneers who will pick up vehicles from PA, prepare them for sale, and sell them using an online platform. • Perform a pilot project for fleet vehicle auctions & potentially extend to abandoned vehicles based on pilot results. Pilot agreement expected to be in effect September 2012.	• Reduced time spent by PA staff to stage vehicles. • Vehicles can be sold as they become available, potentially saving up to 6 months. • Provides more transparency & participation from the general public potentially increasing the sale value.	• Expected to pay a higher commission--- however this can be offset by potential higher sale value and efficiencies in time. • No setup cost. • Timeline – Short term, one-time.
21	Expand Internal Departmental Review Authority	• Typically Law Department review and approval is obtained for items such as solicitation documents, addenda, name changes, government contracts, sole source contracts, and determinations on non-responsive vendors.	• Allow Procurement Contract Review Staff to determine Law Department involvement based on the nature of the transaction.	• Reduced approval timeline.	• Timeline: Short term. • No costs anticipated.
22	Realign Responsibility for Producing Freedom of Information (FOI) Responses	• The Office of the Secretary sends FOI requests to Procurement seeking documents. • Procurement staff assembles documents and drafts response.	• Allow departments to directly submit responses to OSEC. • Procurement Dept. would provide procurement-related information only.	• Time savings in Procurement.	• Timeline: Immediate to Short term. • No costs anticipated.
23	Administrative Purchase Orders	• Procurement Dept. processes administrative purchase orders involving no procurement action.	• Allow line/staff departments to directly process administrative purchase orders.	• Time savings in Procurement.	• Timeline: Short term. • No costs anticipated.

XX. APPENDIX – D: ACHIEVEMENTS & INITIATIVES UNDERWAY

Item	Description
Agency-wide	
Corporate Governance	• Chairman and Vice-Chairman have undertaken a review resulting in changes to the current committee structures, approved during the most recent Board meeting, to drive enhanced focus on key initiatives and oversight of the organization • Staff meetings with vendors pre-cleared with procurement • Established monthly updates to BOC on WTC expenditures & schedules • Approval of new corporate governance structure ***Audit Committee:*** • Formal review of leasing functions • Adoption of financial statements • Change in external Auditors for first time in 31 years • Posted tens of thousands of documents for public review • Revised Freedom of Information Act policies and procedures
Travel Policy	• Implementation of new travel policy restrictions
Organizational Design	• Reviewing and modifying the organizational design to allow it to operate more effectively and efficiently • Conducting, under the direction of the Special Committee, an Agency-wide review to identify potential areas for performance improvement in the organization • Hiring of Navigant, Rothschild and Chertoff to conduct independent reviews • Insurance group to streamline Risk Management and Insurance Costs
Employee Benefits	• Reduced employee headcount by 243 and payroll by $10.5 million in 2010 and 2011 from employee buyouts • Board declaration of its expectation that all future labor agreements for represented employees will include a contribution to healthcare • Elimination of free E-ZPass for most non-represented employees • Elimination of PATH passes for non-represented employees • Enforcement of PANYNJ policy on political activity • Changes to community contributions budget • Sale of helicopters ending use by executives • Elimination of first class / business travel • Reduction in executive assigned vehicles • Instituted quarterly overtime reports to Commissioners & NY State Comptroller • Eliminated vacation exchange and extra allowances for cashing in vacation days upon separation, expected to generate approximately $7.8 million of savings in 2013. • Implemented revised vacation schedule, eliminated certain excess positions as well as certain add-on compensation programs (*i.e.*, FICA, contractual death, management excused days, longevity programs, and death gamble benefits) expected to generate approximately $13.3 million of savings in 2012 • Implemented enhanced web-based total compensation disclosure for all PA employees, evidencing its commitment to transparency

Item	Description
	• Instituted multiple health care plan choices, expected to generate approximately $3 million of savings in 2013 • Implemented healthcare contribution for Non-represented employees and retirees, expected to generate approximately $4.6 million in savings in 2012
Capital Projects Prioritization	• Implemented new scoring process for capital projects, to establish enhanced determination of priorities in the deployment of its capital
Operational Improvements	• Flat operating budget • Salary freeze / no-raise budgets
Public Safety	
Establish Chief Security Officer function	Consolidated the security function under a Chief of Security and commissioned the Chertoff Group to conduct a thorough review, develop and assist in an implementation plan to drive enhanced security and accountability of the personnel entrusted to protect the infrastructure assets and public that rely upon them
Leadership Changes	Restructured senior leadership to provide better accountability
Organizational Changes	Moved Internal Affairs out of Public Safety to Inspector General's office to provide better transparency and accountability
Aviation	
Completed US Airways gate swap with Delta	Gate swap to allow Delta to build-out larger hub presence at LGA and accommodate additional passenger volumes and associated economic stimulus for the region resulting in a $100 million investment in terminals
Delta Expansion	Delta expansion at JFK of approximately $1.0 billion
Approved Jet Blue expansion at JFK	Allows for additional international traffic and associated economic benefit of approximately $150 - $200 million
Request for Information regarding replacement of LGA Central Terminal Building	Pursuing outside expertise to assist in the ultimate replacement of Central Terminal Building and explore alternative financing arrangements; estimated value of the CTB building project is $3.6 billion
Request for Information regarding replacement of Terminal A at Newark	Pursuing outside expertise to assist in the ultimate replacement of Terminal A building at Newark Airport and explore alternative financing arrangements; estimated value of the Terminal A building project is $1.7 billion
TB&T	
Implemented toll-collection "wall of shame"	Allows for publication of toll-violators to encourage repayment and enhance collections
Began Lincoln Tunnel Helix Project	Helix repair to tunnel structure that is over 70 years old
George Washington Bridge Suspender Cable Replacement Project	Initiated major project to replace support cables on entire George Washington Bridge

Item	Description
Completed RFP for Goethals bridge replacement	Completed RFP to evaluate alternatives for replacing existing Goethals bridge with new structure
Raising Bayonne Bridge	Implementing accelerated schedule to raise Bayonne Bridge deck in support of increased clearance for taller ships
PATH	
Completion of new car acquisition	Completed purchase of 340 new PATH railcars to support additional capacity growth and aging assets
Implementation of Automatic Train Control (ATC) Signal System & 10-car Platform Expansion	In process of implementing new signal system, allowing for additional capacity, efficiency and reliability
Port Commerce	
Panama Canal expansion planning	Acceleration of raising of Bayonne Bridge and supplemental dredging to support larger ships
Comprehensive dredging program	50 foot Harbor Deeping Project will address competitive issues with regards to Port Commerce being able to handle ever larger container ships
Intermodal rail program	Planning for connectivity of all port operations through rail system to allow for significantly enhanced efficiency
Real Estate Development	
Non-core assets	Announced strategic alternative evaluation of Teleport and Newport Legal Center
Bus Terminals	Redevelopment of Port Authority and GWB Bus Terminals
Essex County Resource Facility	Contractual renegotiation of Essex County Resource Facility to eliminate future capital obligations to Port Authority
World Trade Center Program	
Financial Controls	Implemented significantly more stringent financial and operational controls to ensure appropriate accountability and transparency
Retail venture with commercial partner Westfield	Announced $625 million investment by Westfield to support retail venture at 1 WTC
Communications facility at 1WTC	Joint venture with the Durst Organization to build and operate state-of-the-art broadcast facilities at 1 WTC.
Observation deck	Initiated RFP for 1WTC observation deck, which is expected to have significant revenue generation opportunities for 1 WTC

XXI. APPENDIX – E: REPORT QUALIFICATIONS & DISCLAIMER

THIS CONFIDENTIAL REPORT HAS BEEN PREPARED FOR THE SPECIAL COMMITTEE OF THE BOARD OF COMMISSIONERS OF THE PORT AUTHORITY IN CONNECTION WITH NAVIGANT'S PHASE II REPORT PURSUANT TO THE AGREEMENT, DATED AS OF NOVEMBER 23, 2011, BY AND BETWEEN NAVIGANT AND THE PORT AUTHORITY. THIS REPORT CONTAINS INFORMATION RELATED TO THE PORT AUTHORITY AND IS BEING PROVIDED ON A STRICTLY CONFIDENTIAL BASIS. THE CONTENT OF THIS REPORT IS NOT TO BE USED FOR ANY OTHER PURPOSE AND, EXCEPT AS MAY BE REQUIRED BY LAW OR ANY OTHER REGULATORY OR GOVERNMENTAL AUTHORITY HAVING JURISDICTION OVER THE PORT AUTHORITY, CANNOT BE DISTRIBUTED WITHOUT THE WRITTEN CONSENT OF NAVIGANT AND MAY NOT, IN ANY CASE, BE RELIED UPON BY ANY THIRD PARTIES WITHOUT NAVIGANT'S PRIOR WRITTEN CONSENT.

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Final Report

Presented to the Special Committee of the Board of Commissioners
Port Authority of New York and New Jersey

ROTHSCHILD

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Introduction

This report is provided to the Special Committee of the Board of Commissioners of the Port Authority of New York and New Jersey in order to assist the Special Committee in its comprehensive review of the Port Authority's operational and financial structure. The primary focus of Rothschild's work product is the Port Authority's financing strategy and considerations related to the long-term funding of the capital investment needs identified by Port Authority staff.

This report is divided into four sections:

- Review of the primary components of the Port Authority's long-term financial forecast (the "Long Range Forecast")
- Analysis of the Port Authority's existing capital structure and corresponding outlook for liquidity and credit profile
- Comparative capital structure analysis of industry peers and implications for the Port Authority's financing strategy
- Discussion of considerations regarding potential Public Private Partnerships ("PPPs")

Executive Summary

Rothschild's scope of work involves assessing the Port Authority's Long Range Forecast and accompanying capital expenditure plan in order to analyze the organization's financing strategy and capability. The assessment involves both a specific review of the Port Authority's financing strategy and a cross-category comparison with peer benchmarks for financial leverage and cost of financing. Preliminary conclusions are provided below:

(1) Based on achieving the Long Range Forecast, the Port Authority has sufficient debt capacity to fund the capital expenditures plan while satisfying the principal credit metrics included in its financing obligations and those analyzed by the credit rating agencies

The Long Range Forecast is premised on numerous underlying assumptions including continued economic recovery in the region, improvement in realized pricing (including the effect of the scheduled toll and fare increases) and estimates for the operating cost structure of the Port Authority. Successful achievement of the key financial targets is important both (i) for the ability to issue new Consolidated Bonds and (ii) maintaining the Port Authority's strong AA- credit rating. As detailed herein, the Long Range Forecast satisfies the identified credit ratio targets with the level of cushion varying principally based on timing of capital expenditures and ramp of revenues. As a result, the financial analysis indicates the Port Authority has adequate debt capacity to support the significant capital expenditures forecast through 2020. However, the level of cushion in the early years of the forecast period is relatively limited. Without the schedule toll and fare increase (or other financial underperformance versus the forecast), the analysis indicates a shortfall versus target credit metrics and thereby risk to the stability of the credit rating and financing terms.

The chart below delineates the financial metrics analyzed in this report based on successful achievement of the Long Range Forecast.

Table 1 – Overview of Financial Tests		
Financial Metric	**Type**	**Estimated Result**
General Reserve Requirement	Statutory requirement	✓
Net Revenues Test – Consolidated Bond Issuance	Test for permitted issuance of Consolidated Bonds	✓
Net Revenues Test – VSO Issuance	Test for permitted issuance of VSO debt	✓
Maximum VSO Debt	Test for permitted issuance of VSO debt	✓
Debt Service Coverage	Credit rating agency metric	✓
Total Obligations / Gross Revenues	Credit rating agency metric	✓
Coverage of Next 2 Years Debt Service	Credit rating agency metric	✓
Consolidated Bond Reserve Minimum	Credit rating agency metric	✓

(2) The Port Authority's financing strategy, principally conducted through the Consolidated Bond program, has effectively sourced capital at a competitive and relatively stable cost.

Market data indicates the Port Authority has successfully achieved a relatively stable cost of financing amidst the volatility of the past decade with the cost comparing favorably to similarly rated municipal debt and public market issuances from other transportation infrastructure operators. This favorable cost is additionally noteworthy since the municipal benchmarks are primarily tax exempt debt and therefore expected to register lower cost versus the overall Port Authority issuances which represent a mixture of taxable and tax exempt obligations. The Port Authority's stable financing cost is due, at least in part, to the stability of the credit rating and the demonstrated managerial focus on satisfying the primary financial metrics necessary to maintain the AA- rating.

(3) Public Private Partnerships ("PPPs") may represent an opportunity for the Port Authority to execute certain of its significant capital projects but need to be evaluated in context with other available alternatives.

The Port Authority has demonstrated success in PPP structures with recent examples including the retail development at the World Trade Center and the Terminal 4 redevelopment at JFK. Given the availability of the successful Consolidated Bond program, PPP proposals should be considered based on the benefits and issues including both the financial considerations (e.g. impact on net cashflows, debt capacity, credit scoring, etc.) and non-financial items (e.g. particular operational considerations or risk transfer).

Long Range Forecast Review

For purposes of evaluating the Port Authority's capitalization and long-term financing needs, Rothschild conducted a due diligence review of the Port Authority's Long Range Forecast and supporting Capital Plan. Rothschild's review is based on in-person sessions with operating and finance staff from each of the Authority's principal operating divisions as well as a review of supporting documentation provided by the Port Authority. Rothschild's analysis is based on the consolidated Long Range Forecast as summarized in Table 2 and the corresponding capital plan as presented in Table 3.

Table 2 – Summary of Long Range Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR %
Revenues										
Aviation	$2,220	$2,294	$2,365	$2,477	$2,581	$2,630	$2,659	$2,749	$2,794	*3%*
PATH	141	161	182	200	220	236	253	269	285	*9%*
Ports	241	249	271	289	305	315	329	353	372	*6%*
TB&T	1,373	1,496	1,625	1,779	1,939	1,950	1,932	2,131	2,162	*6%*
WTC	48	39	121	217	286	323	347	380	397	*30%*
Development	95	95	97	99	100	103	105	107	108	*2%*
Gross Revenues	**4,119**	**4,335**	**4,662**	**5,061**	**5,431**	**5,557**	**5,626**	**5,989**	**6,119**	***5%***
Total O&M Expenses	(2,333)	(2,417)	(2,529)	(2,636)	(2,695)	(2,788)	(2,873)	(2,936)	(3,003)	*3%*
Other adjustments	(228)	(230)	(229)	(237)	(234)	(216)	(221)	(221)	(222)	–
Net Operating Revenues	**1,558**	**1,688**	**1,904**	**2,188**	**2,502**	**2,553**	**2,532**	**2,832**	**2,894**	***8%***
Margin %	*38%*	*39%*	*41%*	*43%*	*46%*	*46%*	*45%*	*47%*	*47%*	
Financial Income	40	55	58	79	110	138	161	161	167	
Passenger Facility Charge	215	221	226	231	236	241	246	251	257	
WTC - Non-operating	179	347	296	188	168	141	65	65	65	
Other	529	438	374	359	129	39	39	39	39	
Net Revenues	**2,521**	**2,750**	**2,859**	**3,046**	**3,144**	**3,111**	**3,042**	**3,347**	**3,422**	
Capital Expenditures	(3,827)	(4,532)	(4,430)	(3,041)	(2,255)	(2,189)	(1,619)	(1,461)	(1,526)	
Net Revenues less Capex	**(1,305)**	**(1,782)**	**(1,570)**	**4**	**889**	**922**	**1,423**	**1,886**	**1,895**	

Source: Port Authority

The capital plan incorporated into the analyses herein includes both the Port Authority's base $25.1 billion plan (covering the period 2011 – 2020) and additional expenditures for the World Trade Center based on updated cost estimates ($2.7 billion). The resulting total of $27.8 billion is analyzed for the future period of 2012 – 2020 (excluding 2011) with a total expenditure of $24.9 billion as summarized below.

