

NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL NO.16-001

DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND
OTHER TECHNICAL SERVICES
FOR THE
NJ TRANSITGRID PROJECT - DISTRIBUTED GENERATION



**RFP No.16-001
DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND OTHER TECHNICAL SERVICES FOR THE
NJ TRANSIT GRID DISTRIBUTED GENERATION PROJECT**

September 8, 2015

ADDENDUM NO.1

To All Proposers

Proposers are advised of the following clarifications, additions and/or revisions to the above referenced RFP. Such clarifications, additions and/or revisions are incorporated into the RFP Documents by means of this Addendum No.1.

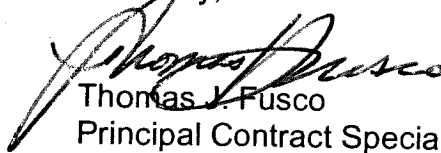
Attached are the September 2, 2015 pre proposals meeting minutes and Attendance Sign In Sheets

The Technical Proposal Due Date remains 2:00 P.M October 14, 2015

All firms must acknowledge Addendum No.1 by signing the Acknowledgment of Receipt of the Addenda and including the form as part of its Proposal submission. Failure to do so may render a submittal non-responsive.

This concludes Addendum No.1.

Sincerely,


Thomas J. Fusco
Principal Contract Specialist

Attachments.

CC: Nicholas Marton
Jacquelin Rush-Gilbert
Lisa-Marie Codrington

Request for Proposal Number 16-001

**DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND
OTHER TECHNICAL SERVICES DISTRIBUTED GENERATION PROJECT
FOR THE
NJ TRANSITGRID PROJECT**

September 2, 2015

TIME: 10:30 a.m.

Preproposal Meeting

Thomas J. Fusco Principal Contract Specialist welcomed the potential Proposers and opened the meeting. The potential Proposers completed the sign in sheet of which a copy is attached.

The attendees were advised that Communication with NJ TRANSIT shall be through the Contracting Officer or his duly authorized representative. Communications shall be in writing via E-Mail to tfusco@njtransit.com

The attendees were advised that the following are required to be submitted with the Technical Proposal.

Acknowledgement of Receipt of Addenda
Statement of Joint Venture – If Applicable
Non-Collusion Affidavit
Contractors Certification of Eligibility
Affidavit of Compliance (Code of Vendor Ethics)
Certification for Contracts, Grants, Loans and Cooperative Agreements

SOURCE DISCLOSURE CERTIFICATION
PUBLIC LAW 2005 CHAPTER 271 Vendor Certification and Political Contribution
Disclosure Form
Disclosure of Investments in Iran

Proposers are reminded as specified in the Request for Proposal a NJ Division of Revenue Business Registration Certificate is required to be submitted prior to execution of a contract for these services.

NJ TRANSIT has formed a Technical Evaluation Committee (TEC). The TEC will review evaluate and score each Technical Proposal against the evaluation criteria found in Attachment "A" of the RFP.

The written technical proposal score will be used by NJ TRANSIT to determine the "competitive range".

Oral Presentations will be requested from at least three (3) qualified Proposers within the competitive range, except NJ TRANSIT may select fewer Proposers if fewer such firms respond to the solicitation or meet the qualifications for the project. Oral Presentations will provide an opportunity for the Proposer to clarify or elaborate on its written technical proposal.

The TEC will use the Oral Presentations to confirm and/or reassess its understanding of the written technical proposals, and incorporate that information into its evaluation by revising the written technical evaluation scores accordingly.

NJ TRANSIT will request a cost proposal from the highest technically qualified firm and enter into negotiations with the highest technically qualified firm to reach an agreement on the Scope of Services and fees.

If in the opinion of NJTRANSIT a satisfactory Contract cannot be negotiated with a selected firm, NJ TRANSIT will formally end negotiations and initiate negotiations with the next most technically qualified firm.

This negotiation procedure will be followed until a satisfactory Contract is negotiated.

A recommendation for award of the Contract to the Proposer, whose proposal is in the best interest and provides the best value to NJ TRANSIT, will be made for approval by NJ TRANSIT's Board of Directors.

NJ TRANSIT has assigned an eighteen percent (19%) **Race Conscious, DBE Goal** of the Gross sum of the contract value.

Jacquelin Rush Gilbert of NJ TRANSITS Office of Business Development gave a brief review of the DBE Sub Contracting Requirements and Business Development Program. The DBE forms only need to be submitted by the successful proposer.

Nick Marton Senior Director NJ TRANSITGrid gave a brief overview of the technical requirements of the project

Thomas J. Fusco opened the floor for questions,

There was only a minor question.

There were no further questions so the meeting was adjourned.

Note:

The Proposals are due on October 14, 2015 at 2:00 PM

NJ TRANSITGRID PROJECT

Contract # 16-001

Septemeber 2, 2015

TIME: 10:30 a.m.

Preproposal Meeting

Name	Firm	Address	Phone #	Email
G Pristach	STARTEC	58 W 23rd St New York, NY 10010		
David Boate'	Gannett Fleming	1037 Raymond Blvd. Suite 1426 Newark, NJ 07102		
Craig Goodall	KKCS	P.O. Box 1212 Summit NJ 07902		
Mark Wilson	NJ TRANSIT	HQ		
Jackie Rush-Gilbert	AST OBO	HQ		
T Fusco	NJ TRANSIT	HQ		

NJ TRANSITGRID PROJECT

Contract # 16-001

Septemeber 2, 2015

TIME: 10:30 a.m.

Preproposal Meeting

Name

Firm

Address

Phone #

Email

JEFF CASEY	BMCD	WALINGFORD, CT		
Chitra Radin	Radin Consulting	One Gateway Newark, NJ		
Jerry Harrism	Parsons	100 Broadway NY, NY		
Aixa G. Lopez	Robinson Aerial Surveys (SBE/DBE)	One Gateway Ctr. Newark, N.J. 07102		
Chris Sylvia	Concord Engineering	500 S. Burnt Mill Rd. Voorhees, NJ 08022		
Jack Kanarek	Dewberry	200 Broadacre Drive Bloomfield, NJ 07003		

NJ TRANSITGRID PROJECT

Contract # 16-001

Septemeber 2, 2015

TIME: 10:30 a.m.

Preproposal Meeting

Name

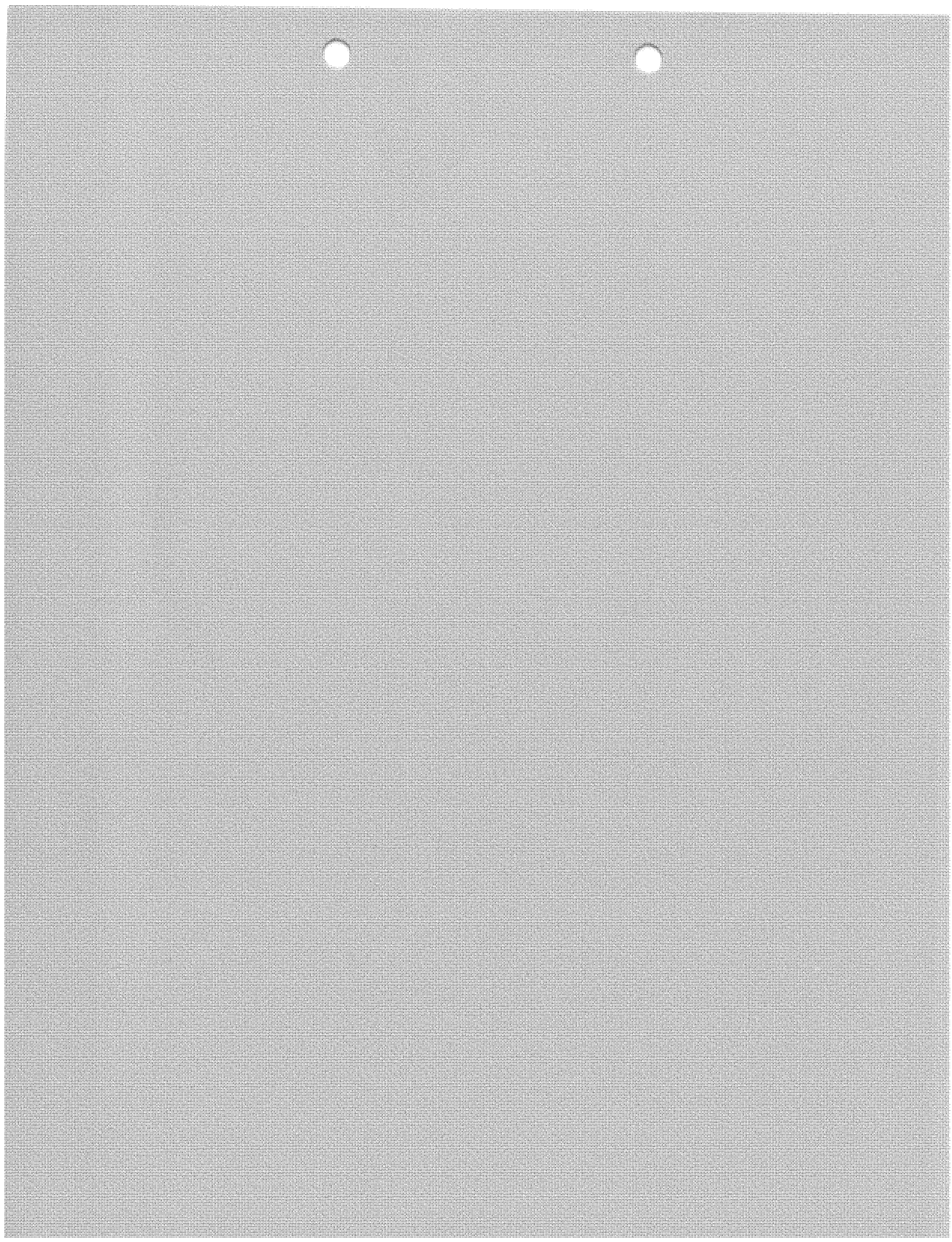
Firm

Address

Phone #

Email

MICHAEL MAIN	AECOM	125 BROAD STREET NY, NY 10004		
BILL FLYNN	AECOM	125 BROAD STREET NY NY 10004		
GARY WALKER	AMEC Foster Wheeler	200 AMERICAN METROBLVD HAMILTON, NJ 08619		
MIKE WALTON	THE BURNS GROUP	1835 MARKET ST PHILADELPHIA, PA 19103		
EMANUELE INCORVAIN	BURNS & MCDONNELL	100 EAGLE ROCK AVE EAST HANOVER, NJ		
Paul VanGelder	CHA Consulting	6 CAMPOS DRIVE PARSIIPPANY NJ 07054		
Jim Petersen	Navigant Consulting	685 Third Ave, 14th Fl New York, NY 10017		
Joseph Yolpo	Process Equipment	11 Melanie Rd East Hanover, N.J.		





RFP No.16-001

September 17, 2015

**DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND OTHER TECHNICAL SERVICES FOR THE
NJ TRANSITGRID DISTRIBUTED GENERATION PROJECT**

ADDENDUM NO.2

To All Proposers

Proposers are advised of the following clarifications, additions and/or revisions to the above referenced RFP. Such clarifications, additions and/or revisions are incorporated into the RFP Documents by means of this Addendum No.2.

Attached for your information is the Energy Efficiency and Distributed Generation for TransitGrid Report.

The following is a question from Burns and Mc Donnell and associated answer:

Q. Will the awarded firm (prime or a subcontractor) for this RFP (Phase 2 DG RFP 16-001) be excluded from submitting as prime or subcontractor as part of the design-build team for RFP 15-031 (Phase 1 Power Plant)?

A. The successful Prime Consulting firm will be excluded from submitting a proposal as a Prime or Sub-Consultant on the Design Build for the NJ TRANSIT Grid. However, a determination to exclude any sub-consultant of the successful Prime firm's team will depend on the level of their participation in the project.

The following are questions from Stantec and associated answers:

Q. On page 27 of the RFP, it references the schedule as requiring completion of preliminary designs and bid ready documents within 10 months of NTP. On page 34 (Subtask 1.2.1) it references these same deliverables need to be completed 12 months after NTP. Please confirm the correct schedule.

A. The correct schedule is 10 months.

Q. Based on this RFP, NJT/FTA are pursuing an EIS for the activities covered under the previous RFP (RFP 15-031) for the proposed power plant, substation work, and other

NEW JERSEY TRANSIT CORPORATION
RFP No.16-001 DESIGN, ENGINEERING,
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ADDENDUM NO.2

Page 2 of 3

components. However, for this RFP (16-001), it is stated that a Categorical Exclusion (CE) is being prepared. Are these documents being completed independent of one another (i.e.

as completely separate actions), or is the EIS serving as a Tier 1 document for the TransitGrid project as a whole, and the CE as a lower tiered document for just this part of the overall project?

A. The CE is being prepared by NJ TRANSIT's third party consultant BEM as part of the overall NJ TRANSITGRID project and grant but under a separate schedule.

Q. On page 109 of the RFP, it references the need to provide services for "Delineation of the results of Cultural Resources investigation including any required historic, architectural, or locational studies (with a report)." Please confirm that completion of the archaeological and historic structures investigations and reporting are to be included in the tasks for this contract, and are not part of the third party NEPA/permitting contractor.

A. As it pertains to the completion of **Subtask 2.3.1 – Right-of-Way Research** The Consultant shall research, collect and review all existing documents relevant or pertaining to the right-of-way, including but not limited to NJ TRANSIT and Amtrak mapping, tax maps, title information etc. and shall conduct field inspections of all areas anticipated to be impacted by this project in order to determine right-of-way available for use.

- Delineation of the results of the Cultural Resources investigation including any required historic, architectural or locational studies (with a report).

Q. Please confirm that all other environmental studies related to NEPA and permitting (such as delineations of wetlands and other resources) are the responsibility of the third party contractor.

A. Note for **Subtask 2.3.1 – Right-of-Way Research**, collect and review all existing documents relevant or pertaining to the right-of-way. Field delineations will be performed by BEM. Surveys incorporating the relevant boundaries are the responsibility of the Design Consultant.

The Technical Proposal Due Date remains 2:00 P.M October 14, 2015

NEW JERSEY TRANSIT CORPORATION
RFP No.16-001 DESIGN, ENGINEERING,
CONSTRUCTION ASSISTANCE AND OTHER TECHNICAL
SERVICES FOR THE NJ TRANSITGRID DISTRIBUTED
GENERATION PROJECT
ADDENDUM NO.2
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All firms must acknowledge Addendum No. 2 by signing the Acknowledgment of Receipt of the Addenda and including the form as part of its Proposal submission. Failure to do so may render a submittal non-responsive.

This concludes Addendum No.2.

Sincerely,



Thomas J. Fusco
Principal Contract Specialist

Attachment

CC: Nicholas Marton
Jacquelin Rush-Gilbert
Lisa-Marie Codrington

Energy Efficiency and Distributed Generation for TransitGrid

Environmental Defense Fund

New Jersey Transit

EDF Climate Corps 2015

July 31, 2015

Written by

Daniel Ryan

University of Michigan Master of Science Candidate, Class of 2016

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&

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EDF Climate Corps (edfclimatecorps.org) taps the talents of tomorrow's leaders to save energy, money and the environment by placing specially-trained EDF fellows in companies, cities and universities as dedicated energy problem solvers. The following report is the result of a 10 week Climate Corps fellowship at New Jersey Transit.

EXECUTIVE SUMMARY

This report provides an analysis of five strategic facilities, two passenger train stations and three bus maintenance garages, identified as a part of the NJ TransitGrid project. Within the context of facility use and operation, the analysis focuses on the current energy consumption and costs, opportunities for energy efficiency measures, and distributed energy options capable of supplying reliable power during storms or other times when the utility grid is compromised.

A number of cost-effective energy efficiency (EE) and distributed energy resources (DER) are recommended for the five facilities – Newark Penn, Secaucus Junction, Wayne bus garage, Meadowlands bus garage, and Greenville bus garage. EE upgrades include: replacement of high use and high wattage lights with LEDs, efficiency retrofits for escalators, variable frequency drives for air handling units and pumps, and replacement of old and inefficient HVAC equipment. DER recommendations include: Combined Heat and Power (CHP) systems for electricity and heating requirements, solar photovoltaic (PV) for cost and environmental benefits, and batteries for facility black start capabilities and grid stabilization.

The EE recommendations result in a 30% reduction in electricity consumption and a 32% reduction in natural gas consumption.

GLOSSARY

ACRP – Airport Cooperative Research Program

Ancillary Services Market – A market operated by an RTO/ISO that provides resource balancing stability services to the electric grid

Belt drive – A power transmission mechanism through a belt, seen in many fans; V-belts are a common type, cogged belts are notched belts that perform the same function with fewer energy losses

BMS – Building Management System, a software system integrated with sensors and controls that can monitor and control HVAC and electrical equipment in a building

BPU – New Jersey Board of Public Utilities

CHP – Combined Heat and Power or cogeneration is a power station that generates both electricity and useful heat.

CFM – Cubic Feet per Minute, a unit of flow rate

Critical Facilities – Facilities that are considered essential to NJ Transit services and operations, as noted in the NJ TransitGrid application

DG –Distributed Generation is a physical infrastructure installed in a building or a facility that generates energy, mainly electricity, to be used at the facility.

DER – Distributed Energy Resources consists of a range of smaller-scale and modular devices designed to provide electricity, and sometimes also thermal energy, in locations close to consumers. They include fossil and renewable energy technologies (e.g., photovoltaic arrays, wind turbines, microturbines, reciprocating engines, fuel cells, combustion turbines, and steam turbines); energy storage devices (e.g., batteries and flywheels); and combined heat and power systems.

Discount Rate – The discount rate refers to the interest rate used in discounted cash flow analysis to determine the present value of future cash flows

DOE-2 and EnergyPlus – Open source building energy simulation engines developed by the Department of Energy (DOE), these can be run independently or through third party graphical user interfaces

Energy Efficiency or EE – Something is energy efficient if it delivers more services for the same energy input, or the same services for less energy input.

GHG – Greenhouse gases, notably carbon dioxide, methane, and nitrous oxide

HID Lamps – High Intensity Discharge lamps are a type of electrical gas-discharge lamp which produces light by means of an electric arc between tungsten electrodes

High bay lights – Lights that are designed to be used in very high areas (approximately 8m and greater) to provide well distributed and uniform light for open areas

HP – Horse Power, a unit of power equivalent to 740 Watts

HVLS fan – High Volume Low Speed fans are large fans that operate at a low speed and displace a large volume of air in operation

HV unit – Heating and Ventilation unit, a packaged rooftop unit that provides ventilation and heat

HVAC – Heating Ventilation and Air Conditioning system

LED – Light emitting diodes, within context of this report LED light bulbs, are a lighting technology that make use of semiconductors and consume less energy than traditional bulbs (e.g. metal halide and incandescent) for the same level of lighting provided

LHV – Lower Heating Value, a unit of measurement for heat released by a substance upon combustion after subtracting the heat required for vaporization of water

MBH – Thousand (M) British Thermal Units per Hour, a unit of heat rate

MECs – Motor Efficiency Controls is a device that controls operation of AC motors

MMBTU – Million British Thermal Units, a unit of measurement of heat, also used as a unit to measure natural gas based on the amount of heat it can supply upon combustion

NG – Natural Gas

NJCEP – New Jersey Clean Energy Program is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment

NREL – National Renewable Energy Laboratory

PATH – Port Authority Trans Hudson (subway)

PJM – Regional transmission organization (RTO) that coordinates the wholesale electricity market in all or parts of 13 states, mainly in the mid-Atlantic region

RFP – Request for Proposal is a solicitation made by a company interested in procurement of a commodity or a service.

Simple Payback or Payback Period – Length of time required to recover the investment cost

Solar PV – Solar photovoltaic, interchangeably denoted as solar or PV, is the technology that produces electricity from solar energy

SRECs – Solar Renewable Energy Credits are tradable environmental commodities in an established market. Each credit represents 1000 kilowatt-hours (kWh) of solar energy generated by an eligible solar renewable energy system.

VAV box – Variable Air Volume boxes vary the airflow at a constant temperature as a part of a larger HVAC system

VFD – Variable Frequency Drive is a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the motor

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OVERVIEW AND BACKGROUND

NJ Transit is New Jersey's public transportation corporation. Covering a service area of 5,325 square miles, NJ Transit is the nation's third largest provider of bus, rail and light rail transit, linking major points in New Jersey, New York and Philadelphia. The agency operates a fleet of 2,027 buses, 711 trains and 45 light rail vehicles. On 236 bus routes and 12 rail lines statewide, NJ Transit provides nearly 223 million passenger trips each year.

In October of 2012, Superstorm Sandy damaged much of NJ Transit's infrastructure and the supporting electric grid, forcing NJ Transit to suspend much of its service. In response to the event, NJ Transit collaborated with the U.S. Department of Energy (DOE) Sandia National Laboratories to design potential energy resilience solutions to support critical transit infrastructure. A number of other state organizations and stakeholders, including the Environmental Defense Fund, were consulted throughout the design process. The result of these collaborations is "NJ TransitGrid" (TransitGrid) – a microgrid capable of providing highly reliable power to support NJ Transit, Amtrak, and PATH's critical energy load 24 hours a day, 7 days a week.

Two EDF fellows, Sindhu Maiyya and Daniel Ryan, focused on five facilities in the TransitGrid application. These facilities were deemed critical and require the ability to operate independently of the larger utility electric grid and NJ Transit traction microgrid. The five facilities included two passenger train and bus stations and three bus garages in northern New Jersey:

- Newark Penn Station
- Secaucus Junction
- Meadowlands bus garage
- Wayne bus garage
- Greenville bus garage

The three bus garages operate 24 hours a day, while Newark Penn and Secaucus Junction operate nearly 24 hours a day with some services reduced or stopped late in the evening or early in the morning. While the bus garages did differ some in terms of layout and building size, their energy use patterns are similar because of their operational characteristics and thus our recommendations are alike. Even though Newark Penn and Secaucus provide similar transit services, the difference in age and building design did dictate dissimilar recommendations in some respects, particularly for energy efficiency.

After studying facility use and energy patterns, we researched and analyzed energy efficiency and distributed energy resource architectures that would support the resiliency requirements of the facility. Recommended energy efficiency upgrades include: replacement of high wattage lights (used most, if not all, of the time) with LEDs, efficiency retrofits for escalators, variable frequency drives for air handling units and pumps, and replacement of old and inefficient HVAC equipment. Distributed energy resource recommendations include: Combined Heat and Power (CHP) systems for electricity and heating requirements, solar PV for cost and environmental benefits, and batteries for facility black start capabilities and grid stabilization.

RECOMMENDED ENERGY EFFICIENCY PROJECTS

The following energy efficiency projects were analyzed to determine the potential reduction in energy consumption, greenhouse gas (GHG) emissions, and costs. A summary of the recommended projects is given in Table 2. Detailed descriptions of each project appear in the following section.

Project	Sensitive to	Annual Savings (\$/yr)	Annual GHG Reduction (ton/yr)
Bus garages lighting retrofit	Electricity price, projected electricity savings	\$165,349	1,255
Newark Penn lighting upgrade	Electricity price, projected electricity savings	\$185,318	1,424
Newark Penn escalators (17) retrofit	Electricity price, projected savings and installation cost	\$14,559	91
Secaucus escalators (30) retrofit	Electricity price, estimated savings and installation cost	\$21,838	137
Newark Penn HVAC upgrade	NG price, estimated savings, rebates	\$141,800	920
Secaucus HVAC upgrade	Electricity price, estimated savings, rebates, plumbing and ductwork cost	\$174,000	949
Meadowlands HVAC upgrade	Gas price, efficiency gains, electricity price	\$93,300	656
Greenville HVAC upgrade	Gas price, efficiency gains, electricity price	\$58,140	418
Wayne HVAC upgrade	Gas price, efficiency gains from upgrade	\$60,700	421
Big Ass (HVLS) fans		savings from increased comfort	

Exhaust Fans: V-belt to cogged belt	Exhaust fan operating hours	\$5,600	28
Total		\$920,604	6,299

Table 1: A summary of proposed EE projects

INDIVIDUAL PROJECT OVERVIEW

The passenger stations – Newark Penn and Secaucus Junction – and the bus garage facilities at Meadowlands, Wayne, and Greenville are among the critical bus facilities included in NJ TransitGrid application. These will be the sites for local distributed generation through solar PV, CHP, and batteries. **Reducing the energy consumption at these sites along with the capability to manage the energy consumption is the first step towards making these facilities resilient.** Improving energy efficiency of the equipment at these facilities will avoid excess investment on oversized distributed generation and will make the systems robust to future equipment upgrades. We recommend the following upgrades at these facilities that can achieve this goal. These upgrades result in operational and maintenance savings, which by itself adds financial value to these upgrades.

Station and Bus Garages Lighting Upgrade

The three bus garages together use over one thousand high bay metal halide lamps that are rated at 400 watts. Newark Penn station alone has over 3,500 light bulbs, many of which are high intensity metal halide, induction, and high pressure sodium bulbs. These light bulbs are kept on 24/7 throughout the year. These lights are not only energy intensive, but also prone to failure because of brownouts and frequency fluctuations at these facilities, especially Wayne, Meadowlands, and Newark Penn.

Replacing these bulbs with comparable LED lamps is highly favored by the maintenance staff at these facilities, because of their low maintenance requirements, longevity, and increased energy service. Just by upgrading to LEDs, more than 50% of electricity consumed on lighting can be reduced. Including sensors and dimming capabilities can result in deeper energy savings, totaling up to 80% reduction in the lighting load.

We did not receive detailed lighting information from Secaucus, therefore, we could not perform a similar analysis. However, we observed that on average lighting contributes to a significant portion of electricity consumed at NJ Transit facilities, so we recommend that Secaucus station be considered for lighting upgrades. Similar to other facilities, we can expect that lighting upgrades at Secaucus will yield large energy reductions.

Project Details

- Project Name: **Newark Penn and Bus Garages Lighting Upgrade**
- Annual Energy Savings (include units): **3,763,032 kWh or over 25%** reduction in annual electricity use at each facility

NJ Clean Energy Program (NJCEP) LED direct replacement rebates are considered. Savings are calculated for individual facilities and then summed.

Recommendations

We recommend NJ Transit complete the bus garage lighting upgrades before the end of 2015. Newark Penn lighting upgrade will involve some design to meet the required lighting level as well as to comply

with historic preservation standards. The lighting upgrade can likely be completed by mid-2016. Detailed analysis of lighting upgrade at Secaucus can be completed by the end of 2015 and the project can be completed by mid-2016. We also recommend the NJ Transit make use of lighting fixtures that include integrated sensors and dimming capabilities to save on design and construction and realize higher savings.

Passenger Stations Escalator and Elevator Upgrade

Secaucus Junction and Newark Penn station have many escalators and elevators, most of which are old and energy intensive. Secaucus has 30 escalators and approximately 20 elevators. Newark Penn has 17 escalators and 20 elevators. According to Airport Cooperative Research Program's (ACRP) escalator cost and energy savings research report installing capacitors and motor efficiency controls (MECs) can result in 10%-15% escalator electricity savings. Further measures such as efficient motors and intermittent drives can add savings but are expensive to install. Considering only the two retrofits in the energy savings model from ACRP, the escalator retrofits have good payback for a small initial investment.

Project Details

- Project Name: **Stations Escalator Retrofit**
- Annual Energy Savings: **321,240 kWh** or **2%** reduction in annual electricity consumption

The energy savings for Newark is calculated based on ACRP's model and the escalator schedule. Since Secaucus escalator schedules were not made available, we have assumed they operate similarly to the Newark Penn escalators to calculate the electricity savings. The ratio of escalators between the two stations, 1.5, is used as a multiplier. The estimated savings are considered a placeholder until detailed escalator schedules become available. Labor cost is assumed to be 25% of the material cost.

Recommendations

Capacitors are useful to smoothing the inrush starting current required by electric motors, which have a power draw of approximately 20 HP in escalators and 60 HP in elevators. MECs reduce energy consumption in escalators that are running idle for a large percentage of their operation hours, which is true in the case of stations. Some capacitors have the functionality to alert if energy consumption by the motor is above a normal threshold, which can help maintenance teams to diagnose problems before failure.

The hydraulic elevators at these stations have ~60 HP motors as opposed to 6 – 8 HP motors in the newer traction elevators. We recommend NJ Transit upgrade elevators to machine room less traction elevators whenever the old ones retire.

Newark Penn HVAC Upgrade

Newark Penn is the only studied facility that has a centralized HVAC system. The station has two 170 ton natural gas engine driven chillers and four new high efficiency condensing boilers. The facility is equipped with variable air volume (VAV) units and outdoor economizers; the equipment can be controlled by its building management system (BMS). Although the building has natural gas powered heating and cooling, the interval data depicts an additional electricity demand of 100 kW during the winter months compared to the shoulder months, which is generally used as a proxy for base load electricity use. Upon discussing with the facility engineer, it was discovered that many portable electric heaters are used in the winter along with other electric supplemental heating. Some areas within the facility (e.g. the police office and a few waiting rooms) also have electric cooling. This equipment is not listed in the design sheets and, consequently, difficult to account for in the analysis.

The CHP plant to be installed at Newark Penn can produce up to 3,400 MBH heat output. This heat can be utilized in the summer months with a vapor absorption chiller (VAC), to supplement the heating from the existing boilers in the winter months, and to provide domestic hot water the rest of the year. The

project involves installing a new VAC, a supplementary chiller, variable frequency drives (VFD) for existing pumps and cooling tower fans, and improving hot and cold air delivery at terminal units to minimize electric heating and cooling.

Project Details

- Project Name: **Newark Penn HVAC Upgrade**
- Annual Energy Savings: **543,318 kWh (7%) and 9800 MMBTU (62%)**

Monthly electricity usage over that past year was used to perform a five parameter (temperature independent electricity consumption or base load, heating set point, cooling set point, heating slope, and cooling slope) regression with the monthly average temperature as the predictor. The temperature independent electricity consumption obtained via the regression (with some buffer) was subtracted from the summer and winter months' electricity consumption to estimate electricity for cooling and heating. These estimates were used to derive electricity savings. The recovered heat from CHP was used to estimate natural gas (NG) savings. Electricity is assumed to cost \$0.12/kWh and natural gas is assumed to cost \$7/MMBTU.

Recommendations

We recommend that the existing 2 chillers be retired, and replaced with a 220 ton VAC and a 120 electric screw chiller. Electric chillers have low capital costs and low operating costs if it is run on electricity produced by the distributed generation at Newark. However, it can add high demand charges on-site electricity becomes unavailable during peak summer hours.

We recommend adding VFDs with motor controls to the primary hot water and cold water pumps as well as cooling tower fans.

We also recommend that HVAC zoning be implemented at Newark Penn and comfort conditioning be improved at offices, so that portable electric heater use can be minimized. In addition, building envelope be improved.

We observed that the vendors in the station were rejecting heat from their kitchens to the conditioned space, which could be minimized by fitting with proper exhaust systems.

The BMS contractor, Siemens, has set up equipment use reports upon our request. This information could be used for detailed design of HVAC upgrade at Newark Penn¹.

Secaucus Station HVAC Upgrade

Secaucus station is a large facility that has over 300,000 square feet of covered area, and is the biggest electricity user among the studied facilities. Although the original plans had envisioned centralized HVAC, non-zonal rooftop units were installed at the time of construction. The facility has over 400 tons of electric cooling and gas heating that is supplemented with electric heating. Analysis of monthly bills depicts an additional electricity demand of 500 kW during the winter months compared to the shoulder months, which is generally used as a proxy for base load electricity use. The additional demand could be a result of electric heating. The facility manager informed us that there are 45 electric heaters in the facility, which supports the electricity consumption observation.

Using the heat output from CHP planned at the station (3,700 MBH) can result in significant electricity savings from cooling and heating, but this would require the facility to be upgraded to a centralized HVAC system. The project involves upgrading the facility to centralized HVAC, installing VACs and an additional direct fired absorption chiller for additional cooling and heating. The direct fired VAC can provide chilled

water in the summer and hot water in the winter, both of which can be used to supplement the thermal output from CHP.

Project Details

- Project Name: **Secaucus HVAC Upgrade**
- Annual Energy Savings: **1,543,000 kWh (18% of annual electricity)**

A regression with monthly average temperatures was performed to determine temperature independent electricity consumption. This, with some buffer, was subtracted from electricity usage in winter (December to March) and summer (May to August) months to estimate electric heating and cooling. Electricity savings were determined based on heating and cooling estimated electricity consumption. Additional natural gas must be purchased to operate the direct fired VAC, which can fulfill heating and cooling demand that is not met by CHP.

Recommendations

NJ Transit should invest more resources in analyzing the costs and benefits of centralizing Secaucus's HVAC with an attached CHP plant. The preliminary analysis show that a significant reduction in electricity demand can be realized by converting all of the electric heating and cooling to natural gas, which in turn can affect CHP sizing. We recommend that DOE-2 or EnergyPlus 8,670 hour simulation be done by the end of 2015 to estimate building energy use post upgrades. The results should be used to optimize HVAC upgrades, CHP generation, and PV generation together as a system to determine the best course of action.

The facility has poor insulation, does not appear to have proper HVAC system zoning, and the equipment is not integrated with BMS software. Since this a transfer station that has most of the passenger activity during busy hours, we recommend that proper zoning and schedules be included in the new HVAC design. We also recommend installing a new integrated BMS with HVAC, motor, and lighting controls.

Bus Garages HVAC Upgrade

The bus garages have areas for vehicle storage, bus washing, maintenance, drivers, locker rooms, and offices. The offices and drivers areas are air-conditioned. HVAC upgrades for offices have not been considered in this analysis, as we could not get detailed plans and schedules. The garages have high ceilings, 19 feet, and large open spaces. They have 20 year old packaged rooftop HV units, which need frequent maintenance and repair. In addition to the rooftop HV units, the garages have considered it necessary to install between 25 and 40 gas fired unit heaters to provide supplemental heating.

The mechanical codes at the time of their construction required 1.5 cfm/sqft of ventilation, resulting in high ventilation electricity usage throughout the year and high gas usage for heating during the winter months.

If the ventilation system is retained, it is not economical to install centralized systems at the garages. The analysis evaluates the installation of high efficiency direct fired rooftop heaters, make-up air units for space heating, and infrared heaters for comfort heating at the garages.

Project Details

- Project Name: **Garages HVAC Upgrade**
- Annual Energy Savings
 - Meadowlands: **247,238 kWh (10%) + 9,189 MMBTU (35%)**
 - Wayne: **240,000 kWh (11%) + 4,713 MMBTU (31%)**
 - Greenville: **59,280 kWh (4%) + 7,151 MMBTU (33%)**

Natural gas savings are estimated based on efficiency gains from installing new equipment (72% to 94%); older indirect fired heaters have a seasonal efficiency of less than 75%. The electricity savings are based on efficiency gains from including high efficiency motors in the new heating units.

Sizing of new rooftop heaters is based on maximum gas consumption in the past year, i.e., based on highest monthly consumption in the past year.