Table 3 – Summary of Capital Plan by Project Category ($m)

Category	Projects	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
MAND	83	$1,118	$1,588	$1,773	$918	$220	$304	$72	$140	$137	$6,271
RPP	55	1,197	1,056	587	349	299	268	215	133	272	4,378
SEC	84	360	347	222	90	52	47	39	42	10	1,209
SEP	106	153	231	366	430	517	591	529	259	180	3,256
SRP	16	505	566	576	536	568	336	236	236	229	3,790
SGR	485	738	1,186	1,401	911	761	776	631	650	697	7,751
Subtotal	**829**	**4,073**	**4,975**	**4,924**	**3,233**	**2,417**	**2,322**	**1,723**	**1,461**	**1,526**	**26,654**
Efficiency and Phasing		(246)	(444)	(494)	(192)	(162)	(133)	(104)	--	--	(1,775)
Total		**$3,827**	**$4,532**	**$4,430**	**$3,041**	**$2,255**	**$2,189**	**$1,619**	**$1,461**	**$1,526**	**$24,880**

Source: Port Authority

Table 4 – Description of Project Categorization		
Project Category	**Identifier**	**Description**
Mandatory	MAND	▪ Projects required by law, governmental rule or regulation
Revenue Producing	RPP	▪ Projects which provide system enhancements, improved customer service levels, and/or regional benefits and which yield a positive financial return on invested capital to the Port Authority
Security	SEC	▪ Projects that are necessary to meet the agency's security plan
System Enhancing	SEP	▪ Projects that provide system enhancements, improved customer service levels, and/or regional benefits but do not yield a positive financial return to the Port Authority
Regional	SRP	▪ Projects undertaken by the Port Authority which advance the objectives of the Port Authority but are not operated by the Port Authority
State of Good Repair	SGR	▪ Projects that are necessary to maintain the continued functioning of the Port Authority's assets consistent with the agency's business objectives, especially those necessary to maintain critical structural integrity and operational capability of facilities

Source: Port Authority

Although Rothschild's analysis relies on the Long Range Forecast in a consolidated context, the diverse nature of the Port Authority's operations requires a distinct due diligence review by operating division. Rothschild's due diligence for each operating division incorporated a review of forecasting methodology and underlying assumption drivers. While Rothschild's scope of work does not include a critical assessment of the Long Range Forecast, the material included herein is an important informational foundation for the capital structure and financing analysis. Rothschild's analysis and conclusions are premised on the achievement of the Long Range Forecast; actual results may vary and the impact of such variations may be material.

Operating Division: Aviation Department

Forecasting Methodology

The Aviation Department forecasts revenue streams in four primary categories: cost recovery, activity related, fixed rentals and other. Cost recovery revenues represent the largest source of income for the Aviation Department and include flight fees, monorail fees, sale of electricity and water, security and fuel fees. These revenues are realized based on long-term cost recovery agreements with airlines and other third parties and are subject to an annual audit. The cost recovery agreements provide a forecastable return on investment for capital and operating expenses and help to reduce execution risk of the Aviation Department forecast. Activity related revenue is forecasted based on estimates of passenger activity for each of the airports operated by the Aviation Department. The additional primary source of revenue for the Aviation Department is fixed rental agreements. The forecast relies on the

contractually set rents and is adjusted for staff estimates for rent increases related to terminals that are currently in planning / development stage. Other revenue, which represents approximately 2% of 2012 revenue, is estimated to remain relatively flat during the forecast period.

Principal categories of forecasted operating expenses include labor, city rent, utilities, contract services (e.g. security, customer care, snow removal, etc.), engineering and allocations. These items are forecasted to increase based on CPI projections and/or contractually known terms.

Table 5 – Aviation Department Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR %
Revenues										
Flight fees	$639	$653	$661	$671	$678	$687	$692	$691	$694	*1%*
Other Activity	791	821	840	855	892	903	919	961	981	*3%*
Fixed Rentals	682	694	684	703	736	752	750	794	815	*2%*
Other	108	125	180	249	274	288	299	303	303	*14%*
Total Revenues	2,220	2,294	2,365	2,477	2,581	2,630	2,659	2,749	2,794	*3%*
O&M Expenses										
Labor	313	327	341	351	361	372	383	395	406	*3%*
M&S costs	701	716	716	726	740	755	770	786	801	*2%*
City Rent	225	225	225	224	227	255	255	255	255	*2%*
Overhead	72	85	89	88	90	92	94	96	99	*4%*
Total O&M Expenses	1,311	1,353	1,370	1,389	1,418	1,474	1,503	1,532	1,562	*2%*
Net Revenues	**909**	**941**	**995**	**1,088**	**1,163**	**1,156**	**1,156**	**1,217**	**1,233**	*4%*
Margin %	*41%*	*41%*	*42%*	*44%*	*45%*	*44%*	*43%*	*44%*	*44%*	
Capital Expenditures	(452)	(1,103)	(1,396)	(853)	(571)	(601)	(489)	(291)	(449)	
Net Revenues less Capex	**457**	**(162)**	**(401)**	**236**	**592**	**555**	**667**	**926**	**784**	

Source: Port Authority

Capital Projects

The Aviation Department capital plan includes significant, high-profile investments during the forecast period with total investment estimated at approximately $6.2 billion. The large-scale development and modernization of the region's airports includes terminal redevelopment and runway expansion / rehabilitation at all three of the region's primary airports. In particular, the capital plan for the project at LaGuardia Airport Central Terminal is limited to costs recoverable via passenger facility charges. This capital plan is anticipated to provide additional revenue streams and system capabilities, in addition to maintaining the essential operating condition of the facilities. A summary of the capital program is outlined below.

Table 6 – Aviation Department Capital Plan ($m)

Category	Projects	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
MAND	44	$65	$131	$99	$64	$65	$91	$9	$5	$2	$531
RPP	26	72	128	206	262	265	243	193	122	265	1,755
SEC	40	35	141	156	56	16	4	--	--	--	407
SEP	63	59	127	179	94	49	74	99	59	117	855
SGR	210	221	577	757	377	175	190	188	106	66	2,657
Total	**383**	**$452**	**$1,103**	**$1,396**	**$853**	**$571**	**$601**	**$489**	**$291**	**$449**	**$6,205**

Source: Port Authority

Note: Categories include Mandatory, Revenue Producing, Security, System Enhancing and State of Good Repair

Operating Division Forecast: Port Commerce Department

Forecasting Methodology

The Port Commerce Department ("PCD") revenues are largely divided between fixed rents for land and building usage (69% of 2012 forecasted revenue) and variable revenue based on cargo throughput, cargo facility charges and fees for dockage and wharfage. In developing the Long Range Forecast, PCD staff utilized an independent container volume projection developed by forecasting firm Global Insight. The Global Insight forecast provides volume outlook by cargo type and both import and export levels by foreign country. PCD staff made certain adjustments to the Global Insight forecast to aggregate forecasted traffic by region and also align the volume outlook with observed trends. The resulting volumes were incorporated into PCD's forecasting model based on four types of volume: container, rail, auto and bulk / general cargo. These volumes determine the variable revenue outlook for PCD along with estimates for wharfage fees and dockage fees. Fixed revenue rents were forecast based on CPI estimates. Additionally PCD forecasts revenue related to cargo facility charges (based on contractual provisions) and containerized municipal solid waste. Forecasted operating expenses are developed based on guidance from the Budget Department and influenced by existing trendlines and known parameter restrictions such as the zero growth headcount policy.

Table 7 – Port Commerce Department Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR
Revenues										
Variable Rentals	$13	$14	$14	$15	$17	$18	$19	$20	$21	*6%*
Percentage Rentals	30	34	42	44	47	50	55	60	66	*10%*
Other	32	35	39	45	51	56	61	75	87	*13%*
Fixed Rentals	166	167	177	185	190	191	194	198	198	*2%*
Total Revenues	241	249	271	289	305	315	329	353	372	*6%*
O&M Expenses										
Labor	31	33	34	35	36	37	38	39	41	*3%*
M&S costs	103	86	82	79	80	82	84	86	88	*(2%)*
City Rent	19	19	19	16	16	17	17	17	17	*(1%)*
Overhead	16	20	18	19	18	19	19	20	20	*3%*
Total O&M Expenses	170	159	153	149	151	155	159	162	166	--
Net Revenues	**71**	**91**	**119**	**141**	**154**	**160**	**171**	**191**	**206**	*14%*
Margin %	*29%*	*36%*	*44%*	*49%*	*51%*	*51%*	*52%*	*54%*	*55%*	
Capital Expenditures	(346)	(301)	(177)	(157)	(113)	(126)	(113)	(83)	(87)	
Net Revenues less Capex	**(275)**	**(210)**	**(58)**	**(17)**	**41**	**34**	**57**	**108**	**119**	

Source: Port Authority

Capital Projects

The PCD capital plan is estimated at approximately $1.5 billion total cost with over 100 projects identified. Of this overall capital plan, over 60% is targeted for revenue producing and/or system enhancing projects (approximately $928 million estimated cost). The capital plan also includes significant investment state of good repair work ($432 million) and projects categorized as mandatory ($130 million). A summary of identified projects is presented below based on project category.

Table 8 – Port Commerce Department Capital Plan ($m)											
Category	**Projects**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**TOTAL**
MAND	13	$76	$14	$13	$21	$3	$1	$1	$1	$1	$130
RPP	23	167	177	73	49	18	17	21	12	8	541
SEC	5	3	8	--	--	--	--	--	--	--	11
SEP	14	49	47	28	44	53	63	45	25	33	387
SGR	32	50	55	63	43	40	45	46	45	45	432
Total	**87**	**$346**	**$301**	**$177**	**$157**	**$113**	**$126**	**$113**	**$83**	**$87**	**$1,502**

Source: Port Authority

Note: Categories include Mandatory, Revenue Producing, Security, System Enhancing and State of Good Repair

Operating Division: Tunnels, Bridges and Terminals Department

The Port Authority operates three services which together form the Interstate Transportation Network ("ITN"). The first of these departments is the Tunnels, Bridges and Terminals Department ("TB&T"). The long-term forecast for TB&T relies principally on estimated traffic volumes for the department assets and secondarily on macroeconomic variables including office employment, fuel prices, consumer spending. Estimates for these factors, along with particular explanatory variables including snowfall patterns and toll levels, are input into an econometric model in order to develop TB&T forecasts for traffic volumes. This forecast is separately developed for the four primary types of traffic: auto, bus, light truck and heavy truck. These volume forecasts drive the revenue outlook for TB&T which also includes staff estimates for EZ Pass adoption rates. Given the pricing difference between cash payment and EZ Pass, this assumption may meaningfully influence the realized revenues. A key driver of the anticipated improvement in revenues is the toll and fare increase implemented in 2011 (with increases scheduled for each year through 2015.)

Principal categories of forecasted expense include labor, overheads, maintenance/service, EZ Pass fees, engineering and insurance. These items are generally forecasted based on CPI estimates with certain items such as EZ Pass fees adjusted based on contractual estimates.

Table 9 – TB&T Department Forecast ($m)	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR
Revenue										
Toll and Fare	$1,329	$1,449	$1,574	$1,727	$1,886	$1,896	$1,877	$2,075	$2,105	*6%*
Other Activity	25	26	26	27	27	28	28	29	30	*2%*
Fixed Rentals	19	21	25	25	25	26	27	27	28	*5%*
Total Revenues	1,373	1,496	1,625	1,779	1,939	1,950	1,932	2,131	2,162	*6%*
O&M Expenses										
Labor	$191	$200	$205	$210	$216	$221	$226	$232	$238	*3%*
M&S costs	145	156	153	155	160	164	169	174	180	*3%*
Overhead	58	61	72	74	76	77	79	81	83	*5%*
Other	8	9	9	9	9	9	22	22	22	*13%*
Total O&M Expenses	402	426	439	448	460	472	496	509	523	*3%*
Net Revenues	**972**	**1,071**	**1,185**	**1,331**	**1,479**	**1,479**	**1,435**	**1,622**	**1,638**	*7%*
Margin %	*71%*	*72%*	*73%*	*75%*	*76%*	*76%*	*74%*	*76%*	*76%*	
Capital Expenditures	(626)	(756)	(923)	(945)	(1,023)	(713)	(574)	(459)	(506)	
Net Revenues less Capex	**346**	**315**	**262**	**386**	**455**	**766**	**861**	**1,162**	**1,132**	

Source: Port Authority

TB&T Capital Plan

The capital investment plan for the TB&T Department includes over 200 identified projects including several multi-year state of good repair projects designed to renew the critical infrastructure assets managed by TB&T. Significant projects include (i) structural modifications to the Bayonne Bridge, (ii) infrastructure projects at the Lincoln Tunnel to accommodate increasing traffic volumes and reduce congestion and (iii) state of good repair work with the George Washington Bridge required due to the useful life of the bridge infrastructure. The TB&T capital investment plan also incorporates anticipated capital savings from a contemplated PPP structure for the Goethals Bridge modernization project. A summary of the TB&T capital plan is presented below.

Table 10 – TB&T Department Capital Plan ($m)											
Category	**Projects**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**TOTAL**
MAND	9	$4	$2	$1	--	--	--	--	--	--	$8
RPP	2	35	38	25	22	5	--	--	--	--	126
SEC	21	11	29	29	7	4	--	--	--	--	80
SEP	14	14	21	119	233	330	384	303	92	14	1,511
SRP	3	343	353	376	375	353	--	--	--	--	1,800
SGR	157	217	313	372	308	331	329	272	367	492	3,001
Total	**206**	**$626**	**$756**	**$923**	**$945**	**$1,023**	**$713**	**$574**	**$459**	**$506**	**$6,525**

Source: Port Authority

Note: Categories include Mandatory, Revenue Producing, Security, System Enhancing and State of Good Repair

Operating Division: PATH Department

In addition to the TB&T Department, the ITN includes the PATH Department which provides rail service between Hoboken / Jersey City / Newark, New Jersey and Manhattan. The PATH long-term forecast relies on ridership forecasts to estimate revenues and gauge customer service and capital investment needs. Beginning in 2009, PATH developed a detailed statistical forecasting model for estimating ridership based on economic development, demographic trends, observed travel patterns and key Port

Authority infrastructure projects including the completion of One WTC and development / growth of the areas in the immediate vicinity of PATH stations.