Recommendations

We recommend older indirect fired rooftop heaters be retired, along with many unit heaters and electric heaters, and be replaced with direct fired high efficiency “blow thru” heaters at the garages. The burner is located downstream of the blower in “blow-thru” heaters, which improves the longevity of critical components in the heater. Cambridge Engineering’s Model S and Model M series of space heaters and make up heaters are modeled in this analysis. Based on discussion with vendor Dynatherm Corp. (Livingston, NJ), these heaters comply with the local codes and have been successfully installed in parking garages. These heaters are more efficient and have a better destratification of warm air. This, along with the high volume low speed (HVLS) fans, results in improved comfort in maintenance areas of the garages. We also recommend the installation of speed doors at the garages that don’t have them to improve the building envelope.

The current mechanical code requires garages to have 0.75 cfm/sqft of ventilation, but does allow for variances if toxic gas sensors are installed. We recommend NJ Transit look into integrating CO, NO₂ and unburnt hydrocarbon sensors with garage ventilation system to regulate the ventilation based on the concentration of these gases. This can result in a lot more energy savings.

The CHP heat output at these garages can be utilized for the offices and drivers’ area at an added cost of installing a 50 ton absorption chiller and by installing the necessary plumbing and equipment. The BMS contractor, Siemens, has been requested to set up reports for equipment use at Meadowlands and Wayne garages. This information can be used for detailed design of HVAC upgradesⁱⁱ.

Big Ass (HVLS) fans

“Big Ass” fans or HVLS fans provide comfort draft in the summer and hot air destratification in the winter. Case studies show that these fans can bring in energy savings from HVAC due to uniform distribution of air and by allowing set points to be higher or lower as applicable. They can be installed at garage maintenance areas and station waiting rooms.

Project Details

- Project Name: **Big Ass (HVLS) Fans**
- Annual Energy Savings: NA

No calculations have been made about savings from these fans.

Belt Drives Upgrade

V-belt drives are used in most of the exhaust fans and HV unit fans at the garages. Older belt drives have worn sheaves and slippage. They also have frequent maintenance issues as was observed at the garages. Upgrading v-belt drives to cogged belt drives result in 3% energy savings in these fans.

Project Details

- Project Name: **Belt Drives Upgrade at Garages**
- Annual Energy Savings: **38,830 kWh** or **1%** of annual electricity consumption at three garages

Recommendations

We recommend NJ Transit upgrade v-belt drives to cogged belt drives wherever possible. The upgrade is not expensive and results in a payback period of less than a year. We recommend this measure for older or new fans that have v-belt drives at the three garages.

RECOMMENDED DISTRIBUTED ENERGY RESOURCE PROJECTS

To support continued operations in the event of a larger electric grid outage, several distributed energy technologies were considered, namely Combined Heat and Power (CHP), solar photovoltaic (PV), and a battery for energy storage. Each of the three technologies was modeled separately and the results of the two energy generation technologies (CHP and PV) results were then optimized. It was assumed that any energy generated from the PV system in excess of facility electricity requirements would be net metered and credited on a monthly and annual basis as per the Public Service Enterprise Group (PSE&G) electricity tariff. Although not modeled, the distributed generation controls should consider the CHP efficiency curve, setting the lowest partial load threshold for the CHP plant to either net meter solar energy or shut down the CHP plant. Inputs to the analysis included: electric and natural gas utility bills and associated tariffs, one year of historical 30 minute electric interval data (2014-2015), two years of PJM hourly frequency regulation market clearing prices (2013 and 2014), industry standard financial and technical specifications for CHP and PV systems.

CHP was modeled in an Excel based model that the Rutgers Center for Energy, Economic, & Environmental Policy (CEEPP) built for the New Jersey Board of Public Utilities (BPU). The National Renewable Energy Laboratory's (NREL) System Advisor Model (SAM) was used to model PV. Finally, we developed a battery discharge model in Excel to provide failover and projected revenue from PJM's ancillary services market.

The following distributed energy resource projects were analyzed to meet facility energy resiliency requirements. For each project the potential reduction in energy consumption, CO₂ emissions, and energy cost savings were also analyzed. A summary table of our recommended projects is below and detailed descriptions of each project follow.

Project	Annual Cost Savings	CO₂ reduction (metric tons/yr)
Newark Penn: CHP, PV, & Battery	\$2,148,976*	3,394
Secaucus Junction: CHP, PV, & Battery	\$2,116,635*	3,895
Wayne Garage: CHP, PV, & Battery	\$815,434*	1,145
Meadowlands Garage: CHP, PV, & Battery	\$747,572*	1,379
Greenville Garage: CHP, PV, & Battery	\$389,155*	824
TOTAL	\$6,217,772*	10,638

Table 2: DER Value, Costs, and Savings Summary

*Represents annual energy savings and projected revenue from PJM ancillary services market (based on hourly regulation market clearing prices in 2014)

INDIVIDUAL PROJECT OVERVIEW

Newark Penn Station

Basic Project Information

Newark Penn Station is a major transportation hub in Newark, New Jersey. It is served by NJ Transit commuter trains, Amtrak Northeast Corridor and long distance trains, the Port Authority Trans Hudson (PATH) subway, the Newark Light Rail, and local and regional bus services. Electricity makes up the majority of its annual energy use and costs. In 2014, the station used about 8,000 MWhs of electricity at a cost of \$904,000. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Newark Penn Station DER Architecture
- CHP Size: 793 kW
- PV Size: 200 kW
- Li-Ion Battery Capacity / Energy: 1.24 MW/1.55 MWh

Since the recommended lighting upgrades have a simple pay back of less than 1 year, it was assumed these were completed prior to completion of the DER project and thus reduced the electric load accordingly. The 200 kW PV potential is a rough estimate of the area above the bus passenger lanes that could be leveraged. For structural and historical preservation reasons, PV on the roof of the main part of the station and above the tracks was not considered. As owners of the PV system and Li-Ion battery, we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Secaucus Junction

Basic Project Information

Secaucus Junction is a large transfer station in Secaucus, New Jersey. It is served by NJ Transit commuter trains and local bus services. Electricity makes up the majority of its annual energy use and costs. In 2014, the station used about 8,200 MWhs of electricity at a cost of \$1,060,000. For resiliency reasons, the CHP plant and battery were sized to meet 75% of annual electric load. An 80% scenario was also analyzed but had a smaller NPV than the 75% scenario.

Project Details

- Project Name: Secaucus Junction DER Architecture

- CHP Size: 875 kW
- PV Size: 500 kW
- Li-Ion Battery Capacity / Energy: 1.2 MW/1.5 MWh

Secaucus Junction opened in 2003 and has a mix of fluorescent, incandescent, and metal-halide lights throughout the station and bus lanes. Because we did not have as complete a lighting inventory as other stations, we assumed a potential 20% reduction in electric load through lighting upgrades that would be finished prior to the completion of the DER project, and thus reduced the electric load accordingly. For comparison purposes, the recommended lighting upgrade at Newark Penn resulted in a 25% reduction in electric load. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Wayne Bus Garage

Basic Project Information

Wayne bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Wayne, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 70-75% of energy costs. In 2014, the station used about 2,070 MWhs of electricity at a cost of \$257,952. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Wayne Bus Garage
- CHP Size: 167 kW
- PV Size: 550 kW
- Li-Ion Battery Capacity / Energy: 377 kW/472kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an

absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Meadowlands Bus Garage

Basic Project Information

Meadowlands bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Meadowlands, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 65% of energy costs. In 2014, the station used about 2,500 MWhs of electricity at a cost of \$368,000. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Meadowlands Bus Garage
- CHP Size: 230 kW
- PV Size: 521 kW
- Li-Ion Battery Capacity / Energy: 330 kW/412kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Greenville Bus Garage

Basic Project Information

Greenville bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Jersey City, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 83% of energy costs. In 2014, the station used about 1,480 MWhs of electricity at a cost of \$180,100. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Greenville Bus Garage
- CHP Size: 132 kW
- PV Size: 289 kW
- Li-Ion Battery Capacity / Energy: 165 kW/205 kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV

electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

RECOMMENDED NEXT STEPS

Action Plan & Timeline

NJ Transit should consider all projects listed above, prioritizing energy efficiency projects that can be completed in less than one year or prior to completion of the CHP plant at each facility.

KEY STAKEHOLDERS

Environmental Services:

John Geitner – Senior Director Environmental Services – 973.491.7017 JGeitner@njtransit.com
Steve Jenks – Manager Energy and Sustainability Programs – 973.491.8589 SJenks@njtransit.com

Capital Planning and Programs:

Steve Santoro – Assistant Executive Director Capital Planning and Programs – 973.491.8960
SSantoro@njtransit.com
Nick Marton – Senior Director TransitGrid Project Manager – 856.614.7003 NMarton@njtransit.com
Eric Daleo – Director Superstorm Sandy Disaster Recovery Capital Planning – 973.491.8528
EDaleo@njtransit.com

Eric Daleo worked with Mary Barber at EDF during the TransitGrid federal grant application. Nick Marton supported the application and is the TransitGrid project manager. Both report to the Assistant Executive Director of capital planning for NJ Transit, Steve Santoro.

Steve Jenks oversaw the work of the EDF fellows and has an extensive technical background in energy and its relation to environmental policy. He reports to John Geitner, who is the Senior Director of Energy, Environment & Sustainability at NJ Transit.

APPENDIX

Energy Use and Analysis

EnergyStar Portfolio Manager

- Inputs (Historical Monthly Consumption and Costs):
 - Newark Penn: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Newark Penn\FCE_Newark_Penn_Energy
 - Secaucus: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Secaucus\FCE_Secaucus_Energy
 - Wayne: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne\FCE_Wayne_Energy
 - Meadowlands: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Meadowlands\Meadowlands_energy\Meadowlands_Energy
 - Greenville: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Greenville\FCE_Greenville_Energy
- Reports: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\EnergyStar Reports
- Portfolio Manager:
 - ID / Password: EDF_CC / NJT2015!

Electric Interval Demand Data and Analysis (1 year of 30 minute demand - <Facility Name> _Interval)

- Newark Penn: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Newark Penn
- Secaucus: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Secaucus
- Wayne: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne
- Meadowlands: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Meadowlands
- Greenville: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Greenville

Site Visit Notes, Questions, and Pictures:

- Site Visits: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Site Visits

Analysis Inputs and References

- Incentives and Rebates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Incentives and Rebates
- PJM References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\PJM Docs
- Utility Tariffs: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\PSEG Tariffs

Equipment Inventory and Financials

- Lighting Inventory: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\Lighting

- Lighting Financials: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\Lighting\Financial Analysis
- HVAC and Electric Equipment Inventory: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\ Station & Garage - HVAC & Lighting_v2.xlsx and a few relevant files in the folder
- Equipment Upgrade Rebates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\NJCEP Rebates.docx

Local Government Energy Audit Program

- RFP: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Audit RFPs

EE and DER Executive Presentation

- EDF Fellow TransitGrid Updates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\TransitGrid Update Presentation

Distributed Generation Analysis

Combined Heat and Power (CHP)

- Industry and Technical References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\References
- EPA CHP Size Estimator: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\EPA CHP Estimator (Spark Spread Estimator)
- CHP Sizing and Cost Benefit Analysis, Combined CHP and PV Systems as Well: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\CHP Cost Benefit Analysis (Rutgers CEEEP Model)

Energy Storage

- Battery Discharge Model (for Frequency Regulation): N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Energy Storage
- References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Energy Storage\References

Solar PV

- PV Scenario Analysis: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Garage and Station PV Analysis
- Hourly Load and PV Generation: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Hourly Load & PV Gen
- Hourly Load Inputs to SAM: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Load Data
- SAM Project: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne\Wayne_SAMS_PV ←includes all PV projects
- Weather Data (TMY): N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Weather Data

Industry References:

- DG and Reliability: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Industry Docs

Energy Efficiency Analysis

- Documented Resources: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\EE upgrade resources
- Vendor Contacts: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\Vendor Contacts.docx

Escalators

- Reference and Model: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Escalators
- Financials: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\Escalator Financial

Temperature Dependent Energy Usage

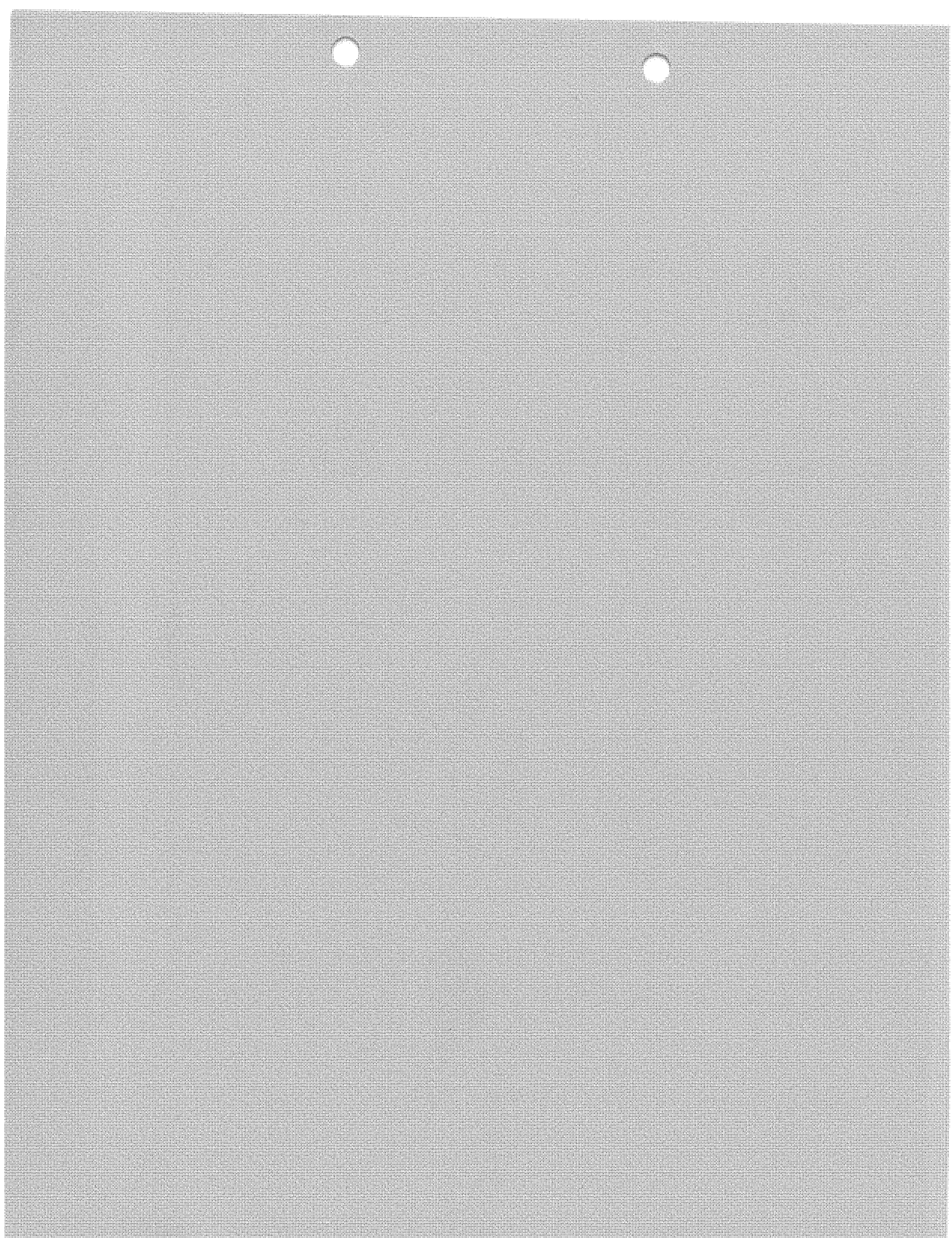
- Reference: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Temperature Dependent
 - The software Energy Explorer C was used to run 5 parameter and 3 parameter regression of electricity and gas monthly usage with monthly average temperatures over the last 6-7 years, depending on the data available for the facility
 - Energy Calculations Based on Regression: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Temperature Dependent\EnergyUse_Compiled for all facilities.xlsx
- These estimates are used in some of the savings calculations for HVAC

HVAC Upgrade Analysis

- Garage Heating: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Garage Heating
- HVAC Upgrade modeling and financial calculations: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\HVAC Upgrades

ⁱ Timothy McKiernan (timothy.mckiernan@siemens.com) is the contact at the BMS vendor, Siemens, who set up these reports at Newark Penn

ⁱⁱ Timothy McKiernan (timothy.mckiernan@siemens.com) is the contact at the BMS vendor, Siemens, who set up these reports at Meadowlands and Wayne





**RFP No.16-001
DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND OTHER TECHNICAL SERVICES FOR THE
NJ TRANSITGRID DISTRIBUTED GENERATION PROJECT**

October 1, 2015

ADDENDUM NO.3

To All Proposers

Proposers are advised of the following clarifications, additions and/or revisions to the above referenced RFP. Such clarifications, additions and/or revisions are incorporated into the RFP Documents by means of this Addendum No.3.

Item No. 1 Revise RFP Section B. PROPOSAL EVALUATION paragraph three to read as follows:

Oral Presentations will provide an opportunity for the Proposer to clarify or elaborate on its written technical proposal. The TEC will conduct the Oral Presentations. The TEC will use the Oral Presentations to Confirm and/or reassess its understanding of the written technical proposals, and incorporate that information into its evaluation by revising the written technical evaluation scores accordingly.

Item No.2

Note the attachment of the July 31, 2015 report as reference and entitled, "Energy Efficiency and Distributed Generation for TransitGrid", Environmental Defense Fund, New Jersey Transit

The following are questions from AECOM and associated answers:

Q. Given that there are multiple locations provided in various sections of the RFP, outlining bus, rail and ferry facilities, for the purpose of clarity, can the NJT confirm the full listing of facilities to be included under the scope of this Distributed Generation Project?

- 1) Greenville, Meadowlands, and Wayne bus garages are included in the project scope along with Newark Broad Street, Secaucus Junction and NJ TRANSIT's commuter rail station at Newark Penn. As noted in the RFP, the DG system design including sizing and optimal technology categories for each ferry facility, passenger station and bus maintenance facility shall be determined by the Consultant as part of this RFP scope and as applicable. The selection of ferry facilities for distributed generation in addition to Weehawken Ferry Terminal, will be based upon the referenced system design analysis and implementation requirements for distributed generation modifications.

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Q. As a general observation, it appears that some of the Tasks outlined in the RFP 15-031 are exactly repeated within RFP 16-001, for example, issues related to Subtask 2.3 Existing Right of Way. Since these distributed energy resources are going to be deployed next to or within existing NJ Transit outlined facilities, can NJT provide some clarification on how this requirement in this section would apply?

2) If not immediately available from NJ TRANSIT, the Consultant shall obtain existing railroad valuation maps from the various rail companies and owners of the ROW including but not limited to Amtrak, Property Description information for candidate bus garages and selected ferry terminals or operations to support design of DG related modifications to such facilities. **The Consultant shall utilize these property descriptions for the various facilities and related drawings and maps to develop Project specific documentation necessary to support DG related facility modification design efforts.**

Q. Under Task 14 Analysis of Ancillary Services Market Revenue opportunity, is the NJT's expectation that the ultimate installed Distributed Generation Resources will be such that these options may be applicable?

3) As indicated under Task 14, this support shall include but not be limited to Project design information necessary to categorize Project infrastructure in order to determine BPU regulatory applicability. Furthermore, **the Consultant shall assist NJ TRANSIT in determining if participation in any PJM market services is statutorily and technically feasible and shall result in further revenue optimization from the operation of the DG Power Generation infrastructure.**

Q. For the purposes of quantifying the applicable scope of services required at each of the identified facilities, is it NJT's expectation that detailed concept verification will need to be completed for all specified Distributed Energy Resource at the facilities outlined?

4) See answer #1 above

Q. Can NJT provide a general overall duration of its expected timeline for the project following the submittal of the 20% preliminary design?

5) The current projection is for implementation to support commissioning of DG technology by the end of 2018.

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Q. There is a conflict in Phase I duration in the RFP. What is the duration of Phase I, 10 or 12 months?

6) 10 months

Q. RFP Page 27 top paragraph states: "The Consultant shall complete the development of the Design Criteria and Preliminary Engineering and bid ready documents for the Project ten (10) months following Notice to Proceed (NTP)."

7) See answer # 6

Q. RFP Page 34, Subtask 1.2.1 first paragraph states: "The Consultant shall develop and maintain a detailed project schedule, representing a practical plan to complete the Contract scope of work, and to meet the overall schedule objective of achieving Bid Ready status by NTP + 12 months."

8) See answer #6

Q. What is the assumed duration for Phase II?

9) Approximately 24 months

The following are questions from CHA ~ design/construction solutions and associated answers:

Q. Page 37 of the Sandia Report lists the ferry terminals as noted in the RFP; then lists "secondary" sites and notes that Liberty Landing is one of them (not sites for this RFP).

10) Facilities projected for potential DG modifications are listed in the RFP.

Q. The precise location of the Liberty State Park Ferry Terminal identified in the RFP is unclear. Could NJ Transit please clarify the facility that they intended to be included in this project at Liberty State Park?

11) As referenced in the RFP, the Sandia Report identifies particular sites under consideration but also notes that other sites may be considered as part of an ongoing analysis. Furthermore, the Feasibility Study referenced the following ferry terminals on the

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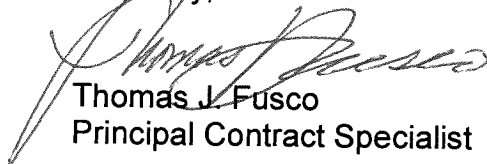
New Jersey side of the Hudson River: Port Imperial, Hoboken South, Paulus Hook, Liberty State Park, and Ferry Maintenance Facility south of Port Imperial as part of such ongoing analyses. Nevertheless, as Liberty State Park ferry services do not augment the proposed NJ TRANSIT limited Northeast Corridor Rail Passenger Service when rail traction power is operated in islanded mode, this ferry service will not be considered for DG modifications.

The Technical Proposal Due Date remains 2:00 P.M October 14, 2015

All firms must acknowledge Addendum No.3 by signing the Acknowledgment of Receipt of the Addenda and including the form as part of its Proposal submission. Failure to do so may render a submittal non-responsive.

This concludes Addendum No.3.

Sincerely,



Thomas J. Fusco
Principal Contract Specialist

CC: Nicholas Marton
Jacquelin Rush-Gilbert
Lisa-Marie Codrington



CLIMATE CORPS

Energy Efficiency and Distributed Generation for TransitGrid

Environmental Defense Fund

New Jersey Transit

EDF Climate Corps 2015

July 31, 2015

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EDF Climate Corps (edfclimatecorps.org) taps the talents of tomorrow's leaders to save energy, money and the environment by placing specially-trained EDF fellows in companies, cities and universities as dedicated energy problem solvers. The following report is the result of a 10 week Climate Corps fellowship at New Jersey Transit.

EXECUTIVE SUMMARY

This report provides an analysis of five strategic facilities, two passenger train stations and three bus maintenance garages, identified as a part of the NJ TransitGrid project. Within the context of facility use and operation, the analysis focuses on the current energy consumption and costs, opportunities for energy efficiency measures, and distributed energy options capable of supplying reliable power during storms or other times when the utility grid is compromised.

A number of cost-effective energy efficiency (EE) and distributed energy resources (DER) are recommended for the five facilities – Newark Penn, Secaucus Junction, Wayne bus garage, Meadowlands bus garage, and Greenville bus garage. EE upgrades include: replacement of high use and high wattage lights with LEDs, efficiency retrofits for escalators, variable frequency drives for air handling units and pumps, and replacement of old and inefficient HVAC equipment. DER recommendations include: Combined Heat and Power (CHP) systems for electricity and heating requirements, solar photovoltaic (PV) for cost and environmental benefits, and batteries for facility black start capabilities and grid stabilization.

The EE recommendations result in a 30% reduction in electricity consumption and a 32% reduction in natural gas consumption.

GLOSSARY

ACRP – Airport Cooperative Research Program

Ancillary Services Market – A market operated by an RTO/ISO that provides resource balancing stability services to the electric grid

Belt drive – A power transmission mechanism through a belt, seen in many fans; V-belts are a common type, cogged belts are notched belts that perform the same function with fewer energy losses

BMS – Building Management System, a software system integrated with sensors and controls that can monitor and control HVAC and electrical equipment in a building

BPU – New Jersey Board of Public Utilities

CHP – Combined Heat and Power or cogeneration is a power station that generates both electricity and useful heat.

CFM – Cubic Feet per Minute, a unit of flow rate

Critical Facilities – Facilities that are considered essential to NJ Transit services and operations, as noted in the NJ TransitGrid application

DG –Distributed Generation is a physical infrastructure installed in a building or a facility that generates energy, mainly electricity, to be used at the facility.

DER – Distributed Energy Resources consists of a range of smaller-scale and modular devices designed to provide electricity, and sometimes also thermal energy, in locations close to consumers. They include fossil and renewable energy technologies (e.g., photovoltaic arrays, wind turbines, microturbines, reciprocating engines, fuel cells, combustion turbines, and steam turbines); energy storage devices (e.g., batteries and flywheels); and combined heat and power systems.

Discount Rate – The discount rate refers to the interest rate used in discounted cash flow analysis to determine the present value of future cash flows

DOE-2 and EnergyPlus – Open source building energy simulation engines developed by the Department of Energy (DOE), these can be run independently or through third party graphical user interfaces

Energy Efficiency or EE – Something is energy efficient if it delivers more services for the same energy input, or the same services for less energy input.

GHG – Greenhouse gases, notably carbon dioxide, methane, and nitrous oxide

HID Lamps – High Intensity Discharge lamps are a type of electrical gas-discharge lamp which produces light by means of an electric arc between tungsten electrodes

High bay lights – Lights that are designed to be used in very high areas (approximately 8m and greater) to provide well distributed and uniform light for open areas

HP – Horse Power, a unit of power equivalent to 740 Watts

HVLS fan – High Volume Low Speed fans are large fans that operate at a low speed and displace a large volume of air in operation

HV unit – Heating and Ventilation unit, a packaged rooftop unit that provides ventilation and heat

HVAC – Heating Ventilation and Air Conditioning system

LED – Light emitting diodes, within context of this report LED light bulbs, are a lighting technology that make use of semiconductors and consume less energy than traditional bulbs (e.g. metal halide and incandescent) for the same level of lighting provided

LHV – Lower Heating Value, a unit of measurement for heat released by a substance upon combustion after subtracting the heat required for vaporization of water

MBH – Thousand (M) British Thermal Units per Hour, a unit of heat rate

MECs – Motor Efficiency Controls is a device that controls operation of AC motors

MMBTU – Million British Thermal Units, a unit of measurement of heat, also used as a unit to measure natural gas based on the amount of heat it can supply upon combustion

NG – Natural Gas

NJCEP – New Jersey Clean Energy Program is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment

NREL – National Renewable Energy Laboratory

PATH – Port Authority Trans Hudson (subway)

PJM – Regional transmission organization (RTO) that coordinates the wholesale electricity market in all or parts of 13 states, mainly in the mid-Atlantic region

RFP – Request for Proposal is a solicitation made by a company interested in procurement of a commodity or a service.

Simple Payback or Payback Period – Length of time required to recover the investment cost

Solar PV – Solar photovoltaic, interchangeably denoted as solar or PV, is the technology that produces electricity from solar energy

SRECs – Solar Renewable Energy Credits are tradable environmental commodities in an established market. Each credit represents 1000 kilowatt-hours (kWh) of solar energy generated by an eligible solar renewable energy system.

VAV box – Variable Air Volume boxes vary the airflow at a constant temperature as a part of a larger HVAC system

VFD – Variable Frequency Drive is a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the motor

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OVERVIEW AND BACKGROUND

NJ Transit is New Jersey's public transportation corporation. Covering a service area of 5,325 square miles, NJ Transit is the nation's third largest provider of bus, rail and light rail transit, linking major points in New Jersey, New York and Philadelphia. The agency operates a fleet of 2,027 buses, 711 trains and 45 light rail vehicles. On 236 bus routes and 12 rail lines statewide, NJ Transit provides nearly 223 million passenger trips each year.

In October of 2012, Superstorm Sandy damaged much of NJ Transit's infrastructure and the supporting electric grid, forcing NJ Transit to suspend much of its service. In response to the event, NJ Transit collaborated with the U.S. Department of Energy (DOE) Sandia National Laboratories to design potential energy resilience solutions to support critical transit infrastructure. A number of other state organizations and stakeholders, including the Environmental Defense Fund, were consulted throughout the design process. The result of these collaborations is "NJ TransitGrid" (TransitGrid) – a microgrid capable of providing highly reliable power to support NJ Transit, Amtrak, and PATH's critical energy load 24 hours a day, 7 days a week.

Two EDF fellows, Sindhu Maiyya and Daniel Ryan, focused on five facilities in the TransitGrid application. These facilities were deemed critical and require the ability to operate independently of the larger utility electric grid and NJ Transit traction microgrid. The five facilities included two passenger train and bus stations and three bus garages in northern New Jersey:

- Newark Penn Station
- Secaucus Junction
- Meadowlands bus garage
- Wayne bus garage
- Greenville bus garage

The three bus garages operate 24 hours a day, while Newark Penn and Secaucus Junction operate nearly 24 hours a day with some services reduced or stopped late in the evening or early in the morning. While the bus garages did differ some in terms of layout and building size, their energy use patterns are similar because of their operational characteristics and thus our recommendations are alike. Even though Newark Penn and Secaucus provide similar transit services, the difference in age and building design did dictate dissimilar recommendations in some respects, particularly for energy efficiency.

After studying facility use and energy patterns, we researched and analyzed energy efficiency and distributed energy resource architectures that would support the resiliency requirements of the facility. Recommended energy efficiency upgrades include: replacement of high wattage lights (used most, if not all, of the time) with LEDs, efficiency retrofits for escalators, variable frequency drives for air handling units and pumps, and replacement of old and inefficient HVAC equipment. Distributed energy resource recommendations include: Combined Heat and Power (CHP) systems for electricity and heating requirements, solar PV for cost and environmental benefits, and batteries for facility black start capabilities and grid stabilization.

RECOMMENDED ENERGY EFFICIENCY PROJECTS

The following energy efficiency projects were analyzed to determine the potential reduction in energy consumption, greenhouse gas (GHG) emissions, and costs. A summary of the recommended projects is given in Table 2. Detailed descriptions of each project appear in the following section.

Project	Sensitive to	Annual Savings (\$/yr)	Annual GHG Reduction (ton/yr)
Bus garages lighting retrofit	Electricity price, projected electricity savings	\$165,349	1,255
Newark Penn lighting upgrade	Electricity price, projected electricity savings	\$185,318	1,424
Newark Penn escalators (17) retrofit	Electricity price, projected savings and installation cost	\$14,559	91
Secaucus escalators (30) retrofit	Electricity price, estimated savings and installation cost	\$21,838	137
Newark Penn HVAC upgrade	NG price, estimated savings, rebates	\$141,800	920
Secaucus HVAC upgrade	Electricity price, estimated savings, rebates, plumbing and ductwork cost	\$174,000	949
Meadowlands HVAC upgrade	Gas price, efficiency gains, electricity price	\$93,300	656
Greenville HVAC upgrade	Gas price, efficiency gains, electricity price	\$58,140	418
Wayne HVAC upgrade	Gas price, efficiency gains from upgrade	\$60,700	421
Big Ass (HVLS) fans		savings from increased comfort	

Exhaust Fans: V-belt to cogged belt	Exhaust fan operating hours	\$5,600	28
Total		\$920,604	6,299

Table 1: A summary of proposed EE projects

INDIVIDUAL PROJECT OVERVIEW

The passenger stations – Newark Penn and Secaucus Junction – and the bus garage facilities at Meadowlands, Wayne, and Greenville are among the critical bus facilities included in NJ TransitGrid application. These will be the sites for local distributed generation through solar PV, CHP, and batteries. **Reducing the energy consumption at these sites along with the capability to manage the energy consumption is the first step towards making these facilities resilient.** Improving energy efficiency of the equipment at these facilities will avoid excess investment on oversized distributed generation and will make the systems robust to future equipment upgrades. We recommend the following upgrades at these facilities that can achieve this goal. These upgrades result in operational and maintenance savings, which by itself adds financial value to these upgrades.

Station and Bus Garages Lighting Upgrade

The three bus garages together use over one thousand high bay metal halide lamps that are rated at 400 watts. Newark Penn station alone has over 3,500 light bulbs, many of which are high intensity metal halide, induction, and high pressure sodium bulbs. These light bulbs are kept on 24/7 throughout the year. These lights are not only energy intensive, but also prone to failure because of brownouts and frequency fluctuations at these facilities, especially Wayne, Meadowlands, and Newark Penn.

Replacing these bulbs with comparable LED lamps is highly favored by the maintenance staff at these facilities, because of their low maintenance requirements, longevity, and increased energy service. Just by upgrading to LEDs, more than 50% of electricity consumed on lighting can be reduced. Including sensors and dimming capabilities can result in deeper energy savings, totaling up to 80% reduction in the lighting load.

We did not receive detailed lighting information from Secaucus, therefore, we could not perform a similar analysis. However, we observed that on average lighting contributes to a significant portion of electricity consumed at NJ Transit facilities, so we recommend that Secaucus station be considered for lighting upgrades. Similar to other facilities, we can expect that lighting upgrades at Secaucus will yield large energy reductions.

Project Details

- Project Name: **Newark Penn and Bus Garages Lighting Upgrade**
- Annual Energy Savings (include units): **3,763,032 kWh or over 25%** reduction in annual electricity use at each facility

NJ Clean Energy Program (NJCEP) LED direct replacement rebates are considered. Savings are calculated for individual facilities and then summed.

Recommendations

We recommend NJ Transit complete the bus garage lighting upgrades before the end of 2015. Newark Penn lighting upgrade will involve some design to meet the required lighting level as well as to comply

with historic preservation standards. The lighting upgrade can likely be completed by mid-2016. Detailed analysis of lighting upgrade at Secaucus can be completed by the end of 2015 and the project can be completed by mid-2016. We also recommend the NJ Transit make use of lighting fixtures that include integrated sensors and dimming capabilities to save on design and construction and realize higher savings.

Passenger Stations Escalator and Elevator Upgrade

Secaucus Junction and Newark Penn station have many escalators and elevators, most of which are old and energy intensive. Secaucus has 30 escalators and approximately 20 elevators. Newark Penn has 17 escalators and 20 elevators. According to Airport Cooperative Research Program's (ACRP) escalator cost and energy savings research report installing capacitors and motor efficiency controls (MECs) can result in 10%-15% escalator electricity savings. Further measures such as efficient motors and intermittent drives can add savings but are expensive to install. Considering only the two retrofits in the energy savings model from ACRP, the escalator retrofits have good payback for a small initial investment.