The PATH operation is forecasted to continue generating operating losses throughout the forecast period with costs substantially exceeding revenues despite record ridership in recent years. Difficulty with increasing fares as well as an underlying infrastructure with maintenance requirements determined by federal regulation contribute to the profitability challenges experienced by PATH. Total funding requirements are further compounded by ongoing capital investment needs principally related to State of Good Repair projects. PATH's forecasted deficit is consistent with financial performance of other mass transit rail operators as indicated herein on page 31.

Table 11 – PATH Department Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR
Revenues										
Tolls and Fares	$136	$156	$177	$195	$215	$230	$247	$264	$280	*9%*
Percentage Rentals	3	3	3	3	3	3	3	3	3	*2%*
Fixed Rentals	1	1	1	1	1	1	2	2	2	*3%*
Other	1	1	1	1	1	1	1	1	1	--
Total Revenues	141	161	182	200	220	236	253	269	285	*9%*
O&M Expenses										
Labor	169	177	184	189	194	198	203	208	214	*3%*
M&S costs	71	77	77	79	81	83	85	87	89	*3%*
Overhead	19	19	20	21	21	22	22	23	23	*3%*
Total O&M Expenses	259	272	281	288	295	303	310	318	326	*3%*
Net Revenues	**(118)**	**(111)**	**(100)**	**(89)**	**(76)**	**(67)**	**(57)**	**(49)**	**(40)**	*(13%)*
Margin %	*(84%)*	*(69%)*	*(55%)*	*(44%)*	*(34%)*	*(28%)*	*(23%)*	*(18%)*	*(14%)*	
Capital Expenditures	(351)	(327)	(289)	(299)	(375)	(357)	(278)	(257)	(121)	
Net Revenues less Capex	**(470)**	**(439)**	**(388)**	**(387)**	**(450)**	**(424)**	**(336)**	**(305)**	**(161)**	

Source: Port Authority

PATH Capital Plan

Table 12 – PATH Department Capital Plan ($m)

Category	Projects	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
MAND	3	$5	$7	$9	$36	$45	$31	$33	--	--	$165
RPP	0	--	--	--	--	--	--	--	--	--	--
SEC	16	85	51	37	27	32	43	39	42	10	367
SEP	13	13	28	36	55	82	71	82	82	17	467
SGR	84	249	241	207	180	215	213	124	132	94	1,655
Total	**116**	**$351**	**$327**	**$289**	**$299**	**$375**	**$357**	**$278**	**$257**	**$121**	**$2,654**

Source: Port Authority

Note: Categories include Mandatory, Revenue Producing, Security, System Enhancing and State of Good Repair

A summary of the long-term forecast for the ITN (including the TB&T Department, the PATH Department and the Ferry operation) is presented below for reference purposes.

Table 13 – ITN Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR
Revenues										
Tolls and Fares	$1,465	$1,605	$1,751	$1,922	$2,101	$2,127	$2,124	$2,339	$2,384	*6%*
Other Activity	25	26	26	27	27	28	28	29	30	*2%*
Percentage Rentals	3	3	3	3	3	3	3	3	3	*2%*
Fixed Rentals	20	23	26	26	27	27	28	29	29	*5%*
Other	1	1	1	1	1	1	1	1	1	*(2%)*
Total Revenues	$1,514	$1,657	$1,806	$1,979	$2,159	$2,186	$2,185	$2,400	$2,447	*6%*
O&M Expenses										
Labor	$361	$377	$389	$399	$409	$419	$430	$441	$452	*3%*
M&S costs	216	232	230	233	241	247	254	261	269	*3%*
Overhead	77	81	92	95	97	99	101	104	106	*4%*
Other	8	9	9	9	9	9	22	22	22	*13%*
Total O&M Expenses	661	698	721	736	756	774	807	827	849	*3%*
Net Revenues	**853**	**959**	**1,086**	**1,243**	**1,403**	**1,412**	**1,378**	**1,573**	**1,598**	*8%*
Margin %	*56%*	*58%*	*60%*	*63%*	*65%*	*65%*	*63%*	*66%*	*65%*	
Capital Expenditures	(977)	(1,083)	(1,211)	(1,244)	(1,398)	(1,070)	(853)	(716)	(627)	
Net Revenues less Capex	**(124)**	**(124)**	**(126)**	**(1)**	**5**	**342**	**525**	**857**	**971**	

Operating Division: World Trade Center Department ("WTC")

The long-term forecast for the WTC exhibits a ramp up in revenue generation due to the current state of the redevelopment project. Rental revenue first reaches the long-term level in 2017. This rental forecast is developed by WTC staff with input from private sector market participants to gauge the reasonability of the estimated rental rates. Additionally, the WTC forecast incorporates a financial overlay for the retail joint venture with Westfield and 1 World Trade Center joint venture with Durst. In developing the long-term forecast, WTC staff have identified upside and downside sensitivities, with the primary distinction being the timetable for occupancy and therefore ramp up in revenue collections. Given the ongoing construction during the forecast period, the WTC financial outlook includes near-term operating losses as the site comes online with operating profits projected for the 2016 and onward period and cashflow profitability beginning in 2017.

Table 14 – WTC Department Forecast ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	CAGR %
Revenues										
Variable rentals	$5	$5	$7	$21	$25	$27	$29	$30	$31	*26%*
Fixed rentals	10	11	16	17	17	18	19	21	20	*8%*
Intercompany rent	4	--	61	144	219	282	302	309	319	*74%*
WT / NLC Net Leases	29	23	37	35	25	(4)	(2)	20	28	*(1%)*
Total Revenues	48	39	121	217	286	323	347	380	397	*30%*
O&M Expenses										
Labor	15	16	17	17	18	18	18	19	19	*3%*
M&S Costs	38	53	72	74	76	78	80	82	84	*11%*
Rent	6	2	23	5	6	7	8	9	9	*5%*
PILOTs	10	21	36	78	94	96	98	101	103	*34%*
Overhead	3	3	3	3	3	3	4	4	4	*3%*
Other	0	15	38	90	76	82	95	97	101	*238%*
Total O&M Expenses	72	111	190	267	273	284	303	311	320	*21%*
Net Revenues	**(23)**	**(71)**	**(69)**	**(50)**	**13**	**38**	**45**	**69**	**77**	*NM*
Margin %	*(48%)*	*NM*	*(57%)*	*(23%)*	*5%*	*12%*	*13%*	*18%*	*19%*	
Capital Expenditures	(2,431)	(2,453)	(1,803)	(586)	(203)	(100)	(31)	(135)	(135)	
Net Revenues less Capex	**(2,454)**	**(2,524)**	**(1,872)**	**(636)**	**(190)**	**(62)**	**14**	**(66)**	**(57)**	

Source: Port Authority

Table 15 – WTC Department Capital Plan ($m)

Category	Projects	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
MAND	17	$1,224	$1,575	$1,483	$570	$193	$93	$29	$135	$135	$5,437
RPP	4	923	714	284	16	10	7	2	--	--	1,956
SEC	1	226	117	--	--	--	--	--	--	--	343
SEP	1	17	5	--	--	--	--	--	--	--	22
SRP	1	41	41	36	--	--	--	--	--	--	119
SGR	--	--	--	--	--	--	--	--	--	--	--
Total	**24**	**$2,431**	**$2,453**	**$1,803**	**$586**	**$203**	**$100**	**$31**	**$135**	**$135**	**$7,876**

Source: Port Authority

Note: Categories include Mandatory, Revenue Producing, Security, System Enhancing, Regional and State of Good Repair

Consolidated Bond Structure: Background and description

The roots of the Port Authority's existing capital structure date to 1925 when the Port Authority issued its first series of bonds. In 1931, the General Reserve Fund was established to coordinate and combine revenue flow from the various assets operated by the Port Authority. In 1935, the General and Refunding Bond Program was established which built upon the organization of the General Reserve Fund with the Lincoln Tunnel being the first project financed thereunder.

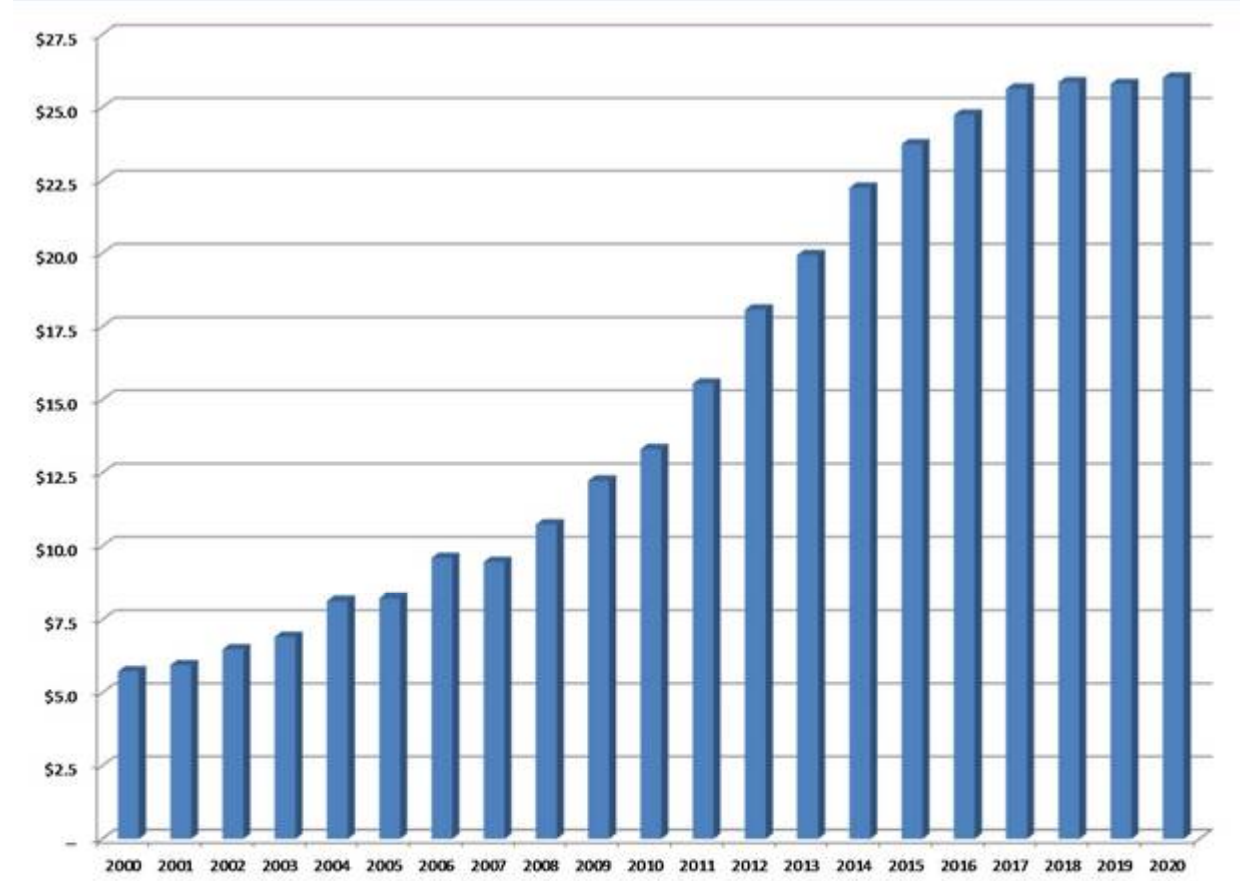
The Consolidated Bond program was instituted in 1952 and since that time has served as the primary method of general financing for the Port Authority. As outlined in the Consolidated Bond Resolution, the Port Authority may issue Consolidated Bonds for broad purposes[1] subject to the satisfaction of the Net Revenues Test (as referenced above). Additionally, issuance of Consolidated Bonds in connection with additional facilities requires multiple certifications stating that such issuance will not (i) adversely impact the sound credit standing of the Port Authority, (ii) adversely impact the investment status of the Consolidated Bonds, (iii) materially impair the ability of the Port Authority to fulfill its commitments (whether statutory or contractual) including its obligations to holders of previously existing Consolidated Bonds.

Consolidated Bonds are equally and ratably secured by a pledge of the net revenues of all existing facilities of the Port Authority and any additional facility which may be financed in whole or in part by Consolidated Bonds in the future. Consolidated Bonds are further secured by a pledge of the Consolidated Bond Reserve Fund and by a pledge of the General Reserve Fund, in that case such pledge is pari passu with other obligations which have a pledge of the General Reserve Fund.

As the primary source of debt funding, the Consolidated Bond Program has grown meaningfully in recent years as the level of Port Authority capital investment has substantially increased in connection with the redevelopment of the World Trade Center site and other large scale Port Authority infrastructure projects. Indebtedness under the program has risen from approximately $5.7 billion in 2000 to a current level of $15.5 billion (as of December 31, 2011). The Long Range Forecast anticipates additional issuance with total outstanding Consolidated Bonds reaching $26 billion in 2020 (see next page Figure 1).

[1] Authorized purposes defined as purposes for which pledges of the General Reserve Fund are permitted.

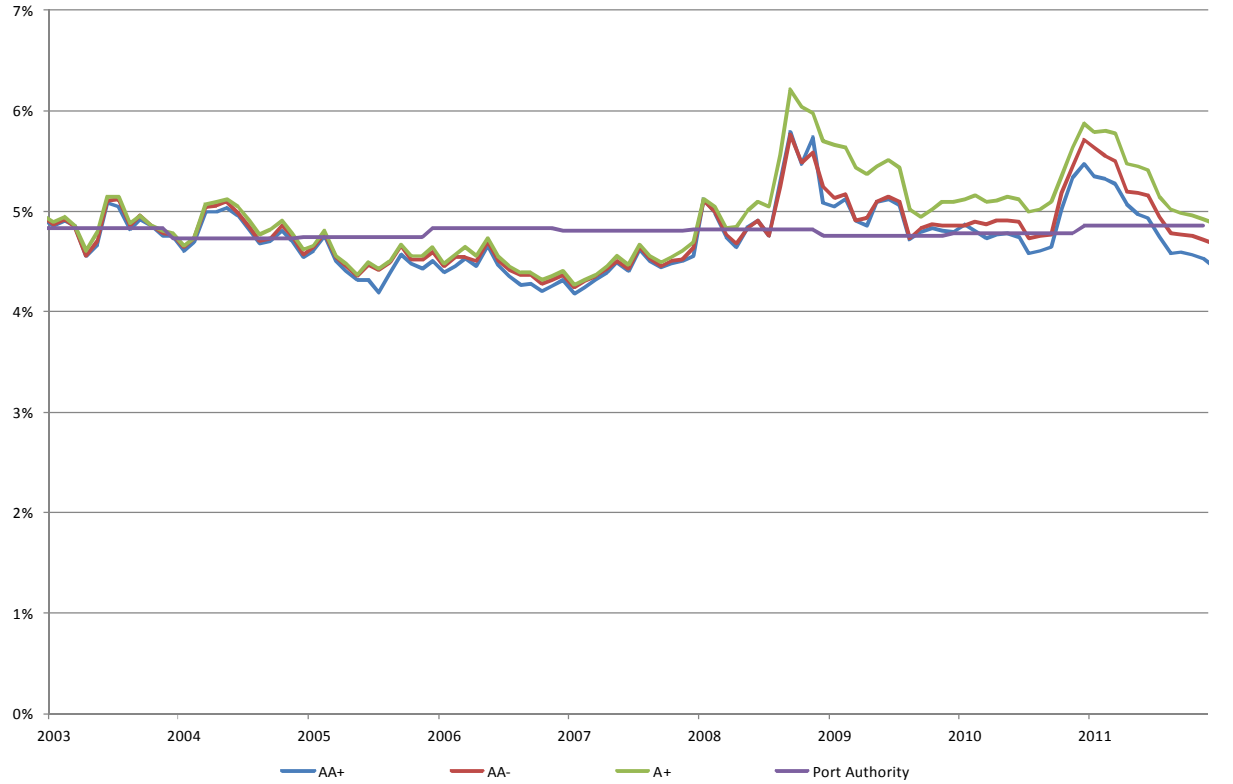
Figure 1 – Consolidated Bonds Outstanding: 2000 – 2020 ($bn)



Source: Port Authority

Despite the increase in outstanding debt obligations, the Port Authority has been successful in maintaining its credit rating and as a result maintaining a relatively consistent cost of debt. Benchmarked against municipal bond indices for A and AA ratings, the Port Authority's overall interest cost has registered a high degree of stability with average borrowing costs lower than the overall market during the volatile period since 2008 (see Figure 2 on following page). This attractive financing cost has been achieved with a combination of taxable and tax-exempt issuances even as the municipal index comparison is composed of predominantly tax-exempt issuances.