Project Details

- Project Name: **Stations Escalator Retrofit**
- Annual Energy Savings: **321,240 kWh** or **2%** reduction in annual electricity consumption

The energy savings for Newark is calculated based on ACRP's model and the escalator schedule. Since Secaucus escalator schedules were not made available, we have assumed they operate similarly to the Newark Penn escalators to calculate the electricity savings. The ratio of escalators between the two stations, 1.5, is used as a multiplier. The estimated savings are considered a placeholder until detailed escalator schedules become available. Labor cost is assumed to be 25% of the material cost.

Recommendations

Capacitors are useful to smoothing the inrush starting current required by electric motors, which have a power draw of approximately 20 HP in escalators and 60 HP in elevators. MECs reduce energy consumption in escalators that are running idle for a large percentage of their operation hours, which is true in the case of stations. Some capacitors have the functionality to alert if energy consumption by the motor is above a normal threshold, which can help maintenance teams to diagnose problems before failure.

The hydraulic elevators at these stations have ~60 HP motors as opposed to 6 – 8 HP motors in the newer traction elevators. We recommend NJ Transit upgrade elevators to machine room less traction elevators whenever the old ones retire.

Newark Penn HVAC Upgrade

Newark Penn is the only studied facility that has a centralized HVAC system. The station has two 170 ton natural gas engine driven chillers and four new high efficiency condensing boilers. The facility is equipped with variable air volume (VAV) units and outdoor economizers; the equipment can be controlled by its building management system (BMS). Although the building has natural gas powered heating and cooling, the interval data depicts an additional electricity demand of 100 kW during the winter months compared to the shoulder months, which is generally used as a proxy for base load electricity use. Upon discussing with the facility engineer, it was discovered that many portable electric heaters are used in the winter along with other electric supplemental heating. Some areas within the facility (e.g. the police office and a few waiting rooms) also have electric cooling. This equipment is not listed in the design sheets and, consequently, difficult to account for in the analysis.

The CHP plant to be installed at Newark Penn can produce up to 3,400 MBH heat output. This heat can be utilized in the summer months with a vapor absorption chiller (VAC), to supplement the heating from the existing boilers in the winter months, and to provide domestic hot water the rest of the year. The

project involves installing a new VAC, a supplementary chiller, variable frequency drives (VFD) for existing pumps and cooling tower fans, and improving hot and cold air delivery at terminal units to minimize electric heating and cooling.

Project Details

- Project Name: **Newark Penn HVAC Upgrade**
- Annual Energy Savings: **543,318 kWh (7%) and 9800 MMBTU (62%)**

Monthly electricity usage over that past year was used to perform a five parameter (temperature independent electricity consumption or base load, heating set point, cooling set point, heating slope, and cooling slope) regression with the monthly average temperature as the predictor. The temperature independent electricity consumption obtained via the regression (with some buffer) was subtracted from the summer and winter months' electricity consumption to estimate electricity for cooling and heating. These estimates were used to derive electricity savings. The recovered heat from CHP was used to estimate natural gas (NG) savings. Electricity is assumed to cost \$0.12/kWh and natural gas is assumed to cost \$7/MMBTU.

Recommendations

We recommend that the existing 2 chillers be retired, and replaced with a 220 ton VAC and a 120 electric screw chiller. Electric chillers have low capital costs and low operating costs if it is run on electricity produced by the distributed generation at Newark. However, it can add high demand charges on-site electricity becomes unavailable during peak summer hours.

We recommend adding VFDs with motor controls to the primary hot water and cold water pumps as well as cooling tower fans.

We also recommend that HVAC zoning be implemented at Newark Penn and comfort conditioning be improved at offices, so that portable electric heater use can be minimized. In addition, building envelope be improved.

We observed that the vendors in the station were rejecting heat from their kitchens to the conditioned space, which could be minimized by fitting with proper exhaust systems.

The BMS contractor, Siemens, has set up equipment use reports upon our request. This information could be used for detailed design of HVAC upgrade at Newark Penn¹.

Secaucus Station HVAC Upgrade

Secaucus station is a large facility that has over 300,000 square feet of covered area, and is the biggest electricity user among the studied facilities. Although the original plans had envisioned centralized HVAC, non-zonal rooftop units were installed at the time of construction. The facility has over 400 tons of electric cooling and gas heating that is supplemented with electric heating. Analysis of monthly bills depicts an additional electricity demand of 500 kW during the winter months compared to the shoulder months, which is generally used as a proxy for base load electricity use. The additional demand could be a result of electric heating. The facility manager informed us that there are 45 electric heaters in the facility, which supports the electricity consumption observation.

Using the heat output from CHP planned at the station (3,700 MBH) can result in significant electricity savings from cooling and heating, but this would require the facility to be upgraded to a centralized HVAC system. The project involves upgrading the facility to centralized HVAC, installing VACs and an additional direct fired absorption chiller for additional cooling and heating. The direct fired VAC can provide chilled

water in the summer and hot water in the winter, both of which can be used to supplement the thermal output from CHP.

Project Details

- Project Name: **Secaucus HVAC Upgrade**
- Annual Energy Savings: **1,543,000 kWh (18% of annual electricity)**

A regression with monthly average temperatures was performed to determine temperature independent electricity consumption. This, with some buffer, was subtracted from electricity usage in winter (December to March) and summer (May to August) months to estimate electric heating and cooling. Electricity savings were determined based on heating and cooling estimated electricity consumption. Additional natural gas must be purchased to operate the direct fired VAC, which can fulfill heating and cooling demand that is not met by CHP.

Recommendations

NJ Transit should invest more resources in analyzing the costs and benefits of centralizing Secaucus's HVAC with an attached CHP plant. The preliminary analysis show that a significant reduction in electricity demand can be realized by converting all of the electric heating and cooling to natural gas, which in turn can affect CHP sizing. We recommend that DOE-2 or EnergyPlus 8,670 hour simulation be done by the end of 2015 to estimate building energy use post upgrades. The results should be used to optimize HVAC upgrades, CHP generation, and PV generation together as a system to determine the best course of action.

The facility has poor insulation, does not appear to have proper HVAC system zoning, and the equipment is not integrated with BMS software. Since this a transfer station that has most of the passenger activity during busy hours, we recommend that proper zoning and schedules be included in the new HVAC design. We also recommend installing a new integrated BMS with HVAC, motor, and lighting controls.

Bus Garages HVAC Upgrade

The bus garages have areas for vehicle storage, bus washing, maintenance, drivers, locker rooms, and offices. The offices and drivers areas are air-conditioned. HVAC upgrades for offices have not been considered in this analysis, as we could not get detailed plans and schedules. The garages have high ceilings, 19 feet, and large open spaces. They have 20 year old packaged rooftop HVAC units, which need frequent maintenance and repair. In addition to the rooftop HVAC units, the garages have considered it necessary to install between 25 and 40 gas fired unit heaters to provide supplemental heating.

The mechanical codes at the time of their construction required 1.5 cfm/sqft of ventilation, resulting in high ventilation electricity usage throughout the year and high gas usage for heating during the winter months.

If the ventilation system is retained, it is not economical to install centralized systems at the garages. The analysis evaluates the installation of high efficiency direct fired rooftop heaters, make-up air units for space heating, and infrared heaters for comfort heating at the garages.

Project Details

- Project Name: **Garages HVAC Upgrade**
- Annual Energy Savings
 - Meadowlands: **247,238 kWh (10%) + 9,189 MMBTU (35%)**
 - Wayne: **240,000 kWh (11%) + 4,713 MMBTU (31%)**
 - Greenville: **59,280 kWh (4%) + 7,151 MMBTU (33%)**

Natural gas savings are estimated based on efficiency gains from installing new equipment (72% to 94%); older indirect fired heaters have a seasonal efficiency of less than 75%. The electricity savings are based on efficiency gains from including high efficiency motors in the new heating units.

Sizing of new rooftop heaters is based on maximum gas consumption in the past year, i.e., based on highest monthly consumption in the past year.

Recommendations

We recommend older indirect fired rooftop heaters be retired, along with many unit heaters and electric heaters, and be replaced with direct fired high efficiency "blow thru" heaters at the garages. The burner is located downstream of the blower in "blow-thru" heaters, which improves the longevity of critical components in the heater. Cambridge Engineering's Model S and Model M series of space heaters and make up heaters are modeled in this analysis. Based on discussion with vendor Dynatherm Corp. (Livingston, NJ), these heaters comply with the local codes and have been successfully installed in parking garages. These heaters are more efficient and have a better destratification of warm air. This, along with the high volume low speed (HVLS) fans, results in improved comfort in maintenance areas of the garages. We also recommend the installation of speed doors at the garages that don't have them to improve the building envelope.

The current mechanical code requires garages to have 0.75 cfm/sqft of ventilation, but does allow for variances if toxic gas sensors are installed. We recommend NJ Transit look into integrating CO, NO₂ and unburnt hydrocarbon sensors with garage ventilation system to regulate the ventilation based on the concentration of these gases. This can result in a lot more energy savings.

The CHP heat output at these garages can be utilized for the offices and drivers' area at an added cost of installing a 50 ton absorption chiller and by installing the necessary plumbing and equipment. The BMS contractor, Siemens, has been requested to set up reports for equipment use at Meadowlands and Wayne garages. This information can be used for detailed design of HVAC upgradesⁱⁱ.

Big Ass (HVLS) fans

"Big Ass" fans or HVLS fans provide comfort draft in the summer and hot air destratification in the winter. Case studies show that these fans can bring in energy savings from HVAC due to uniform distribution of air and by allowing set points to be higher or lower as applicable. They can be installed at garage maintenance areas and station waiting rooms.

Project Details

- Project Name: **Big Ass (HVLS) Fans**
- Annual Energy Savings: NA

No calculations have been made about savings from these fans.

Belt Drives Upgrade

V-belt drives are used in most of the exhaust fans and HV unit fans at the garages. Older belt drives have worn sheaves and slippage. They also have frequent maintenance issues as was observed at the garages. Upgrading v-belt drives to cogged belt drives result in 3% energy savings in these fans.

Project Details

- Project Name: **Belt Drives Upgrade at Garages**
- Annual Energy Savings: **38,830 kWh** or **1%** of annual electricity consumption at three garages

Recommendations

We recommend NJ Transit upgrade v-belt drives to cogged belt drives wherever possible. The upgrade is not expensive and results in a payback period of less than a year. We recommend this measure for older or new fans that have v-belt drives at the three garages.

RECOMMENDED DISTRIBUTED ENERGY RESOURCE PROJECTS

To support continued operations in the event of a larger electric grid outage, several distributed energy technologies were considered, namely Combined Heat and Power (CHP), solar photovoltaic (PV), and a battery for energy storage. Each of the three technologies was modeled separately and the results of the two energy generation technologies (CHP and PV) results were then optimized. It was assumed that any energy generated from the PV system in excess of facility electricity requirements would be net metered and credited on a monthly and annual basis as per the Public Service Enterprise Group (PSE&G) electricity tariff. Although not modeled, the distributed generation controls should consider the CHP efficiency curve, setting the lowest partial load threshold for the CHP plant to either net meter solar energy or shut down the CHP plant. Inputs to the analysis included: electric and natural gas utility bills and associated tariffs, one year of historical 30 minute electric interval data (2014-2015), two years of PJM hourly frequency regulation market clearing prices (2013 and 2014), industry standard financial and technical specifications for CHP and PV systems.

CHP was modeled in an Excel based model that the Rutgers Center for Energy, Economic, & Environmental Policy (CEEPP) built for the New Jersey Board of Public Utilities (BPU). The National Renewable Energy Laboratory's (NREL) System Advisor Model (SAM) was used to model PV. Finally, we developed a battery discharge model in Excel to provide failover and projected revenue from PJM's ancillary services market.

The following distributed energy resource projects were analyzed to meet facility energy resiliency requirements. For each project the potential reduction in energy consumption, CO₂ emissions, and energy cost savings were also analyzed. A summary table of our recommended projects is below and detailed descriptions of each project follow.

Project	Annual Cost Savings	CO₂ reduction (metric tons/yr)
Newark Penn: CHP, PV, & Battery	\$2,148,976*	3,394
Secaucus Junction: CHP, PV, & Battery	\$2,116,635*	3,895
Wayne Garage: CHP, PV, & Battery	\$815,434*	1,145
Meadowlands Garage: CHP, PV, & Battery	\$747,572*	1,379
Greenville Garage: CHP, PV, & Battery	\$389,155*	824
TOTAL	\$6,217,772*	10,638

Table 2: DER Value, Costs, and Savings Summary

*Represents annual energy savings and projected revenue from PJM ancillary services market (based on hourly regulation market clearing prices in 2014)

INDIVIDUAL PROJECT OVERVIEW

Newark Penn Station

Basic Project Information

Newark Penn Station is a major transportation hub in Newark, New Jersey. It is served by NJ Transit commuter trains, Amtrak Northeast Corridor and long distance trains, the Port Authority Trans Hudson (PATH) subway, the Newark Light Rail, and local and regional bus services. Electricity makes up the majority of its annual energy use and costs. In 2014, the station used about 8,000 MWhs of electricity at a cost of \$904,000. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Newark Penn Station DER Architecture
- CHP Size: 793 kW
- PV Size: 200 kW
- Li-Ion Battery Capacity / Energy: 1.24 MW/1.55 MWh

Since the recommended lighting upgrades have a simple pay back of less than 1 year, it was assumed these were completed prior to completion of the DER project and thus reduced the electric load accordingly. The 200 kW PV potential is a rough estimate of the area above the bus passenger lanes that could be leveraged. For structural and historical preservation reasons, PV on the roof of the main part of the station and above the tracks was not considered. As owners of the PV system and Li-Ion battery, we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Secaucus Junction

Basic Project Information

Secaucus Junction is a large transfer station in Secaucus, New Jersey. It is served by NJ Transit commuter trains and local bus services. Electricity makes up the majority of its annual energy use and costs. In 2014, the station used about 8,200 MWhs of electricity at a cost of \$1,060,000. For resiliency reasons, the CHP plant and battery were sized to meet 75% of annual electric load. An 80% scenario was also analyzed but had a smaller NPV than the 75% scenario.

Project Details

- Project Name: Secaucus Junction DER Architecture

- CHP Size: 875 kW
- PV Size: 500 kW
- Li-Ion Battery Capacity / Energy: 1.2 MW/1.5 MWh

Secaucus Junction opened in 2003 and has a mix of fluorescent, incandescent, and metal-halide lights throughout the station and bus lanes. Because we did not have as complete a lighting inventory as other stations, we assumed a potential 20% reduction in electric load through lighting upgrades that would be finished prior to the completion of the DER project, and thus reduced the electric load accordingly. For comparison purposes, the recommended lighting upgrade at Newark Penn resulted in a 25% reduction in electric load. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Wayne Bus Garage

Basic Project Information

Wayne bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Wayne, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 70-75% of energy costs. In 2014, the station used about 2,070 MWhs of electricity at a cost of \$257,952. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Wayne Bus Garage
- CHP Size: 167 kW
- PV Size: 550 kW
- Li-Ion Battery Capacity / Energy: 377 kW/472kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an

absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Meadowlands Bus Garage

Basic Project Information

Meadowlands bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Meadowlands, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 65% of energy costs. In 2014, the station used about 2,500 MWhs of electricity at a cost of \$368,000. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Meadowlands Bus Garage
- CHP Size: 230 kW
- PV Size: 521 kW
- Li-Ion Battery Capacity / Energy: 330 kW/412kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

Greenville Bus Garage

Basic Project Information

Greenville bus garage serves as a NJ Transit bus maintenance, operations, and storage facility in Jersey City, New Jersey. Natural gas makes up the majority of its annual energy use but electricity still dominates its energy expenditures, about 83% of energy costs. In 2014, the station used about 1,480 MWhs of electricity at a cost of \$180,100. For resiliency reasons, the CHP plant and battery were sized to meet 80% of annual electric load.

Project Details

- Project Name: Greenville Bus Garage
- CHP Size: 132 kW
- PV Size: 289 kW
- Li-Ion Battery Capacity / Energy: 165 kW/205 kWh

Since the recommended lighting upgrade has a simple pay back of 1 year, it was assumed this was completed prior to completion of the DER project and thus reduced the electric load accordingly. As owners of the PV system and Li-Ion battery we assumed NJ Transit would collect the revenue generated by Solar Renewable Energy Credits (SRECs) and the PJM frequency regulation market, respectively. SREC revenue was projected for 15 years using historical SREC prices and Solar Alternative Compliance Prices (SACP), and frequency regulation revenue was estimated for 5 years using 2014 PJM hourly market clearing prices as a proxy.

Bus garages have significant heating loads and comparably small cooling loads, so waste heat utilization may be an issue during months when heat is not required. Although not analyzed, if at some point in the future a bus garage centralizes its air conditioning load (offices, break rooms, and locker rooms) then an absorption chiller attached to the CHP plant should be considered. Energy costs and CO₂ emissions could be reduced by switching from electric to natural gas sourced cooling.

To qualify for the NJ Clean Energy Program (CEP), the CHP system with waste heat utilization must achieve annual system efficiency of at least 65% LHV; electric only generation must achieve 50% LHV

electrical efficiency. Additionally, the system must operate a minimum of 5,000 full load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated KW output). For critical facilities the Board of Public Utilities (BPU) Office of Clean Energy (OCE) may evaluate systems operating as low as 3,500 full load equivalent hours per year for incentives on a case by case basis. Since a CHP reciprocating engine will not likely meet the 50% LHV electrical efficiency, the CHP plant may have to be shut down during months when heat is not used and the larger grid is operating normally, and approval as a critical facility will be required to receive the NJ CEP incentive.

Recommendations

We recommend NJ Transit implement all three distributed energy resources. While the CHP and PV systems provide annual energy savings independently, combined the two systems provide complementary benefits. The CHP plant provides base load generation for the station and the PV system allows the CHP plant to run at a lower capacity factor (and thus consume less natural gas) when it is producing energy (i.e. during the day). Should the primary power supply fail, the battery can provide failover to a backup power source, quickly energizing circuits. Since the PJM frequency regulation market is lucrative for high performing batteries like Li-Ion, we recommend NJ Transit participate in this market, generating revenue for future projects or battery replacement, while enhancing the reliability of the larger utility grid.

RECOMMENDED NEXT STEPS

Action Plan & Timeline

NJ Transit should consider all projects listed above, prioritizing energy efficiency projects that can be completed in less than one year or prior to completion of the CHP plant at each facility.

KEY STAKEHOLDERS

Environmental Services:

John Geitner – Senior Director Environmental Services – 973.491.7017 JGeitner@njtransit.com
Steve Jenks – Manager Energy and Sustainability Programs – 973.491.8589 SJenks@njtransit.com

Capital Planning and Programs:

Steve Santoro – Assistant Executive Director Capital Planning and Programs – 973.491.8960
SSantoro@njtransit.com
Nick Marton – Senior Director TransitGrid Project Manager – 856.614.7003 NMarton@njtransit.com
Eric Daleo – Director Superstorm Sandy Disaster Recovery Capital Planning – 973.491.8528
EDaleo@njtransit.com

Eric Daleo worked with Mary Barber at EDF during the TransitGrid federal grant application. Nick Marton supported the application and is the TransitGrid project manager. Both report to the Assistant Executive Director of capital planning for NJ Transit, Steve Santoro.

Steve Jenks oversaw the work of the EDF fellows and has an extensive technical background in energy and its relation to environmental policy. He reports to John Geitner, who is the Senior Director of Energy, Environment & Sustainability at NJ Transit.

APPENDIX

Energy Use and Analysis

EnergyStar Portfolio Manager

- Inputs (Historical Monthly Consumption and Costs):
 - Newark Penn: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Newark Penn\FCE_Newark_Penn_Energy
 - Secaucus: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Secaucus\FCE_Secaucus_Energy
 - Wayne: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne\FCE_Wayne_Energy
 - Meadowlands: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Meadowlands\Meadowlands_energy\Meadowlands_Energy
 - Greenville: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Greenville\FCE_Greenville_Energy
- Reports: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\EnergyStar Reports
- Portfolio Manager:
 - ID / Password: EDF_CC / NJT2015!

Electric Interval Demand Data and Analysis (1 year of 30 minute demand - <Facility Name> _Interval)

- Newark Penn: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Newark Penn
- Secaucus: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Secaucus
- Wayne: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne
- Meadowlands: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Meadowlands
- Greenville: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Greenville

Site Visit Notes, Questions, and Pictures:

- Site Visits: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Site Visits

Analysis Inputs and References

- Incentives and Rebates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Incentives and Rebates
- PJM References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\PJM Docs
- Utility Tariffs: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\PSEG Tariffs

Equipment Inventory and Financials

- Lighting Inventory: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\Lighting

- Lighting Financials: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\Lighting\Financial Analysis
- HVAC and Electric Equipment Inventory: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Equipment Inventory\ Station & Garage - HVAC & Lighting_v2.xlsx and a few relevant files in the folder
- Equipment Upgrade Rebates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\NJCEP Rebates.docx

Local Government Energy Audit Program

- RFP: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\Audit RFPs

EE and DER Executive Presentation

- EDF Fellow TransitGrid Updates: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\TransitGrid Update Presentation

Distributed Generation Analysis

Combined Heat and Power (CHP)

- Industry and Technical References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\References
- EPA CHP Size Estimator: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\EPA CHP Estimator (Spark Spread Estimator)
- CHP Sizing and Cost Benefit Analysis, Combined CHP and PV Systems as Well: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\CHP\CHP Cost Benefit Analysis (Rutgers CEEEP Model)

Energy Storage

- Battery Discharge Model (for Frequency Regulation): N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Energy Storage
- References: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Energy Storage\References

Solar PV

- PV Scenario Analysis: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Garage and Station PV Analysis
- Hourly Load and PV Generation: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Hourly Load & PV Gen
- Hourly Load Inputs to SAM: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Load Data
- SAM Project: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\Stations\Wayne\Wayne_SAMS_PV ←includes all PV projects
- Weather Data (TMY): N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Solar PV - NREL SAM Model\Weather Data

Industry References:

- DG and Reliability: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - DPR\DG\Industry Docs

Energy Efficiency Analysis

- Documented Resources: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\EE upgrade resources
- Vendor Contacts: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\Vendor Contacts.docx

Escalators

- Reference and Model: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Escalators
- Financials: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\Escalator Financial

Temperature Dependent Energy Usage

- Reference: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Temperature Dependent
 - The software Energy Explorer C was used to run 5 parameter and 3 parameter regression of electricity and gas monthly usage with monthly average temperatures over the last 6-7 years, depending on the data available for the facility
 - Energy Calculations Based on Regression: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Temperature Dependent\EnergyUse_Compiled for all facilities.xlsx
- These estimates are used in some of the savings calculations for HVAC

HVAC Upgrade Analysis

- Garage Heating: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ ESU-SAM\Efficiency Research\Garage Heating
- HVAC Upgrade modeling and financial calculations: N:\Design & Environmental Services (Les Eckrich's Unit)\ENVIRONMENTAL SERVICES UNIT\ESU - SEJ\EDF_Fellow_working_folder\EE Measures\HVAC Upgrades

ⁱ Timothy McKiernan (timothy.mckiernan@siemens.com) is the contact at the BMS vendor, Siemens, who set up these reports at Newark Penn

ⁱⁱ Timothy McKiernan (timothy.mckiernan@siemens.com) is the contact at the BMS vendor, Siemens, who set up these reports at Meadowlands and Wayne

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Task 9:	NJ TRANSIT-DG Start-Up Support
Task 10:	Project Closeout Support
Task 11:	Alternate Designs

APPENDICES

Appendix 1: Sandia Report: NJ TRANSIT - DG Feasibility Study (Feb. 2014, SAND2014-1100)

Appendix 2: "Area Location Map"

Appendix 3: Circular - Final FTA C 5800.1, Safety and Security Management Guidance for Major Capital Projects, August 1, 2007

Appendix 4: Sample Invoice

Appendix 5: FTA Grant Application for the Project dated March 25, 2014

ATTACHMENTS

PAECETRAK Data Management System: Attachment A

PROCUREMENT INFORMATION FOR PROPOSERS

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EXHIBITS

- A. NJ TRANSIT Professional Services Agreement**
- B. Travel & Business Reimbursement Guidelines**
- C. Equal Employment Opportunity Requirements**
- D. DBE Requirements**
- E. Statement of Joint Venture**
- F. Acknowledgement of Receipt of Addenda**
- G. Non-Collusion Affidavit**
- H. Contractors Certification of Eligibility**
- I. Affidavit of Compliance (Code of Vendor Ethics)**
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GENERAL PROJECT INFORMATION

I. GENERAL PROJECT INFORMATION

A. New Jersey Transit Corporation (NJ TRANSIT) is issuing this Request for Proposal (RFP) to solicit professional Consultants for engineering work associated with the New Jersey TransitGrid- Distributed Generation (DG) Project.

This project is being implemented under Federal Transit Administration's Resilience Projects in response to Superstorm Sandy as shown in the Federal Register: Volume 79, No. 214 dated November 5, 2014.

The goal of this RFP is to engage a Consultant to provide design, engineering, and construction assistance, as well as other technical services, to support the development of “NJ TRANSITGRID-DG” – a first-of-its-kind microgrid system capable of providing reliable power to support certain critical transit infrastructure supporting bus and rail systems operated by NJ TRANSIT and selected ferry operations.

This contract will be divided into two distinct phases:

- Phase I. Conceptual and Preliminary Design (0%- 20%)
- Phase II. Construction Assistance/Engineering Support

Costs associated with the various Phases and Tasks will be negotiated and a fixed, not-to-exceed cost will be established. Additional or unauthorized costs incurred by the Consultant will not be reimbursed.

NJ TRANSIT reserves the right to reject any and all proposal(s). Contract award is subject to the availability of funds and Consultant agreement to NJ TRANSIT terms and conditions.

All proposers are notified that NJ TRANSIT reserves the right to delete or modify any task from the Scope of Services at any time during the course of the contract. NJ TRANSIT also reserves the right to approve all sub-Consultants.

Prior to the execution of this contract by NJ TRANSIT and before commencing any performance hereunder, the Consultant shall provide NJ TRANSIT with the required proof(s) of insurance as set forth in Section 12 of Exhibit A.

All proposers are notified that it is NJ TRANSIT policy that Consultants who do or may do business with NJ TRANSIT must avoid all situations where proprietary or financial interest, or the opportunity for financial gain could lead a NJ TRANSIT officer or employee to secure favored treatment for any organization or individual. Proposers must avoid all circumstances and conduct which may not constitute actual wrongdoing,

or conflict of interest, but might nevertheless appear questionable to the general public, thus compromising the integrity of NJ TRANSIT. All proposers must comply with the NJ TRANSIT Code of Ethics as set forth in Section 29 of Exhibit A.

In addition, proposers are advised that communications with NJ TRANSIT that in any way relates to this project shall be conducted with or through the authorized representative of the Contracting Officer in NJ TRANSIT's Division of Procurement. All other contacts are strictly prohibited and are considered improper. Proposers are advised that violation of this prohibition may result in the removal of the Consultant from consideration for this contract and possible suspension/debarment.

I. NOTICE OF EXECUTIVE ORDER 125 REQUIREMENT FOR POSTING WINNING PROPOSAL AND CONTRACT DOCUMENTS

Pursuant to Executive Order No. 125, signed by Governor Christie on February 8, 2013, the Office of the State Comptroller ("OSC") is required to make all approved State contracts for the allocation and expenditure of federal reconstruction resources available to the public by posting such contracts on an appropriate State website. Such contracts are posted on the New Jersey Sandy Transparency website located at: <http://nj.gov/comptroller/sandytransparency/contracts/sandy>.

The contract resulting from this [RFP/RFQ] is subject to the requirements of Executive Order No. 125. Accordingly, the OSC will post a copy of the contract, including the [RFP/RFQ], the winning bidder's proposal and other related contract documents for the above contract on the Sandy Transparency website.

In submitting its proposal, a bidder may designate specific information as not subject to disclosure. However, such bidder must have a good faith legal and/ or factual basis to assert that such designated portions of its proposal (i) are proprietary and confidential financial or commercial information or trade secrets or (ii) must not be disclosed to protect the personal privacy of an identified

individual. The location in the proposal of any such designation should be clearly stated in a cover letter, and a redacted copy of the proposal should be provided.

The State reserves the right to make the determination as to what is proprietary or confidential, and will advise the winning bidder accordingly. The State will not honor any attempt by a winning bidder to designate its entire proposal as proprietary, confidential and/or to claim copyright protection for its entire proposal. In the event of any challenge to the winning bidder's assertion of confidentiality with which the State does not concur, the bidder shall be solely responsible for defending its designation.

B. ANTICIPATED CONSULTANT SELECTION SCHEDULE

Action	Date
Advertise Request for Proposal	August 12, 2015
Pre-Proposal Conference	September 02, 2015
Requests for Information Due	September 14, 2015
Proposal Due Date	October 14, 2015
Oral Presentations Begin	November 11, 2015
Selection of Consultant	December 02, 2015
Begin Negotiations	December 07, 2015
Board of Directors Authorization	February 10, 2016
Notice to Proceed	March 1, 2016

C. PRE-PROPOSAL CONFERENCE

In order to discuss the project and to address questions, NJ TRANSIT will hold a Pre-Proposal Conference on September 2, 2015 at 10:30AM in the Bid Room at NJ TRANSIT Headquarters, located at One Penn Plaza East, Newark, New Jersey 07105, which is adjacent to Newark Penn Station. The location is easily accessible from Newark Liberty International Airport by AirTrain service connecting to Newark Penn Station. To obtain driving directions please go to the NJ TRANSIT website at www.njtransit.com.

Attendance at the Pre-Proposal Conference is highly recommended but not mandatory. Recipients of this RFP that do not attend may be at a disadvantage when submitting a proposal.

D. REQUEST FOR INFORMATION AND ADDENDA

The Consultant shall examine carefully the Proposal package and conditions affecting the work. By submitting a proposal, the Consultant acknowledges that it has carefully examined the proposal package and satisfied itself as to the conditions affecting the work. NJ TRANSIT assumes no responsibility for any conclusions or interpretations made by the Consultant on the basis of the information made available by NJ TRANSIT. To be given consideration, all such inquiries must be received in writing no later than (ten) 10 business days before the RFP due date and must reference contract name and number, section and page number.

Inquiries regarding the Proposal Package shall be submitted in writing to NJ TRANSIT at the following address:

NJ TRANSIT Corporation
Procurement Department
One Penn Plaza East, 6th Floor
Newark, New Jersey 07105-2246

RE: RFP No. 16-001

Attn: Thomas J. Fusco
TFusco@njtransit.com

Any response that NJ TRANSIT may choose to make will be by a written addendum to the RFP and sent to all listed holders of the Proposal Package. NJ TRANSIT will not be bound by any informal explanation, clarification, or interpretation, oral or written, by whomever made, that is not incorporated into an addendum. Copies of all such Addenda will be mailed to each Consultant.

Receipt of the Addenda by the Consultant shall be acknowledged as specified below.

A Consultant's failure to request a clarification, interpretation, correction or amendment will preclude such Consultant from, thereafter, claiming any ambiguity, inconsistency or error which should have been discovered by a reasonably prudent Consultant.

NJ TRANSIT reserves the right to amend the proposal package prior to the date set for receipt of proposals. Such revisions, if any, will be announced by addenda to this Request for Proposal. Copies of such addenda as may be issued will be furnished to all prospective Consultants. The date set for receipt of proposals may be postponed by such number of days as in the opinion of the Contracting Officer will enable Consultants to revise their proposal forms. In such cases, the addenda will include the new date for receipt of proposals.

Consultants are required to acknowledge receipt of all addenda by signing the "Acknowledgement of Receipt of Addenda" form. This form (Exhibit F) shall be included as part of the technical proposal. Failure to acknowledge receipt of all addenda may render proposals non-responsive.

E. JOINT VENTURE

A Consultant consisting of more than one business entity must clearly identify itself in the proposal as a joint venture. Each party to a joint venture shall provide financial data (i.e.: financial statement, D&B report, etc.) as a separate business entity. Each party to a joint venture shall bear, jointly and severally, the entire responsibility for contract performance (see Exhibit "E" Statement of Joint Venture).

F. DBE INVOLVEMENT

Disadvantaged Business Enterprise (DBE) Goal Assignment

As an aid in meeting the commitment of its Disadvantaged Business Enterprise (DBE) Program, NJ TRANSIT has assigned a Race Conscious 18% DBE goal on the gross sum amount of the bid or contract for DBE subcontracting participation. All New Jersey Unified Certification Program (NJUCP) certified DBE Consultants, including suppliers, are eligible to participate in this contract.

NJ TRANSIT's DBE Program is accorded the same priority as compliance with all other legal obligations required by the USDOT. Consultants shall comply with the DBE Program requirements in the award and administration of NJ TRANSIT contracts. Failure by the Consultant to carry out these requirements shall constitute a breach of the contract, which may result in the termination of the contract or other such remedy, as NJ TRANSIT deems appropriate.

The Consultant shall refer to the DBE Requirements for Federally Funded Procurement Activities (Exhibit D) included in the RFP for the requirements concerning the DBE obligations and mandatory submissions for this contract. In accordance with those requirements, the Consultant shall identify all DBE and Non-DBE sub-Consultants and suppliers proposed to participate in and solicited for this contract, and complete and submit the mandatory required forms (A, A1, A2) and any applicable supplemental forms (AA, AA1, AA2) with their proposal or within seven (7) calendar days of the proposal due date. Consultants are strongly encouraged to submit these forms with the proposal to prevent delay of award. Consultants utilizing DBE Consultants and/or suppliers to participate in this contract shall also submit the mandatory Forms B and BB if applicable and a NJUCP DBE certification letter for each DBE Consultant/supplier in accordance with the same time frame indicated above. All forms shall be completed entirely with no blank fields. Any questions regarding the DBE requirements or the mandatory required forms for this contract should be directed to:

Ms. Jacquelin Rush-Gilbert

Senior Contract Compliance Specialist

973-491-8061

JRush-Gilbert@njtransit.com

F. EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

In addition to the above DBE requirements, Consultants will be required to comply with State Equal Employment Opportunity requirements contained in N.J.S.A. 10:5-31 et seq. (P.L. 1975, c.127) and N.J.A.C. 17:27.

G. DIVISION OF REVENUE

In accordance with N.J.S.A. 52:32-44, all New Jersey and out of state business organizations must obtain a Business Registration Certificate (BRC) from the Department of Treasury, Division of Revenue prior to the time a contract is awarded or authorized by NJ TRANSIT. The business registration form (form NJ-REG) can be found online at: <http://www.nj.gov/treasury/revenue/gettingregistered.shtml>.

Accordingly, the proposer should submit with its proposal the Business Registration Certificates for all team members, but no later than the date of contract award.

H. DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

Pursuant to N.J.S.A. 52:32-55 et seq., a Proposer that, at the time of bid opening, is identified on a list created pursuant to such law by the New Jersey Department of the Treasury as a person or entity engaging in investment activities in Iran as described in such law, shall be ineligible to, and shall not, propose on or enter into a contract with NJ TRANSIT. As required by such law, the Proposer must complete the certification with its Proposal to attest under penalty of perjury, that neither the person or entity nor any of its parents, subsidiaries or affiliates is identified on the New Jersey Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. Failure to complete the certification will render the proposal non-responsive.

I. TECHNICAL EVALUATION COMMITTEE

A Project Technical Evaluation Committee (TEC) comprised of NJ TRANSIT staff will be responsible for reviewing written proposals and oral presentations, and recommending the project Consultant. The TEC will analyze the submitted technical proposals, which are to include project manpower estimates, for the respective phases and tasks outlined in the Scope of Services. In order to adequately evaluate the capability of submitting Consultants or team of Consultants, the proposal must address all tasks.

J. MODIFICATION OR WITHDRAWAL

Modifications of proposals already submitted shall be submitted in a sealed envelope, clearly marked with contract name and number, date of opening and name of Consultant. Consultants shall assume that its failure to comply with these requirements may result in the modification being opened prematurely, or not opened at all.

Proposals may be withdrawn at any time prior to the time specified for the opening of proposals by filing a written withdrawal with NJ TRANSIT, duly executed by the Consultant or its authorized representative. The withdrawal of a proposal does not prejudice the right of the Consultant to file a new proposal. Withdrawals received after the time specified for the opening of proposals will not be considered nor may any proposal be withdrawn after that time.

K. DISQUALIFICATION OF CONSULTANTS

Submission of more than one (1) proposal from an individual, Consultant, partnership, corporation or combination thereof under the same or different names shall be cause for disqualification of the proposals submitted by such entities. Reasonable grounds for believing that any individual, Consultant, partnership, corporation or combination thereof is interested as a principal in more than one (1) proposal for the procurement contemplated may cause the rejection of all proposals submitted by such individual, Consultant, partnership, corporation or combination thereof.

II. PROJECT BACKGROUND AND DESCRIPTION

New Jersey Transit Corporation ("NJ TRANSIT") is issuing this Request for Proposal (RFP) to engage a Consultant to provide design, engineering, and construction assistance, as well as other technical services, to support the development of DG components for the NJ TRANSIT-DG– a first-of-its-kind microgrid system capable of providing reliable power to support certain critical transit infrastructure supporting bus and rail systems operated by NJ TRANSIT and selected ferry operations.

NJ TRANSIT intends to issue two separate Consulting Requests for Proposals (RFP).

This RFP, advances a scope of work that includes:

Design, procurement and construction support for establishing supplemental/emergency electric power for continued operations of select passenger stations, bus garages,

operations support facilities and support of ferry boat service between Manhattan and New Jersey. Contemplated technologies that may be implemented shall include distributed generation systems at several NJ TRANSIT multi-modal facilities, bus garages and ferry terminals.

Facilities and operations that utilize distributed generation, shall have the ability to operate independently from existing commercial utility systems when the commercial grid is inoperable and the subject facility is under grid islanded conditions.

A prior and related RFP 15-031, was advertised June,12 2015 and included requirements for a central gas fired, power plant and associated 230kv substation; a 138kv frequency converter and associated substation as well as electric power to and reconstruction of Amtrak's substation #41; associated power distribution systems along NJ TRANSIT right-of-way connecting to NJ TRANSIT's Mason substation located in Kearny, NJ, and to several Hudson-Bergen Light Rail substations; natural gas transmission lines; and connections to the PJM commercial grid.

Consultants or teams can respond to one or both of the RFP's.

Under this RFP NO. 16-001, the Consultant would provide: (1) design criteria development and preliminary engineering; (2) performance specifications; (3) drawings; (4) bid packaging for the procurement of an engineer/procure/construct contractor; and (5) construction assistance support, including final design/engineering reviews for the project.

The breadth of expertise required from the Consultant team shall include all relevant technical disciplines, familiarity with electric power design/construction procurement, familiarity with operations/maintenance services procurement; experience with the NJ Board of Public Utilities, PJM experience, power generation market and financial analysis, cyber-security, and knowledge of the impacts of working within operating railroad, bus and ferry environments.

The Project is partially funded by the Federal Transit Administration and is therefore required to follow the federal NEPA process. NJ TRANSIT has engaged a team lead by

BEM Corp. to develop the NEPA documents as well as preparation of necessary permitting documents.

Need for Project.

Superstorm Sandy significantly impacted New Jersey's public transit systems. Commuter rail service was disrupted for months in what has been described by the President's Hurricane Sandy Rebuilding Task Force as "the worst disaster for public transit systems (e.g., bus, subway, commuter rail) in the nation's history." NJ TRANSIT's rail network experienced substation inundation, track washouts, downed catenary wires, and damage to signal and communications systems. Prolonged and diffuse electrical outages also significantly hampered the system's recovery. As the heaviest traveled portion of the Northeast Corridor, damage to NJ TRANSIT's systems had significant ripple effects across the region, impacting thousands of customers and doubling or tripling commuter travel time.

Since Superstorm Sandy, NJ TRANSIT has focused on making immediate repairs to restore service, planning for long-term repair and replacement of key NJ TRANSIT assets, and identifying opportunities to incorporate mitigation and resilience elements, allowing the system to better withstand storm surge associated flooding from future extreme weather events and other hazards.

NJ TRANSIT's energy systems and ability to power locomotives, stations, and critical facilities, however, remain vulnerable to future outages. Superstorm Sandy, Hurricane Irene, Hurricane Floyd, the 2003 Northeast Blackout, and other events demonstrate that a reliable source of electric power for traction, signals, switches, and railroad communications, as well as power for other related transportation infrastructure including bus garages and ferry operations, all key components of system-wide resiliency, remain beyond NJ TRANSIT's control. New and innovative solutions are needed to address these energy vulnerabilities.

Project Development.

To address energy vulnerabilities, on August 19, 2013, NJ TRANSIT, the U.S. Department of Energy ("USDOE"), and the New Jersey Board of Public Utilities

("NJBPU") entered into a Memorandum of Understanding to collaborate to develop and conceptually design an advanced microgrid system known as NJ TRANSIT-DG in consultation with USDOE's Sandia National Laboratories ("Sandia").

Under the terms of the Memorandum of Understanding, NJ TRANSIT, USDOE, and NJBPU agreed to study the energy needs of NJ TRANSIT's commuter operations (including rail, bus and ferry services) in the Northeast region of New Jersey that provide critical interconnections between New Jersey communities and New York City, and that form part of the larger Northeast Corridor that Amtrak utilizes. USDOE agreed to engage Sandia in performing a conceptual design study of an advanced microgrid system to support NJ TRANSIT's operations. In performing this work, Sandia would employ its Energy Surety Design Methodology ("ESDM"), which is a quantitative risk based assessment approach developed to help communities evaluate regional critical and priority energy needs and identify advanced solutions to attain energy system performance goals. The conceptual design of NJ TRANSIT-DG would represent the first transportation system application of ESDM in the nation.

Over the course of six months, NJ TRANSIT worked with Sandia, the New Jersey Governor's Office of Recovery and Rebuilding, USDOE, NJBPU, and other State agencies to advance the conceptual design. To inform the effort, in collaboration with Rutgers University, NJ TRANSIT modeled transportation capacity to identify target locations including select Passenger stations, operations support facilities and Ferry boat service between Manhattan and New Jersey, that would need to be powered in order to maximize available service. NJ TRANSIT worked with Sandia to define system boundaries, identify the Design Basis Threat (DBT) to the system, determine performance objectives, and to review energy usage needs and data over an extended period of time. NJ TRANSIT worked with two regional partners to explore potential for partnership on the project: Amtrak and the Port Authority of New York and New Jersey's Trans-Hudson System (PATH). NJ TRANSIT also sought input from PSE&G, the Environmental Defense Fund, and other regional stakeholders.

This effort culminated in Sandia's issuance of a feasibility study report in February 2014 (A. Ellis et al., *Sandia Report: NJ TRANSIT-DG Feasibility Study* (Feb. 2014,

SAND2014-1100)).

The Sandia Report and other information were submitted for consideration to the U.S. Department of Transportation's Federal Transit Administration ("FTA") in March 2014 as part of a thirteen state resiliency competition. In September 2014, the FTA announced that NJ TRANSIT would receive a \$410 million grant to develop the project. NJ TRANSIT is coordinating the project with other FTA-funded activities as part of NJ TRANSIT's Superstorm Sandy Recovery and Resilience Program.

Project Technical Overview.

As detailed in the Sandia Report¹, NJ TRANSIT-DG would protect the "inner core" rail system from regional power blackouts, by supplying independently generated electric power directly to the constituent systems, through engineered control technology that can deliver reliable and consistent power as required for the NJ TRANSIT Morris & Essex lines, a portion of Amtrak's Northeast Corridor Line, NJ TRANSIT's Hudson-Bergen Light Rail system, and several NJ TRANSIT bus, station, maintenance and ferry facilities. By retaining critical inner-core rail, light rail and bus service, the region shall retain a level of functionality even the event of a major power disruption.

Distributed generation designed with micro-grid controls to enable off-grid capabilities allows a facility to continue operations during a utility power failure and can supply continuous base load power throughout the year resulting in energy cost savings. A well-designed system will supply the majority of the facility's energy needs and draw power from the utility grid to make up for any energy deficits. When the utility grid is down, the distributed generation system will transfer seamlessly to operate in off-grid mode or "islanded mode" and supply power to designated critical load allowing for continued operations.

As currently contemplated, the distributed generation aspect of the NJ TRANSIT-DG shall be designed, constructed and operated as an on-site distributed generation and distribution resource for several NJ TRANSIT stations, bus maintenance garages and

¹ The Sandia Report explores multiple NJ TRANSITGRID configuration scenarios, including a potential scenario where power is supplied to support PATH critical system operations. The scenario being pursued at this time does not include powering the PATH system.

ferry facilities, with islanding mode capabilities . The implementation and continuous operation of distributed generation technologies offset consumption of power from the bulk electric power grid, thereby replacing it with cost effective clean technology that result in a cleaner emissions profile. When the utility grid is compromised, these distributed generation resources shall be able to operate in island mode and supply power to the respective facilities enumerated below and in support of the NJ TRANSIT public transit system and limited Northeast Corridor Rail Passenger Service.

The feasibility study contemplates that the critical loads of these key facilities would be supplied power through individual or combinations where most efficient, of up to 5 MW of photovoltaic power generation, up to 7 megawatts (MW) of distributed generation, energy storage and heat recovery units . This generation infrastructure would be located at each selected facility where electric power demand would optimize the use of these technologies. The Sandia Report identifies particular sites under consideration but also notes that other sites may be considered as part of an ongoing analysis. The sites under consideration for distributed generation including Fuel Cells, CHP and Photo Voltaic (PV) power generation include; Newark Broad Street, Secaucus Junction and NJ TRANSIT's commuter rail station at Newark Penn. These passenger terminals need to be operational to enable passenger service on the NEC.

Furthermore, the following ferry terminals on the New Jersey side of the Hudson River are also included: Port Imperial, Hoboken South, Paulus Hook, Liberty State Park, and Ferry Maintenance Facility south of Port Imperial. Ferry boats provide substantial value toward the project objectives because they provide an alternative way to get passengers and goods across the Hudson River in an emergency situation. Only ferry terminals on the New Jersey side of the Hudson River are considered part of the project scope. During the referenced feasibility study stage, very limited technical information from the ferry terminal assessments was developed.

The following basic facts were established:

- The Hoboken South and Port Imperial terminals, as well as the ferry maintenance/refueling facility, have emergency backup generators.
- All ferry terminals require lighting for visibility.

- Ferry ramps are not operated by electricity.
- It may be possible to connect some ferry terminals to the traction power microgrid, depending on the distance to traction power feeders. Reference is made to RFP 15-031.
- The Edgewater, Hoboken, and Port Imperial ferry terminals are associated with buildings that may have HVAC loads and are likely candidates for application of CHP.
- Other ferry terminals may be candidates for PV + power storage system.

The DG system design including sizing and optimal technology categories for each ferry facility, passenger station and bus maintenance facility shall be determined by the Consultant as part of this RFP scope and as applicable.

The DG type that can be considered for a particular location depends on a number of facility-specific factors such as load magnitude, space availability, structural integrity, and thermal load availability. PV, possibly coupled with energy storage, is a good option to consider for small loads, such as ferry, light-rail, and even maintenance facilities terminals. CHP, or cogeneration, is the use of a prime mover to simultaneously generate electricity and useful heat. Several CHP technologies can be considered depending on the local conditions. Fuel cells have the advantage of being compact, have a low emissions profile, are electricity efficient and easier to integrate into an existing facility.

Finally, Greenville, Meadowlands, and Wayne bus garages are also included in the project scope, supporting passenger transportation to areas surrounding the NEC.

Opportunities to implement energy efficiency and demand response measures were identified, including addition of electric vehicles. To operate the system safely, reliably, and optimally, the design shall include an extensive communication, control, and protection infrastructure, with robust cybersecurity protocols.

Project Transportation Objective

The fundamental purpose of the NJ TRANSIT-DG is to provide a sustainable level of transit service as contemplated by the “Incident Transportation Plan” immediately following a major event that negatively impacts the supply of electric power to transit facilities.

The overall service goal is to transport as many people as possible to greater Newark, the NJ Hudson River Waterfront in Hudson County, or the Manhattan Central Business District (south of 59th Street) utilizing an array of bus, commuter rail, light rail, rail rapid transit and ferry services. While some services shall operate in a limited manner because of available electrical power, and some shall operate fully, all shall benefit from the implementation of the NJ TransitGrid.

Within New Jersey, a limited portion of the NJ TRANSIT commuter rail system in northern New Jersey shall have electrical power provided to it from the NJ TRANSIT-DG to sustain a core system operation. NJ TRANSIT’s intrastate bus services shall be operating and interstate bus services shall be redirected to locations where travelers can transfer to available trans-Hudson services. NJ TRANSIT shall be operating the Hudson Bergen Light Rail Line to provide transit service to the New Jersey Hudson River Waterfront in Hudson County, New Jersey. There are four primary locations where trans-Hudson travelers shall be able to board public transit into Manhattan: Hoboken Terminal, Secaucus Junction, Weehawken Ferry Terminal and Newark Penn Station. There are also a few smaller locations where travelers shall be able to access lower-capacity private ferry services. While the focus is on AM peak period demand, it is assumed a PM peak period service shall also be provided where historically, demand is more spread out.

Technical Services Contemplated in this RFP.

The Technical Services contemplated in this RFP shall inform NJ TRANSIT’s project development strategy through the review, validation and/or modification of prior studies and assumptions, ultimately resulting in the development of a bid package for procuring final design and construction, including potentially through a design, build, operate and maintain procurement or other procurement vehicle as warranted by the project.

This contract shall be divided into two separate Phases with two separate Notices to

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Proceed (NTP's):

Phase I – Includes preparation of a Design Criteria document and generation of Preliminary Engineering documents, generally based upon previously developed Concept Design as described in the Sandia Report and information contained in the NJ TRANSIT-DG Grant Application dated March 25, 2014. In addition, Phase I includes support to the NJ TRANSIT team (includes BEM Corporation) responsible for preparing a Categorical Exclusion and meeting permitting requirements. Environmental/regulatory compliance technical engineering support and documents for this project shall be supplied by the Consultant during all contract phases as necessary and as directed by NJ TRANSIT to support Permit Applications and Regulatory Approvals prepared by others.

Phase I activities include the development and implementation of bid assistance support, contract packaging, and procurement support during the bid process.

Phase I activities include identification of Project task risks and a recommended mitigation program along with other NJ TRANSIT Superstorm Sandy programmatic requirements.

Phase II –Engineering Assistance During Construction

At NJ TRANSIT's direction, the Consultant shall provide the necessary qualified personnel to provide engineering support during project construction. Such forces shall be mobilized upon successful award of a separate contract for the Final Design, Construction and Operations of the Project. Consultant staff shall form an adjunct to NJ TRANSIT forces providing design change assessments, value engineering support, change order review support and cost estimating support deemed appropriate by NJ TRANSIT.

The initial NTP shall be for Phase I services only. Phase II shall be at the sole discretion of NJ TRANSIT. The Consultant's technical proposal shall provide a detailed scope of services for the completion of Phase I and a general scope of services for Phase II. The Consultant's cost proposal shall provide a cost proposal for the provision of services for the completion of Phase I. A separate cost proposal for Phase II shall be

submitted by the Consultant when requested by NJ TRANSIT.

Required “Team” Organizational Structure

- The Consultant shall provide an organizational structure of a Project Team, which shall address each Task, identified herein; control the budget, schedule and product quality; and advance the Project to a successful completion.
- The Consultant shall organize and staff a project office in New Jersey accessible to NJ TRANSIT Project staff and reasonably near the Project Area, with adequate staffing, hardware and support to successfully manage and complete the requirements for the Project.
- The Consultant shall receive written approval from NJ TRANSIT prior to any change in the Consultant’s organization, key personnel, and/or manpower structure subsequent to Contract Award.
- The Consultant shall perform services for, attend and assist at required meetings and coordinate work, with NJ TRANSIT and other Project participants and relevant state, federal, regional regulatory authorities and local governmental entities as directed by NJ TRANSIT. The Consultant shall be responsible for identifying any other stakeholders including agencies, community groups, associations or organizations that must be coordinated with in connection with the Project. All communication with all outside agencies shall be accomplished solely through NJ TRANSIT. The Consultant shall NOT contact outside agencies or stakeholders directly. Draft Meeting minutes shall be prepared and distributed in accordance with the requirements of sub-task 1.6. Final Meeting Minutes shall be approved by NJ TRANSIT and subsequently distributed to participants upon NJ TRANSIT request.

This work shall be directed by a designated Consultant Project Manager, who is employed full-time by the Consultant on the project, and who shall coordinate all efforts and serve as liaison between all parties implementing this Project. This Consultant Project Manager shall be a licensed Professional Engineer and shall be supported by principals of the Consultant and other specialists as required.

Project Manager Responsibilities

- The Consultant Project Manager shall represent the entire Consultant team and be responsible for all communications with NJ TRANSIT. It shall be the responsibility of this individual to coordinate the activities of the multi-disciplined effort to provide NJ TRANSIT with a completed Project within the established schedule and cost.
- The Consultant Project Manager shall conduct review meetings, progress meetings and attend workshops or meetings with other Consultants performing work for NJ TRANSIT, bi-weekly, monthly, or as often as required by NJ TRANSIT and shall ensure minutes of the same are taken and provided to NJ TRANSIT.

Required Project Manager Capabilities

The Consultant Project Manager (PM) shall have demonstrated experience of ten (10) years or more in the design, construction and commissioning of Distributed Energy Resources. This experience shall also include experience and working knowledge of advanced, smart-grid technologies as a way to improve the reliability, security, and resiliency of the electric grid during a disruptive event.

Required Deputy Project Manager Capabilities

The Consultant Deputy Project Manager (DPM) shall have demonstrated experience of ten (10) years or more working with commuter rail or inter-city rail environments. Specifically, the DPM shall have experience working with passenger rail design and engineering as related to the civil, structural, geotechnical engineering, design and construction of electrical power transmission/interconnection compatible with existing commuter rail infrastructure in the Project Area, station design and integration of bus and ferry facilities into the NJ TRANSIT transportation network. The DPM shall demonstrate requisite prior experience that shall ensure the successful integration of all NJ TRANSIT and passenger ferry infrastructure with Distributed Generation aspects of the NJ TRANSIT-DG electric power systems as outlined in this RFP.

Required Consultant Team Capabilities

Proposers should be thoroughly familiar with the most recent Federal and State guidance on the conduct and preparation of design and engineering efforts as well as associated environmental and regulatory compliance requirements for design, construction and operation of renewable and energy efficiency elements, including electric/hybrid vehicles, large-scale PV generation, high-efficiency CHP, and energy efficiency technologies such as the implementation of fuel cell power generation technology, distributed power generation to selected transportation and support facilities as well as rail projects as prescribed by Federal Energy Regulatory Commission (“FERC”), North American Electric Reliability Corporation (“NERC”), New Jersey Board of Public Utilities (“NJBPU”), Northeast Power Coordinating Council (“NPCC”), PJM regulations and practices, as well as other Regional Entity Reliability Standards, the Federal Railroad Administration (FRA) policies and regulations and other applicable agencies or jurisdictions including the Federal Transit Administration (FTA).

The Consultant Team must possess a working knowledge and expertise in the areas of Regulatory Compliance as applicable to the registration, certification and operation of DG power generating equipment as well as the distribution of such electric power. The ensuing discussion shall not be considered exhaustive but provides an initial background characterization of required work elements to be provided by the successful Consultant Team, to the extent applicable to the Project. The RFP’s reference to any specific statute, regulation, order, reporting form, or requirement does not indicate that NJ TRANSIT has determined that the statute, regulation, order, reporting form, or requirement is applicable to the Project.

In addition to the foregoing technical expertise, Consultants must demonstrate a capability to design and assist NJ TRANSIT in selecting and implementing optimal renewable and energy efficiency elements, including electric/hybrid vehicles, large-scale PV generation, other distributed generation solutions that might include stationary fuel cell systems using one of three fuel cell technologies that are currently available to support power generation and CHP stationary systems: proton exchange membrane fuel cell (PEM) systems; molten carbonate fuel cell (MCFC) systems and solid oxide fuel cell (SOFC) systems, connection to natural gas supply as necessary, equipment commissioning and operation at selected bus and rail maintenance facilities as well as

rail passenger stations and selected ferry operations along with power transmission inter-connection to the regional power grid if appropriate.

Furthermore, the Consultant teams responding to this RFP shall be able to demonstrate relevant experience, working with commuter rail or inter-city rail environments, as well design experience related to fresh water wetlands, riverine environments and regulated floodplains, as well as brownfield settings.

The Consultant team shall have multidisciplinary staff resources with experience and expertise in such aspects as:

- Management and successful completion of engineering of distributed generation, Photovoltaic electric power generation and storage, facility power distribution, electric power control architecture including industry standard software (including cyber-security) and hardware design, as well as;
- The evaluation and procurement of electric and hybrid electric vehicles and charging stations that shall primarily support Meadows Maintenance Complex (MMC) and rail operations.
- Experience and working knowledge of advanced, smart-grid technologies as a way to improve the reliability, security, and resiliency of the electric grid during a disruptive event. Advanced or smart design approaches use modern communication and energy-management and energy-control technologies to enable distribution system feeders to operate both "grid-tied" and "islanded" modes using natural gas photovoltaic energy storage and combinations of multiple technologies resulting in hybrid energy resource systems. Such design shall support facility reliability and resiliency when islanded;
- Where applicable, determination of environmental and compliance impacts as well as mitigation techniques with respect to noise and vibration, air quality, aesthetics, energy, archeology/historic preservation, wetlands, development in the floodplains (hydraulic, net fill, riparian mitigation and storm-water management), parks and recreation areas, water resources, wildlife and vegetation and the development of associated mitigation measures along with an ability to fully support NJ TRANSIT Project Federal and State permit and agency approval efforts including the Project Federal Environmental Categorical Exclusion process undertaken by NJ TRANSIT

under a separate Contract;

- Facility/Plant Operations and maintenance cost estimation;
- Experience and knowledge of wholesale electricity markets;
- Engineering and capital cost estimation for selected facility DG power generation resiliency enhancements, associated distribution and interconnection infrastructure if applicable and related transit facilities, structures and utilities, at preliminary levels of design;
- Civil, structural, geotechnical engineering, studies for design and implementation of natural gas fired electric CHP power generation enhancements along with PV and energy storage solutions where applicable and cost efficient, at selected rail, bus and ferry facilities, electrical power distribution/interconnection compatible with existing commuter rail passenger stations in the Project Area as well as the commercial power grid supplying the electric power to the Project Area;
- Utility relocation/construction;
- Hazardous waste as well as regulated soil and ground and surface water testing, analysis, cleanup and/or remediation planning and cost estimation
- Stakeholder participation and agency coordination for major projects under and through NJ TRANSIT direction;
- NJDEP/USACOE rules and regulations pertaining to Project construction impacts, Electric Traction demand analysis and forecasting;
- Surveying, mapping, right-of-way identification and title research;
- Report preparation and presentation graphics;
- Development and operation of an electronic project document control and data management system.

III. SCOPE OF SERVICES – GENERAL

NJ TRANSIT reserves the right to cancel the project or reduce the scope of effort for the Consultant without cause at any time.

The Consultant shall complete the development of the Design Criteria and Preliminary Engineering and bid ready documents for the Project ten (10) months following Notice to Proceed (NTP).

If during the course of this project, it is determined by NJ TRANSIT that an extension of time is required to meet new or modified project demands, NJ TRANSIT reserves the right to extend this agreement for a period agreeable to both parties.

The Consultant shall perform services for NJ TRANSIT, and attend and assist at all meetings required to inform and coordinate work with NJ TRANSIT staff and relevant agencies.

The Consultant shall provide a work plan with timelines and milestones for the management of these services to NJ TRANSIT's Project Director. In addition, the Consultant shall keep NJ TRANSIT's Project Director routinely informed of its progress during the needs analysis, network(s) design and implementation strategy, in written format, as required, during the course of the work.

The Consultant shall maintain and make available, as requested, all documents, records and other evidence pertaining to service and costs thereof for a period of five (5) years from the final payment under the contract.

When plans and specifications are required, the approval of drawings by NJ TRANSIT is not to be construed as authority to violate, cancel or set aside any provisions of applicable Municipal, County, State or Federal codes, laws, rules and regulations. Nothing contained in this RFP or any resultant contract is intended to relieve the Consultant of responsibility for maintaining adequate supervision/responsible charge over the design in order to endeavor to guard NJ TRANSIT against deficiencies in the design work.

Proposing Consultants are reminded that it shall be necessary to monitor and/or coordinate with other relevant major projects and local developments during the conduct of this project. These may include:

- Amtrak 's projects including: The 5th Track in New Jersey Segments of the NEC, and the New Jersey Gateway Connections;
- Projects being coordinated as part of NJ TRANSIT Superstorm Sandy Recovery

and Resilience Program (“SSRRP”) and other NJ TRANSIT Capital Program activities to ensure that existing or contemplated projects do not preclude integration with NJ TRANSITGRID. The Consultant may be asked to review design drawings for SSRRP and other Capital Program projects, to the extent there is a possibility of overlap or need for coordination between projects.

The NJ TRANSIT-DG Project is a pivotal element of the NJ TRANSIT Superstorm Sandy Recovery and Resilience Program. Consequently, all Project communications, reports and submittals shall conform with programmatic standards and requirements as developed by NJ TRANSIT for the Superstorm Sandy Recovery and Resilience Program.

In no way is the material in the succeeding sections of this solicitation intended to prescribe the exact requirements of the contract. Rather, the contract shall require preparation of design/engineering documentation demonstrating compliance with Project goals, environmental and regulatory requirements as well as risk assessments in conformance with all relevant rules and regulations and industry norms and standards, for the production of such documents as may be required by the U.S. Department of Transportation(USDOT), the Federal Transit Administration (FTA), the Federal Railroad Administration (FRA), U.S. Department of Energy (USDOE), Federal Energy Regulatory Commission (FERC), New Jersey Board of Public Utilities (NJBPU), New Jersey Department of Environmental Protection(NJDEP), United States Army Corps Of Engineers (USACOE), United States Coast Guard (USCG), PJM Interconnection LLC (PJM), Amtrak and any other agencies with jurisdiction. Any deficiencies in the Consultant work products identified by any reviewing agencies – State or Federal – shall be the sole responsibility of the Consultant to cure, at its cost and without recourse to NJ TRANSIT. The material herein is intended merely to establish minimum standards for content and form of material and data required to be gathered, analyzed, and presented to comply with provisions of a Federally compliant Project Categorical Exclusion(s) as well as any applicable Federal and State regulations as they apply to the design, construction and operation of the Project.

IV. SCOPE OF SERVICES - DETAILED DESCRIPTION OF TASKS

PHASE I – Project Management and Engineering

The Project Management and Engineering Phase of the Project includes design elements for the implementation and operation of distributed generation resources at selected NJ TRANSIT bus and rail facilities as well as selected ferry stations operating passenger transport between New Jersey and Manhattan, facility-wide power distribution and infrastructure for the electric power generated, associated control and management with inter-connection to the Regional Commercial Power Grid where technically feasible and desired by NJ TRANSIT. In addition, this effort shall require, all structural and infrastructure components and control elements necessary to maintain a defined level of operations at each respective facility for NJ TRANSIT and/or ferry operations in the Project Area complementing regional transportation of patrons along NJ TRANSIT Rail and Light Rail Lines. There is significant intermodal connectivity to bus transportation at most light and commuter rail locations requiring bus refueling and maintenance operations at selected NJ TRANSIT garages. The multi-component task descriptions below reflect the diverse nature of the multi-discipline Project design effort. Not included in this RFP is the design of the 104 MW Natural Gas Fired Central Power Plant that shall support limited passenger rail service along the NEC, the M&E and the Hudson Bergen Light Rail.

Related Field Activities

- The Consultant may be required to secure the right to enter upon, cross over, under or above the property of owners owning land adjacent to the proposed Project as directed by NJ TRANSIT. The Consultant shall therefore obtain written approval to enter upon this property from said owners prior to any entry onto the property by the Consultant following permission by and coordination with NJ TRANSIT. Furthermore, the Consultant shall upon direction by NJ TRANSIT, secure approval to enter Amtrak property.
- The Federal Roadway Worker Safety Act requires “Roadway Worker Protection (RWP)” training for anyone working on or near an active railroad. Satisfaction of this requirement is the responsibility of the Consultant. A certification to this effect must be presented to NJ TRANSIT prior to any Consultant or Sub-

Consultant's employee entering onto or near the R-O-W. If the Consultant does not have the required training, NJ TRANSIT can and shall provide it relative to entry upon NJ TRANSIT right-of-way. All contractors entering upon Amtrak property are required to attend Amtrak contractor safety training annually.

- All requirements of 49 CFR 214 shall be followed as applicable.
- When working within the Project site, the Consultant shall be governed by the following Site Work Procedures;
 - i. The Consultant shall limit work to the areas necessary for the performance of such inspections and shall not interfere with the operation of adjacent commercial activities, the bus, ferry and railroad and associated infrastructure without first obtaining specific approval from NJ TRANSIT. Any activity that requires access to the rail road right of way must be conducted with personnel that have the relevant and current rail safety training as a minimum, but not limited to, Roadway Worker Protection (RWP) training.
 - ii. During all periods of time when not performing operations at the field work site, the Consultant shall store all equipment being used for the inspection in pre-approved areas and shall provide all security required for such equipment. The Consultant shall not permit any objects or pieces of equipment to lie unattended on sidewalks, roadways, passageways, corridors, stairways, platforms or structures at any time.
 - iii. Survey work within the existing Right-of-Way (ROW) of the railroad or NJ TRANSIT property shall be performed at the site only between the hours of 9:30AM and 3:30PM, Monday through Friday, unless otherwise directed by the NJ TRANSIT Project Director or designee. Subsequent references to the "Project Manager approval" in this RFP are meant to identify the appropriate NJ TRANSIT Project Director or his designee.
 - iv. The Consultant shall coordinate all site work necessary to conduct the inspection and survey work, (as detailed in Phase I) required with the Project Director. Such work shall only advance following approval by the NJ TRANSIT Project Director.

- v. The Consultant shall provide the NJ TRANSIT Project Director with a minimum of two (2) working days of notice prior to the intent to conduct site inspections on NJ TRANSIT property (prepare and submit SSWP as required in sufficient time prior to such notice) and 14 working days' notice for access to Amtrak or privately owned property. At that time, the Consultant shall provide details relevant to the character and nature of the inspections planned and prepare a Site Specific Work Plan (SSWP) if required. Work shall only commence following the approval of the SSWP by the subject Railroad.
- Work within the fouling limits of the railroad (defined as within 18 feet of the centerline of track on NJ TRANSIT's right-of-way and within 25 feet of the centerline on Amtrak's right-of-way), shall require appropriate flag protection. The Consultant is not to work within the fouling limits of the railroad without flag protection cost of which will be accommodated by NJ TRANSIT. Track fouling shall be coordinated through NJ TRANSIT but fouling time cannot be guaranteed by either Railroad.

The deliverables of each task shall be provided in the form of camera-ready originals as applicable and electronically in their native format and in Adobe pdf format. All reports, drawings and text material shall be provided in hard copy, electronic transmission and on CD Rom as directed by the NJ TRANSIT Project Director.

TASK 1 - PROJECT MANAGEMENT AND ADMINISTRATION

The objective of this task is to keep NJ TRANSIT informed in a timely fashion with regard to both technical progress and financial status of the project. Project management shall anticipate problems and delays as best as possible and address them before they reach crisis level. Another objective is to maintain a continuous and timely dialogue and flow of information between the Consultant and NJ TRANSIT. Coordination and assistance with Amtrak, utilities and other related jurisdictional agency reviews is required subject to NJ TRANSIT direction.

The Consultant shall provide an experienced, integrated team with the specific combination of technical and management expertise across all required disciplines

necessary to meet all Contract requirements.

To these ends, the project management team shall implement and maintain a three-step approach to project management and control:

Subtask 1.1 Project Management Plan

A project management plan shall be prepared and implemented by the Consultant and NJ TRANSIT at the outset of the project. The plan shall clearly define the roles and responsibilities of all parties involved. Formal lines of communication shall be outlined, budgets shall be established, schedules agreed upon, quality control procedures identified and invoicing procedures established.

The Consultant shall prepare a comprehensive Project Management Plan (PMP) for the Project, fully addressing the means, methodologies, procedures and resources to be applied by both NJ TRANSIT and the Consultant in achieving the Project Management objectives stated above. The PMP shall work in conjunction with the Quality Management Plan as described later in this RFP.

The PMP shall be prepared in accordance with the established guidelines of the FTA and shall be of sufficient detail to monitor the Project's planning, engineering, and third party coordination throughout the duration of the Contract. NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJ TRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the PMP submission shall be available to the Contractor subsequent to Contract award. The Consultant shall submit a draft of the PMP within four weeks of NTP, and the final PMP within eight weeks of NTP after receiving comments from NJ TRANSIT including comments from the FTA representative. Updates to the PMP shall be made periodically or as directed by NJ TRANSIT.

The PMP shall include appropriate charts and narrative to describe the organization, relationships, responsibilities, and procedures to be implemented to manage all aspects of the Project. At a minimum, the PMP shall address the following:

- Roles and Responsibilities
- Project Controls Management – schedule and budget
- Communications Protocol
- Design Management – internal reviews and checking procedures
- Configuration Management
- Interface and Integration Management
- Third Party Coordination / Third Party Agreements management
- Records Management

Subtask 1.2 Project Control

The Consultant, after discussion with NJ TRANSIT, shall establish a formal Critical Path Method (CPM) project schedule (min. Primavera 6) for the accomplishment of all tasks in this RFP. CPM updates shall be provided to NJ TRANSIT on a monthly basis or upon request. In addition, the Consultant shall establish a system of monthly progress and cost control reports attached to monthly invoices (see Appendix 4 for Sample Invoice Report). All sub-Consultants employed shall be required to render invoices for the same general time periods that are utilized by the prime Consultant. FAILURE TO SUBMIT THE INVOICES IN THE PRESCRIBED MANNER SHALL RESULT IN SUCH INVOICES BEING HELD UNTIL THE FOLLOWING INVOICE PERIOD. Exceptions identified following NJ TRANSIT invoice review must be resolved to NJ TRANSIT's satisfaction within two working days. Absent such resolution, disputed invoice amounts shall be deducted from that invoice. The report form as well as invoice(s) shall include a written description of current technical, budget and schedule status as well as a comparison of this information to the preceding month, project-to-date and projected future work efforts as applicable. Milestones, decisions made, issues and action items shall be highlighted. Any unanticipated delays or gains or cost adjustments driven by unforeseen circumstances should be discussed in terms of completing the overall project on time and within budget. The Consultant shall provide a summary of all invoice costs in a format depicting values as described in Appendix 4.