Figure 2 – Municipal Yields vs. Port Authority Cost of Debt: 2003 – 2011



Source: Bloomberg, Port Authority

Note: Municipal bond yields based on 30 year Transportation Industry Revenue Obligation bonds

Commentary from credit rating agencies provides insight into the Port Authority's attractive cost of debt versus market benchmarks. Recent reports emphasize the credit strength from the consolidated nature of the financing underpinned by a "stable revenue base" from "an expansive, diverse portfolio of transportation and commerce related assets".

Table 16 – Credit Rating Considerations

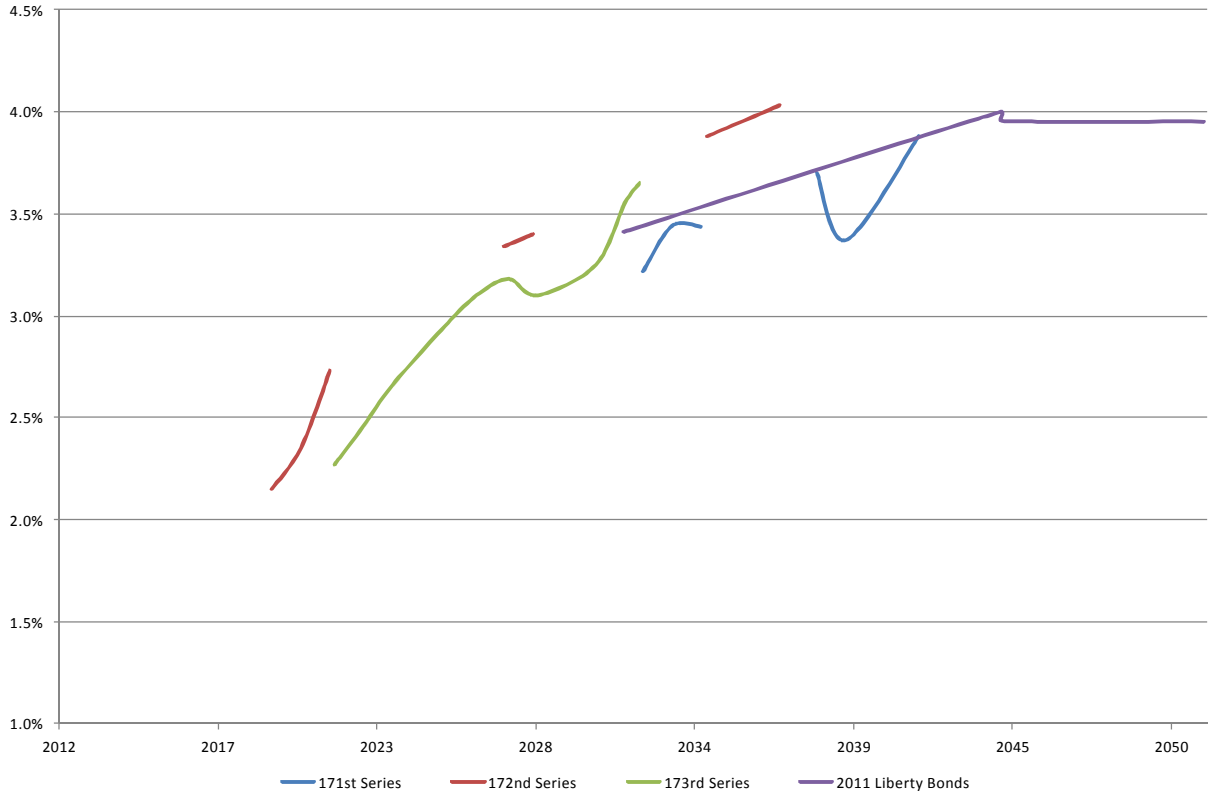
Rating Drivers – Strengths	Fitch	Moody's	S&P
Critical nature of infrastructure assets	✓	✓	✓
Stable revenue base	✓	✓	✓
Rate-setting flexibility	✓	✓	
Leverage levels and coverage ratios	✓		✓
Fixed rate capital structure	✓		
Large reserve balance		✓	✓
Strong financial performance		✓	✓

Source: Fitch Ratings credit report (June 8, 2012); Moody's credit report (June 11, 2012) and Standard and Poor's credit report (June 12, 2012)

This "diverse portfolio" credit strength contrasts with the credit rating methodology of the 2011 Liberty Bonds. Based on the subordinated position of the Liberty Bonds, the issuance is notched below the current rating of the Port Authority and the New York City General Obligation ("GO") rating. Moody's notes "we based the rating on the credit characteristics of the revenues available for debt service. . .

According to our criteria, should either the consolidated bond or GO bond rating change, the rating on the 2011 bonds will continue to be a notch below the lower of the two ratings."[2] Despite the lower notch credit rating, the current market yield for 2011 series Liberty Bonds is not meaningfully more costly than recent consolidated bond issuances of similar term.

Figure 3 – Comparison of Implied Yield Curve: Recent Consolidated Bond Issues vs. Liberty Bonds



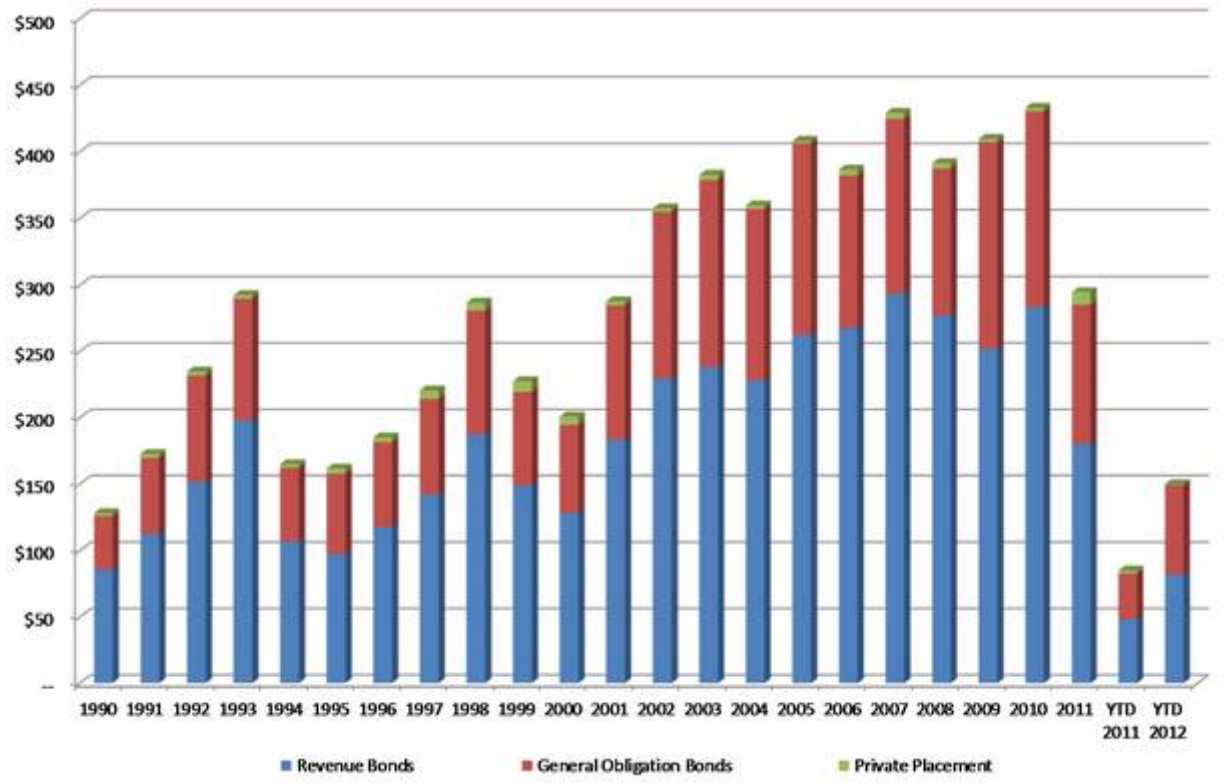
Source: Bloomberg

[2] Source: Standard and Poor's. "Port Authority of New York & New Jersey; Appropriations; CP; Note; Ports/Port Authorities", June 12, 2012.

Municipal market trends

Municipal bond issuance in 2012 has resumed strongly after relatively lower volume activity in 2011. Year to date issuance volume for Revenue bonds was $82.1 billion, an increase of 71% versus the year ago period. Similarly, year to date General Obligation bond volume of $67.1 billion represents an increase of 94% versus prior year. Issuance for new capital continues to grow the market, representing $55.2 billion of year-to-date issuance. The cessation of the Build America Bond program has reduced volume of taxable issuance markedly versus the expanded levels seen in 2008-2009. Long-term issuance trends are illustrated below; notably 2011 represented the lowest total issuance volume since 2001.

Figure 4 – Municipal Bond Issuance: 1990 – Current ($bn)



Source: Securities Industry and Financial Markets Association

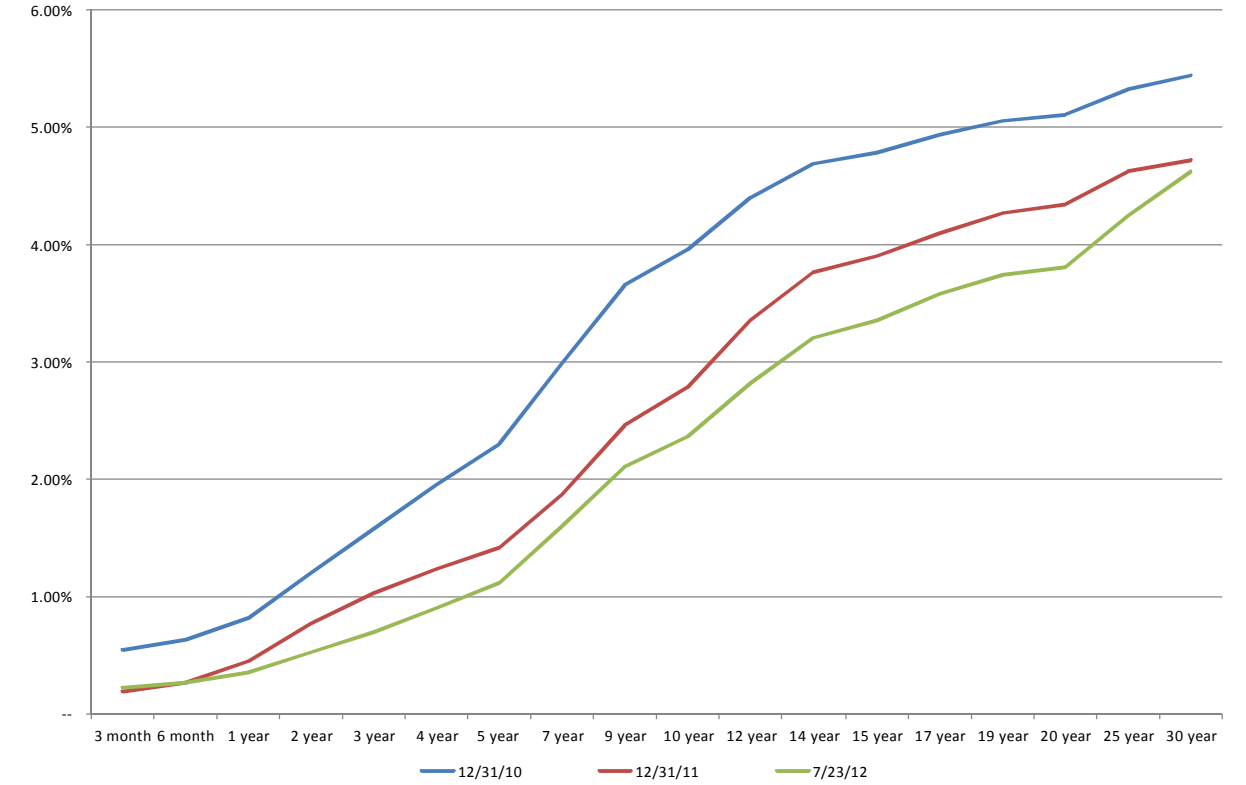
Investor flow into the municipal market has also returned to positive net inflows during the last nine months after registering sizeable outflows in 2010 and early 2011.

Figure 5 – Municipal Bond Market: Net Inflow / (Outflow) ($bn)

Source: Investment Company Institute

These net flow dynamics have pushed the market to an effective net demand position and therefore provided downward pressure on market yields. The chart below illustrates the tightening yield curve for representative Transportation Industry Revenue Bonds with rating AA-; yields have tightened by 0.33% at the shortest term with the most contraction occurring at the 10 year mark by 1.60%.

Figure 6 – Municipal Bond Yield Curve: AA- Transportation Revenue Bonds



Source: Bloomberg

Although current market dynamics are relatively strong, market sentiment continues to be impacted by uncertainty regarding federal and state policy. The Obama Administration's fiscal 2013 included several provisions potentially impacting municipal debt including (i) limiting tax exemption for individual filers to 28% and (ii) the extension and expansion of the Build America Bond program. These potential policy changes, among other less significant items, continue to occupy the municipal bond headlines with as of yet little visibility on potential resolution.