Subtask 1.2.1 Final Scoping/Preliminary Engineering (PE) Schedule

Timely and successful completion of PE is pivotal to the advancement of subsequent

contracts and phases as well as regulatory compliance documentation including but not limited to the Project Federal EIS, Federal and State Permits, etc.. The Consultant shall develop and maintain a detailed project schedule, representing a practical plan to complete the Contract scope of work, and to meet the overall schedule objective of achieving Bid Ready status by NTP + 12 months. Additionally the Consultant shall prepare a projected construction schedule(s) for the work required to complete the NJ TRANSIT-DG Project DG components and have it fully operational.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the Project Schedule submission shall be available to the Contractor subsequent to Contract award.

The purpose of the schedule is to provide an effective management tool by which the Consultant and NJ TRANSIT can measure progress of the work, identify areas of schedule risk, and mitigate against any potential delays on a timely basis. The actual number of activities in the schedule shall, in the judgment of NJ TRANSIT, be sufficient to assure adequate planning of the Project and to permit monitoring and evaluation of progress and the analysis of time impacts.

The Phase I Schedule shall be detailed and correlate with the work plan described in the PMP and organized based on the tasks and major elements of the Project. The Phase I schedule shall identify all activities and milestones associated with the PE Contract's scope of work.

The Consultant shall use Project Primavera 6.0, or NJ TRANSIT approved equal. The format of the schedule shall include bar chart plots and shall show columns for:

- Activity ID
- Activity Description
- Original Duration
- Early Start, Late Start, Early Finish and Late Finish

- Total Floats.

Timescale shall be shown in calendar days.

Initial Scheduling Meetings and Schedule Update Meetings shall be held to review, agree and approve all schedule deliverables.

The WBS codes shall be presented in organizational-chart format for approval prior to developing the Contract Schedule. Consultant shall code the Baseline Schedule using no more than 8 alpha-numeric characters for the Activity ID, and shall utilize the approved WBS.

The Consultant shall submit the draft Baseline Schedule *without status* within three (3) weeks of NTP. The Baseline Schedule shall be accompanied by a narrative outlining the assumptions made, formatting approach, definitions of terminology to be used in monthly reporting, estimates of original durations, calendar types used, explanation of resources and the production rates, relevant drawings or charts.

The Consultant shall make all corrections to the draft Baseline Schedule requested by NJ TRANSIT and resubmit within two (2) weeks of receiving comments. If the Consultant does not agree with NJ TRANSIT's comments, the Consultant shall provide written notice of disagreement within five (5) days from the receipt of the comments. The items in disagreement shall be resolved in a meeting held for that purpose, if necessary.

The Baseline Schedule shall show the sequence and interdependence of activities required for complete performance of the Project beginning with the date of the NTP, and concluding with the date of acceptance of the Project and shall list specifically:

- Interim milestone completion dates required by the Contract shall be characterized. Phasing of all design activities as specified shall be prominently identified. Particular attention shall be given to design submittals.
- Submittal and review of design submittals and other deliverables shall include review time for designated reviewers.

- Submittals to, and reviews by outside agencies and shall allow sufficient time for review.
- Interface coordination and dependencies with proceeding, concurrent, and follow on contracts shall be developed.
- NJ TRANSIT designated milestones shall be developed.
- NJ TRANSIT, Amtrak, Third Party Commercial and Regulatory milestones, as required to achieve approval into Final Design shall be developed .
- Acceptance of the Project, including completion of unfinished items prior to completion of any Contract milestones shall be noted.
- Work to be performed by other Consultants and agencies that affect the schedule and shall allow reasonable time for completion shall be noted.
- Acquisition of permits, Final CE acceptance and related environmental approval, licenses, agreements, and coordination with, municipalities, other agencies and community groups shall be noted.

The Consultant shall accurately develop the schedule logic and activity interdependencies, such that the schedule can fully convey an understanding of the Critical Path.

The Progress Schedule shall include all information current as of the status date. The Progress Schedule submittal to NJ TRANSIT shall be accompanied by a Schedule Status Report. This narrative report shall describe activities completed and progressed during the report period, activities planned for the forthcoming report period, potential issues, delay chain analysis as required, and actions required to correct any negative float (actual or predicted). The report shall include an explanation of potential delays and problems, their estimated impact on performance, and their estimated impact on the Contract completion date. In addition, alternatives for possible schedule recovery, complete with a narrative rationale, to mitigate any potential delay shall be included for consideration by NJ TRANSIT.

Every Progress Schedule shall be submitted for approval at least five (5) days prior to the NJ TRANSIT designated Progress Schedule Meeting. The Progress Meeting shall include discussion on Consulting percentage complete, actual start/finish, earned

values and remaining duration. Upon approval of the Progress Schedule, it shall be included in the Monthly Report. The status date of the Progress Schedule shall be the last day of each month.

Timely progress reporting and review by the Consultant's management team shall be critical in avoiding schedule creep or delays which shall be detrimental to the schedule given the objectives of the project. Progress Reports shall include;

- Consultant's Transmittal Letter;
- Description of Problem Areas;
- Current and Anticipated Delays; and the following information;
- Cause of the delay;
- Corrective action and schedule adjustments to correct the delay; and
- Impact of the delay on other activities, milestones, and completion dates.
- Pending Items and Status Thereof, regarding the following requirements:
 - Permits;
 - Commercial agreements with Third Parties, i.e. natural gas pipeline supply connections, interconnections with PJM, etc.
 - Change Order;
 - Time extensions; and
 - Interim Milestone Dates and Contract Completion Dates Status
- Discussion of critical path for month and any changes to critical path since the last report;
- Progress during period and plans for Project in forthcoming period.

Planned schedule percentage complete versus actual percentage achieved and earned value versus planned usage for each resource for shall be computed in tabular format from the resource and price loading developed for this RFP and Contract execution. An overall cumulative progress curve shall be plotted with the horizontal axis in calendar months.

A schedule found to be unsatisfactory, or otherwise not in compliance with Contract documents shall be revised by the Consultant and resubmitted. Resubmittals shall conform to the same requirements as original submittals.

Use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, negative lags, long lags, extended activity times, or imposed or constrained dates, shall be cause for rejection of the Detailed CPM Schedule and any revisions or updates.

The Consultant shall schedule submittals for review by NJ TRANSIT in a manner that distributes reviews across time to avoid concentration of reviews in any discipline.

Whenever it becomes apparent in the course of the current Progress Schedule Meeting or from the Progress Schedule itself that interim milestones, constraints, or submittal dates shall not be met, the Consultant shall identify remedial actions through a Recovery Plan & Schedule, to be included as supplement/attachment to the Schedule Status Report. The Recovery Schedule shall be a separate discrete “break-out” schedule, which shall include activities as required to achieve the final milestones that shall coincide with the approved Baseline Schedule. Prior to executing remedial actions, the Consultant shall immediately notify NJ TRANSIT, and obtain approval before proceeding with same.

If original Baseline Schedule dates cannot be maintained, then the Consultant shall obtain approval from NJ TRANSIT prior to incorporating any revised dates into the next Progress Schedule submittal.

The last updated schedule submitted shall be identified as the “Final Progress Schedule.” This schedule shall reflect the exact manner in which the Contract was actually completed (including start and completion dates, activities, actual duration’s, sequences, and logic), and shall be signed and certified by the Consultant’s Project Manager and the Consultant’s scheduler as being a true reflection of the way in which the Contract was actually completed.

Deliverables:

Work Breakdown Structure Codes

Baseline Schedule – draft and final

Monthly Progress Schedule and Schedule Status Report

Recovery Plan and Schedule, as required

As-Built Schedule

In addition to routine reporting, the Consultant shall create and maintain an intra-project, password protected web-site through which NJ TRANSIT and the Consultant can communicate and share data, drawings and reports rapidly and efficiently. This shall help the Consultant operate proactively to both inform NJ TRANSIT of emerging issues and facilitate rapid resolution to maintain schedule and budget. This system shall also be utilized as the project's file cabinet and for archiving all project documents and correspondence. The said system shall be compatible with the document control records management system outlined below. Upon completion of the project or at such time as directed by NJ TRANSIT, the Consultant shall provide all data contained therein to NJ TRANSIT using computer hardware storage approved by NJ TRANSIT for incorporation into the NJ TRANSIT computer network system.

Subtask 1.2.2 - Records Management Control System

The Consultant shall develop and maintain a system to identify and manage correspondence, business documents, current revision of instructions, procedures, drawings, specifications, reports and analyses, etc. The document database developed on this project shall be kept current throughout the term of the Contract, and provided to NJ TRANSIT in a condition suitable for use by others without need for additional licenses for another 5 years from Project Completion and be in compliance with the Consultant's Configuration Management Plan. NJ TRANSIT's objective is to establish a "paperless" project to the extent as practicable.

The system at a minimum shall provide the following definition and components:

- a) A system designed around the Consultant's evaluation and analysis of NJ TRANSIT's work flow and business practices;

- b) An electronic interface (“desktop”) that requires nominal user training and provides quick response time for document creation, storage, and retrieval;
- c) A highly secure system that can assign different access clearances for staff and project stakeholders;
- d) A system that is fully compatible with and utilizes the same assumptions as the NJ TRANSIT ECMS document control system.

The system must manage manual and electronic documents including:

- General correspondence
- Contracts, specifications, progress reports, invoices
- Budget & finance data
- Drawings, plans, and images
- E-mail messages and attachments
- CDs, DVDs, and other hard media
- Native files and image files of all documents

The system must provide the following features:

- Central clearinghouse for all project documents
- Categorization of inbound traffic
- Marking of each document with (at a minimum):
 - Originating date
 - Received date
 - From organization
 - To organization
 - Subject
 - Unique sequence number
- Scanning and indexing
- Posting of scanned documents for retrieval
- Email notification to document recipients
- Maintenance of the document database
- On-site printing capability for all document sizes and formats

- Filing of original hardcopy
- Transmitting of original hardcopy to offsite records warehouse (If needed for compliance with NJDARM requirements)

The system shall also provide a fully-integrated Electronic Content Management (ECM) system, including the following components:

- Digital Mailroom (DM) - or future project field office
- Scan, index and distribute
- Electronic Document Management System (EDMS) - web-based
- Electronic Document posting and notification
- Document collaboration capabilities
- E-mail management including forced classifications
- Check-in and check-out protocols
- Revision control
- Audit trail
- Security (document by user/group)
- Watermarking for printed copies
- Administrator reports
- Workflow
- Records Management (RM)
- Retention schedules
- Notification of destruction

NJ TRANSIT is using an in house Enterprise Content Management System (ECMS), using Open Text Live Link as the platform. Upon request by NJ TRANSIT, the Consultant shall provide personnel at a designated NJ TRANSIT Office to assist NJ TRANSIT in data entry as well as down loading and up loading of documents into the NJ TRANSIT ECMS. The schedule for data uploads to the NJ TRANSIT ECMS shall be determined subsequent to Contract award. However, such uploads shall occur at a minimum on a monthly basis. It is anticipated that the Consultant shall employ an ftp site or similar portal to transfer documents between NJ TRANSIT's

ECMS and the Consultant's document system. The personnel should be cognizant of DARM regulations concerning document scanning and management procedures.

Deliverable:

Records Document Management System and identification of appropriate support staff subject to NJ TRANSIT approval.

Subtask 1.2.3 - Monthly Progress Reporting

The Consultant shall carefully monitor the progress of the Project during design and provide NJ TRANSIT with Monthly Progress Reports. The approved schedules shall be used by the Consultant to ensure adequate planning, scheduling, management, and execution of the Project and to enable NJ TRANSIT to evaluate Project progress and requests for payments by the Consultant.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJ TRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the Project Monthly Progress Report submission shall be available to the Contractor subsequent to Contract award. Upon direction by NJ TRANSIT, the Consultant shall assist and provide support to NJ TRANSIT staff in the preparation and submittal of Project reports to the FTA.

The Consultant shall submit one (1) hard copy and one (1) electronic copy of the Monthly Progress Report to NJ TRANSIT by the 7th day of each month that shall cover a reporting period for the preceding month. The Monthly Progress Report shall be submitted by the Consultant's principal and shall include as a minimum the following:

- A written review of progress of the progress achieved for that month with specific reference to the activities detailed on the Baseline Schedule and detailed progress on each stage of the design during the reporting period.

- Details of any delays shall be specifically highlighted together with details of the Consultant's actions/proposals for corrective action and schedule recovery.
- Areas of concern and proposed resolution.
- Per task, planned schedule percentage complete versus actual percentage achieved and earned value versus planned usage for each resource shall be computed in tabular format from the resource and price loading. An overall cumulative progress curve shall be plotted with the horizontal axis in calendar months.
- Comparative progress curves and histograms showing actual versus planned performance in respect to major activities as may be required by NJ TRANSIT.
- A monthly update of the overall progress curve (or S curve) versus baseline progress curve.
- Updates of the Consultant's labor curve/table showing actual and planned labor, including sub-Consultant labor.
- Status of DBE participation.
- An up-to-date copy of the Delivery Submittal Schedule to NJ TRANSIT.
- Other content as directed by NJ TRANSIT.

A certificate signed by the Quality Manager certifying for the previous month that:

- All work, including that of sub-Consultants at all tiers, has been checked and/or inspected by the Consultant's quality staff and that all work, except as specifically noted in the certification, conforms to the requirements of the Contract.
- The Quality Management Plan (QMP) and all measures and procedures provided therein are functioning properly and are being followed, except as specifically noted in the certification.

Deliverables:

Monthly Progress Report

Monthly Quality Certificate

Subtask 1.3 - Quality Control

A Quality Management Plan shall cover not only the Consultant but also all sub-Consultants; the procedures shall be uniformly applied to all phases of the project. The

Quality Control plan requires the completion, checking, and correcting of work products before releasing them, to ensure accuracy, completeness, and ability to be understood by target audience.

Subtask 1.3.1 - Quality Management Plan (QMP)

The Consultant shall develop a comprehensive Quality Management Plan (QMP) for Phase I of the Project. The Consultant shall be responsible for conducting an ongoing quality program during the entire period of performance of the Contract based upon the QMP approved by NJ TRANSIT. An effective quality program is fundamental to all work performed by the Consultant.

The Quality Management Plan shall require the completion, checking, and correcting of work products before releasing them, to ensure accuracy, completeness, and ability to be understood by target audience.

The purpose of the quality program is to effectively and economically assure technical quality in the design of the Project, thus reducing the potential for:

- Adverse schedule and cost impacts.
- A poor quality design.
- Poor quality products.
- Interface and integration problems among various design elements of the and overall interface with elements of the NJ TRANSIT SANDY Resiliency Program and Amtrak NEC/Gateway Program.
- Personal and public safety problems

The QMP shall document how the Consultant shall execute the project to assure that:

- The Consultant's design process translates NJ TRANSIT's needs and requirements into an acceptable design.
- The Project is properly completed and furnished to NJ TRANSIT on time.

During the term of the Contract, the Consultant shall exercise positive control over the entire Project including the work of its subcontractors and sub-Consultants as described in the approved QMP.

Subtask 1.3.2 - Quality Management Plan Requirements

The QMP shall be prepared in general accordance with the established guidelines of the FTA, which essentially follow article 4.0 of the ISO 9001:2000 and ISO 10013 guides, and are further discussed below. The QMP shall be an executable system of processes defined and established for the Project. At a minimum, the QMP shall include a Quality Policy and Procedures, and reference other plans as may be specified herein and elsewhere in the Contract.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the Project Quality Management Plan submission shall be available to the Contractor subsequent to Contract award.

The QMP shall be approved by the Principal-In-Charge in the Consultant's organization having primary responsibility for the Contract. The Consultant shall submit a draft within 4 weeks of NTP, and a final within eight weeks of NTP, incorporating comments from NJ TRANSIT and other stakeholders as applicable. The QMP shall be revised, updated, and approved as necessary throughout the term of the Contract to reflect the management system being currently used as the means for executing the Contract.

Implementation of the QMP shall be subject to NJ TRANSIT audit throughout the term of the Contract.

Subtask 1.3.3 - ISO 9001 Requirements

Certification of the Consultant under ISO 9001:2000 is not required for this Contract; however, the quality principles established by ISO 9001:2000, as set forth herein, form

the basis for the quality system and Quality Management Plan required to be established by the Consultant.

The quality standards applicable to the Project under the Contract include the following:

- ISO 9001:2000: Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation and Servicing.
- ISO 10013:2000: Guidelines for Developing Quality Manuals
- ISO 8402: 2000: Quality Management and Quality Assurance – Vocabulary

Subtask 1.3.4 - Quality Manager and Other Resources

The Consultant shall appoint an experienced, qualified Quality Manager trained in accordance with established quality management standards, requirements and regulations. The selection of this individual is subject to NJ TRANSIT approval. The Quality Manager shall perform as the Consultant management representative and shall:

- Be responsible for implementing the QMP and shall have the authority to stop the Project. There shall be a clearly articulated Quality Policy approved by the Executive(s) of the Consultant and it shall be widely publicized and known throughout the project team.
- Report directly to the Consultant's Project Support Manager or more senior employee.
- Have direct access to a senior executive at the Consultant's Consultant.
- Be responsible for ensuring that the Quality Management effort is effective in ensuring that all Contract requirements are satisfied.
- Have direct access to and by NJ TRANSIT's Quality Director.

An Internal Quality Management Review shall occur at least bimonthly. A report regarding the results of the review shall be forwarded to NJ TRANSIT. Organizational and technical interfaces shall be defined in a manner that assures inter-discipline coordination and communication among and between designers and major subcontractors and sub-Consultants and NJ TRANSIT.

Subtask 1.3.5 - Design Control

The Consultant shall develop a Design Control Plan (DCP), establishing design control procedures that shall be integrated and consistent with the requirements described throughout this RFP. The Plan shall visibly track and report the status of design products to be submitted by the Consultant for NJ TRANSIT review. The Consultant shall revise, update, and submit for approval the Plan as required. The Plan shall:

- Define procedures for completing internal verification prior to the submission of documents to NJ TRANSIT for its review. Design Verification Activities shall include checking and back-checking calculations, drawings, and other design elements without reliance on review and comments from NJ TRANSIT and shall be conducted before providing each design submittal to NJ TRANSIT.
- Define how design inputs and changes shall be managed by the Consultant in a manner that assures Contract and Consultant requirements are correctly translated into the drawings and specifications.
- Include a Design Review Schedule which shall be revised as needed as the design progresses.
- Be consistent with and follow from the Quality Management Plan and shall specifically track all design and design verification activities included in the approved Quality Management Plan.
- Be in a format that allows the Consultant and NJ TRANSIT to reasonably understand the means by which each design element of the project is being completed. It shall provide planned versus actual schedule performance and be accurate and useful as a means for NJ TRANSIT to determine how the design is proceeding throughout the design phase of the Project.
- Include subcontracted design elements, if appropriate.

The Consultant shall be liable to NJ TRANSIT for any costs incurred during the Construction Phase to correct, modify or redesign any drawings completed by the Consultant that are later found to be defective, or not in accordance with the provisions of this agreement as a result of any act, error or omission on the part of the Consultant

or its agents, servants or employees. The Consultant shall be given reasonable opportunity to correct any deficiencies at no additional cost to NJT.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to Design Control submissions shall be available to the Contractor subsequent to Contract award.

Subtask 1.3.6 - Control of Quality Records

The Consultant shall establish and implement procedures to identify, collect, index, file, store and retrieve all quality records required by the Contract and generated pursuant to the Quality Management Plan and shall include the records of sub-Consultants and subcontractors, as appropriate. These procedures shall include an electronic database to track and maintain control over all quality records generated by the Contract, which shall be part of the Records Management System and subject to data transfer to the NJ TRANSIT ECMS system referenced above.

Quality records shall be stored and maintained in such a way that they are readily retrievable and provided with a suitable environment that shall minimize deterioration or damage, and prevent unauthorized alteration or loss.

Quality control records shall be legible, reproducible, and identifiable with the item involved, and contain the date of origination and identity of the originator, verifier, and/or responsible supervisor.

The Consultant shall retain all quality records for a period of seven (7) years from the date of completion of the Project unless otherwise specified in the Contract. All quality records shall be made available to NJ TRANSIT throughout the retention period.

Subtask 1.3.7 - Internal Quality Audits

The Contactor shall establish a procedure for conducting internal quality audits

throughout the period of performance of the Contact as follows:

- Perform internal audits at least quarterly.
- Identify in the audit any deficiencies found in the quality system, the causes of deficiencies and the status of corrective action or preventive action, when appropriate.
- Provide the audit results to NJ TRANSIT within five (5) days of the completion of the audit, including required corrective actions.
- Provide a final report to NJ TRANSIT confirming the completion of required corrective actions within thirty (30) days of the audit.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the Project Quality Audit Reports submissions shall be available to the Contractor subsequent to Contract award.

Deliverables:

Quality Management Plan

Design Control Plan

Internal Quality Management Review reports

Audit Reports

Report of Completion of Corrective Actions

Subtask 1.4 -Peer Review of Design

Prior to the 20% design completion the Consultant shall conduct a Peer Review of its design in order to validate that the overall engineering, quality, risk and procurement objectives of the Project have been successfully addressed. Additionally the Peer Review shall review the integration of the different systems and disciplines to ensure that this aspect of the Project has been adequately addressed.

The Peer Review shall also include a constructability review and analysis of construction cost estimates and proposed follow-on contract packaging suggestions

prepared by the Consultant. The Peer Review team shall consist of senior engineering and project management personnel from the Consultant design team Consultants who are **not** associated with or have had any knowledge or involvement with the technical details of the Project prior to being assigned to the team. The review team may also involve other transit agency personnel, and third party Consultants. The Peer Review team personnel shall be approved by NJ TRANSIT and shall include selected NJ TRANSIT personnel. Information and data to be presented during the Peer Review shall not be made available to any member of the Peer Review team prior to the review.

The Peer Review discussion and results shall be documented in a report within seven (7) days of the completion of the Peer Review.

Deliverable:

Peer Review Reports

Subtask 1.5 -Configuration Management

The Consultant shall be responsible for configuration management and document change control for its design for the duration of the Project. The Consultant shall prepare and submit to NJ TRANSIT for its approval, a Configuration Management Plan (CMP) which is in accordance with the requirements of ISO 10000. The CMP shall utilize a proven, auditable electronic based configuration management system to its design of the Project. Configuration management of drawings, specifications, documents, reports and analyses is the responsibility of the Consultant. The Consultant shall maintain document change control, including engineering plans, drawings and specifications and shall update all project documents as the design progresses. Configuration management shall provide an accurate historical record that can trace decisions made throughout the life of the Project.

The Consultant shall develop and maintain a Contract Documents Log created in an electronic data base format acceptable to NJ TRANSIT for NJ TRANSIT's review and approval. The Log shall list all design drawings, specifications, design calculations, analyses, reports and other documents to be prepared by the Consultant. Only one (1) version of a document may be effective at any one time. The Log shall function to keep

a history of each document created by the Consultant and its evolutionary status. The Log shall form an integrated part of the Records Management System.

At the end of the Project, the Consultant shall provide NJ TRANSIT in electronic format, a complete configuration management history, fully documenting all required project information, including the final revision status of all design elements that shall allow for the progress of the Project design to proceed.

Deliverables:

Configuration Management Plan – draft and final
Contract Document Log

Subtask 1.6 - Project Meetings

This provision specifies the requirements for project meetings to be held during the term of the Contract. The Consultant shall attend and participate in the meetings set forth herein with NJ TRANSIT, its representatives, government officials or other parties interested in the Project as may be determined by NJ TRANSIT.

The Consultant shall prepare a record of the meetings stating: the date and place, meeting purpose, names and titles of those present, a brief description of the matters discussed, agreements reached/decisions made, action items and the party responsible for taking the identified action. Meeting minutes shall be prepared and provided within seven (7) calendar days from the meeting date to NJ TRANSIT for review and comments. Final meeting minutes shall be issued to all appropriate parties within 14 calendar days of the meeting date.

NJ TRANSIT shall schedule a kickoff meeting with the Consultant within ten (10) days of issuance of the Notice to Proceed for the Contract. The purpose of meeting shall be to review the parties' responsibilities, major project milestones, procedures and submittals and personnel assignments. This meeting shall be chaired by NJ TRANSIT and be attended by representatives of NJ TRANSIT, all key personnel identified by the

Consultant and all major sub-Consultants proposed by the Consultant. Agenda items shall include:

- Consultant's personnel roster
- Identification of all sub-Consultants
- Consultant's project schedule, WBS, critical paths and major milestones
- Project Management Plan
- Design Control Plan
- Interface and Integration Management Plan
- Configuration Management Plan
- Quality Management Plan, including quality documents & records to be generated
- Procedures for processing design decisions and approvals
- Procedure for processing applications for payment
- Mobilization Issues

The Consultant shall conduct monthly (or more frequently if deemed necessary by NJ TRANSIT) systems interface and integration meetings throughout the design process in order to ensure that all of the design elements properly interface with each other, and also to assure that the elements properly interface and are integrated with the other elements of the NJ TRANSIT Superstorm Sandy Recovery and Resilience Program and other NJ TRANSIT Capital Programs as well as the Amtrak Raceway & Gateway Programs where applicable (and as provided by other Consultants or parties). The basis for conducting these meetings is to implement and monitor the Consultant's Interface Management Plan. These meetings shall be attended by the Consultant, NJ TRANSIT and all other parties whose design activities shall interface with the CE/PE Consultant.

The Consultant shall conduct monthly progress meetings with NJ TRANSIT on a regularly established date, convenient for all parties involved (or more frequently if deemed necessary by NJ TRANSIT). Progress meetings shall be held in addition to other specific meetings held for other purposes. The meeting shall address technical and administrative issues of concern, determine courses of action, develop appropriate

deadlines for resolution of issues, and assign individuals responsible for resolution of those issues. The Consultant and NJ TRANSIT shall determine who, in addition to themselves, shall attend the meetings. Additional attendees may include other parties as deemed appropriate for the success of the Project.

Agenda items shall include matters of significance that could affect progress such as:

- Review of the previous meetings minutes and resolution of open items.
- Consultant's CE/PE schedule.
- Interface requirements and coordination with other Amtrak/Yard Consultants.
- Requests for information and/or approvals.
- Changes
- Invoices and Payment Procedures

Status meetings shall be held prior to the submittal of the Consultant's Application for Payment. The purpose of the meetings is to determine that the status of activities as stated in Consultant's Monthly Progress Report and Progress Schedule. This meeting shall be attended by NJ TRANSIT and the Consultant. NJ TRANSIT disposition on the matter shall be documented. The Consultant shall prepare meeting minutes.

Deliverables:

Kickoff Meeting Minutes

Interface and Integration Management Meeting Minutes

Progress Meeting Minutes

Subtask 1.7 - Payment Procedures

This provision specifies the procedures for the Consultant's submission of Applications for Payments under this Contract and NJ TRANSIT's processing of those applications.

The Consultant shall bill monthly and be eligible to receive payment upon successfully achieving verifiable progress and compliance with the requirements of this provision and any other applicable provisions of the Contract.

The Consultant shall notify NJ TRANSIT in writing that it has achieved verifiable progress and requests reimbursement in connection with said progress. NJ TRANSIT shall ascertain whether the claimed progress has been achieved or not during the status review meetings and by review of valid Progress Reports as prescribed above.

Applications for payment shall at a minimum contain:

- The Consultant's name and address.
- The remittance address or bank to which payment is to be made.
- The Contract name or title and Contract number.
- An actual invoice for the amount identified above plus any other amounts due the Consultant under any other provision of the Contract signed by the Consultants Project Support Manager.
- The Consultant's certification that the amount requested is due and payable under the Contract and has not been previously invoiced or paid
- Certified Payrolls (timesheets not required).
- Supporting documentation for all expenses incurred.
- DBE participation levels.

NJ TRANSIT shall promptly review the Consultant's Application for Payment upon receipt for accuracy and conformance with the above and shall prepare and issue a Payment certificate, with a copy provided to the Consultant, showing the amount payable by NJ TRANSIT to the Consultant.

NJ TRANSIT may, by any payment, make any correction or modification that should properly be made to any amount previously considered due and paid by NJ TRANSIT.

A payment issued by NJ TRANSIT shall not be construed as waiving any rights of NJ TRANSIT under the Contract or to be an acceptance of the Project or any portion thereof nor shall it relieve the Consultant from any requirement or responsibility under the Contract or from replacing or revising unsatisfactory work for which it is responsible.

Deliverables:

TASK 2 - Engineering

The engineering of major elements of the Project shall be required, including value engineering analysis. This design effort shall generally be progressed to the 10% and then to 20% design level. However, the actual level for each element shall be coordinated with the NEPA, Permitting and Regulatory Compliance engineering data requirements as well as Risk Assessment, and Contract Packaging tasks to produce the best value for NJ TRANSIT to move the project forward to completion.

Some critical facilities shall not be connected to the traction microgrid (the 104 MW Central Power Plant), and thus require separate Distributed Energy Resources (DER). (For the purposes of this section and continuing discussions throughout this document, the term DER refers to any energy systems, equipment or processes that are small, modular, and decentralized to provide onsite power as opposed to the customer obtaining power from the grid from a larger centralized power.). Energy storage alone is not cost-effective due to the size of the demand and the performance requirements (a 7 day outage); however, storage could be used in combination with PV or other distributed generation (DG). (For the purposes of this section and continuing discussions throughout this document, the term DG refers to the on-site generation portion of DER.) Facilities within the project scope that may require a DER solution are listed below:

- NJ TRANSIT Secaucus Junction, Newark Broad St. Station, Newark Penn Station, and NJ TRANSIT headquarters building at One Penn Plaza, Newark;
- Headquarters building at One Penn Plaza, Newark;
- NJ TRANSIT bus garages at Greenville, Meadowlands (maintenance facility), and Wayne;
- Selected passenger ferry terminals and associated facilities.

In addition to the locations listed above, several other stand-alone facilities with loads, ranging from 600 kW to 2.5 MW, require backup generation in the form of DER, as they

also would not be able to receive power from the centralized power plant in the event power from the commercial grid is not available. Some of these stand-alone units are suitable to be powered from PV, and others are more suited to other forms of distributed generation (DG), such as natural-gas-fired fuel cells with or without CHP. (For purposes of this section and continuing discussions throughout this document, the term facility refers to the “stand-alone” loads referenced above.)

The Consultant shall advise NJ TRANSIT as to which DG technology can be considered for a particular location, accounting for facility-specific factors such as load magnitude, and variation, operational constraints space availability, structural integrity, and thermal load availability. PV, possibly coupled with energy storage, may be considered for small loads, such as ferry, light-rail, and maintenance facilities. Fuel Cell Stacks supporting CHP may be more efficient for loads ranging from 300 KW to loads of 1 MW or more.

Ferry terminals in the project area are operated by PANYNJ or by private ferry operators. Compared to rail systems, ferry boats support a lesser passenger traffic volume across the Hudson River. However, ferry boats provide substantial value toward the project objectives because they provide an alternative way to get passengers and goods across the Hudson River in an emergency situation. Only ferry terminals on the New Jersey side of the Hudson River, are considered part of the project scope. For the purposes of the project, the following New Jersey ferry terminals are considered most important and potential candidates for energy resiliency improvements:

- Edgewater,
- Port Imperial,
- Hoboken South,
- Paulus Hook,
- and Liberty State Park.

Hoboken South, Port Imperial, and Paulus Hook terminals are intermodal. The Port Imperial terminal connects to NJ TRANSIT light rail and bus, whereas the Hoboken terminal ties to PATH, HBLR, and NJ TRANSIT commuter rail lines. Paulus Hook, which saw very high traffic during Superstorm Sandy, connects to PATH's Exchange Place

station and has a helicopter pad. Liberty State Park terminal is an integral part of an existing PANYNJ emergency operations plan. The Hoboken South and Port Imperial terminals, as well as the ferry maintenance/refueling facility, have emergency backup generators. In addition, the following limited operational information provides further characterization of Ferry operations;

- All ferry terminals require lighting for visibility.
- Ferry ramps are not operated by electricity.
- It may be possible to connect some ferry terminals to the traction power microgrid, depending on the distance to traction power feeders.
- The Edgewater, Hoboken, and Port Imperial ferry terminals are associated with buildings that may have HVAC loads and are potential candidates for application of CHP.
- Other ferry terminals may be candidates for PV + storage system.

The required design elements include but are not limited to; an engineering review of NJ TRANSIT candidate facilities for the implementation of distributed energy resources. This review shall account for facility structural characteristics that support the implementation of such electrical power generation, resiliency, foundations, earthwork, facility enclosures, natural gas supply and facility interconnections, and distribution infrastructure (including but not limited to, circuits, i.e. cabling, transformers, as applicable), facility function and control architecture and hardware. The Consultant shall use this information to develop cost analyses to determine the efficacy of applied resiliency technologies, also accounting for reconstruction and modification costs of existing structures and infrastructure as necessary. In addition, the Consultant shall perform analysis of critical operations to be maintained during islanded operations including but not limited to evaluation of facility power demands, in turn, selection of appropriate power generation technology, i.e. CHP using natural gas, solar power generation, energy storage or a combination thereof. The electrical power supply to support facility operations must accommodate facility critical loads including but not limited to; lighting, ventilation, pumps, compressors, and communications where applicable. The Consultant shall investigate whether some house power (stations or other facilities) may be powered by the central power plant, the subject of RFP 16-001.

The results of this analysis shall be provided to NJ TRANSIT for review and further action as warranted.

Required design elements shall also include methods for satisfaction of project environmental, regulatory compliance requirements, staging options and cost implications to Project Design and Construction. A proposed construction schedule for DG related modifications, including maintenance of passenger rail operations, ferry operations and bus operations/maintenance during construction, i.e. operating windows, shall also be developed as part of this task. The format of the proposed Construction Schedule shall be consistent with NJ TRANSIT's Superstorm Sandy Recovery and Resilience Program requirements. Such requirements shall be available subsequent to Contract award.