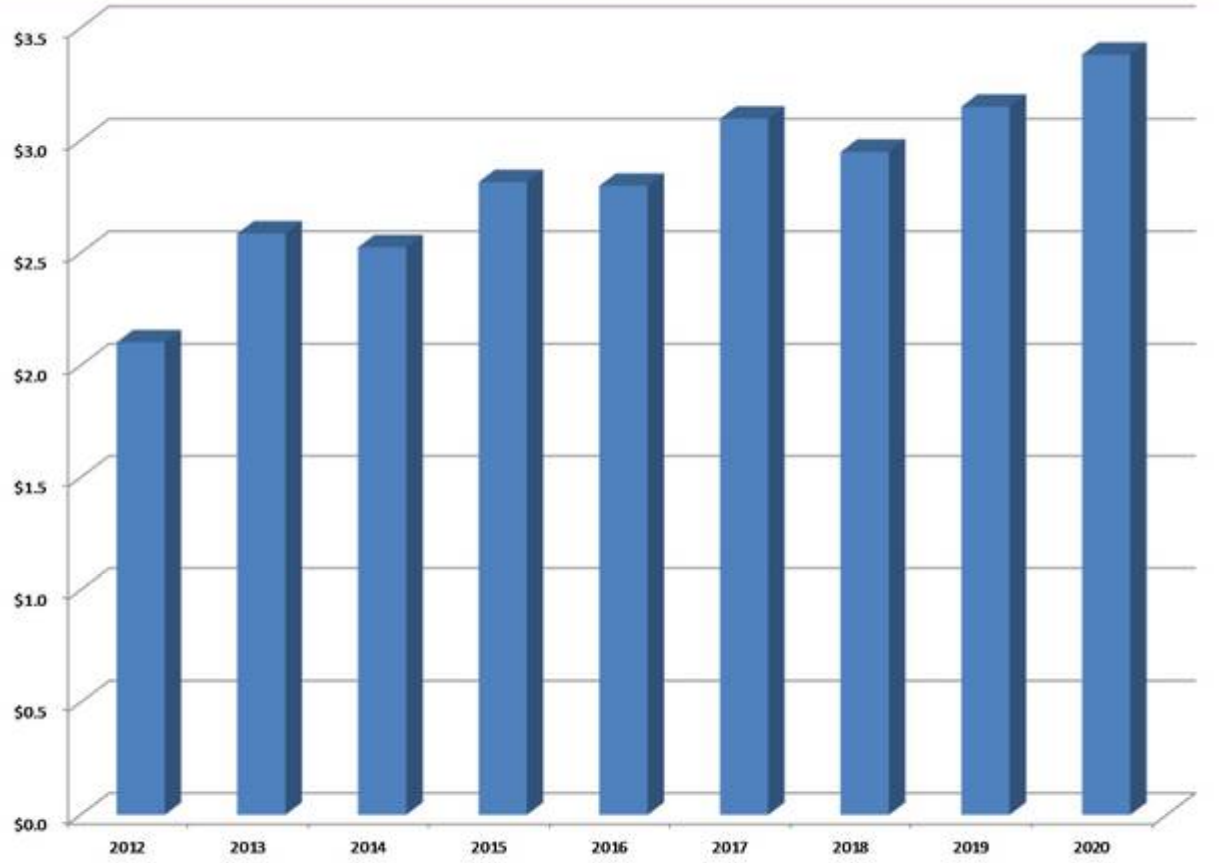
In addition to ongoing tax policy uncertainty, several recent municipal bankruptcies in California have sparked discussion regarding the perceived low risk nature of municipal investments. Despite this recent uptick, the strong technical fundamentals in the market have not been meaningfully offset due to (i) the relatively small debt implicated in the bankruptcies, (ii) widespread anticipation of the larger defaults (e.g. Jefferson County) and (iii) expectation of minimal creditor impairment.

Capitalization Forecast

The Long Range Forecast incorporates Port Authority staff estimates for financing of capital investment from a variety of sources including issuances of Consolidated Bonds (primary capital source), proceeds from passenger facility charges, grants and capital inflows from joint venture agreements. Rothschild evaluated this forecast from both the perspective of forecasted liquidity as well as achievement of financial covenant compliance, in particular, compliance with the terms of the Consolidated Bond Structure. The analysis herein assumes successful achievement of the Long Range Forecast; actual results may vary and the impact of such variations may be material.

The Port Authority liquidity outlook is a multi-stage calculation including (i) forecasted net revenues, (ii) reserves in excess of the General Reserve Fund requirement, (iii) anticipated debt service, (iv) capital investment and (v) forecasted capital raising. As illustrated in Figure 7 below, the Long Range Forecast anticipates maintaining $2 billion or greater liquidity throughout the projection period.

Figure 7 – Liquidity Forecast ($bn)



Source: Port Authority

In terms of covenant compliance, the Port Authority is subject to four primary financial tests based on terms of the Consolidated Bond Structure, provisions of the Versatile Structure Obligations ("VSOs") program and applicable statutes. These include:

Table 17 – Overview of Financial Tests

Financial Test	Type	Description
General Reserve Requirement	Statutory requirement	General Reserve Fund balance of at least 10% of applicable debt
Net Revenues Test – Consolidated Bond Issuance	Test for permitted Consolidated Bond issuance	Net Revenues [(1)] of at least 1.30x future maximum debt service for the Consolidated Bonds then outstanding
Net Revenues Test – VSO Issuance	Test for permitted VSO issuance	Net Revenues of at least 1.15x future maximum debt service for total debt [(2)]
Maximum VSO Debt	Test for permitted VSO issuance	VSO Debt of no more than 25% of total debt [(3)]

Notes:

(1) Net Revenues measured as peak 12 month level during prior 3 year period.
(2) For purposes of calculation, Total Debt excludes commercial paper.
(3) Excludes Special Project Bonds, Commercial Paper and Port Authority Equipment Notes.

General Reserve Requirement

Based on applicable statute, the Port Authority is required to maintain a General Reserve Fund in the amount of 10% of the par value of applicable debt outstanding. Based on the Long Range Forecast, the Port Authority continues to satisfy this requirement throughout the forecast period, as illustrated below.

Table 18 – Forecasted General Reserve Fund Test ($m)[(1)]

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Projected applicable debt	$20,283	$22,090	$24,333	$25,739	$26,714	$27,538	$27,681	$27,531	$27,672
Reserve level	10%	10%	10%	10%	10%	10%	10%	10%	10%
Implied General Reserve	$2,028	$2,209	$2,433	$2,574	$2,671	$2,754	$2,768	$2,753	$2,767
Forecasted total reserves	$3,545	$3,831	$3,817	$3,946	$4,358	$4,486	$4,445	$4,457	$4,645
Cushion - $	$1,516	$1,622	$1,384	$1,372	$1,687	$1,732	$1,676	$1,704	$1,878

Source: Port Authority

Notes:

(1) Long Range Forecast adjusted as necessary in order to optimize mix of debt and equity used to finance the Port Authority's capital program. Current forecast based on 60% appropriated reserves / 40% cash

Net Revenues Test – Consolidated Bond Issuance

Based on the originating statute establishing the Consolidated Bond Structure, the Port Authority is limited in its ability to issue additional Consolidated Bonds based on a test of (i) net revenues from projects subject to the Consolidated Bonds versus (ii) estimated maximum debt service cost for the

Consolidated Bonds outstanding following the proposed issuance. The level of the test is set at a 1.30x requirement which provides a 30% extra coverage above the forecasted need. The effect of the test is to require sufficient historical financial performance to satisfy future financing obligations. This may be operationally limiting in a circumstance of needed capital investment to drive long-term development as the benefit to financial performance is primarily in the future period and may not be captured in the calculation of the covenant ratio. Additionally, to the extent the capital investment is not anticipated to generate additional revenue (e.g. maintenance, certain state of good repair projects), the ability to maintain the 1.30x ratio may be impacted.

With recent capital investment levels for the Port Authority significantly in excess of "normal" levels, the Long Range Forecast demonstrates both of these dynamics. As a result, the projected ratio is moderately strained in the early years of the projection period as incremental revenue projects are starting to come online. Given the importance of the Consolidated Bond Structure, the maintenance of this issuance covenant functions as a key component of financing strategy for the Port Authority and sets an "upper limit" on its traditional financing source.

Table 19 – Forecasted Consolidated Bond Net Revenues Test ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net revenues (1)	$2,270	$2,521	$2,750	$2,859	$3,046	$3,144	$3,144	$3,144	$3,347
Future max debt service (2)	1,399	1,518	1,667	1,780	1,858	1,930	1,971	2,010	2,062
Implied service multiple	1.62 x	1.66 x	1.65 x	1.61 x	1.64 x	1.63 x	1.60 x	1.56 x	1.62 x
Level for Issuance Test	1.30 x	1.30 x	1.30 x	1.30 x	1.30 x	1.30 x	1.30 x	1.30 x	1.30 x
Cushion - Net Revenues $	$452	$547	$582	$546	$631	$636	$582	$531	$666
Cushion - % of Net Revenues	20%	22%	21%	19%	21%	20%	19%	17%	20%

Source: Port Authority

Notes

(1) For purposes of this calculation, net revenues is based on peak 12 month net revenues during the prior 3 year period.

(2) Future maximum debt service is limited to debt service of the Consolidated Bonds for purposes of the ratio.

Net Revenues Test – VSO Issuance

In addition to the Consolidated Bond Program, the Port Authority established an issue of special obligations known as Port Authority Versatile Structure Obligations in 1992. The resolution establishing the VSO program includes a Net Revenues Test similar in construct to the Net Revenues Test contained in the Consolidated Bond Program. In order to issue additional VSOs, the Port Authority must satisfy a test of 1.15x based on the ratio of (a) net revenues versus (b) maximum future debt service for all debt which is secured by net revenues excluding commercial paper. The broader scope of the debt service, as compared to the Consolidated Bond Net Revenue Test, results in lower projected metrics. However, the lower 1.15x threshold results in substantial capacity to satisfy the test as illustrated below. Nonetheless, the Long Range Forecast does not indicate further issuance of VSOs, with the most recent issue having been fully repaid in 2011.

Table 20 – Forecasted VSO Net Revenues Test	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net revenues [1]	$2,270	$2,521	$2,750	$2,859	$3,046	$3,144	$3,144	$3,144	$3,347
Debt service [2]	1,478	1,610	1,768	1,897	1,994	2,105	2,155	2,194	2,247
Implied service multiple	1.54 x	1.57 x	1.55 x	1.51 x	1.53 x	1.49 x	1.46 x	1.43 x	1.49 x
Level for Issuance Test	1.15 x	1.15 x	1.15 x	1.15 x	1.15 x	1.15 x	1.15 x	1.15 x	1.15 x
Cushion - Net Revenues $	$570	$670	$716	$678	$753	$724	$666	$621	$764
Cushion - % of Net Revenues	25%	27%	26%	24%	25%	23%	21%	20%	23%

Source: Port Authority

Notes

(1) For purposes of this calculation, net revenues is based on peak 12 month net revenues during the prior 3 year period.

(2) Future maximum debt service excludes debt service related to Commercial Paper.

Maximum Variable Rate Debt

In addition to the Net Revenues Test described above, the VSO program also requires issuance be limited such that total variable rate debt does not exceed 25% of total Port Authority debt. Although a contractual requirement, this test does not present a practical limitation due to the tighter restriction imposed by the Net Revenues Test.

Table 21 – Forecasted Variable Rate Debt % ($m)	2012	2013	2014	2015	2016	2017	2018	2019	2020
Variable Rate Debt	$451	$451	$451	$451	$451	$451	$451	$451	$451
Total Debt	20,283	22,090	24,333	25,739	26,714	27,538	27,681	27,531	27,672
% of Total Debt	2%	2%	2%	2%	2%	2%	2%	2%	2%
Maximum %	25%	25%	25%	25%	25%	25%	25%	25%	25%

Source: Port Authority

Although the Port Authority has wide latitude for variable rate issuance under the VSO test, the current market environment favors fixed rate issuance in order to lock-in historically low borrowing costs. Consistent with the broader fixed income market, municipal bond yields are at or near all-time lows across a variety of indices (see Figure 8 on following page).

Figure 8 – Municipal Bond Yields: 2000 to Present

Although the current long-term rate environment is highly favorable, shorter term, variable rate financing may be considered within the overall financing strategy of the Port Authority:

Table 22 – Variable Rate Financing: Benefits and Considerations

Benefits	Considerations
▪ Lowest current cost of borrowing in the short-term variable rate market ▪ Balanced risk exposure to municipal market yield curve	▪ Short-term variable and fixed rate yield curves have approximately converged ▪ Ability to refinance cost effectively is essential to avoid adverse rate spike (e.g. auction rate securities market risk) ▪ Port Authority capital investment and returns are inherently geared toward long-term horizon

Credit Rating Agency Considerations

In addition to managing the statutory and contractual financial tests, the Port Authority's financing strategy is operated to maintain its strong AA- credit rating which involves additional debt ratios based on credit rating agency input. Primary credit ratio benchmarks are identified below. These ratios, along with the financial covenant tests, are instructive in assessing the Port Authority's theoretical debt capacity. A multi-ratio benchmarking analysis is included at the end of this section.

Table 23 – Overview of Credit Rating Agency Metrics

Financial Metric	Description
Debt Service Coverage	▪ Ratio of Net Operating Revenues and Financial Income versus Bonded Debt Service. Targeted level of 1.8x or greater
Total Obligations / Gross Revenues	▪ Ratio of Total Obligations [(1)] versus Gross Revenues. Targeted level of 5.0x or less
Coverage of Next 2 Years Debt Service	▪ Sum of the General Reserve Fund and Consolidated Bond Reserve Fund to be in excess of the currently outstanding Consolidated Bonds' projected interest and principal payments for the coming 2 year period [(2)]
Consolidated Bond Reserve Minimum	▪ Minimum balance of $750 million

Notes

(1) Excludes Special Project Bonds

(2) Debt service measurement limited to Consolidated Bonds

Credit Rating Metric: Debt Service Coverage

The Debt Service Coverage metric assesses the Port Authority's ability to fund debt service as measured by current year interest (excluding capitalized interest and interest paid from reserves) and principal payments based on inflows from net revenues and financial income. As illustrated below, the Long-Term Forecast indicates an ability to satisfy this ratio at the 1.8x level.

Table 24 – Forecasted Debt Service Coverage ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net Operating Revenues	$1,558	$1,688	$1,904	$2,188	$2,502	$2,553	$2,532	$2,832	$2,894
Financial Income	40	55	58	79	110	138	161	161	167
Subtotal	1,598	1,743	1,963	2,267	2,612	2,691	2,693	2,993	3,061
Bonded Debt Service	725	748	932	1,124	1,269	1,368	1,460	1,638	1,550
Forecasted Ratio	2.2 x	2.3 x	2.1 x	2.0 x	2.1 x	2.0 x	1.8 x	1.8 x	2.0 x
Target Level	1.8 x	1.8 x	1.8 x	1.8 x	1.8 x	1.8 x	1.8 x	1.8 x	1.8 x
Cushion $	$163	$220	$158	$135	$182	$127	$35	$25	$150
Cushion %	10.2%	12.6%	8.1%	6.0%	7.0%	4.7%	1.3%	0.8%	4.9%

Credit Rating Metric: Total Obligations / Gross Revenues

The credit rating agencies also examine overall relative indebtedness via the Total Obligations / Gross Revenues metric. For purposes of this calculation, Total Obligations is broadly defined including (i) Consolidated Bonds, (ii) Consolidated Notes, (iii) VSOs, (iv) Variable Rate Master Notes, (v) Commercial Paper and (vi) the Port Authority Equipment Notes. The Long-Term Forecast manages the debt balance below the 5.0x target level. As discussed in the review of the Long-Term Forecast, the early years of the projection period are impacted by above long-term levels of capital investment and do not yet benefit from the full ramp up level of revenues at critical redevelopment projects including the World Trade Center site. As a result, the Total Obligations / Gross Revenues metric has less cushion in the early part of the projection.

Table 25 – Forecasted Total Obligations / Gross Revenues Ratio ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Obligations	$18,607	$20,485	$22,803	$24,288	$25,323	$26,210	$26,435	$26,380	$26,593
Gross Revenue	4,119	4,335	4,662	5,061	5,431	5,557	5,626	5,989	6,119
Forecasted Ratio	4.5 x	4.7 x	4.9 x	4.8 x	4.7 x	4.7 x	4.7 x	4.4 x	4.3 x
Target Level	5.0 x	5.0 x	5.0 x	5.0 x	5.0 x	5.0 x	5.0 x	5.0 x	5.0 x
Cushion $	$1,989	$1,188	$507	$1,019	$1,834	$1,577	$1,692	$3,565	$4,000
Cushion %	10.7%	5.8%	2.2%	4.2%	7.2%	6.0%	6.4%	13.5%	15.0%

Credit Rating Metric: Coverage of Next 2 Years Debt Service

The Port Authority's strong credit rating is supported by its substantial capital reserves. The relative strength of the reserves is measured versus the forecasted Consolidated Bond debt service for the forward-looking 2 year period. The Long-Term Forecast projects the Port Authority will maintain this level of reserves with the cushion reaching a low point in 2014. This metric improves steadily thereafter due in part to the ramp up in revenues from the World Trade Center.

Table 26 – Forecasted Coverage of Next 2 Years Debt Service ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forecasted Reserve	$3,545	$3,831	$3,817	$3,946	$4,358	$4,486	$4,445	$4,457	$4,645
2 Years Debt Service	2,232	2,500	2,823	3,072	3,263	3,566	3,625	3,539	3,609
Cushion $	$1,313	$1,331	$994	$874	$1,096	$920	$820	$918	$1,036
Cushion %	37.0%	34.8%	26.0%	22.1%	25.1%	20.5%	18.4%	20.6%	22.3%

Credit Rating Metric: Consolidated Bond Reserve Minimum

In addition to the metrics discussed above, the Port Authority targets a Consolidated Bond Reserve Fund (the "CBRF") of at least $750 million due in part to support the organization's $500 million commercial paper program which thereby avoids the expense of a third-party liquidity facility. The Long-Term Forecast estimates the CBRF in excess of the $750 million level in each year of the projection.

Table 27 – Consolidated Bond Reserve Minimum ($m)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forecasted CBRF	$1,516	$1,622	$1,384	$1,372	$1,687	$1,732	$1,676	$1,704	$1,878
Target Level	750	750	750	750	750	750	750	750	750
Cushion $	$766	$872	$634	$622	$937	$982	$926	$954	$1,128
Cushion %	50.5%	53.8%	45.8%	45.3%	55.5%	56.7%	55.3%	56.0%	60.1%

Ratio Analysis: Implied Debt Capacity

Analyzed in a coordinated context, the applicable financial covenants and credit rating metrics provide insight into the achievable debt capacity of the Port Authority. As summarized below, the Long-Term Forecast indicates debt capacity is predominantly most restricted based on the Total Obligations / Gross Revenues ratio (credit rating agency metric). The analysis indicates debt capacity modestly above the projection funding level with the smallest cushion in 2014 at approximately $500 million (equivalent to $100 million revenue based on the 5x metric). An important consideration related to this test is the benefit the Port Authority receives from the toll and fare increase implemented in 2011. Absent the revenues from the toll and fare increase, the Long-Term Forecast indicates a shortfall versus the target credit tests (in particular the Total Obligations / Gross Revenues metric) which may in turn risk the stability of the Port Authority's credit rating and cost of financing.

Table 28 – Implied Debt Capacity Based on Credit Tests ($bn)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Credit Tests									
General Fund Requirement	$36.6	$39.5	$39.2	$40.5	$44.7	$46.1	$46.3	$46.4	$48.3
Debt Service Coverage	19.3	21.1	23.7	27.4	31.5	32.5	32.5	36.1	37.0
Total Obligations / Gross Revenues	20.6	21.7	23.3	25.3	27.2	27.8	28.1	29.9	30.6
Minimum	$19.3	$21.1	$23.3	$25.3	$27.2	$27.8	$28.1	$29.9	$30.6
Forecasted Total Debt	$18.6	$20.5	$22.8	$24.3	$25.3	$26.2	$26.4	$26.4	$26.6
Cushion - $	0.7	0.6	0.5	1.0	1.8	1.6	1.7	3.6	4.0

Debt Capacity Assessment

Rothschild's assessment of the Port Authority's potential debt capacity incorporates a review of selected comparable "peer group" organizations in order to benchmark the Port Authority's capital structure and credit profile. In order to compile the peer group, Rothschild targeted public and private organizations, both domestic and foreign, that operate in four primary categories: (i) Airports, (ii) Ports, (iii) Rail / Toll Roads and (iv) Infrastructure Conglomerates.

Table 29 – Selected Peer Group

Airports	Ports	Rail / Toll Roads	Conglomerates
▪ Atlanta Hartsfield-Jackson International Airport ▪ Aeroports de Paris ▪ BAA ▪ Greater Toronto Airports Authority ▪ Los Angeles World Airports ▪ Sydney Airport Corporation Limited	▪ DP World Limited ▪ Port of Corpus Christie ▪ Port of Long Beach ▪ Port of Los Angeles ▪ Port of Rotterdam ▪ Port of Tauranga ▪ Virginia Port Authority	▪ Chicago Transit Authority ▪ Delaware River Port Authority ▪ Massachusetts Bay Transit Authority ▪ Metropolitan Transportation Authority ▪ Metropolitan Transportation Commission ▪ New Jersey Transit Corporation ▪ New Jersey Turnpike Authority ▪ New York Thruway Authority ▪ Pennsylvania Turnpike Commission ▪ Southeastern Pennsylvania Transportation Authority	▪ Abertis ▪ ACS ▪ Atlantia ▪ Ecorodovias ▪ Eiffage ▪ Ferrovial ▪ Groupe Eurotunnel ▪ Macquarie Atlas ▪ Transurban ▪ Vinci

Peer Group Analysis: Airports

In determining the comparable group of airport operators, Rothschild focused on companies which operate major international airports and that control many, if not all, of the airports in a single market.

Table 30 – Airport Peer Group

Peer Company	Description	Financial Summary ($m)		
Atlanta Hartsfield-Jackson International Airport	▪ Operates Hartsfield-Jackson, the primary Atlanta, GA airport ▪ Total assets: $6.7bn		**2009**	**2010**
		Revenue	$390	$401
		Operating Costs	179	210
		Net Profit	211	191
		% margin	54%	48%
Aeroports de Paris	▪ Owns and operates the 3 major airports in Paris, including Charles de Gaulle, as well as 10 airfields in France ▪ Total assets: $11.5bn		**2010**	**2011**
		Revenue	$3,326	$3,250
		Operating Costs	2,089	1,988
		Net Profit	1,236	1,263
		% margin	37%	39%
BAA	▪ Owns and operates airports in the UK including Heathrow, Stansted and 4 other smaller regional airports ▪ Total assets: $20.3bn		**2010**	**2011**
		Revenue	$3,239	$3,549
		Operating Costs	1,729	1,787
		Net Profit	1,510	1,762
		% margin	47%	50%
Greater Toronto Airports Authority	▪ Owns and operates airports in the Toronto metropolitan area ▪ Total assets: $7.1bn		**2010**	**2011**
		Revenue	$1,118	$1,119
		Operating Costs	459	451
		Net Profit	659	668
		% Margin	59%	60%
Los Angeles World Airports	▪ Owns and operates all 5 airports in the Los Angeles metropolitan region ▪ Total assets: $8.3bn		**2010**	**2011**
		Revenue	$752	$855
		Operating Costs	617	617
		Net Profit	135	239
		% margin	18%	28%
Sydney Airport Corporation Limited	▪ Owns and operates the Sydney Airport ▪ Total assets: $12.1bn		**2010**	**2011**
		Revenue	$929	$968
		Operating Costs	155	178
		Net Profit	773	790
		% margin	83%	82%

A financial review of the airport peer group reveals a high level of operating profitability (Los Angeles World Airports is a clear outlier) and stable revenue base likely attributable to the broad scope of the operators' reach within the particular regions of service. The sector has undergone significant stress since the 2008 financial crisis which has led to the sector accumulating debt in order to finance capital investment needs. As a result, the sector exhibits a relatively high degree of leverage with a

mean/median leverage metric of 10.7x / 11.5x. Despite these leverage metrics, the sector's cost of debt capital is in relatively moderate with mean / median cost of debt of 5.0% / 4.8%. In terms of capitalization strategy, the peer group demonstrates a clear preference for consolidated "holdco" financing with the single exception being Atlanta Hartsfield-Jackson International Airport which has a tranche of debt issued at the operating company level and secured by PFC revenues (cost of capital was in line with existing holdco debt). The sector generally exhibits a preference for fixed rate debt with the exception of BAA which is relatively balanced in the distribution of fixed versus floating rate debt. Relatedly, Atlanta Hartsfield has recently indicated its intention to retire its floating rate debt in order to limit exposure to interest rate risk.

Table 31 – Airport Peer Group: Credit Analysis

Peer Company	Total Debt	Leverage	Credit Rating			Interest Rate	% Floating
			Fitch	Moody's	S&P		
Atlanta Hartsfield-Jackson International Airport	$2,236	11.7x	NR	NR	NR	4.5%	23.4%
Aeroports de Paris	4,496	3.6x	AA-	NR	A+	3.4%	16.6%
BAA	23,711	13.5x	A-	NR	A-	5.1%	41.1%
Greater Toronto Airports Authority	7,585	11.3x	NR	A1	A	5.6%	--
Los Angeles World Airports	3,741	15.7x	NR	NR	AA	4.3%	3.1%
Sydney Airport Corporation Limited	6,911	8.8x	BBB	Baa2	BBB	7.1%	69.8%
Port Authority	19,524[(1)]	10.1x	AA-	Aa2	AA-	4.9%	2.4%
Mean		10.7x				5.0%	25.7%
Median		11.5x				4.8%	20.0%

Note:

(1) Of this amount, $3.54B for commercial paper obligations, variable rate master notes, versatile structure obligations, MOTBY obligation, Tower 4 liberty bonds, and special project bonds are not secured by or payable from the General Reserve Fund. All debt balances are calculated at par value.

Peer Group Analysis: Ports

In determining the comparable group of port operators, Rothschild selected the operators of major ports globally. The companies below are each pure port operators, as distinguished from the infrastructure conglomerates that have non-port operating activities.

Table 32 – Ports Peer Group

Peer Company	Description	Financial Summary ($m)		
DP World Limited	▪ Develops and operates marine terminals and related services worldwide ▪ Total assets: $13.9bn		**2010**	**2011**
		Revenue	$3,189	$2,978
		Operating Costs	1,948	1,670
		Net Profit	1,240	1,307
		% margin	39%	44%
Port of Corpus Christie	▪ Operates the Port of		**2010**	**2011**

	Corpus Christie, Texas ▪ Total assets: $400m	Revenue	$52	$59
		Operating Costs	35	37
		Net Profit	17	22
		% margin	33%	37%
Port of Long Beach	▪ Operates the Port of Long Beach, California ▪ Total assets: $3.5bn		**2010**	**2011**
		Revenue	$322	$345
		Operating Costs	98	81
		Net Profit	224	264
		% margin	70%	77%
Port of Los Angeles	▪ Operates the Port of Los Angeles, California ▪ Total assets: $3.9bn		**2010**	**2011**
		Revenue	$407	$401
		Operating Costs	246	209
		Net Profit	161	191
		% margin	40%	48%
Port of Rotterdam	▪ Operates the Port of Rotterdam, Netherlands ▪ Total assets: $4.2bn		**2010**	**2011**
		Revenue	$739	$764
		Operating Costs	297	297
		Net Profit	443	467
		% margin	60%	61%
Port of Tauranga	▪ Operates the major port in New Zealand ▪ Total assets: $773m		**2010**	**2011**
		Revenue	$136	$155
		Operating Costs	65	76
		Net Profit	70	79
		% margin	51%	51%
Virginia Port Authority	▪ Owns and operates marine terminals in the state of Virginia including the Norfolk Port ▪ Total assets: $1.1bn		**2010**	**2011**
		Revenue	$208	$284
		Operating Costs	179	257
		Net Profit	29	27
		% margin	14%	9%

Rothschild's financial review of the port peer group indicates a consistent financing construct across the sample set. Profitability metrics for the port peer group are relatively strong an average margin of 47%. In terms of capitalization, the Port Group is the least indebted with mean/median leverage metrics of 3.0x / 2.4x[3]. This relatively low debt burden is accompanied by a cost of debt which stratifies between the US ports in the 4.5% - 5.7% range versus the foreign ports with interest costs of 4.9% - 12.4%. Additionally the US port operators are each capitalized with similar guidelines: financing is via fixed rate bonds issued at the consolidated "holdco" level and secured by port revenue.

[3] Mean / median calculation excludes Virginia Port Authority as an outlier.

Table 33 – Ports Peer Group: Credit Analysis

Peer Company	Total Debt	Leverage	Credit Rating: Fitch	Credit Rating: Moody's	Credit Rating: S&P	Interest Rate	% Floating
DP World	$7,707	5.9x	BBB-	Baa3	NR	4.9%	56.6%
Port of Corpus Christie	$7	0.3x	NR	A1	A+	5.7%	--
Port of Long Beach	723	2.7x	AA	NR	NR	4.6%	--
Port of Los Angeles	982	5.1x	NR	NR	AA+	4.5%	--
Port of Rotterdam	990	2.1x	NR	NR	NR	12.4%	54.4%
Port of Tauranga	161	2.0x	NR	NR	BBB+	6.9%	99.7%
Virginia Port Authority	474	17.6x	AA+	A1	AA+	5.3%	--
Port Authority	19,524	10.1x	AA-	Aa2	AA-	4.9%	2.4%
Mean		3.0x				6.3%	30.1%
Median		2.4x				5.3%	--

Peer Group Analysis: Rail / Toll Roads

The analysis group for the Rail / Toll Roads sector includes a broad mix of organizations that operate public transit and/or toll-funded infrastructure assets in major metropolitan areas throughout the United States. The selected organizations are detailed below, segmented between rail operators and operators of toll roads and/or bridges.