Project General Plan and Specification Requirements:

As applicable, the Consultant shall provide all necessary architectural, engineering and professional services required to prepare all contract plans, technical specifications, special provisions, and a detailed cost estimate and bid documents for all sections of the proposed work. The construction plans shall be on 24" x 36" with standard NJ TRANSIT title box and shall consist of: Key Map, Location Map, Estimate of Quantities, Distribution of Quantities sheet, Site Plan, Elevations, Sections, Typical Sections Standard Details, etc. Certain copies of design development drawings may be half-size as designated and/or agreed by NJ TRANSIT. Specifications and supplemental specifications shall conform to CSI format or other acceptable format as pre-approved by NJ TRANSIT. Use of graphics shall conform to the NJ TRANSIT Graphics Manual where applicable. Construction plans shall be prepared with a computer-assisted drafting program; disks containing final design drawings shall also be submitted to NJ TRANSIT.

For Amtrak facilities, Amtrak standards shall be met. These Standards are readily available from Amtrak.

The Consultant shall coordinate the plans with other project tasks as necessary to advance the design to the 10% level then to the Preliminary Design level (approximately 20%). Develop a construction plan for each facility showing all elements to be constructed. Such plans shall detail requirements as applicable for natural gas supply and connection, electrical power distribution and interconnection, water, sewer, communications, parking, roads, traffic signalization and catenary modifications as applicable. In addition, the electrical plans shall include location of cable and conduit runs and lighting as applicable.

The civil drawings shall graphically depict the proposed layout of facility modifications necessary to implement and operate Distributed Energy Resources as they relate to NJDEP Land Use Program as well as ACOE regulatory limits of disturbance for the selected Project footprints. Demolition of structures and utilities shall also be identified as applicable. The structural drawings shall depict the type of structures necessary and the size and type of foundations to be proposed. The geotechnical design shall include a report and foundation recommendations for required facility modifications. A construction-staging plan shall describe potential methods and sequence of construction to complete the project while maintaining facility operations and/or passenger service where applicable. The hydraulic design shall include the delineation of the drainage patterns for modified facilities and resulting appurtenances. The location of drainage features shall be defined and sized. Drainage requirements in floodplains and wetland areas shall be defined as necessary. A report describing the entire drainage program for the project shall be prepared discussing the impacts and requirements of NJDEP and USEPA and taking into account guidance per AASHTO / NJDOT criteria. It is the Consultant's responsibility to ensure that all plans and drawings developed for this Project shall comply with project permit conditions and associated regulatory compliance requirements. Upon the direction by NJ TRANSIT, the Consultant shall be prepared to demonstrate said compliance. Preliminary Design drawings, specifications, schedules and associated documents shall be prepared consistent with the standards set forth in the RFP and shall include at least the following information:

1. Cover Sheet
2. Index of Drawings
3. Site Drawings

4. Facility Plans, Profiles and Cross Sections.
5. Plans, Elevations, Sections and other details pertinent to the feature of Design.
6. Design Analyses, shall completely cover the electrical design requirements for electrical systems necessary for the Project. It shall be used to justify Concept Design and verification. The Basis for Design shall include a concise outline for functional features, including a description of existing systems and other considerations affecting the design. In addition, a full description of any special requirements and justification for any proposed departure from standard criteria are required. The Analysis shall be separately bound and labeled and sufficiently complete to permit review of:
 - a. Structural analyses
 - b. Mechanical analysis with line diagrams
 - c. Electrical analysis with line diagrams and load protection
 - d. Special features (e.g. automated systems, corrosion prevention, etc.)
 - e. Site security (as applicable)
 - f. As applicable, project utilities such as telephone, communications, lighting, etc.
 - g. An estimate of total connected loads, power factors, demand factors, diversity factors, load profiles where required, resulting demands and sizes of proposed transformers to serve either the complete project or the various portions involved shall be provided
 - h. The basis for selection for primary and secondary distribution voltages and of overhead or underground construction shall be provided
 - i. Computations shall be provided to indicate that systems and materials are adequate but not over designed and are correctly coordinated
7. Technical Specifications
8. Statement of Estimated Construction Costs and Schedule (staging if appropriate) in sufficient detail (quantity take-offs) so as to permit evaluation. The format of the Cost Estimate reports shall be consistent with NJTRANSIT's Superstorm Sandy Recovery and Resilience Program requirements. Such requirements shall be available subsequent to Contract award.

Plans, Profiles and Section Drawings:

- Develop plans for use in cost estimating and display of plans and profiles for NJ TRANSIT review and approval.
- Prepare plans, profiles, typical sections, and sketches in sufficient number and detail to define and allow for the evaluation of the alternative construction and implementation concepts.
- Support NJ TRANSIT complete permit applications as required and directed by NJ TRANSIT, in a format for presentation of plan, profiles and sections, for use in an 11 inch-by 17 inch, or 8.5 inch-by-11 inch report in both hard copy and electronic format. Plan and profile drawings for these purposes shall be presented in the report and as reductions of the full-size drawings. Plans for special facilities for these purposes shall also be presented in the report as reductions of the full-size drawings. The formats shall be submitted to NJ TRANSIT followed by other agencies for prior review and approval.

Deliverables

- Drawing formats for approval;
- Technical Memoranda documenting additional engineering studies as required (15 copies);
- Review Set, plan and profile drawings for the, sections at appropriate scales;
- Final Set, plan, profile and section drawings as above (15 copies CADD files on CD-Disc);
- Review set, 11 x 17 inches and 8 1/2 x 11 inches drawing reductions as above (15 copies originals plus CADD files on Disc).

(Note: For the facilities that shall be owned and maintained by Amtrak, Amtrak may elect to further modify requirements relative to the types and scales of drawings required.)

In addition and in order to facilitate reviews, the drawings shall also be made available on the project website and formatted as Adobe documentation.

Note on use of CADD: Due to the many differing needs of NJ TRANSIT and outside interested parties for review of specific elements of the projects, it shall be necessary to reproduce the design documents. They shall require enlargement, downsizing, and modification, showing without certain elements or emphasis on certain elements. To facilitate these requirements, the use of computer-aided design and drafting (CADD) is required. The Consultant shall accommodate such requirements in its proposed resource allocations.

The Preliminary Design documents shall be submitted in 15 copies [10 half-scale and three full-size set of plans] to NJ TRANSIT for review and comment. Any comments /revisions generated as a result of the review process shall be incorporated during the Final Design Task.

CADD Standards Manual: The documents shall be submitted in both their original software format (e.g. WORD, EXCEL, CAD, Photoshop) and as pdf files. The electronic submittals can also be provided via FTP Site.

General Notes: The preparation of all Project plans, details and sections, related but not limited to natural gas supply and connection, electrical power distribution and interconnection, water, sewer, communications, parking, roads, traffic signalization and rail signalization as well as roadway alignment, Facility structural, right-of-way, architectural, building systems including layout plans, shall be guided by the following requirements;

- i. All Project documents shall be developed by the Consultant at such scales and of sufficient detail to indicate the full extent of work required;
- ii. The engineering and /or construction shall consist of:
Key Map, Location Map, Estimate of Quantities, Distribution of Quantities sheet, Site Plan, Elevations, Sections, Typical Sections, Standard Details, etc.
- iii. All design work shall be incorporated on plans on a scale of at least 1" = 20'. Architectural plans shall be developed to a similar scale. Certain engineering drawings may be half-size;
- iv. More detailed structural drawings shall be prepared at the appropriate

- scales to depict necessary details;
- v. All contract documents must be made with a computer-assisted drafting program so long as the elements specified herein are included. The latest or applicable version of AutoCAD shall be used in accordance with NJ TRANSIT's CAD standards. [Note – Amtrak owned and maintained facilities shall be drawn using Amtrak CAD standards. MicroStation for Amtrak – the Consultant shall confirm the version in use by NJ TRANSIT and Amtrak ,– NJ TRANSIT standard libraries shall be used as applicable]
 - vi. Design calculations for the work shall be recorded on 8 ½" x 11" calculation paper, shall be indexed by subject and electronic copy provided;
 - vii. All plans and calculations shall be signed and dated by both the designer and checker, and shall be compiled in separate volumes for future reference;
 - viii. Specifications and supplemental specifications shall conform to the Construction Specification Institute (CSI) format.
 - ix. All computer runs shall be reduced to similar size, indexed and compiled with input and output identified; and,
 - x. Sketches, as may be required, shall accompany design calculations to outline design concepts and results.
 - xi. Signed and sealed survey drawings of all base maps surveyed for the preparation of the project plans including draft right-of-way metes and bounds descriptions.

Deliverables:

10% Plans & Specs

50% complete interim 20% Plans & Specs review package

100% complete final 20 % Plans & Specs review package

Electric Power Loads

The overall performance objective is to enable critical facility operations capability in the event that electricity cannot be supplied from the existing commercial grid as a result of an event consistent with the Project's **Design Basis Threat (DBT)**.

The design shall provide for selection and implementation of appropriate DER systems to supply necessary electrical power at the following; NEC commuter rail stations at Newark Broad Street, Secaucus Junction, Newark Penn and Hoboken. The following ferry terminals on the New Jersey side of the Hudson River are also potentially included: Port Imperial Hoboken South, Paulus Hook, Liberty State Park, and Ferry Maintenance Facility south of Port Imperial. Greenville, Meadowlands, and Wayne bus garages are also included in the project scope. The two operating modes shall be: a grid-tied mode that shall supply continuous power to offset a portion of the facility's use of commercial grid electric power; an Islanded Mode that shall meet the critical operational power needs for the Incident Transportation Plan, allowing for operation of facility critical elements.

The following information, as applicable, is required for design:

1. Forecast of annual diversified peak load to be served by the project.
2. Typical seasonal and daily load curves and load duration curves of the load to be served.
3. If the facility is to operate interconnected with the local utility company, the Consultant shall develop information such as capacity, rates, metering, and interface switchgear requirements.
4. If the facility is to operate in ISLANDED MODE, the Consultant shall also develop:
 - a. Estimated operating power consumption data for each element required to implement the transportation plan
 - b. Recommended distribution voltage, generator voltage, and interconnecting substation voltages (where applicable).

The system shall be designed to minimize the need for significant upgrades to existing utility distribution or transmission systems.

INCIDENT TRANSPORTATION PLAN

The overall service goal is to transport as many people as possible to greater Newark, the New Jersey Hudson River Waterfront in Hudson County, or the Manhattan Central Business District (south of 59th Street) utilizing an array of bus, commuter rail, light rail, rail rapid transit and ferry services. While some services shall operate in a limited manner because of available electrical power, and some shall operate fully, all shall benefit from the implementation of the NJ TransitGrid.

Within New Jersey, a limited portion of the NJ TRANSIT commuter rail system in northern NJ shall have electrical power provided to it from the NJ TRANSIT-DG to sustain a core system operation. NJ TRANSIT's intrastate bus services shall be operating and interstate bus services shall be redirected to locations where travelers can transfer to available trans-Hudson services. NJ TRANSIT shall be operating the Hudson Bergen Light Rail Line to provide transit service to the New Jersey Hudson River Waterfront in Hudson County, NJ. There are four primary locations where trans-Hudson travelers shall be able to board public transit into Manhattan: Hoboken Terminal, Secaucus Junction, Weehawken Ferry Terminal and Newark Penn Station. There are also a few smaller locations where travelers shall be able to access lower-capacity private ferry services. While the focus is on AM peak period demand, it is assumed a PM peak period service shall also be provided where historically demand is more spread out.



- No service on Newark Light Rail.
- No Amtrak service.
- The system is managed to balance demand on public transit services more evenly over four hour AM peak period (6AM-10AM) – transit service shall continue outside of this peak period time but at a lower frequency and capacity.
- A PM peak period service plan shall be implemented to match the volumes of AM peak period inbound travelers.
- Highways and major roads are usable as are arterials with police assistance at intersections (possibly using barricades to prevent turning movements).
- NJ TRANSIT intrastate bus routes shall operate as close to normal schedule as permitted locally.
- National electrical grid feeding northern NJ and Manhattan initially shut down completely, and subsequently impaired from normal operation with full power restoration not achieved for two weeks requiring alternate power supply.

THE NJ TRANSIT-DG POWERED FACILITIES AND SERVICES¹: Base Case Scenario

(¹ Assume these services are operational 24 hours after power outage begins. This allows time to position transit equipment and operating personnel. If the outage is tied to a weather condition, transit equipment may be stored someplace other than in its normal location.)

- Power for switches and signals only for NJ TRANSIT-owned lines:
 - Bergen County/Pascack Valley to Sports Complex via Secaucus Junction to Hoboken Terminal using diesel powered trains.
 - Morris & Essex Line trains operate from Maplewood to Hoboken Terminal
 - using diesel powered trains (no use of overhead electrical power)
- Northeast Corridor switches and signals powered, electrical/diesel powered
 - trains operate from North Brunswick to Newark Penn Station. Limited service continuing into Penn Station, NY.
- Hudson-Bergen Light Rail fully powered.
- Hoboken Terminal fully powered (able to accommodate all modes).
- Weehawken Ferry Terminal fully powered with service to Manhattan.
- Newark Penn Station and Frank R. Lautenberg Transportation Center at Secaucus Junction operable (able to accommodate all modes) Penn Station, NY,

partial power sufficient to accommodate limited NJ TRANSIT service.

- Rail system is otherwise physically undamaged and capable of supporting operation of a limited number of trains.
- Although the focus of this exercise is on the dominant AM eastbound flows, rail, bus, ferry and light rail services shall also operate in the reverse direction during these time periods.
- NJ TRANSIT and private interstate buses shall be diverted to selected intercept locations where passengers can transfer to functioning trans-Hudson modes (PATH, Rail into PSNY and Ferry into Manhattan).

Specific NJT Commuter Rail Lines/Services NOT Operating:

- Raritan Valley Line
- North Jersey Coast Line
- Bergen County Line (other than using line to get to Sports Complex)
- Main Line
- Pascack Valley Line (other than trains operating on it for short distance to access Sports Complex)
- Montclair-Boonton Line
 - Gladstone Branch
 - Morris & Essex west of Maplewood
 - Northeast Corridor west of North Brunswick
 - Port Jervis Line (although it is operated under contract to Metro North Railroad it must use either the Bergen County Line or Main Line to reach Hoboken Terminal, the terminus of this service)

Two main issues prevent operations on these rail lines:

- No power for at-grade crossing gates, impractical to effectively staff every at grade location; and,
- No ability to distribute power to signals and switches to outlying areas.

Bus Services Not Operating:

- No Lincoln or Holland Tunnel bus service due to lack of power for ventilation fans
- No buses into Port Authority Bus Terminal or George Washington Bridge Bus Station because of electrical power limitations permitting full functioning of these facilities

Light Rail Services Not Operating:

- Newark Light Rail shall not be operating but NJ TRANSIT shall provide parallel bus services and enhance other bus services serving the same general ridership markets.

CYBERSECURITY

The Project's critical nature requires a robust cybersecurity architecture. As a baseline, and where applicable, industry standard best practices for typical power grid industrial control systems (ICSs), including those found in NERC Critical Infrastructure Protection (CIP) and the National Institute of Standards and Technology (NIST) Interagency Report (IR) 7628, shall be incorporated in the design. However, a goal of the project is to make the project more robust than ICSs given that the microgrid shall be used in emergency situations and may be critical to emergency operation continuity. In addition to referenced best practices, additional rigor shall be applied to strengthen the microgrid control system's defense-in-depth. To further enforce defense-in-depth and expand on industry standard best practices, segmentation strategies within the microgrid control system itself are required to reduce the risk of widespread control system damage as a result of malicious activity or unexpected failures.

At a minimum, the Consultant shall address the following recommendations as they relate to hardening of the cybersecurity aspects of NJ TRANSIT-DG controls;

Policy/Procedural

- Developing and maintaining security policies, procedures, training and educational material that applies specifically to the microgrid control system.
- Establishment of a cross functional cyber security team is required and should consist of IT staff, control engineer, control system operator, network and system security experts, management staff, and physical security department member at minimum.
- Addressing security throughout the lifecycle of the microgrid control system, including architecture design, procurement, installation, maintenance, and decommissioning.
- Evaluate control system security policies and procedures based on the Homeland Security Advisory System Threat Level and deploy increasingly heightened security postures as the Threat Level increases.
- Reviewing user accounts on regular basis and providing a means of quickly changing accounts when access privileges change (e.g., employment termination).
- Authentication/Encryption
- The use of separate authentication mechanisms and credentials for users of the control system network and corporate network.
- Restricting user privileges to only those that are required to perform each person's job (i.e., establishing role-based access control and configuring each role based on the principle of least privilege).
- Applying security techniques such as encryption and/or cryptographic hashes to control system data storage and communications where appropriate.
- Using modern technology, such as smart cards, for additional factors for identity verification.

Segmentation

- Implementing a network topology for the control system that has multiple layers, with the most critical communications occurring in the most secure and reliable layer.
- Providing physical separation between the corporate and control system networks.
- Employing a DMZ network architecture to prevent direct traffic between corporate and control system networks while allowing historian data transfer.

Redundancy/Spares

- Ensuring that critical components are redundant and are on redundant networks.
- Designing critical systems for graceful degradation (fault tolerant) to prevent catastrophic cascading events.

Physical Protection

- Restricting physical access to the control system network and devices.

Monitoring/Audit

- Tracking and monitoring audit trails on critical areas of the control system.
- Establishing use restrictions, monitors, and effectively managing access to the control system.

Change Control

- Expeditiously deploying security patches after testing all patches under field conditions on a test system if possible, before installation on the control system.

Security Controls

- Implementing security controls such as intrusion detection software, antivirus software, and file integrity checking software, where technically feasible, to prevent, deter, detect, and mitigate the introduction, exposure, and propagation of malicious software to, within, and from the control system network.
- Disabling unused ports and services on control system devices and networking equipment.
- Establishing usage restrictions and implementation guidance for allowing remote vendor connections, including authorization of remote access before each connection, automatic session termination, and physical disconnection of remote connection when complete.
- Implementation of strong, non-default passwords and two-factor authentication where feasible.

Distributed Energy Resources Design Attributes

Distributed energy resources (DER) are electric generation units (typically in the range of 3 kW to 50 MW) located within the electric distribution system at or near the end user. They are parallel to the electric utility or stand-alone units. DER have been available for many years, and are known by different names such as generators, back-up generators, or on-site power systems. Within the electric industry the terms that have been used include distributed generation (DG), distributed power (DP), and DER. "DER" refers to the broadest range of technologies that can provide power to the user outside of the

grid, and includes demand-side measures such as energy efficiency and demand response.

Distributed Generation—Any technology that produces power outside of the utility grid (e.g., [fuel cells](#), [microturbines](#), and [photovoltaics](#))

Fuel

Cells

Fuel cell power systems are quiet, clean, highly efficient on-site electrical generators that use an electrochemical process—not combustion—to convert fuel into electricity. In addition to providing power, they can supply a thermal energy source for water and space heating, or absorption cooling. In demonstration projects, fuel cells have been shown to reduce facility energy service costs by 20% to 40% over conventional energy service.

Energy Storage/UPS Systems

Energy storage technologies produce no net energy but can provide electric power over short periods of time. They are used to correct voltage sags, flicker, and surges that occur when utilities or customers switch suppliers or loads. They may also be used as an uninterruptible power supply (UPS). As such, energy storage technologies are considered to be a distributed energy resource.

Photovoltaic Systems

Photovoltaic (PV) cells, or solar cells, convert sunlight directly into electricity. PV cells are assembled into flat plate systems that can be mounted on rooftops or other sunny areas. They generate electricity with no moving parts, operate quietly with no emissions, and require little maintenance.

Reliability. Facility DG reliability standards shall be developed as part of the design criteria development.

Resiliency. Facility DG resiliency standards shall be developed as part of the design criteria development.

Maintenance. Facility DG Power equipment arrangement shall permit reasonable access for operation and maintenance of equipment. Careful attention shall be given to the arrangement of equipment and electrical devices so that items can be maintained or replaced as necessary. Adequate platforms, stairs, handrails, and kick plates shall be provided so that operators and maintenance personnel can function conveniently and safely.

Future expansion. The specific technology selected for each facility and the physical arrangement of the facility equipment, building, and support facilities such as natural gas supply connection systems, circulating water system, trackage, and access roads shall be arranged insofar as practicable so as not to preclude future expansion.

Intraplant Communications.

Where applicable, related necessary modifications to existing communications systems shall be designed for operation in a noisy environment.

Efficiency and Environmental Considerations. In addition to assessing cost and capacity, and considering maintenance, future expansion, and other considerations, the Consultant shall identify technologies or other design considerations that have the capacity to reduce potential emissions or to improve energy efficiency, through heat recovery or other methods for consideration by NJ TRANSIT.

On the basis of conceptual information provided to the Consultant by NJTRANSIT, the Consultant shall produce approximately 20% design plans and specifications, with drawings at 1"=20' scale. The 10% Design Documents as detailed and required in Task 2, shall serve to fix and describe the size and character of the project as to structural, mechanical, communication and electrical systems including project related modifications of existing facility electrical systems, interconnections to the existing commercial grid as approved by NJ TRANSIT, connections to natural gas supply pipelines, generation distribution and related equipment, schedules and other essentials as appropriate. The 20% design plans shall include a 50% progress set (midpoint in the generation of the Preliminary Engineering package) for NJ TRANSIT review and the final or 100% Preliminary Engineering set for NJ TRANSIT review and approval.

Subtask 2.1 - Verification of Concept Design Criteria

The objective of this subtask is to ensure accuracy and update information and engineering/design data developed during previous NJ TRANSIT efforts in order to develop the project Design Criteria resulting in 10% Design Documents. This activity is a prerequisite to initiating further engineering on the Project. The Design Criteria shall be prepared for review and approval by NJ TRANSIT. Once approved by NJ TRANSIT, the Design Criteria shall be utilized by the Consultant to progress engineering.

A list of relevant documents previously developed by NJ TRANSIT can be found in the FTA Grant Application for the Project dated March 25, 2014 and which is included as part of this RFP with emphasis on the following:

- Sandia Report Phase I dated February 2014
- INCIDENT TRANSPORTATION PLAN

Pivotal Design Criteria considerations include but are not limited to;

- A thorough analysis of power usage, projected and temporal, with regard to peak and non-peak loading. Similarly, ramping of power demand shall also require characterization. Project/System Power demand characterization from a generation and distribution perspective relative to operation of each facility must also be analyzed.
- In all cases, DG type and configuration accounting for physical footprint and general layout requirements shall also be determined. (Discussed further in Subtask 2.2 – Engineering and Design).

Physical design parameters/specifications (including electrical power loads) and construction requirements for Distribution infrastructure to support facility operations including and as applicable;

- Other NJ TRANSIT identified Project transformers;
- Power distribution to control and communication systems.

Another key component of Concept Design verification is the selection and verification of appropriate gas and/or Photovoltaic power generation technology along with CHP if

practicable and desired by NJ TRANSIT. The Consultant shall assist NJ TRANSIT in this selection by providing a comprehensive review and summary of available technologies to achieve the requisite power generation capability for the NJ TRANSIT-DG Distributed Generation components critical operations. Based on recommendations and analysis by Sandia, NJ TRANSIT is currently considering up to 5 MW of photovoltaic electric power generation and an additional 7 megawatts (MW) of distributed generation Technology at some of the select locations discussed above in Task 2, or a combination of the two technologies in order to accommodate requirements related to minimum operating load, ramping capability, and cycling (start-stop) that must be met in order to operate an islanded scenario versus grid connected. As part of this evaluation, the Consultant shall characterize a cost-benefit analysis of each technology for power generation accounting for maximum operational efficiencies in the grid connected mode and islanded modes, related emission characteristics, along with the use of heat-recovery steam generators as practicable. Finally, the Consultant shall verify the peak load assumptions and critical operation loads of each facility, i.e. the selected DG technology(s) and resultant power generation capacity is optimal to achieve stated emergency operational power demands and advise NJ TRANSIT accordingly. This review shall apply to both the Grid Connected as well as Islanded modes of operation. Facility DG configurations must be designed to be black-start capable as necessary. A life cycle cost analysis shall be presented in support of the Consultant's conclusions.

The results of this study shall be provided to NJ TRANSIT in report form for review and approval. As noted above, this effort is a pre-requisite before commencing Preliminary Engineering.

Deliverable:

10% Design Documents

Design Criteria Manual

Gas Fired Technology Analysis Report for NJ TRANSIT-DG

Subtask 2.2 – Engineering and Design

The Consultant shall assist NJ TRANSIT in the selection and implementation of appropriate DER technology for the selected facilities as described in Task 2 above.

Potential technologies may include one or more, or combinations of the following;

- Photovoltaic, or PV, arrays consisting of semiconductor devices that convert sunlight into electricity;
- Combined heat and power, or CHP, is the joint production of both heat (usually steam or hot water) and electricity from a single fuel source. Collecting and making productive use of that waste heat can result in total efficiencies over 70 percent. Combined heat and power is often referred to as cogeneration.
- Fuel cells generate electricity by converting chemical energy into electrical power with few moving parts. Fuel Cell technology considered by NJ TRANSIT shall employ natural gas as a fuel source.
- Energy storage, a device that stores energy to produce useful work at a later time
- Demand side energy management, the modification of consumer demand for energy through various methods such as changes to operations, energy efficiency measures, demand response, etc.

Subtask 2.2.1 – Evaluation and Design Application of Fuel Cell Technology

Based upon the developed and NJ TRANSIT approved project concept plans, the Consultant shall assist NJ TRANSIT in selection design and implementation of new DG Fuel Cell Power and associated electric power distribution facilities where applicable. These efforts shall be coordinated with other related tasks.

Applying Fuel Cell Technology as a DG Solution

Fuel cell backup power can provide a critical service in times of emergencies and decrease the economic and productivity losses during other grid instabilities when compared with incumbent technologies. Fuel cells can provide an extended run time similar to that of diesel generators while also providing a low-emission and low-noise solution, which is especially important in urban environments. A fuel cell operates like a battery, but can operate indefinitely, provided the availability of a continuous fuel source. Instead of charging, it is an electrochemical device that uses oxygen and a

readily replenished fuel, such as hydrogen, to produce electricity. Individual fuel cells are stacked in a module to produce the desired energy output, much like commercial batteries use an array of individual cells. With heat and water as the primary byproducts, fuel cells are virtually pollution-free and have more than two times the efficiency of traditional combustion technologies, which typically have an efficiency rate of 33% to 35%. As long as fuel is supplied to the fuel cell, energy in the form of heat and electricity shall be produced. Fuel cells can provide power for a range of applications—from laptop computers to utility power plants. A power converter can convert the direct current (DC) power produced by the fuel cell into alternating current (AC) power that is compatible for use by the facility and the utility.

According to the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) Fuel Cell Technologies Program (<http://www1.eere.energy.gov/hydrogenandfuelcells>), when the heat from the fuel cell is captured and used in combination with electrical power (such as combined heat and power), fuel cells can have efficiency rates between 70% and 85%.

Benefits and advantages of fuel cell technologies include:

- Near zero emissions at the point of operation;
- Reduction in current and future electricity costs through the efficient use of renewable energy technologies;
- A high-quality, reliable, and consistent power supply as long as fuel is supplied
- Higher electrical efficiency than traditional combustion power supplies;
- Combined heat and power installations of fuel cells, which further increases efficiency by utilizing the heat generated by the fuel cell for building heating needs;
- Fuel-flexibility, enabling the use of a variety of domestic energy sources (e.g. hydrogen, natural gas, and methanol);
- Silent operation 24 hours per day, 7 days per week;

The fuel delivery module is what governs the delivery of the hydrogen to the fuel cell stack and is needed in most fuel cell installations. Hydrogen is produced and purified on demand for the fuel cell system by a fuel processor. The fuel processor then converts the fuel supply (e.g. natural gas and biogas) into a hydrogen-rich stream, which is

purified to an acceptable purity level for the fuel cell stack. Maintaining the required hydrogen purity is critical in these systems. Certain contaminants in the fuel supply act as poisons to the fuel cell stack and drastically shorten the lifetime of the fuel cell system. (In some parts of northern NJ, refinery gas is injected into the NG pipeline and, while it generally presents no problems, it may present problems for fuel cells during the reforming process possible poisoning the catalyst.)

The fuel cell stack is where the electrochemical process of converting hydrogen into electricity and heat occurs. It is surrounded by a various balance of plant components (e.g. valves, air blowers, and sensors) to monitor and regulate system operation. The hydrogen is fed into the anode side of the fuel cell stack, while air is fed to the cathode side of the fuel cell stack to sustain the electrochemical reaction.

The electricity produced by the fuel cell stack is DC. A power electronics module is typically incorporated into the fuel cell system design to manage the power output and quality from the fuel cell system. If the end user requires an AC output, the conversion from DC to AC power is accomplished in the power electronics module. A control system is used to operate the entire fuel cell system and typically interfaces with the electrical system at the customer site. Of the various types of fuel cells (http://www1.eere.energy.gov/hydrogenandfuelcells/fuelcells/fc_types.html), four are commercially available: phosphoric acid, polymer electrolyte membrane, molten carbonate, and solid oxide.

Molten Carbonate Fuel Cells

Molten carbonate fuel cells are currently used for electrical utility, industrial, distributed generation, and military applications. They operate at high temperatures (600°C to 700°C) and do not require an external fuel processor. Depending on system size, molten carbonate fuel cells can provide 300 kW to 3 megawatts (MW) of power and are well-suited for large applications. Alone they have an efficiency rate approaching 65% and when used in combined heat and power applications, the efficiency increases to 85%.

Polymer Electrolyte Membrane

Polymer electrolyte membrane fuel cells—also called proton exchange membrane fuel cells—need only hydrogen, oxygen from the air, and water to operate and do not require corrosive fluids like some fuel cells. This type of fuel cell runs at low temperatures, usually around 80°C, with electrical efficiencies of about 45%. In addition, polymer electrolyte membrane fuel cells are the primary candidate for automotive and small stationary applications. They are used in back-up power applications, critical loads, high quality power, and emergency service equipment. They also provide between 1 kW to 100 kW of power for applications and have a quick start-up capability.

Solid Oxide Fuel Cells

Solid oxide fuel cells operate at very high temperatures, between 700°C to 1,000°C (1,830°F). They are currently used in residential and commercial applications, providing 1 kW to 2 MW of power depending on the size. High temperature operation removes the need for precious-metal catalyst and like molten carbonate fuel cells, enables internal reformation of fuels; thereby reducing the cost of the fuel cell system. High-temperature solid oxide fuel cells are being demonstrated for distributed generation, auxiliary power, and electric utility applications.

Economics

Site-specific economic analysis is critical for evaluating if a particular site is suitable for installation of a fuel cell system. Key factors include grid electricity costs, delivered fuel costs (typically natural gas), site load profiles, and availability of financial incentives. Two of the most important drivers for economic viability are:

1) The premium placed on backup and reliable power for a given facility, and 2) the spread in cost between natural gas provided to a facility and the cost of electricity purchased from the grid, otherwise known as the "spark spread".

Interconnection

A fuel cell that shall be connected to the local utility grid must meet interconnection requirements of the local utility. Many states or localities have guidelines that require interconnection of many customer-owned power projects. Some guidelines limit the size of a project that can be interconnected or restrict the types of technologies that can be connected. A Federal agency should confirm early in the discussion with the utility, if it can sign the utility interconnection agreement as

there have been some cases where utility indemnification clauses prevented an agency from legally signing the agreement.

Rules also vary for net metering of interconnected systems, including availability of net metering, terms of the tariff, and the size of eligible systems. In some cases, the rules for fuel cells may vary from other energy sources.

Deliverables: Evaluation and Recommendation Report, Draft and Final

Subtask 2.2.2 - Evaluation and Design Application of Photovoltaic (PV) Technology

Based upon the developed and NJ TRANSIT approved project concept plans, the Consultant shall assist NJ TRANSIT in selection design and implementation of new DG Photovoltaic Power and associated electric power distribution facilities where applicable. These efforts shall be coordinated with other related tasks.

Photovoltaic, or PV, cells are semiconductor devices that convert sunlight into electricity. They have no moving parts. They are expected to have very long lifetimes (25 years) with little or no maintenance. PV products are often integrated into building materials such as standing seam metal roofing, window or overhead glazing, or shingles. Energy storage in remote applications, if needed, is provided with batteries.

A PV module creates relatively low-voltage direct current (DC) electricity. PV modules are connected in series and in parallel to create arrays. Series connections increase the voltage of a string, and parallel connections increase the current delivered by the array.

The Consultant shall emulate a two-part process that has been developed as a guide to implementing a solar project as described in the September 2010 USDOE document, "Procuring Solar Energy: A Guide for Federal Facility Decision Makers". Part 1 of the process includes five project planning steps that cover identification of needs and goals, assembling an on-site team, evaluating the site's solar screening, project requirements and recommendations, and making a financing and contracting decision. Part 2 of the

process, if employed by NJ TRANSIT, includes process guidance on the following financing and contracting options:

- Agency-funded project – funds have been designated for the outright purchase of a project
- Power purchase agreement – a private entity installs, owns, operates, and maintains customer-sited solar energy, and the site purchases electricity or thermal energy through a long-term contract with specified energy prices
- Energy savings performance contract – an energy services company incurs the cost of implementing an energy project and is paid from the operations savings resulting from the project
- Utility energy services contract – an agreement with a “serving” utility to finance and install an energy project
- Enhanced use lease – prospective developers compete for an energy project site lease with payment being either monetary or in-kind consideration; renewable power can be part of the consideration.

The Consultant shall assist NJ TRANSIT in the selection of one or more optimal PV distributed generation types. Similarly, the use of string inverters or micro-inverters, typically ranging in size from 1.5 kW to 500 kW, shall likely be necessary. The three types of PV system designs are grid-connected without storage, grid-connected with battery storage, and off-grid with battery storage. NJ TRANSIT envisions the PV systems will be designed as grid-connected systems during normal operation with the ability to continue operating in Island mode when the utility grid is unavailable through the use of dynamic or battery-based inverter(s). In this sense, it will be a hybrid between a grid-connected system and off-grid system. Battery storage shall also be evaluated as part of the hybrid PV systems. There are three primary benefits of integrating battery storage with PV systems: (1) back-up power, (2) frequency regulation, and (3) load shifting.

All types of PV systems require switch gear and protections as directed by electrical code (e.g., NEC 690) and good system design to protect the equipment. This gear may include DC disconnect; AC disconnect; lighting surge arrestor; ground fault current interrupter; and fuses or breakers and transformers required for higher voltage interconnections. Many utilities require redundant utility-specified relays.

Deliverables: Evaluation and Recommendation Report, Draft and Final

Subtask 2.2.3 - Evaluation and Design Application of Combined Heat and Power (CHP) and Procurement of Electric Vehicles

Based upon the developed and NJ TRANSIT approved project concept plans, the Consultant shall assist NJ TRANSIT in selection design and implementation of new DG supplemental Combined Heat and Power systems and associated electric power distribution facilities where applicable. These efforts shall be coordinated with other related tasks.

Combined heat and power (CHP) systems, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated system. CHP is not a technology, but an approach to applying technologies. Heat that is normally wasted in conventional power generation is recovered as useful energy, which avoids the losses that would otherwise be incurred from separate generation of heat and power. While the conventional method of producing usable heat and power separately has a typical combined efficiency of 45 percent, CHP systems can operate at levels as high as 80 percent.

Advances in electricity-efficient, cost-effective generation technologies—in particular advanced combustion turbines and reciprocating engines—have allowed for new configurations of systems that combine heat and power production, expanding opportunities for these systems and increasing the amount of electricity they can produce. These CHP systems now come in many more configurations, and can even satisfy compressed air requirements by bleeding high-pressure air off the compressor stage of a combustion turbine.

The Consultant shall assist NJ TRANSIT in the selection and implementation, where feasible, of CHP or Micro-CHP technology at the facilities listed in Task 2 above.

As noted in the SANDIA report, the project shall incorporate new electric and hybrid electric vehicles and charging stations that shall primarily support MMC and rail operations. Preliminarily, the following electric and hybrid vehicles shall be procured as part of the project:

- 27 golf cart vehicles
- 62 fork/scissor lifts
- 27 standard vehicles (sedans, picks ups, cargo trucks, and specialty vehicles)

This fleet of vehicles shall displace existing gasoline and diesel-fueled vehicles. New electric vehicle charging stations shall be added at the MMC. The Consultant shall assist NJ TRANSIT in the evaluation, selection and procurement of the equipment specified.

Deliverables: Evaluation and Recommendation Report, Draft and Final

Subtask 2.2.4 – Facility Structural Modifications Supporting DG

Building Modifications

Any modifications to facility arrangements shall depend on the selected equipment or combinations of DG equipment including fuel cells, photovoltaics and CHP with provisions for future expansion and aesthetic and environmental considerations.

1. DG Equipment shall be located in an area that shall not interfere with future facility expansion and isolated from main facilities to control noise;
2. For semi-outdoor or outdoor locations, enclosures for controls shall be enclosed in manufacturer supplied walk-in metal housings or site fabricated closures;
3. Structural design – The Consultant shall advise NJ TRANSIT and upon approval design any modifications necessary to support the addition of DG equipment . Provision must be made in such event for support of piping, trays and conduits.

Live loads. Modifications to Buildings, structures and all portions thereof shall be designed and constructed to support all live and dead loads without exceeding

the allowable stresses of the selected materials in the structural members and connections.

Other loads. In addition to the live and dead loads, the following loadings shall be provided for:

(a) *Wind loading.* Modified structures shall be designed to resist the horizontal wind pressure available for the site on all surfaces exposed to the wind and in accordance with any applicable code or standards requirements;

(b) *Seismic loading.* Modified structures shall be designed to resist seismic loading in accordance with the zone in which the building is located and in accordance with any applicable code or standards requirements;

(c) *Equipment loading.* Equipment loads are furnished by the various manufacturers of each equipment item. In addition to equipment dead loads, impact loads, short circuit forces for generators, and other pertinent special loads prescribed by the equipment function or requirements shall be included.

(d) *Foundation design.* Foundations shall be designed to safely support all structures, considering type of foundation and allowable bearing pressures.

4. Vibration mounts or “floating floor” foundations where equipment or equipment foundation inertia blocks are separated from the main building floor by springs or precompressed material shall generally not be used. In these circumstances where such inertia blocks are considered necessary for equipment not normally so mounted, written justification shall be included in the project design analysis supporting such a necessity.

Safety

The following general requirements with regard to safety shall be incorporated;

- (1) Equipment shall be arranged with adequate access space for operation and for maintenance.
- (2) Safety guards shall be provided on moving parts of all equipment.

- (3) All valves, specialties, and devices needing manipulation by operators shall be accessible without ladders, and preferably without using chain wheels. This can be achieved by careful piping design, but some access platforms or remote mechanical operators may be necessary.
- (4) Impact type handwheels shall be used for high pressure valves and all large valves.
- (5) Valve centers shall be mounted approximately 7 feet above floors and platforms so that rising stems and bottom rims of handwheels shall not be a hazard.
- (6) Stairs with conventional riser-tread proportions shall be used. Vertical ladders, installed only as a last resort, must have a safety cage if required by the Occupational Safety and Health Act (OSHA).
- (7) All floors, gratings and checkered plates shall have non-slip surfaces.
- (8) No platform or walkway shall be less than 3 feet wide.
- (9) Toe plates, fitted closely to the edge of all floor openings, platforms and stairways, shall be provided in all cases.
- (10) Adequate piping and equipment drains to waste shall be provided.
- (11) All floors subject to washdown or leaks shall be sloped to floor drains.
- (12) All areas subject to lube oil or chemical spills shall be provided with curbs and drains,
- (13) Adequate illumination shall be provided throughout the plant. Illumination shall comply with requirements of the Illuminating Engineers Society (IES) Lighting Handbook
- (15) Mechanical supply and exhaust ventilation shall be provided for all of the equipment where applicable and necessary. Battery room (as applicable) shall have separate exhaust fans to remove hydrogen emitted by batteries.
- (16) Noise level shall be reduced to at least the recommended maximum levels of OSHA. Control valves shall be designed to limit noise emissions.
- (17) Each equipment item shall be clearly labelled in block letters identifying it both by equipment item number and name. A complete, coordinated system of pipe markers shall be used for identification of each separate cycle and power plant service system. All switches, controls, and devices on all control panels

shall be labelled using the identical names shown on equipment or remote devices being controlled.

1. Provide 1" = 20' scale layouts of DG Power Equipment, associated building or facility modifications, associated electric power inverters, transformers, cabling and distribution infrastructure, along with grading, utility and drainage requirements, as well as construction cost estimates and half-size drawings. One set of copies shall also be required.
2. The Consultant is advised that supporting documentation accompanying this RFP is the result of a conceptual design phase to assist in ascertaining the optimum physical layout and construction for this project. Particular attention should be focused on NJ TRANSIT and Ferry Operations requirements with regard to the introduction of new equipment in bus, rail and ferry facilities.
3. The goal of this subtask is to establish baseline design criteria compatible with the 20% design package that shall be advanced to final design in the next Project Phase. While the data obtained in other sections may provide some of the standards and design criteria, this information shall be augmented through detailed discussions with NJ TRANSIT personnel and Ferry Operators, in the engineering, maintenance, and operations departments as well as representative staff of regional power generation, transmission and distribution agencies and regulatory authorities. If not already available in published standards, the criteria and design parameters established through these discussions shall be documented for use on this Project, and a minimum shall include the following:
 - Building and facilities design modifications
 - Supporting Electric Power cabling modifications and additions, control functions Distribution Facilities
 - Permanent and temporary clearance restrictions
 - Typical subgrade cross sections where required
 - Drainage standards where required
 - Slope Protection Standards where required

6. The above list is not all inclusive, but is shown to illustrate the nature of criteria and parameters that must be established for consideration of constructability studies. The design criteria shall be in accordance with applicable standards and/or recommendations set forth by; American National Standards Institute (ANSI), American Society of Mechanical Engineers, Institute of Electrical and Electronic Engineers, National Electrical Manufacturer's Association, National Fire Protection Association, current NJ TRANSIT design standards as applicable as well as AREMA design standards, where applicable. The Consultant shall attempt to improve upon these criteria with regard to increasing and/or improving facility operations, power generation, system resiliency and power distribution if possible.

Deliverable:

Design Plans and Specifications of the new DG Facility modifications and additions and associated electric power distribution requirements as detailed above.

Subtask 2.2.5 - Power Management Design

DG Power Generation Control

- All generators at the DG powered facilities shall be retrofitted with a networked connected controller.
- Local generator controls must regulate local voltage and frequency during microgrid operation and be retrofitted with control switchgear that enable paralleling and synchronizing to the grid, safely disconnecting from the grid, and synchronizing and paralleling with other generators.
- Local controllers must also provide adequate dynamic response so that transient stability shall be maintained for load steps, generation unit outages, and faults.
- Controllers must be enabled to respond to EMS and SCADA commands to support microgrid operations and market based decisions.
- DG controllers at isolated facilities should have network capabilities to support monitoring functions.

- In the event of CHP implementation, continuous monitoring and control should be implemented by recording vital operational parameters (e.g., heat & power outputs, fuel consumption, water consumption, gas pressure and temperature, etc.) and reporting alarm conditions to the control center.

DG controllers should provide provisions for remote starting and stopping and provide detailed operational data for monitoring and situational awareness purposes.

Load Control

- Monitoring of microgrid loads should be conducted and configured to record real power, reactive power, frequency, and voltage for all buildings and feeders.
- Load data must be recorded at high enough fidelity to conduct load-shedding schemes should they become necessary.
- Inrush current mitigation strategies should be implemented for all problematic loads, including large motor loads and transformers.
- Load control must be implemented in all single-phase systems to maintain proper phase balancing, as outlined in ANSI/NEMA MG 1-2006.
- Automation should be added to medium and /or low voltage switchgear to regulate load connections, depending on the building/equipment location and cost
- Real-time and historical load data for all building and feeder loads during both islanded and normal operation should be collected and used to identify issues and opportunities for improved performance and operational savings.
- Smart metering should be implemented to collect load data and augment grid telemetry.
- Grounding schemes need to be maintained during microgrid operations.
- During microgrid operation, facility operation mitigation strategies should be implemented to reduce stress on power system if needed.

Distribution and Protection System

- Overcurrent relays, synchronizing relays, breakers, and fuses shall be necessary to protect the distribution system assets during islanded conditions, normal operations, and the brief transition intervals.

- All protection must conform to industry requirements, including the addition of grounding apparatus if necessary for MV systems.
- For faults within the microgrid, the affected area must be isolated from the rest of the microgrid before the entire microgrid is disbanded, requiring facilities or equipment within the affected area to revert to standard building backup.
- For faults within a building, the building should disconnect from the microgrid before other (unfaulted) buildings, facilities or equipment assumes that the fault is in the MV network.
- Faults within equipment shall result in their disconnection before other protection is activated in either the LV or MV network.
- Coordination studies should be conducted and implemented for both microgrid and grid connected conditions.
- Protection schemes during grid connected and microgrid mode should be implemented to account for difference in power flow directions, distance calculations, and pilot schemes.
- The Consultant is required to develop detailed construction phasing and cutover plans for replacement and/or modifications of existing systems.
- Provide interfacing, coordination and integration of the new systems with existing systems.
- The Consultant shall obtain approval of Electric Power DG design from NJ TRANSIT as necessary.

Deliverables:

Power Management Design 10% and 20% - Draft and Final

Prior to the start of any work, the Consultant shall submit a design schedule to NJ TRANSIT for review and acceptance. Once the “best” option is decided upon, NJ TRANSIT shall direct the Consultant to progress the Conceptual Design to the 20% (Preliminary) Design Level. The Consultant shall not proceed with the Preliminary (20%) Phase of this project until directed to do so NJ TRANSIT.

The Preliminary (20%) Design Phase shall include:

1. Site Preparation, and Layout – the Consultant shall complete necessary field assessment. The Consultant shall develop plans and specifications that are 20% complete for the preparation of the site(s) including modifications to existing transmission facilities.
2. Site Plans – the Consultant shall prepare and submit 20% site plans and specifications.
3. Electrical Systems – the Consultant shall prepare and submit 20% plans and specifications and perform all calculations for the Electrical Work, including but not limited to the following:
 - a. Location Plan
 - b. Wiring Plans (Single Line Diagram, Main Wiring Diagram)
 - c. Wire, Cable and Conduit Runs
 - d. Relay and Control Schematics
 - e. Cable List
 - f. Electrical Details
 - g. Equipment Layouts
 - h. Hardware
 - i. Bill of Material
4. Structural – the Consultant shall prepare and submit 20% plans and specifications and perform all calculations for any Structural design necessary. A separate Structure Package shall include the following:
 - a. Equipment Mounting Details
 - b. Structural Support Modifications
 - c. Steel Details
 - d. Structure, and Foundation Repairs as Required
 - e. Bill of Material

5. Technical Specification – Technical Specifications shall be prepared to the 20% level in CSI format for construction tasks performed by a contractor and for all special and non -standard Equipment and Material.
6. Construction Cost Estimate and Schedule – the Consultant shall prepare an “order of magnitude” construction cost estimate at the 20% level of design.
7. Administration – the Consultant shall provide administrative Project Management as outlined in this RFP.

The coordinated design schedule shall assume NJ TRANSIT Facility Managers and Project Management staff shall require 21 calendar days from the date of receipt of each design submittal (Conceptual and 20%) for review and comments.

The geotechnical conceptual effort shall include the collection and review of pre-existing geotechnical test boring and laboratory data as available from facilities designated for energy resiliency improvements. Additional borings and laboratory testing shall be needed as a part of future design efforts.

An analysis shall be performed for structural support options. Settlement and stability characteristics of proposed foundations for DG equipment shall be evaluated, as well as a conceptual-level comparison of construction costs. The analysis shall also consider regulatory compliance implications for presented options. In addition, the Consultant shall assist and support NJ TRANSIT in satisfaction of regulatory compliance permitting and related efforts.

A conceptual geotechnical recommendations report shall be prepared summarizing the existing data available, the results of the foundation(s) analysis, and preliminary recommendations regarding the preferred structural support pad alternative.

Deliverables:

20% Preliminary Design Package as outlined above.

Subtask 2.2.6 - Civil, Structural, Geotechnical & Hydraulic

- a. Perform the required preliminary Civil, Structural, Geotechnical and Hydraulic design calculations necessary for construction. Compare and analyze alternative foundation design and construction methods as applicable.
- b. Prepare preliminary design plans and typical preliminary details for the required structures. Show horizontal and vertical control lengths and widths of structures, typical foundation design and construction staging. Specify design criteria to be used.

The civil drawings shall graphically depict the proposed DG equipment installations and all associated generation and distribution equipment in support of facility operations requirements and ACOE and NJDEP Land Use regulatory limits of disturbance for the selected Project site where applicable. Demolition of structures and utilities to be relocated shall also be identified as applicable. The structural drawings shall depict the type of structures necessary, and the size and type of foundations to be proposed. The geotechnical design shall include a report and foundation recommendations. Foundation design shall be based upon geotechnical data obtained from existing data and by the borings taken for this project under the engineering task. A geotechnical investigation shall be conducted to support the preliminary design and contract packaging tasks where required and approved by NJ TRANSIT. A construction-staging plan shall describe the methods and sequence of construction to complete the project along with detailed description of construction windows so as to maintain uninterrupted bus rail and ferry passenger service and adjacent commercial operations as applicable. The hydraulic design shall include the delineation of the drainage patterns for modified facilities and associated appurtenances as well as modifications to related electrical power distribution infrastructure including but not limited to inverters, transformers and control apparatus. The location of drainage features shall be defined and sized. Drainage requirements in floodplains and wetland areas shall be defined. A report describing the entire drainage program for the project shall be prepared discussing the impacts and requirements of NJDEP, USACOE and USEPA.

It is the Consultant's responsibility to ensure that all plans and drawings developed for

this Project shall comply with project permit conditions and associated regulatory compliance requirements as developed by NJ TRANSIT under separate Contract. Upon the direction by NJ TRANSIT, the Consultant shall be prepared to demonstrate said compliance to all Federal and State regulatory agencies, NJ TRANSIT and/or Amtrak.

Design considerations. The DG system shall meet all applicable regulatory requirements, and the application shall be the most economically feasible method of accomplishment for such regulatory compliance. All alternative solutions addressing compliance shall be considered which shall satisfy the given load and which shall produce the least objectionable wastes. Facility design modifications shall be such as to accommodate future additions or modifications at minimum cost.

Deliverables:

Reports as detailed above.

10% Plans & Specs and in conformance with Project General Plan and Specification Requirements as well as General Notes as detailed in Task 2 – Engineering above

20% Plans & Specs and in conformance with Project General Plan and Specification Requirements as well as General Notes as detailed in Task 2 – Engineering above

Subtask 2.2.7 - Subsurface Investigations

The Consultant shall ensure that uncertainty relative to Project Subsurface conditions shall be minimized to the extent practicable by the application of a subsurface investigation effort where necessary to support additional structures or modifications to existing facilities. Prepare boring plans including Railroad flagging requirements (where necessary), subject to NJ TRANSIT and Amtrak approvals, for a Soil Engineer's use in order to take borings and provide diagrammatic sketches for foundation explorations and test pits for subsurface, DG related Facility modifications and design, associated distribution infrastructure, natural gas supply connections, and service road design data. When required, prepare Site Specific Work Plans (SSWP) for Amtrak and NJ TRANSIT review and approval. The report shall include a proposed schedule that shall allow work to continue without impact to daily rail passenger service as applicable.

The plan shall identify the locations at which additional subsurface information is

required in order to ascertain the bedrock profile and quality of subsoils. The Consultant shall conduct the investigation and document the data and findings in a geotechnical report, providing an appropriate level of analysis as required to support final design, temporary support and underpinning design and to determine constructability implications for all facilities and systems associated with the Project.

- a. An outline of the Geotechnical Investigation and a Soil Borings Plan shall be submitted to NJ TRANSIT for approval, prior to the initiation of the detailed investigation. The Consultant shall arrange for the services of an Archeological Sub-Consultant acceptable to NJ TRANSIT to provide field support during this phase and in concert with the findings of any previously developed Section 1(A) Report of Archeological Resources and Effects. In the event that such a report is not available, the Consultant shall develop necessary Federal and State compliance documentation as required. All test boring samples shall be inspected by the Archeological Sub-Consultant, to determine the possible existence of archeologically significant artifacts. The Archeological Sub-Consultant shall prepare and submit all necessary documentation in compliance with applicable requirements set forth by the New Jersey State Historic Preservation Office and in compliance with Federal Section 106 guidelines.
- b. The Consultant shall designate and stake out all necessary boring locations prior to initiation of field activities as well as notify NJ TRANSIT when said task is complete in order to facilitate NJ TRANSIT review. The Consultant should not rely solely on historic or archived soils data to formulate necessary documentation. This effort shall require accumulation of field data and subsequent reporting as detailed herein.
- c. Perform necessary foundation borings and field and laboratory soil tests.
- d. Coordinate and inspect any boring operations and test pit excavations.
- e. Analyze all data obtained by borings and laboratory tests and prepare a soils report with recommendations for approval by NJ TRANSIT.
- f. Identify temporary or permanent sheet piling and dewatering measures for construction of structures.

Deliverables:

Geotechnical Investigation Plan and Boring Program

Boring Plan and Profiles

Geotechnical Report, with boring logs and analysis for each geologically discrete project element.

Section 1(A) Report of Archeological Resources and Effects as necessary.

Subtask 2.2.8 – Topographical Survey Reference NJDOT Survey Standards

The Consultant shall conduct a topographic survey of the proposed Project footprint at scales of 1" = 40' horizontal and 1" = 2' vertical. The base sheets shall show the project coordinate grid system, datum references, all existing surface features and the existing utilities as verified by NJ TRANSIT and through field observation. The Facility location (footprint), including related site appurtenances, utility and drainage work, shall be shown on reproductions of the base sheets for the 100% PE design level. The surveys shall include, but not be limited to:

- Horizontal datum (NAD 83) control in the New Jersey and Pennsylvania Plane Coordinate System.
- Contours at 1' intervals and key spot elevations to accuracy of 1/10 of a foot.
- Existing above and below utilities, from NJ TRANSIT, Amtrak and Utility records.
- Site topography including buildings, structures, drainage channels and any other features.
- Conditions of soils and pavement, including evidence of hazardous waste with the support of a qualified Environmental Inspector as provided by NJ TRANSIT under a separate contract. Conditions of soils shall be determined through borings or test pits.
- Property lines, easement lines, railroad and street rights-of-way and any property encumbrances on or adjacent to the site.

Any drawings or data obtained from NJ TRANSIT shall require verification in the field.

General Notes Regarding Topographical Surveys:

- All surveying activities for the Project as prescribed by the Task shall need to be coordinated with Tasks 4 (Environmental Analysis), 5.0 (Required State and Federal Permits) and Task 6 (NJDEP Site Remediation Compliance), with regards to Data Collection and Mapping.
- Photogrammetry: The Consultant shall secure, review and analyze existing survey data and topographic mapping previously prepared for nearby projects either sponsored by NJ TRANSIT, adjacent property development or Amtrak. The topographic mapping shall be field edited, and necessary changes drafted.
- The Project shall be surveyed under the New Jersey State Plane Coordinate System, NAD83. The Vertical Datum reference shall be to the NGVD29 system. Monumented baselines within the project limit area shall be recovered and missing monuments re-established.
- Location of Borings, Test Pits and Probes: Borings required for the subsurface investigation tasks shall be staked-out in relation to the established baseline monumentation and plotted on prepared boring location plans. Elevations and coordinates shall be established within the project datum for each boring location.
- Location of Utilities and Adjacent Structures: Utility companies having facilities in the project area shall be contacted to provide plans of their facilities that may be affected by the proposed design. Included shall be sewer, water, electric, gas, telephone, data transmission and cable television. Upon receipt of the available plans, a survey field edit shall be performed to verify all subsurface utilities within the right-of-way limits. Inverts of sanitary and storm sewer pipes at manholes, catch basins and outfalls, and top of grate elevations shall be obtained for the affected facilities where accessible by survey equipment. Further details regarding these requirements are provided in Subtask 2.2.6.
- A composite utility plan shall be compiled, incorporating the plans obtained from the utilities and field survey notes. From this, the Consultant shall identify facilities in conflict with the proposed design.
- Field surveys shall be conducted as required to provide the additional information

needed to perform the design, such as critical clearance dimensions to adjacent development, property boundaries, environmental control features, etc.

- Field surveys shall utilize the existing horizontal and vertical control established for the original mapping. New monumentation shall be established, as required, to facilitate construction.
- Topography: Fills or cuts due to construction or other activities after the original topographic maps were prepared, shall also be field edited. New contours (@ 1' intervals) and elevations shall be drawn on the topographic maps.
- The photogrammetric mapping shall be prepared in a scale of 1" = 40' with field survey details needed for the existing structures/buildings, existing electric power distribution and transmission facilities, adjacent rail structures including bridges, rail station(s) and signal and communication system components located in or near the Project Area. It shall include:
 - i. A survey of all structures to verify location and size of all poles, towers, foundations, elevations from top of rail, top of road or structural details.
 - ii. Detailed surveys of existing buildings, bridges, retaining walls and other structures within the project area.
 - iii. Drainage structures, utilities, streets, roads, tree masses, etc.
- Existing plans obtained from others may show structures referenced to a different vertical datum than the project vertical datum. Survey work shall be performed to relate all established vertical datum to the project datum. For preliminary design purposes, the azimuth and bearing of each roadway and track within the project limits shall be obtained.
- Preparation of Cross-Sections: Where agreed upon and required by NJ TRANSIT, Cross-sections of the Project area at 50' intervals shall be developed through photogrammetric methods and field survey verification.
- Digitized Data: To convert the field surveys, as well as the topographic mapping in digitized format, the Consultant shall Import all survey data by file transfer directly to electronic drawings. The data shall be translated to a computerized system for convenient use with CADD systems used by NJ TRANSIT or Amtrak.

Deliverables:

Topographical Survey as detailed above.

Topographic Survey (Supplement to NJ TRANSIT's baseline mapping as necessary).

Subtask 2.2.9 – Utility Engineering

Utility Engineering is also a vital component of the preliminary engineering and production of 20% construction plans. Using already available Project data as a starting point, the Consultant shall identify all existing and proposed utilities within and immediately adjacent to the site including but not limited to the aerial, surface and subsurface PSE&G power lines and commercially owned natural gas transmission pipelines in the Project area. The Consultant shall identify the locations of possible utility impacts or conflicts resulting from the project and determine the required improvement. The Consultant shall locate all types and sizes of utilities, including mains, high pressure lines, aerial transmission lines, fiber optic banks, etc. and prepare both existing utility and utility relocation drawings.

Where agreed upon and required by NJ TRANSIT, the Consultant shall conduct Subsurface Utility Engineering (SUE) for determination of the location of underground utilities. The Consultant shall prepare a SUE Plan, comprising of Test Pit Plans identifying where test pits are needed, a description of what equipment and methods shall be used, method of repair to existing properties, and a plan for coordinating with municipal and state requirements during the investigations. Innovative and non-destructive methods for the preliminary location of utilities shall also be considered.

The utility drawings shall include all facilities such as duct banks, vaults, manholes, telephone poles, utility poles, hydrants, and other relevant structures or facilities that may be potentially impacted by Project Construction. The Consultant shall determine the utility owners' horizontal and vertical controls, and convert the survey the data to comply with the project standards. The Consultant shall catalog data collected, and maintain file copies of source documents, such as deeds, licenses, plots, easements, or other documents used to locate utilities.

Utilities shall also be located on the base mapping.

Upon NJ TRANSIT direction, the Consultant shall meet with utility owners and associated regulatory agencies to ascertain the requirements for permanent utility relocations, as well as for temporary supports and work-around as required during construction. The Consultant shall support NJ TRANSIT in developing Utility Agreements based on these discussions.

The Consultant shall also develop utility cost estimates for all temporary and permanent work, including providing support during construction. The format of the Cost Estimate reports shall be consistent with NJ TRANSIT's Superstorm Sandy Recovery and Resilience Program requirements. Such requirements shall be available subsequent to Contract award.

The Consultant shall develop the drawings in compliance with rules of the appropriate regulatory authority.

The Consultant shall evaluate and provide for electrical, water, natural gas supply, sewerage and other utilities needed to support construction operations in the preliminary design. The Consultant shall incorporate these services into the utility cost estimates and agreements.

General Notes Regarding Utilities and Coordination:

- During development of the preliminary design documents for utility work, liaison shall be maintained with agencies and utility companies whose facilities maybe impacted by this Project. Available utility plans, records, reports and surveys shall be initially reviewed and shall be followed by a site inspection to:
 - i. confirm the specific existing utilities in the field;
 - ii. assess the condition of such utilities;
 - iii. determine the impact of design on such utilities; and
 - iv. determine the impact of construction on such utilities.

- The location, type, and size of the systems operated by the respective utilities shall be identified. Affected utility owners shall be contacted by NJ TRANSIT to discuss general policies concerning the operation, protection, support, relocation, and reconstruction of the facility.
- The utility facilities can be relocated as necessary, subject to approval by the appropriate utility and NJ TRANSIT. Coordination meetings shall be scheduled to obtain utility input during the early stages of the design, at which time comments shall be considered for use during the development of the preliminary design documents.
- The Consultant shall establish, using the standards and practices of utility owners, the design criteria for utilities that shall be used as a basis for the preparation of construction phase documents. The standards shall be developed using current NJ TRANSIT/Amtrak/utility standards as a base, with modifications to be made where necessary to accommodate the special needs of this Project. Proposed modifications or additions to existing design standards shall be identified and submitted to NJ TRANSIT/Amtrak/Utilities as applicable for their approval prior to use to support design preparation.
- Preliminary design documents for utility relocation shall be prepared in accordance with applicable regional, county or municipal, and utility company's applicable rules and regulations. The Consultant shall prepare the necessary sketches, plans, and agreements, along with descriptions of work, to accompany utility permit applications. The Consultant shall also be available to assist NJ TRANSIT and the Utilities in preparing agreements for the correction of utility-related problems with the respective utility owners, if required
- The Consultant shall provide necessary documents and applications required to permit rearrangement of utilities and/or secure easements. Standard procedures for submission of modifications, changes or relocations shall be noted in the construction contract documents.

Deliverables:

Subsurface Utility Engineering Plan

Existing Utility Drawings

Proposed Utility Relocation Drawings

Utility Cost Estimates

Utility Agreements – drafts and final for reimbursement of engineering cost.

Utility Catalog and Files

Draft and Final Physical Facilities 20% Construction Plans as detailed above

Subtask 2.2.10 - Structures

- This task encompasses the establishment of design criteria and standards for structural elements of the Project in accordance with design standards as set forth above and as applicable, as well as NJ TRANSIT and Amtrak standards and specifications as applicable. These standards, in addition to the normal structural design standards of AREMA, AASHTO, NJDOT, ACI and AISC, where applicable, shall also contain criteria to meet specific requirements of applicable railroad and roadway design standards. Where conflicts occur in the railroad design criteria and standards, NJ TRANSIT and Amtrak shall provide guidance as necessary. These criteria and standards shall be the basis for developing preliminary structural schemes, construction staging procedures and preliminary drawings in sufficient detail so as to identify the structural requirements of the Project.
- The major structural requirements for this Project shall be imposed by the layout and operational schemes of the proposed DG related facility modifications and new or modified alignments for power distribution. Alternate structural systems, elements, and components shall be evaluated considering various substructure and superstructure systems to achieve low maintenance, aesthetic, practical and cost-effective structures.
- The evaluation of candidate structures shall be an iterative process. Constructability, in light of operational and environmental constraints, shall be considered for all alternatives. Maintenance criteria shall be included in the evaluation.
- The structural effort under this task shall include the preliminary design and layout of the new structures and facilities. Additional factors of ROW or NJ

TRANSIT property limitations, impact on abutting properties and facilities, constructability, maintenance, and cost shall be considered for structural alternatives.

- Preliminary designs and plans for structural elements required for the Project shall be prepared in sufficient detail to evaluate and assess the alternatives to be considered. Preliminary plans to be developed under this task shall include, but not be limited to:
 - i. Foundation, building and superstructure plans
 - ii. Culverts
 - iii. Retaining walls
 - iv. Structural modifications to existing facilities

Major requirements of this task shall include preparing cost estimates for the primary designs, alternatives and sub-options to be developed by the Consultant for comparison of cost effectiveness, and determination of funding implications. As noted previously, cost estimates shall be prepared consistent with NJTRANSIT's Superstorm Sandy Recovery and Resilience Program requirements. Such requirements shall be available subsequent to Contract award.

- The results of this work effort along with recommendations for final implementation shall be presented to NJ TRANSIT for approval and selection of the preferred concept. All alternative concept studies and their comparative cost, constructability, performance and maintenance shall be presented. Recommendations shall be fully supported and documented in the Draft Preliminary Design/Project Definition Report.
- Detailed quantities shall be checked, compiled and indexed for future reference. Technical and procurement specifications, required as a result of the design process, shall be identified for future inclusion into the final contract documents.

Subtask 2.2.11 - Power Management Communications

The Consultant shall establish design criteria for the Communications Systems to be

compatible with NJ TRANSIT systems. Proposed systems shall specify the communication infrastructure that is required to maintain normal communication systems necessary for functional interface with operations and interconnection with the area commercial power grid.

The control architecture for the NJ TRANSIT-DG is essential to the stability and efficiency of its operation. A dedicated communication network shall be required for monitoring and data exchange. Optimal operation shall require controllers on energy resources that shall likely replace or interface with OEM controls.

Microgrid Communication Network

- Network connectivity shall be provided to all microgrid monitored assets, controlled assets, and the primary and secondary control and monitoring centers.
- Network communications must satisfy low latency requirements for control and provide a highly reliable information channel that retains the integrity of data.
- Control system network must, at minimum, meet industry standard best practices for cyber security (reference cyber security section).
- Network architecture and communication protocols must have point-to-point and broadcast capabilities.
- All communications must support interoperability between all distributed devices using published object functions, standard commands, and standard protocols.
- Communications must be adequately extensible to accommodate future additions/modifications.
- Interoperability requirements must also be satisfied for all interconnection control and monitoring systems from NJT and local utilities.
- Network and communication device time synchronization shall be implemented between all transacting parties within a reasonable degree of accuracy.
- Fiber optic communications shall be implemented for the bulk of the microgrid communications.
- Rather than simple logical isolation, all microgrid control system network communication shall be physically isolated from all other networks (as opposed to VLAN separation).
- Provisions for remote access shall be provided for troubleshooting, remote maintenance, and software updates.

- Controlled communication channels shall be established for data transfer between the microgrid network and all rail, bus and ferry operators as well as utility partners, including PSE&G, and PJM.
- Network architecture shall be hardened with redundant communication paths, uninterruptible power supplies, critical spares, and environmental controls.
- Critical network equipment shall be located above the DBT flood level and have adequate physical protection from tampering and unauthorized access.

Energy Management System/SCADA

- An EMS and SCADA system shall be installed for the NJ TRANSIT-DG separate of any existing information systems or rail operation systems currently in place.
- The EMS and SCADA system shall have an HMI to facilitate monitoring and man-in-the-loop control.
- Full backups of the EMS and SCADA systems shall exist in a geographically diverse location and located above the DBT flood level.
- EMS and SCADA systems shall monitor all critical parameters of the microgrid to manage frequency, voltage, energy/power production, load shedding, microgrid activation, generation asset optimization, and synchronization in accordance with ANSI/NEMA C84.1-2006 and IEEE 1547 standards.
- The EMS shall provide manual and automated start capabilities, including black start.
- Provisions for manual microgrid switchover (for testing or preventative measure purposes) shall be included to disconnect from utility during normal operations.
- Hierarchical controls shall be implemented so that the EMS can manage real and reactive power in a holistic fashion, maintain adequate reserve margins, and properly respond to load fluctuations.
- All parameters and measurements should be archived using data historian functionality.
- Data historians shall be complete with data filters based on time and value rate of change, configurable sampling rates, and shall either save all historical data in provisions for long term storage or have a round robin database with sufficient storage.
- Data acquisition equipment shall contain set, get, forced, and unforced capabilities.
- All EMS/SCADA field equipment shall be protected by environmentally hardened enclosures to protect against the elements, tampering and DBT conditions.
- The SCADA system shall extend to all isolated facilities for monitoring purposes and at minimum shall monitor generator real/reactive power output, building

voltage and current draw, fuel levels, and state of renewable energy output (if any).

- Continuous, 24/7 monitoring shall be conducted by qualified operations personnel.
- A paging system shall be put in place to provide monitoring and alert capabilities via a paging system so operations and maintenance personnel can quickly respond to failures or potential problems.
- Remote access to the EMS/SCADA shall permit remote monitoring, diagnosis, troubleshooting, software/firmware updating and limited control during normal and emergency conditions.
- Remote access functionality must satisfy cyber security best practices and recommendations (reference cyber security section).
- Persistent remote access connections shall not be permitted and physically disconnected when not in use.
- Remote connections shall be controlled with connection timeouts and strong encryption and authentication methods.

Preliminary design plans, specifications and cost estimates shall be prepared for the necessary modifications to communications facilities affected by this project. Cable routing, communications, bungalow layouts, and typical details shall be shown. The work shall be performed in accordance with applicable Federal and State requirements, PJM and PSE&G requirements as well as NJ TRANSIT standards as applicable and subject to review and approval by all agencies as applicable. Installation instructions and plans for the communication system configuration shall be provided.

Deliverables:

Performance Specification for Communications Backbone Power Management Infrastructure, Emergency Alarm Stations, Fire Alarm Systems. – draft and final.

Subtask 2.2.12 – Concept of Operations

The objective of this subtask is to assist NJ TRANSIT in developing an outline for baseline operations of the DG components of the microgrid.

Under normal conditions, when the grid is fully available, DG components of the microgrid shall be electrically connected to the grid. Such DG components shall deliver energy to NJ TRANSIT facilities as well as Ferry operations.