Table 34 – Rail / Toll Roads Peer Group: Rail Operators

Peer Company	Description	Financial Summary ($m)		
Chicago Transit Authority	▪ Operates the public transportation system for the City of Chicago ▪ Total assets: $6.9bn		**2009**	**2010**
		Revenue	$565	$548
		Operating Costs	1,649	1,165
		Net Profit	(1,085)	(617)
		% margin	NM	NM
Massachusetts Bay Transit Authority	▪ Operates public transportation in the Massachusetts Bay area ▪ Total assets: $9.6bn		**2010**	**2011**
		Revenue	$500	$511
		Operating Costs	1,298	1,321
		Net Profit	(798)	(809)
		% margin	NM	NM
Metropolitan Transportation Authority	▪ Operates the public transportation system for the City of New York ▪ Total assets: $62.5bn		**2010**	**2011**
		Revenue	$6,419	$6,939
		Operating Costs	10,709	11,690
		Net Profit	(4,290)	(4,751)
		% margin	NM	NM
New Jersey Transit Corporation	▪ Operates public transit in New Jersey ▪ Total assets: $9.8bn		**2010**	**2011**
		Revenue	$839	$943
		Operating Costs	1,820	1,876
		Net Profit	(981)	(934)
		% margin	NM	NM
Southeastern	▪ Operates the public		**2010**	**2011**

Pennsylvania Transportation Authority	transit for the Philadelphia region ▪ Total assets: $4.3bn	Revenue	$426	$470
		Operating Costs	1,514	1,581
		Net Profit	(1,089)	(1,110)
		% margin	NM	NM

Table 35 – Rail / Toll Roads Peer Group: Toll Road / Bridge Operators

Peer Company	Description	Financial Summary ($m)		
Delaware River Port Authority	▪ Operates the bridges and ferries that cross the Delaware River in the Philadelphia region ▪ Total assets: $1.8bn		**2009**	**2010**
		Revenue	$273	$275
		Operating Costs	140	154
		Net Profit	133	120
		% margin	49%	44%
Metropolitan Transportation Commission	▪ Transportation planning and financing agency for the San Francisco Bay area ▪ Total assets: $4.5bn		**2010**	**2011**
		Revenue	$487	$623
		Operating Costs	118	151
		Net Profit	369	472
		% margin	76%	76%
New Jersey Turnpike Authority	▪ Operates the turnpikes and roadways in New Jersey ▪ Total assets: $9.4bn		**2010**	**2011**
		Revenue	$1,034	$1,033
		Operating Costs	565	553
		Net Profit	469	480
		% margin	45%	46%
New York Thruway Authority	▪ Operates toll road in New York state ▪ Total assets: $5.6bn		**2010**	**2011**
		Revenue	$672	$665
		Operating Costs	457	478
		Net Profit	215	187
		% margin	32%	28%
Pennsylvania Turnpike Commission	▪ Owns and operates toll roads in Pennsylvania ▪ Total assets: $6.7bn		**2010**	**2011**
		Revenue	$710	$759
		Operating Costs	378	360
		Net Profit	332	399
		% margin	47%	53%

As distinguished from other sectors analyzed, the Rail / Toll Road peer group diverges with rail operators exhibiting operating losses whereas the toll road / bridge operators generate net profits. Additionally, many of these operators benefit from government funding (local, state and/or federal) in order to meet operating costs and capital investment. Despite the profit performance, the essential nature of the service and governmental backing enable the operators to attract private debt financing at a cost of capital in line with the other infrastructure sectors reviewed. Mean/median metrics for cost of debt for the selected operators are 4.8% / 4.8% amidst highly leveraged credit metrics for the group overall. The sector also exhibits a preference for fixed rate borrowings with Delaware River Port Authority and SEPTA being the only operators with a meaningful level of floating rate indebtedness. Debt financing is almost exclusively via revenue bonds at the consolidated operator level.

Table 36 – Rail / Toll Roads Peer Group: Credit Analysis

Peer Company	Total Debt	Leverage	Credit Rating			Interest Rate	% Floating
			Fitch	Moody's	S&P		
Chicago Transit Authority	$3,418	NM	NR	A1	AA	5.9%	--
Delaware River Port Authority	1,393	11.6x	NR	A3	A	5.2%	50.0%
Massachusetts Bay Transit Authority	5,587	6.9x	NR	Aa1	AAA	5.1%	5.2%
Metropolitan Transportation Authority	32,179	NM	A	A2	A	4.6%	2.8%
Metropolitan Transportation Commission	9,379	19.9x	NR	NR	NR	3.8%	--
New Jersey Transit Corporation	1,971	NM	A+	NR	NR	5.1%	--
New Jersey Turnpike Authority	8,322	17.3x	A+	A1	A+	5.7%	18.0%
New York Thruway Authority	3,085	16.5x	AA	NR	AA	3.3%	--
Pennsylvania Turnpike Commission	7,720	19.4x	A+	Aa3	A+	4.5%	17.4%
Southeastern Pennsylvania Transportation Authority	353	NM	AA	A1	A+	4.5%	33.5%
Port Authority	19,524	10.1x	AA-	Aa2	AA-	4.9%	2.4%
Mean		15.3x				4.8%	12.7%
Median		16.9x				4.8%	4.0%

Peer Group Analysis: Infrastructure Conglomerates

In addition to operators which focus on a specific type of infrastructure assets, Rothschild analyzed a selection of large publicly-traded infrastructure conglomerates which are more diverse in scope, similar to the Port Authority itself. Although the identified companies are exclusively European or Australian headquartered corporations, the operating activities are global in reach.

Table 37 – Infrastructure Conglomerates Peer Group

Peer Company	Description	Financial Summary ($m)	2010	2011
Abertis Infraestructuras S.A.	▪ Owns, operates and constructs toll roads, parking lots, logistics centers and transport centers. Abertis also owns interests in 29 airports	Revenue	$957	$1,359
		Operating Costs	85	99
		Net Profit	872	1,261
		% margin	91%	93%

	▪ Total assets: $17.2bn			
Actividades de Construccion y Servicios, S.A. ("ACS")	▪ Owns, operates and constructs toll roads, railways, airports and port infrastructure ▪ Total assets: $62.3bn		**2010**	**2011**
		Revenue	$19,214	$36,989
		Operating Costs	17,294	33,977
		Net Profit	1,920	3,011
		% margin	10%	8%
Atlantia	▪ Owns, operates and constructs toll roads worldwide with predominant focus in Italy ▪ Total assets: $30.1bn		**2010**	**2011**
		Revenue	$4,990	$5,166
		Operating Costs	1,948	2,067
		Net Profit	3,042	3,099
		% margin	61%	60%
Ecorodovias	▪ Integrated operation of highway concessions and logistics assets in Brazil ▪ Total assets: $2.2bn		**2010**	**2011**
		Revenue	$920	$1,065
		Operating Costs	402	508
		Net Profit	518	557
		% margin	56%	52%
Eiffage S.A.	▪ Owns, operates and constructs toll roads, railways and buildings. Also provides engineering services ▪ Total assets: $33.1bn		**2010**	**2011**
		Revenue	$18,174	$17,930
		Operating Costs	15,736	15,489
		Net Profit	2,438	2,441
		% margin	13%	14%
Ferrovial, S.A.	▪ Owns, operates and constructs airports, toll roads, railways, parking lots, port infrastructure and buildings. Also provides engineering services ▪ Total assets: $29.8bn		**2010**	**2011**
		Revenue	$12,606	$9,693
		Operating Costs	10,934	8,629
		Net Profit	1,672	1,064
		% margin	13%	11%
Groupe Eurotunnel, S.A.	▪ Operates the channel tunnel infrastructure and rail networks between France and the UK ▪ Total assets: $9.4bn		**2010**	**2011**
		Revenue	$988	$1,110
		Operating Costs	537	586
		Net Profit	451	524
		% margin	46%	47%
Macquarie Atlas Roads Group	▪ Develops and operates toll roads, bridges and tunnels ▪ Total assets: $1.6bn		**2010**	**2011**
		Revenue	$103	$92
		Operating Costs	70	176
		Net Profit	33	(84)
		% margin	32%	NM
Transurban Group	▪ Develops, operates and maintains toll roads in Australia ▪ Total assets: $10.4bn		**2010**	**2011**
		Revenue	$817	$1,037
		Operating Costs	290	433
		Net Profit	527	604
		% margin	65%	58%
Vinci S.A.	▪ Owns, operates and		**2010**	**2011**

	constructs toll roads, railways, airports, buildings and parking lots ▪ Total assets: $78.7bn	Revenue Operating Costs Net Profit % margin	$45,595 38,893 6,703 15%	$48,907 42,066 6,841 14%

From a capital structure benchmarking perspective, the infrastructure conglomerate peer group exhibits certain notable differences versus the single category operators analyzed previously. Leverage metrics generally fall in between the range created by the lower leverage ports and the higher leverage airports / rail / toll roads. This result is consistent with the operations of the conglomerates which include each of the different infrastructure asset categories. Cost of financing for the group registers a mean / median level of 6.5% / 5.8% which most closely approximates the interest cost of the Ports category. Apart from these similarities, the capital structure trends of the Conglomerates peer group diverge with respect to frequency of floating rate debt (mean metric of 48%) and the usage of asset-specific financing structures rather than consolidated "holdco" financing. Additionally relevant is the lack of a municipal bond market in the applicable jurisdictions which constrain financing options for the Infrastructure Conglomerates.

Table 38 – Infrastructure Conglomerates Peer Group: Credit Analysis

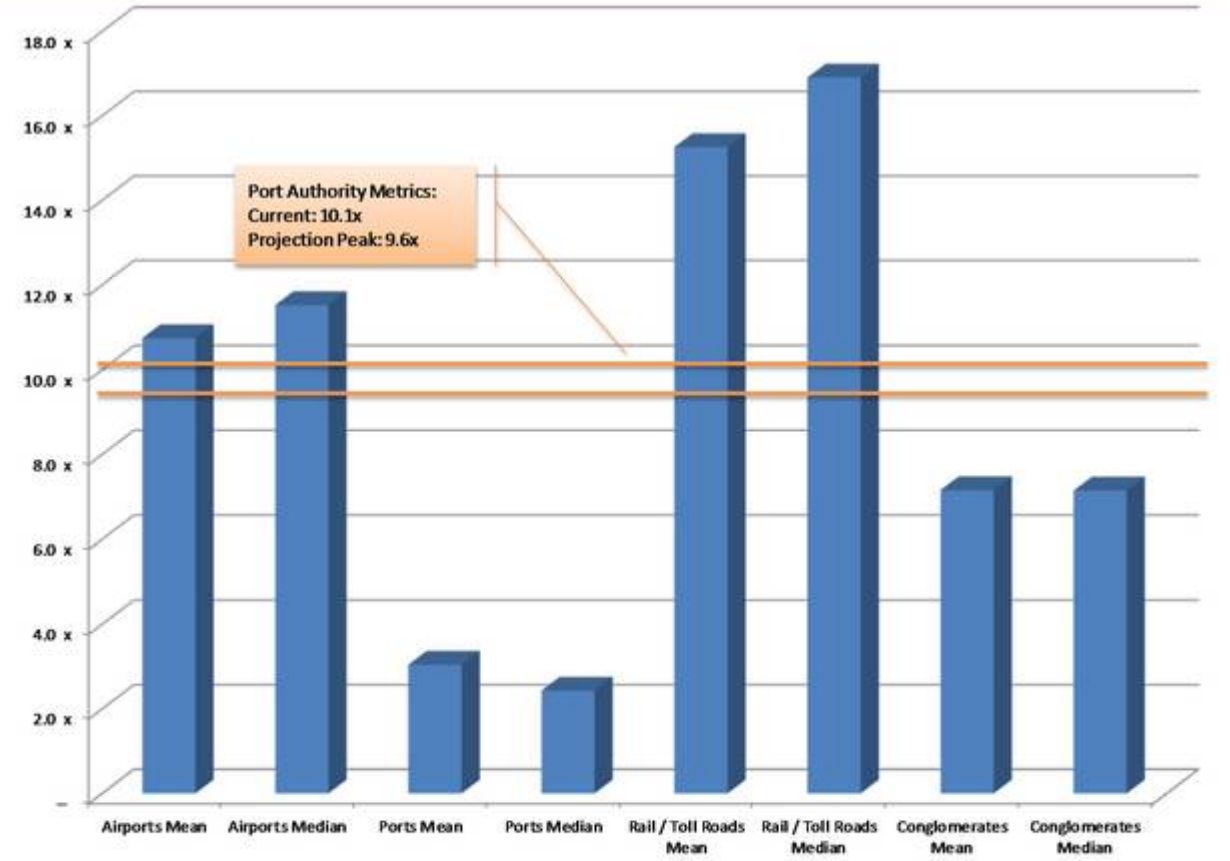
			Credit Rating				
Peer Company	**Total Debt**	**Leverage**	**Fitch**	**Moody's**	**S&P**	**Interest Rate**	**% Floating**
Abertis Infraestructuras	$14,283	11.3x	A-	NR	BBB	4.7%	13.4%
ACS	21,430	7.1x	NR	NR	NR	7.4%	NA
Atlantia	13,585	4.4x	A-	Baa1	BBB+	5.1%	14.4%
Ecorodovias	899	1.6x	NR	NR	AA+	11.2%	100.0%
Eiffage	17,441	7.1x	NR	Baa3	BBB-	5.0%	NA
Ferrovial	10,276	9.7x	BBB-	BBB-	NR	6.9%	37.7%
Groupe Eurotunnel	5,030	9.6x	NR	Baa2	NR	5.8%	35.4%
Macquarie Atlas Roads Group	1,765	NM	NR	NR	NR	5.8%	85.8%
Transurban Group	5,862	9.7x	A-	Baa1	A-	8.6%	61.3%
Vinci S.A.	26,399	3.9x	BBB+	Baa1	BBB+	4.2%	33.0%
Port Authority	19,524	10.1x	AA-	Aa2	AA-	4.9%	2.4%
Mean		7.2x				6.5%	47.6%
Median		7.1x				5.8%	36.6%

Peer Group Assessment

Comparison analysis of the identified peer group versus current and projected metrics of the Port Authority places the Port Authority moderately less leveraged than the Airport peer group and moderately higher debt than the Infrastructure Conglomerates. This comparison extends to cost of debt where the analysis indicates the Port Authority enjoys a comparable cost of debt to that of the Airport group and lower cost than both the Ports peer group and the Infrastructure Conglomerates. Based on

2011 reported financial results, the Port Authority's overall cost of debt was approximately 4.85% versus the mean/median rates of the peer group of 5.7% / 5.1%.

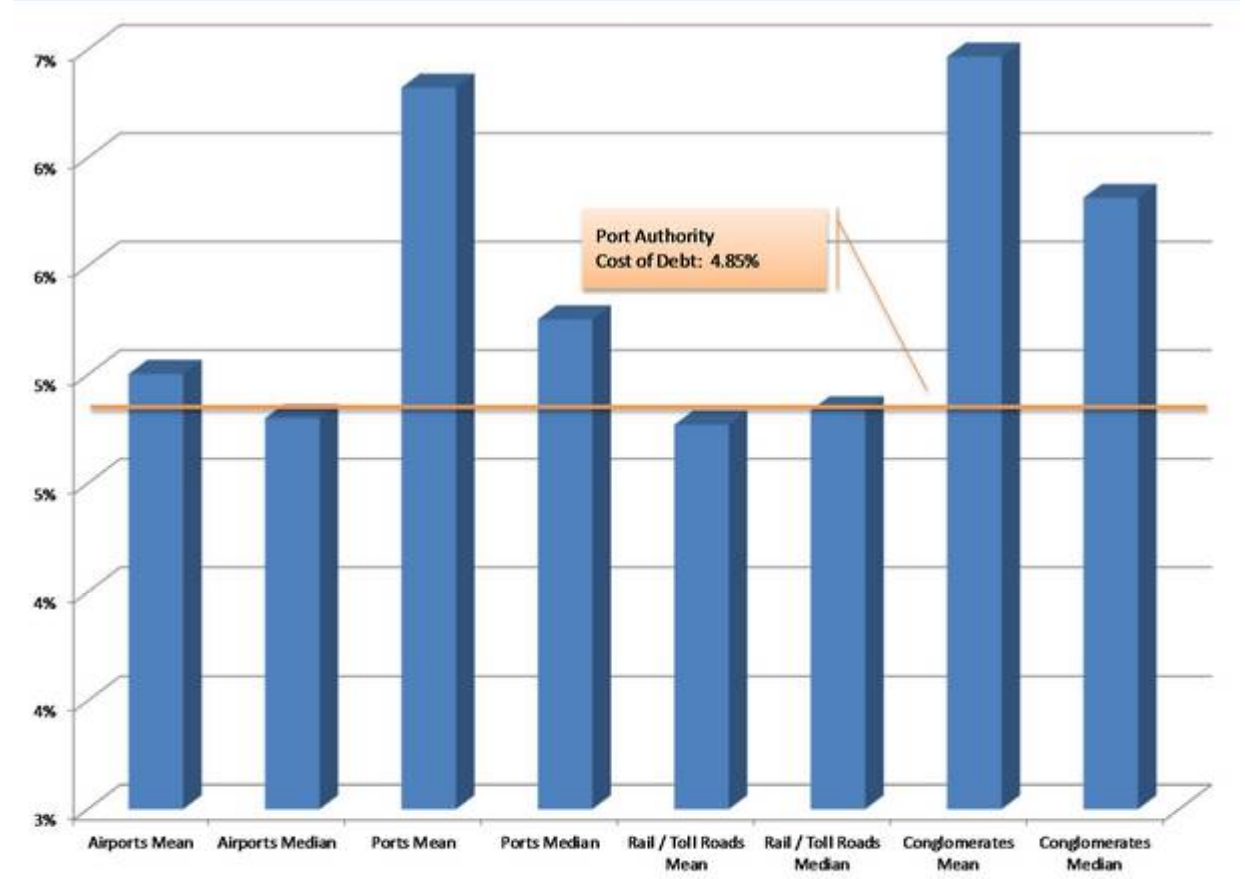
Figure 9 – Leverage Metric Analysis: Peer Group vs. Port Authority



Source: Public filings; Port Authority

Note: Port Authority Current metric based on 2011 reported financials. Projected Peak represents the maximum leverage level during the Long Range Forecast.

Figure 10 – Cost of Debt Analysis: Peer Group vs. Port Authority



Source: Public filings; Port Authority

Note: Port Authority Cost of Debt metric based on weighted average interest cost of debt outstanding as of December 31, 2011

Credit Rating Considerations

The Port Authority has enjoyed a stable credit rating history with current ratings in the upper tier of investment grade. In providing their rating outlooks, the credit rating agencies delineate possible factors for a ratings change; recent commentary is provided below. In terms of downgrade action, the agencies highlight risk related to (i) revenue underperforming expectations, (ii) worsening of leverage and/or debt coverage ratios and (iii) ongoing development of the World Trade Center site and potential for cost overruns.

Table 39 – Credit Rating Agency Guidance

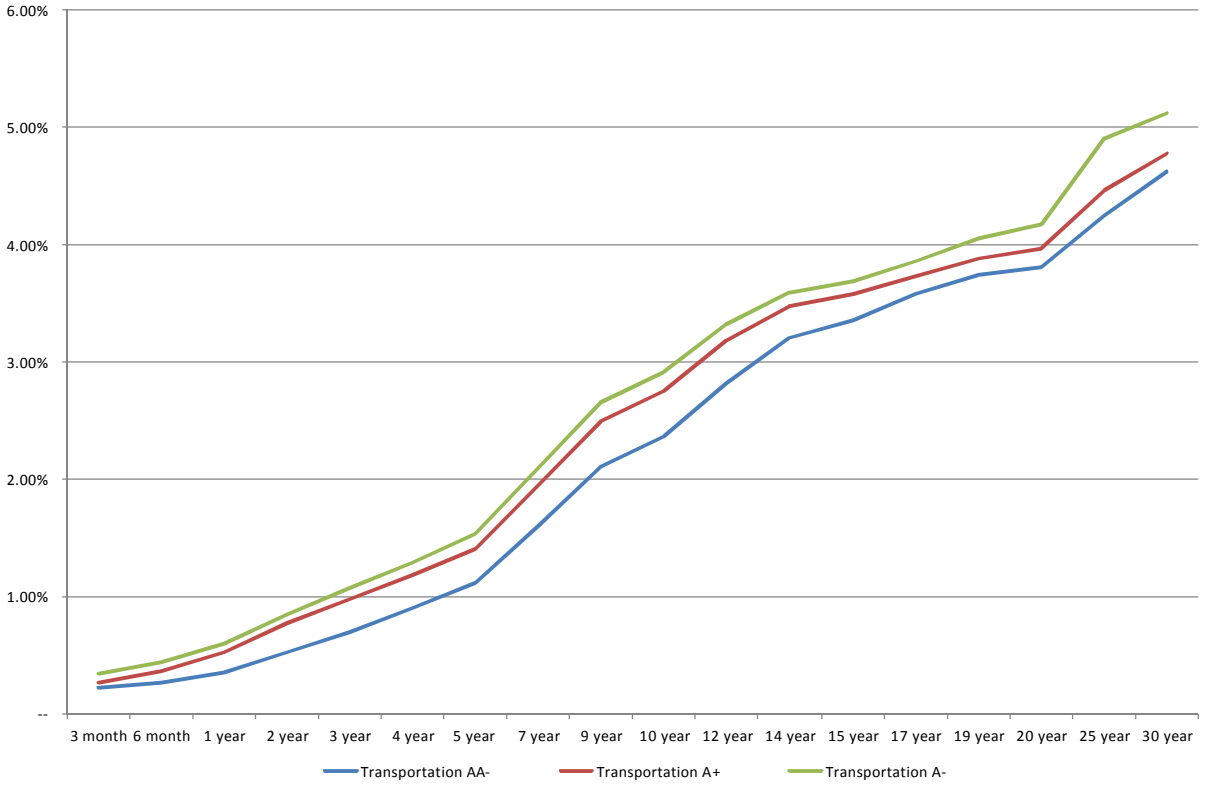
Rating Agency	Outlook Commentary
Fitch *Current rating: AA-* *Outlook: Stable*	What could trigger a rating action: ▪ Weaker financial margins due to slow revenue growth and/or higher rates of growth in operating expenses ▪ Additional leveraging beyond the current plan to debt finance approximately 40%-50% of capital expenditures over the next 10 years not supported by commensurate revenue increases to maintain DSCRs at or above 1.8-2.0x

	▪ Actions by either the State of New York or New Jersey to limit the authority's ability to raise tolls to cover growing debt service obligations
Moody's *Current rating: Aa2* *Outlook Negative*	What could change the rating – UP ▪ Accelerated growth in the regional economy that results in significantly higher facility utilization and revenues, as well as the continued implementation of rate adjustments as planned to ensure self-sufficient operations for component enterprises, DSCRs consistently well above 2.0 times; continued successful delivery of WTC site components on schedule and within current budget and more clarity regarding the not yet adopted 10-year CIP could stabilize the rating outlook and exert positive credit pressure What could change the rating – DOWN ▪ A significant increase in debt without a commensurate increase in revenues that results in DSCRs of less than 1.75 times on a bond ordinance basis or less than 1.4 times on a net revenue basis; debt to operating revenues above 5 times, or reduced liquidity below historic levels could place downward pressure on the rating. A protracted downturn of the regional economy, or the assumption of greater financial responsibility for non revenue-producing projects including significant cost escalations in the development of the WTC site, also could negatively pressure the rating.
Standard & Poor's *Current rating: AA-* *Outlook: Stable*	The stable outlook reflects our view of the strong regional essentiality of the authority's facilities and management's ability to adjust revenues, expenses, and capital spending accordingly to protect sound financial operations. We could lower the ratings if PANYNJ's liquidity and financial margins erode considerably. We do not expect to raise the ratings during the next two years due to the authority's significant additional debt needs.

Source: Fitch Ratings credit report (June 8, 2012); Moody's credit report (June 11, 2012) and Standard and Poor's credit report (June 12, 2012)

Although the potential impact to cost of capital of a credit downgrade is inherently speculative, the current forward yield curve for transportation revenue bonds of differing ratings provides a market perspective. Based on similar maturities, the spread between the yield of AA- revenue bonds (which corresponds to the Port Authority's current credit rating) and the yield of A- revenue bonds (2 credit rating notches down) is at its maximum at 25 year term with a variance of 0.66% (4.25% yield versus 4.91%). Overall, the yield is 0.39% higher for the lower rated securities as illustrated in Figure 12. As observed above, recent Port Authority debt issuances have outperformed these sector metrics, both based on yield at issuance and current market trading levels. As a result, the indexed yield cost of A+ and A- transportation revenue bonds may exceed a similarly rated Port Authority issuance.

Figure 11 – Forward Curve of Transportation Revenue Bonds: Impact of Credit Rating



Source: Bloomberg

Public Private Partnership Considerations

In recent years as municipal and state organizations have faced challenging budgets, PPPs have been widely evaluated and implemented. Primary sectors of PPP activity include healthcare facilities, transit facilities, roads, waste management facilities, correctional facilities and social housing. PPP activity is difficult to measure given the variety of definitions employed across countries and sectors. Public Works Financing maintains a database of PPP projects with 377 PPP infrastructure projects funded in the United States between 1985 and 2011; 104 of which were transportation projects. The majority of transportation PPP projects (81%) were highways, bridges and tunnels with the balance predominantly rail related.[4]

Industry analysts often cite the stability of revenues as a primary consideration in determining the suitability of a PPP structure in transit infrastructure projects. Project development may involve independent traffic studies and demographic analysis to assess the revenue outline and develop baseline financial forecasts. Recent financial troubles for certain PPP projects have heightened the focus on revenue stability (see Table 40 below).

Table 40 – Distressed PPP Transit Projects

PPP Project	Date	Description
Dulles Greenway	1995	▪ Faced with traffic volumes below forecast, private debt was restructured in 1999 following successive changes to toll intended to boost usage ▪ Sold to Macquarie in 2005
Indiana Toll Road	2006	▪ Speculation of possible upcoming debt default
Las Vegas Monorail	2004	▪ Filed for bankruptcy in 2010 as ticket revenue fell short of debt service requirements
South Bay Expressway	2003	▪ Traffic revenues underperformed, leading to bankruptcy filing in 2010 ▪ Sold to consortium of San Diego area governments in 2011

The Port Authority itself has wide-ranging experience with PPP projects including the Terminal 4 redevelopment at JFK, the World Trade Center joint ventures with the Durst Organization and Westfield, the exploratory work currently underway with respect to a PPP for the Goethals Bridge replacement project and the RFI issued for the LaGuardia Airport Central Terminal modernization. As the Port Authority reviews its capital plan for possible PPP activity, a systematic approach with defined criteria for evaluation should be utilized. Suggested evaluative criteria include: (i) size of capital investment required, (ii) stability of revenues, (iii) level of financial, technical and/or operational risk, (iv) ability to support public goals of service quality and safety. Subject to these considerations, three major projects are identified as potentially suitable for a PPP structure either in whole or in part (e.g. parking facility at Newark Airport).

[4] Brookings-Rockefeller Project on State and Metropolitan Innovation. *Moving Forward on Public Private Partnerships: U.S. and International Experience with PPP Units.* December 2011.

Table 41 – Major Projects for PPP Consideration

Project	Asset	Estimated Cost: 2012 - 2020
CTB Modernization [(1)]	LaGuardia Airport	$1.1bn
Goethals Bridge Modernization [(1)]	Goethals Bridge	$282m
Terminal A Redevelopment	Newark Airport	$812m

Source: Port Authority

(1) Currently under consideration for PPP structure

Given the importance of revenue stability to the Port Authority's current financing strategies, pursuing a PPP structure for specific projects may impact the theoretical debt issuance available under the Consolidated Bond program. Analytical evaluation of this financing consideration should be undertaken as a part of the PPP candidate screening effort.

Following this selection, a competitive RFI / RFP process can be effective at creatively identifying feasible project structures within the economic framework of the proposed project. Successful PPP projects are able to distribute the financial and operational risk between the municipal authority and the PPP counterparty. For example, availability payment structures are increasingly utilized as an alternative to a long-term sale/lease. The availability payment reduces the operational risk of traffic volumes to the PPP counterparty while the municipal authority benefits by maintaining ownership of the project asset.

Ultimately the decision to execute a PPP project is dependent on the balance of benefits and issues. Primary considerations are outlined below in Table 42 and generally vary based on the level of ownership / control transferred to the private counterparty.

Table 42 – Key Considerations for PPP Decisionmaking

Benefits	Issues
▪ Efficient delivery: private sector expertise and discipline improve project execution / cost ▪ Alleviate strained capital budgets – ability to address immediate infrastructure needs amidst capital constraints ▪ Manage construction risk / cost overruns ▪ Asset maintenance / quality of service available ▪ Share or transfer staffing cost	▪ Cost of capital typically higher ▪ Contractual limitations (e.g. interplay with existing financing agreements) ▪ PPP structure / extent of risk transfer ▪ Selection of private counterparty

Conclusions

Rothschild's work as presented herein supports the following observations:

Table 43 – Observations and Conclusions	
The Port Authority's financing strategy, principally through the Consolidated Bond structure, has effectively sourced capital at competitive cost	▪ Market data indicates Port Authority bonds have registered lower cost than comparable issuances based on a variety of benchmarks including similarly rated municipal debt and public market issuances from other transportation infrastructure operators
Although subject to ebbs and flows consistent with the overall capital markets, the municipal bond market continues to exhibit demand for new issuances	▪ YTD volumes are outpacing the prior year across the spectrum of bond categories ▪ Market yields have tightened as the overall yield curve has compressed ▪ Recent high profile bankruptcies have not dampened investor appetite
Based on the Long Range Forecast, the Port Authority is projected to score credit metrics in line with the peer group	▪ The Port Authority's forecasted credit metrics exceed the levels of the relatively unlevered port operators but rank below the high leverage of airline specific and rail/toll road operators ▪ The credit profile is estimated to be broadly in line with the diversified infrastructure conglomerates ▪ Long-Term Forecast estimates compliance with the Port Authority's financial metric tests and credit rating targets.
PPP structures may provide an attractive financing alternative but an evaluation needs to consider the potential impact on the Port Authority's primary sources of financing	▪ Following a number of high profile distress situations, revenue stability has gained emphasis in PPP analysis ▪ Segregating highly revenue stable projects for PPP consideration may limit the Port Authority's ability to obtain financing under the existing bond program

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