Under a scenario involving a regional or local blackout condition, DG components of the microgrid would become the primary source of power for affected NJ TRANSIT and Ferry facilities. This would require preplanned switching coordination with the utility after it has been determined that utility power shall not be restored for an extended time period. If the outage affects the NJ TRANSIT system as well, then the tie points to the grid would also be opened. Interlocks and synchronizing relays would be required at each location where switching into an energized secondary source is needed. After a regional outage, it is likely that the microgrid DG components shall be designed to initially trip off line. For this reason, the DG components are required to have black-start capability.

(A more detailed discussion of these requirements is presented in the attached Operational Design Concept/SANDIA Phase I Report - Appendix 1.)

Equipment requirements shall be determined and corresponding capital funding needs identified. The Consultant shall provide an approximate schedule for equipment acquisitions, long lead procurement projections, if any, in terms of months prior to service commencement.

For the outline of the baseline operating plan, the Consultant shall work with NJ TRANSIT staff to determine and define physical facility, hardware and software requirements to effectively support integration and interface of DG components of the microgrid with NJ TRANSIT and Ferry facilities when regional commercial grid operations are suspended.

The Consultant shall also assist NJ TRANSIT in developing and submitting, to the extent required, necessary registrations/certifications with appropriate energy regulatory agencies or bodies, as well as compliance with PJM interconnection requirements as applicable. The Consultant shall provide assistance to NJ TRANSIT in evaluating compliance requirements to Currently Enforceable Standards including but not limited to; FAC-002-1 Coordination of Plans for New generation, Transmission, and End-user

Facilities; FAC-008-3 facility Ratings; PER-005-2 Operations Personnel Training; and PRC-005-2 Protection System Maintenance. The Consultant shall assist NJ TRANSIT in compliance activities when resultant findings require such action.

Deliverables:

Outline of Baseline Operations Model, including applicable drawings, specifications, graphs and diagrams as necessary in support of the concept operating plan (10 copies).
Registration analyses and applications as necessary and described above.

Subtask 2.3 - Existing Right-of-Way (ROW)

If not immediately available from NJ TRANSIT, the Consultant shall obtain existing railroad valuation maps from the various rail companies and owners of the ROW including but not limited to Amtrak, Property Description information for candidate bus garages and selected ferry terminals or operations to support design of DG related modifications to such facilities. The Consultant shall utilize these property descriptions for the various facilities and related drawings and maps to develop Project specific documentation necessary to support DG related facility modification design efforts. These maps/drawings shall be either enlarged or reduced, to bring them to a scale of 1" = 20 ' The ROW and property descriptions, similarly to the contours, shall be incorporated onto the plan/profile drawings.

Early in the project schedule, the proposed standard base sheet for all study drawings shall be developed and submitted to NJ TRANSIT for approval. Typical cross-sections and sketches shall be prepared at an appropriate scale sufficient in number to portray the range of conditions encountered within the study corridor. During the course of the development of project specific design alternatives, a number of additional engineering studies shall be prepared as directed by NJ TRANSIT.

Possible design alternatives related studies shall include:

- Examination of geological conditions - The stability of the soils in filled areas, the presence of ground water, and the uncertainty of rock quality all require special attention in development of alignment, cross sections and cost estimates.

- Examination of environmental conditions and/or restrictions requiring alternate design(s) to achieve cost effective compliance.
- Utility relocation and drainage needs identification.
- Right-Of-Way and parcel identification studies - These studies may be needed where certain critical pieces of property need to be protected and utilized for future public transportation use.

Subtask 2.3.1 – Right-of-Way Research

Objective:

The Consultant shall research, collect and review all existing documents relevant or pertaining to the right-of-way, including but not limited to NJ TRANSIT and Amtrak mapping, tax maps, title information etc. and shall conduct field inspections of all areas anticipated to be impacted by this project in order to determine right-of-way available for use.

The Consultant shall perform all necessary surveys, by a surveyor licensed in the State of New Jersey, required for verification of the existing condition, configuration and dimensions of the right-of-way, and for preparation of site plans at 1" = 20' scale. These surveys shall include but not be limited to:

- All site features, including any and all site improvements.
- Adjacent roadway infrastructure, including bridges, highway lanes, local streets, signals, etc.
- Utilities (electric, gas, water, telephone, fiber optic cable, sanitary sewer and storm sewer).
- Pavement, sidewalks, curbs, landscaping and their condition.
- Site topography at 1 foot contour intervals and key spot elevations.
- Drainage, storm sewers, their sizes, and invert elevations of sewers.
- Definition of property boundaries from tax maps, existing surveys and railroad valuation maps.
- Delineation of right-of-way based on the operational needs of NJ TRANSIT.
- Delineation of the results of the Cultural Resources investigation including any

required historic, architectural or locational studies (with a report).

- Traffic and operational flow including but not limited to existing traffic control devices and methods.
- Property encroachments.

All surveys shall be of sufficient detail to facilitate the preparation of complete location plans, site plans and design plans, profiles, specifications and complete contract documents. The areas to be surveyed are approximately defined as illustrated in Appendix 2, "Area Location Map". If the Consultant identifies additional areas that must be surveyed, such areas shall be approved by NJ TRANSIT in advance.

The Consultant shall submit copies of completed field findings on inspection reporting forms (which will be provided by the Consultant and approved by NJ TRANSIT) and meet with NJ TRANSIT staff to discuss those findings as required by NJ TRANSIT. The Consultant shall also identify any additional data needed for determination of existing site conditions, which affect design, and perform the necessary activities to furnish such data.

All surveys are to be produced in a digital format.

The Consultant shall maintain files on all affected properties, and include all relevant information as described in this Section and per property acquisition best practices.

The Consultant shall prepare all deliverables in compliance with New Jersey eminent domain law and all FTA requirements. Information provided on the maps shall at a minimum include ROW perimeter, block and lot numbers, boundary dimensions, description of improvements, square footage, etc.

The work of this subtask shall be performed to provide a timeframe for obtaining the use of property prior to the commencement of construction. The effort for this task shall include:

- i. **Deeds and/or Right-of-Way Information:** From public records (courthouse and other sources) the Consultant shall obtain the deeds of right-of-way information for the properties affected. Deeds of surrounding properties shall also be obtained and reviewed for possible conflicts. All of

this information shall be plotted and analyzed. Existing Railroad valuation maps shall also be used in the analysis as required.

- ii. **Acquisition and/or Property Field Surveys:** The Consultant shall locate existing boundary and property evidence. If required (in case of lack of satisfactory evidence), the Consultant shall survey adjoining properties in search of such evidence. These surveys shall be accomplished in the same datum as the site and track alignment drawings.
- iii. **Calculations and Plots:** The acquired information described above shall be completed, plotted and compared with the deeds/right-of-way data developed above. After the necessary adjustments, the final property and/or easement limits shall be computed, including their respective metes and boundaries.
- iv. **Drafting Plot Plans and Legal Descriptions:** For each required site, the Consultant shall produce a property plot plan in the format prescribed by the NJDOT Right of Way Engineering Manual. The property lines, their metes and bounds, and areas (remaining and to be taken) shall be drafted on mylar reproducibles.
- v. **Incorporation of Data into NJ TRANSIT PAECETRAK System.:**
For each required site, the Consultant shall input all relevant data into the PAECETRAK real estate record data management system. The Consultant shall provide staff and equipment support as necessary to maintain such records and data. Details regarding the PAECETRAK Data Management System are found in Attachment A

Seven (7) color original signed and sealed copies of Individual Property Parcel Maps (IPPMs) and supporting documentation shall be provided as necessary.

The Consultant shall research all appropriate real estate records, investigate any and all discrepancies that may exist and recommend solutions to reconcile any errors found or adjustments that need to be made. The Consultant shall assist NJ TRANSIT in the mitigation of such errors as directed by NJ TRANSIT.

Deliverables:

General Property Parcel Maps (GPPMs), Individual Property Parcel Maps (IPPMs), Right-Of-Way Survey/Support as detailed above and Site Inspection/Inventory Reports and Surveys (10 copies).

Data input and maintenance of Project PAECETRAK System as noted above

General Property Parcel Maps (GPPMs) 50% and final Preliminary Assessment Report

Task 3 - COST ESTIMATING

Cost/performance estimates for various design options may be developed to aid in developing final design requirements and to help support approval and funding of the energy infrastructure improvements.

The Consultant shall develop quantity take-offs and cost estimates for each of the major items on all plans.

General Notes on Cost Estimating

The Consultant shall prepare three cost estimates during the PE phase. The first estimate shall *independently* validate the cost estimate established during the concept phase. This estimate shall be completed within two months of NTP and shall include a reconciliation report addressing major differences between the two estimates.

The second and final estimates shall be engineer's estimates based on the completed 10% and preliminary design (20%) submittals. The final estimate shall be submitted upon completion of the Final submittal, and shall be an accurate and fully quantified estimate for all elements of the project, and shall be suitable for use to evaluate Construction Bids.

The estimates shall be developed and formatted to comply with the FTA's Standard Cost Category (SCC) methodology. Up-to-Date unit prices shall be used in every version of the estimate.

As previously noted in this RFP, NJ TRANSIT has developed reporting formats and requirements for cost estimates to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program requirements. In order to maintain consistency, such requirements shall be available to the Contractor subsequent to Contract award.

Design Cost Considerations

The Consultant shall implement methods and procedures necessary to identify and incorporate cost savings into the final design.

After each interim design submission and the Final milestone, the Consultant shall be responsible for producing submittals for all design considerations that are consistent with the available budget. In the event that NJ TRANSIT determines that the expected Construction cost for any element exceeds or would potentially exceed the available budget, the Consultant shall provide at no additional cost to NJ TRANSIT:

- Alternatives to reduce the estimated construction cost, including substitution of materials or methods of construction, deletion of features, etc.;
- Other methods to mitigate the cost increases without minimizing safety or performance.

In presenting the cost control alternatives to NJ TRANSIT, the Consultant shall summarize the changes from previous submittals, including changes in quantities and prices.

The requirement that the Consultant's design be cost effective and does not exceed the Project Budget shall be demonstrated using a third party's independent estimate, thereby validating the Consultant's estimate (Third party not part of PE design team). The third party shall be independently selected by NJ TRANSIT.

Deliverables:

Independent Initial Cost Estimate

10% and 20% Cost Estimates

TASK 4 – Federal Environmental Categorical Exclusion (CE)

The objective of this task is to support NJ TRANSIT staff and third party Consultants in the development of a Federal Environmental Categorical Exclusion (CE). The Consultant shall provide requisite engineering and design details in order to verify impacts associated with selected build alternatives as directed by NJ TRANSIT. The Consultant shall also provide technical justification for the extent, configuration and basis of the proposed project including the operational characteristics of the microgrid plan, the function of the improvements and the effect of proposal on the rail, bus and ferry services including operational efficiency.

AS DIRECTED WORK may also include, depending upon the outcome of the above noted work, a separate assessment of the hydrologic and hydraulic impacts of the project and any watercourse modifications or flood hazard impacts in sufficient detail to support a general flood hazard area permit application or an individual permit application with hardship waiver requests and justification as necessary.

Deliverables:

Engineering and design details to verify impacts associated with selected build alternatives as discussed above.

Technical justification for the extent, configuration and basis of the proposed project as discussed above.

TASK 5 - STATE AND FEDERAL PERMITS

Objective:

The objective of this task is to support NJ TRANSIT and its third party consultant's efforts in the development of applications for all permits and approvals that may be required for project construction and operation. The Consultant shall provide requisite engineering and design details in order to support all Federal, State and Local Permits and Approvals as required. Finally, the Consultant shall ensure that all engineering and design details developed as part of the Project shall conform to permit and approval conditions in Phase I and the subsequent Phase II authorized by NJ TRANSIT. All Project design

products shall comply with permit and associated regulatory requirements. The following table identifies some permits/approvals that may be required for project implementation.

<u>Agency</u>	<u>Permit/Approval</u>
NJDEP	Flood Hazard Area Individual Permit & Mitigation Plans
NJDEP	Letter of Interpretation
NJDEP	General Permits as applicable
NJDEP	Freshwater Wetlands Individual Permit & Mitigation Plan
NJDEP	DSHW & Site Remediation
NJDEP	BAQM Air Quality Permitting Program
NJDEP	No Net Loss Reforestation Assessment
County Soil Conservation	Soil Erosion & Sediment Control Certification
USEPA and NJDEP	Memorandum of Agreement
USACOE	Individual Permit
USCG	Individual Permit

Deliverables:

Engineering and design details in support of all NJ TRANSIT Regulatory Compliance Project Permits and Approvals to Preliminary and Final Application as appropriate
Preliminary and Final Documentation as appropriate

TASK 6 - NJDEP SITE REMEDIATION COMPLIANCE

The objective of this task is to support NJ TRANSIT and its third party consultants' efforts in securing all approvals in compliance with NJAC 7:26E, the Technical Requirements for Site Remediation. The Consultant shall assist NJ TRANSIT in completing necessary site characterization by producing any required engineering or design related documentation in satisfaction of the Linear Construction Technical Guidance (where applicable) or other compliance elements in accordance with NJAC 7:26E, by providing required engineering drawings for the preparation of preliminary engineering

remediation plans and related information. Such information shall also be utilized in the production submission and completion of LSRP approved project Soils and Ground Water Management Reports also prepared by third party consultants. Said plans and related documents produced by the Consultant shall be included in the construction bid package.

Deliverables:

Engineering and design details in support of all NJ TRANSIT Regulatory Compliance Documentation as detailed above.

TASK 7 – RISK MANAGEMENT

The Consultant shall conduct a risk assessment and management process that shall as a minimum contain the following elements:

- **Preliminary Risk Identification** – The Consultant shall develop a preliminary list of all risks (threats or opportunities) that currently exist. The risks shall be entered into the Risk Register. The preliminary Risk Register shall be submitted to NJ TRANSIT for review.
- **Preliminary Workshop** – The Consultant and NJ TRANSIT shall meet and review the preliminary Risk Register. The Risk Register shall be refined to add or remove risks. Preliminary discussions shall include who should own the risk and possible mitigation strategies.
- **Draft Risk Register** – The draft Risk Register developed at the preliminary workshop with NJ TRANSIT shall be sent for review two (2) weeks before the Risk Workshop.
- **Risk Workshop** – A risk workshop shall be scheduled and include a facilitator supplied by the Consultants. Smaller working groups of four (4) to six (6) participants shall be established. Each working groups shall be assigned specific risks to review, evaluate, assign ownership, perform a qualitative analysis and develop mitigation strategies. Each working group shall present their risks and findings to the entire team.
- **Risk Register** – Following the meeting a composite Risk Register shall be developed that lists the risks in priority order, includes ownership and mitigation

strategies.

- **Risk Management Plan** – The Consultant shall work with NJ TRANSIT to develop schedule and cost implications associated with each risk. The Risk Register shall be circulated for review and comments periodically or as requested, but updated monthly to address comments. Risk is a dynamic aspect of every project and quarterly meetings shall be held with NJ TRANSIT to update the Risk Register.

NJ TRANSIT has developed document formats and requirements for Programmatic submittals in conformance with reporting to be utilized in NJTRANSIT's Superstorm Sandy Recovery and Resilience Program. In order to maintain consistency, such requirements related to the Risk Assessment Reports and related submissions shall be available to the Contractor subsequent to Contract award.

Deliverable:

Risk Management Plan, associated meetings and workshop findings reports, updates of the Risk Register following Project Progress Meetings

TASK 8 - SYSTEM SAFETY AND SECURITY MANAGEMENT

This task requires the Consultant to include a Safety and Security Management Plan (SSMP) as an element of the Project Management Plan (PMP) submitted to NJ TRANSIT for review and approval.

The SSMP shall be prepared by the Consultant and included as part of the PMP to describe how the NJ TRANSIT-DG Project, DG components, shall address safety and security in this major capital project from initial project planning through initiation into Project Operation and Revenue Service.

The information provided herein is provided as a baseline deliverable as well as guidance to the Consultant relative to the level of effort necessary for satisfaction of this task. NJ TRANSIT requires the Consultant to assist in the development of Safety and Security Management Plans (SSMPs) as part of the PMP. The SSMP must contain the 11 sections specified below.

- **SECTION 1: MANAGEMENT COMMITMENT AND PHILOSOPHY.** NJ TRANSIT requires the first section of the SSMP to include the following:

- Safety and Security Policy Statement. The Consultant shall assist NJ TRANSIT in the development and execution of a signed statement, issued by NJ TRANSIT executive management, endorsing the SSMP and confirming the project's commitment to safety and security.
- Purpose of SSMP. The Consultant shall assist NJ TRANSIT in the development of a description stating the SSMP is the document that shall guide the recipient's integration of safety and security into each phase of the project development process.
- Applicability and Scope. The Consultant shall assist NJ TRANSIT in the development of a section categorizing the SSMP as the document for all safety and security activities that NJ TRANSIT performs during the project development process. Rail transit agencies, as defined in 49 CFR 659.5 and commuter rail agencies, must clarify that the applicability of the SSMP extends to ensuring their compliance with State oversight agency and the Federal Railroad Administration (FRA) regulations and requirements, as applicable. NJ TRANSIT must ensure that the applicability of their SSMP extends to the resolution of any restrictions to full safety and security certification, even after the Project has commenced revenue service and operations.
- SSMP Goal. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that clarifies NJ TRANSIT's use of the SSMP to ensure that the final project commenced into revenue service and operation is safe and secure for passengers, employees, public safety personnel, and the general public.

- **SECTION 2: INTEGRATION OF SAFETY AND SECURITY INTO PROJECT DEVELOPMENT PROCESS.** NJ TRANSIT requires the second section of the SSMP to include the following:

- Safety and Security Activities. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the safety and security tasks that NJ TRANSIT must perform for the project through all phases. This shall include both a text description of the activities and a matrix listing these activities and their corresponding project phases.
- Procedures and Resources. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the procedures and resources that shall support performance of safety and security activities throughout the project phases, including a project budget and schedule for safety and security activities, procedures for managing safety and security contractors, procedures for coordinating safety and security activities with other recipient staff and contractors, and procedures for managing sensitive security information (SSI).
- Interface with Management. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the process and lines of communication through which NJ TRANSIT/Project staff shall communicate safety and security issues to project leadership. This shall include an organization chart. In the organization chart or supporting text, the following information shall be included: 1) identify who among the project team leadership has ultimate decision-making responsibilities for safety and security issues, 2) identify these individuals by names, titles and departments or affiliations, 3) explain how these individuals interface with other project team functions regarding safety and security issues, and 4) identify the relationships from project leadership to construction contractors and subcontractors regarding safety and security issues.

• **SECTION 3: ASSIGNMENT OF SAFETY AND SECURITY RESPONSIBILITIES.**

NJ TRANSIT requires the third section of the SSMP to include the following items:

- Responsibility and Authority. The Consultant shall assist NJ TRANSIT in the development of organizational requirements to perform the safety and security tasks identified in Section 2 of the SSMP. In documenting this

organization, the name, title, and department/affiliation, all staff and contractors assigned to this organization shall be identified. In addition, for committees established to support this organization, each committee member shall be identified by name, with membership provided by title and affiliation. An organization chart shall also be developed and provided.

- Committee Structure. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the organization and responsibilities of the different committees that shall be used for the project, including the Safety and Security Review Committee; the Fire/Life Safety Committee; the Safety and Security Change Review Board; and the Safety and Security Operations Review Committee, or other comparable committees.
- Safety and Security Responsibilities Matrix. The Consultant shall assist NJ TRANSIT in the development of a description of the SSMP that identifies the responsibilities and reporting relationships established for recipient staff, committees and contractors performing the safety and security tasks in Section 2 of the SSMP. For all contractors, NJ TRANSIT shall identify a NJ TRANSIT staff member or committee responsible for overseeing the contractor.

• **SECTION 4: SAFETY AND SECURITY ANALYSIS**. NJ TRANSIT requires the fourth section of the SSMP to include the following:

- Approach to Safety and Security Analysis. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the Project's approach to the analysis of safety hazards and security vulnerabilities. This program shall: (1) identify known hazards and vulnerabilities, (2) categorize them as to their potential severity and probability of occurrence, (3) analyze them for potential impact, and (4) resolve them by design, engineered features, warning devices, procedures and training, or other methods. The Consultant shall assist NJ TRANSIT in the development of a description of the SSMP that identifies

the level of hazards and vulnerabilities NJ TRANSIT project management finds acceptable.

- Requirements for Safety and Security Analysis. The Consultant shall assist NJ TRANSIT in the development of a description of the SSMP that specifies the distinct types of safety and security analyses that shall be performed during the project. Examples of analyses that may be identified include Preliminary Hazard Analysis (PHA), Threat and Vulnerability Analysis (TVA), Subsystem Hazard Analysis (SSHA), System Hazard Analysis (SHA), Failure Modes and Effects Analysis (FMEA), Failure Modes, Effects and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Terrorism Risk Assessment (TRA), Software Safety and Security Analysis (SSSA), Operations and Support Hazard Analysis (O&SHA), Health Hazard Assessment (HHA) and others. The Consultant shall assist NJ TRANSIT in the development of a description of the SSMP that identifies the types of analysis to be performed for the project, who shall be performing these analyses (i.e., contractor, committee, in-house personnel, other), and when they shall be performed during the project. The Consultant shall also assist NJ TRANSIT in developing a description of how project personnel shall communicate the results of these analyses to other members of the project team, and the process that shall be used to assure resolution of identified hazards and vulnerabilities resulting from these analyses.

• **SECTION 5: DEVELOPMENT OF SAFETY AND SECURITY DESIGN CRITERIA.**

NJ TRANSIT requires the fifth section of the SSMP to include the following:

- Approach to Development of Safety and Security Requirements and Design Criteria. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the project's approach to establishing safety and security requirements and design criteria. This description shall include the resources, including standards prepared by such organizations as the American Public Transportation Association (APTA), the National Fire Protection Association (NFPA),

Underwriters Laboratories (UL), etc., that it shall use to develop Project safety and security requirements. This description shall also include how project personnel and contractors shall use the safety and security requirements to develop safety and security design criteria and to identify safety and security certifiable elements and items. In addition, this effort shall explain the Project approach for ensuring that safety and security requirements and design criteria are included in the process to develop final specifications and contract documents for the project. Finally, this section shall also describe how the project documents, including drawings, specifications and reports, shall be maintained in a secure manner while they are in the possession or control of the contractor(s).

- Design Reviews. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies how the recipient shall address safety and security during design reviews to ensure that its project team incorporates the safety and security requirements into the final project design.
- Deviations and Changes. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies procedures for ensuring that changes to safety and security design criteria are appropriately reviewed and approved by recipient personnel prior to adoption.

- **SECTION 6: PROCESS FOR ENSURING QUALIFIED OPERATIONS AND MAINTENANCE PERSONNEL.** NJ TRANSIT requires the sixth section of the SSMP to include the following:

- Operations and Maintenance Personnel Requirements. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the number of personnel and their specific job classifications required to operate and maintain the project in revenue service. The relevant section shall also specify the qualifications and core competencies, required by job classification, for these personnel to ensure their abilities to provide safe and secure service and to respond to

emergencies. Special emphasis on the requirements for front-line personnel (i.e., operators, supervisors, station attendants, and maintenance personnel) is required.

- Plans, Rules and Procedures. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies, by name, the specific safety, security and emergency plans, rules, procedures, and manuals that the recipient shall develop or revise. This section shall also include an implementation schedule.
- Training Program. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that lists the elements of training the Project shall provide to employees, by job classification, to ensure their capabilities to provide safe and secure service and to respond effectively to emergencies. In addition, the section shall include a schedule for the development and offering of this training and for the completion of any qualifications or certifications required for Project staff. The Consultant shall also assist NJ TRANSIT in the development of a section of the SSMP that details record keeping requirements and associated implementation relative to personnel training and qualifications/certifications.
- Emergency Preparedness. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies any exercises, drills, tabletops, or other activities that shall be performed to ensure the readiness of the project. This shall include an explanation of how the Project shall assess and document the results (i.e., after action report or equivalent document).
- Public Awareness. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies programs that support NJ TRANSIT's commitment to ongoing, comprehensive public awareness, for both security awareness (such as the Transit Watch Program) and emergency preparedness (such as emergency evacuation instructions to riders).

- **SECTION 7: SAFETY AND SECURITY VERIFICATION PROCESS (INCLUDING FINAL SAFETY AND SECURITY CERTIFICATION).** NJ TRANSIT requires the seventh section of the SSMP to include the following:

- Design Criteria Verification Process. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the process that shall be used to verify that the technical specifications, drawings, and contract documents for the project conform to the Project's safety and security requirements and design criteria. This shall include an explanation of the Project approach to ensure that all required inspections and tests are incorporated into project test plans.
- Construction Specification Conformance Process. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the process that shall be used to verify that elements of the project provided under construction, procurement, and installation contracts conform to the safety and security components of the Project's technical specifications, drawings, and contract documents.
- Testing/Inspection Verification. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the process that shall be used to verify that the as-built (or delivered) configuration contains the safety and security related requirements identified in the Project technical specifications, drawings, and contract documents. This section shall also describe related programs for contractual testing, systems integration testing, and pre-revenue operations testing.
- Hazard and Vulnerability Resolution Verification. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the process used to verify that project personnel and contractors have appropriately identified, categorized, and resolved hazards and vulnerabilities to a level acceptable by Project management.
- Operational Readiness Verification. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the

process that shall be used to verify that project personnel and contractors developed plans, rules, procedures, manuals, and training and qualification programs, in conformance with the Project safety and security requirements. Further, this description shall also detail associated processes for ensuring the qualification and readiness of operations and maintenance personnel.

- Safety and Security Certification Requirements. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the process that shall be used to deliver final certification that the project is safe and secure for passengers, employees, public safety personnel, and the general public, including the individual certificates the Project shall issue for each of the specific elements to be verified.

• **SECTION 8: CONSTRUCTION SAFETY AND SECURITY.** NJ TRANSIT requires the eighth section of the SSMP to include the following:

- Construction Safety and Security Program Elements. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the Project's program for construction safety and security. This shall include requirements for contractors, including the plans and reports the contractor must submit to the NJ TRANSIT. The description shall also detail the activities the Project shall perform to track and manage contractor construction safety and security programs and plans.
- Construction Phase Hazard and Vulnerability Analysis. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes the Project's requirements for safety and security analysis at construction sites. This shall include a description of the Project approach for identifying and mitigating hazards or threats unique to the construction phase.
- Safety and Security Incentives. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that describes (as

applicable) any incentives the Project may provide for the construction safety and security program.

- **SECTION 9: REQUIREMENTS FOR 49 CFR PART 659, RAIL FIXED GUIDEWAY SYSTEMS; STATE SAFETY OVERSIGHT.** NJ TRANSIT requires the ninth section of the SSMP to describe activities the recipient shall perform to coordinate with its State safety oversight agency throughout the project development process. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the specific State safety oversight agency requirements applicable to the Project and the activities necessary to address these requirements and coordinate with the NJ State safety oversight agency(ies). This shall include (as applicable) a schedule for the activities necessary to ensure compliance with State safety oversight agency requirements.
- **SECTION 10: FRA COORDINATION.** NJ TRANSIT requires the tenth section of the SSMP only for those recipients that propose to share track with one or more FRA-regulated railroads or that shall operate on the general railroad system. The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies activities necessary to comply with FRA regulations and provide a schedule for the performance of these activities as applicable. This shall also include a description of the process for updating existing System Safety Program Plan(s) and submitting same to FRA for review and approval. The System Safety Program Plan shall conform to the American Public Transportation Association (APTA) "Guidelines for the Development of Commuter Rail System Safety Program Plans." In addition, the Consultant shall assist NJ TRANSIT in the compilation and submission of plans for the completion of a collision/derailment hazard analysis that conform to the hazard management process in the approved SSPP or the "Draft FRA Guide to Collision/ Derailment Hazard Analysis" for FRA review and approval as necessary.
- **SECTION 11: DHS COORDINATION.** NJ TRANSIT requires the eleventh section of the SSMP to address how the project shall meet Department of

Homeland Security (DHS) requirements, including the applicable security directives issued by the Transportation Security Administration (TSA) and other programs managed by the Office of Grants and Training (OGT). The Consultant shall assist NJ TRANSIT in the development of a section of the SSMP that identifies the related compliance activities the Project shall perform and provide an implementation schedule. Any concerns regarding the potential for conflict between DHS/TSA/OGT and FTA/PMOCs, should be documented in this section.

Deliverable: SAFETY AND SECURITY MANAGEMENT PLAN as detailed above

TASK 9 – PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Objective:

Assist NJ TRANSIT in targeted outreach efforts to seek input from relevant stakeholders, including the North Jersey Transportation Planning Authority, other regional planning and transportation organizations, municipalities and local government units, electric distribution companies, and other entities as necessary and appropriate.

The objective of this task is to support NJ TRANSIT's efforts regarding public information, stakeholder outreach and agency coordination. The Consultant shall provide assistance and technical support necessary for activities that shall focus upon dissemination of engineering detail status to interested parties including but not limited to preparation of graphics such as maps, schematics, physical design and layout sketches, written handouts, Power Point presentations, brochures, videos, and draft progress engineering/design packages and subsets thereof, etc. A second objective is to assist NJ TRANSIT's efforts to fulfill State and Federal regulatory requirements for public and/or agency participation where necessary and applicable. NJ TRANSIT shall lead targeted outreach efforts to seek input from relevant stakeholders, including the Federal and State Regulatory agencies, North Jersey Transportation Planning Authority, other regional planning and transportation organizations, municipalities and local government units, electric distribution companies, and other entities as necessary and appropriate. As noted elsewhere in this RFP, the Consultant shall not communicate

directly with any potential Agency or stakeholder unless otherwise directed by NJ TRANSIT. All such communications shall be solely through NJ TRANSIT.

Subtask 9.1 - Open Houses and Meetings

If needed, open houses shall be designed to encourage one-on-one discussions between the project staff and members of the public, rather than a large group discussion. Upon the direction of NJ TRANSIT, open houses may be held during milestone points in the engineering/design process. The Consultant shall determine the need for translators or special accommodations at open houses. Facilities selected to host open houses must be accessible to persons with disabilities.

When required by NJ TRANSIT, the Consultant shall assist in presentations to Federal, municipal, county and State representatives and other interested parties. All public outreach activities, including meetings or hearings with local, county and citizen groups shall be initiated and coordinated through NJ TRANSIT. The Consultant shall prepare graphics such as maps, schematics, physical design and layout sketches, written handouts, etc. for assistance and technical support when necessary for these activities as directed by NJ TRANSIT. The Consultant shall attend meetings and events, assisting NJ TRANSIT in accordance with a community information program as directed by NJ TRANSIT. The Consultant should anticipate a minimum of 10 meetings. Meetings with municipalities or private persons shall occur as needed as the work progresses.

TASK 10 - INTEGRATION AND INTERFACE

The Consultant shall be responsible for implementing an interface and integration process within its overall design process. This shall ensure that individual design elements of the Project interface properly among themselves, existing NJ TRANSIT facilities and infrastructure as applicable, and the NJ TRANSIT Corporate-wide SANDY Recovery and Resiliency Plan. As such, the Consultant shall also coordinate its activities as required with other Consultants as well as governmental agencies, individuals and other entities that may be impacted by the Project through NJ TRANSIT.

The Consultant shall prepare and submit to NJ TRANSIT for its approval an Integration Management Plan (IMP). The IMP shall establish and maintain a comprehensive, systematic, documented, verifiable and continuous integration process throughout the duration of the Project in order to achieve NJ TRANSIT's objective as stated herein. At a minimum, the Consultant's interface and integration effort shall:

- Follow the Work Breakdown Structure (WBS) adopted for the Project, and allow capability for future WBS level expansion.
- Provide an integration design document that systematically identifies and formally documents all interfaces and establishes a process for addressing each interface.
- Define methods to confirm interface compatibility and demonstrate said compatibility through tests or other accepted verification methods.
- Coordinate all civil infrastructure, utility, electrical and mechanical interfaces to ensure that they are compatible with other applicable Project Area design elements.
- Allow NJ TRANSIT to independently assess the effectiveness of, and audit, the Consultant's integration process.

The Consultant shall develop and maintain an Interface Database that lists all physical elements and other interfaces it shall encounter on the Project. Data fields/tables to be included in the database shall include such items as:

- Type of interface with relevant characteristics
- Purpose of the interface
- Status
- Relevant safety standard, if any
- Primary responsibility for defining the interface
- Open issues /conflicts

The Interface Database shall be an integrated part of the Records Management System.

Approval of the Integration Management Plan by NJ TRANSIT shall not imply in any way that the Plan and Report shall be sufficient to enable the Consultant to meet its obligations under the Contract or that they meet requirements of the Contract.

Upon approval of the IMP, the Consultant shall prepare and submit an Interface Control Report that addresses all identified interfaces during design. At any time during the performance of the Contract, NJ TRANSIT may require the Consultant to modify or revise the Plan as NJ TRANSIT deems necessary.

It is the Consultant's responsibility to successfully achieve the interface and integration of the individual design elements of the Project as well with the design elements of other connected or impacted projects. Successful interface and integration shall have been achieved when the Consultant demonstrates that its design shall allow for progress beyond the preliminary engineering phase without the need for re-engineering or re-design of the individual design elements due to failure to identify or properly address required design interfaces.

Lastly, for all elements of PE design, the Consultant shall always take into consideration the operations and maintenance requirements developed by the Consultant and approved by NJ TRANSIT for the Project, and ensure that design criteria does not conflict with O&M requirements for all facets of the completed Project.

Deliverables:

Integration Management Plan – draft and final

Interface Control Document (ICD)

Interface Database

Integration Report for Amtrak Sub-41

TASK 11 - CONSTRUCTABILITY REVIEWS

The Consultant shall participate in formal constructability reviews at the 50% and prior to 100% stages of PE, evaluating issues that affect the construction, adjacent properties and the public. The Consultant shall follow Construction Industry Institute (CII) guidelines, which defines constructability as “the optimum use of construction

knowledge and experience in planning, design, procurement and field operations to achieve the overall project objectives.” The Consultant shall provide experienced construction personnel to be involved with the project from the earliest stages to ensure that the construction focus and their experience are properly communicated to the project’s planners and engineers. Constructability shall be used as a design consideration, by factoring in cost and schedule effectiveness.

Examples of project issues to be considered include:

- Ground Water Control and Containment – evaluation of containment systems, impact on adjacent structures, recharging the water table, construction of groundwater cut-off systems, dewatering needs which shall include provisions for construction monitoring and requirements for drawdown.
- Utilities – evaluate relocations and restorations as needed; minimize large magnitude relocations.
- Maintenance and Protection of Vehicular and Pedestrian Traffic
- Environmental Issues – sensitive areas, hazardous materials, high impact mitigations, compliance with conditions of permits and approvals, etc.
- Materials Handling and Disposal / Spoils Disposal
- Construction Equipment Clearance
- Underpinning of existing facilities/building as applicable.
- Temporary Support Structures - lateral support for excavations, design of proposed support systems, limits of such systems, easement takings, etc.
- Staging of work elements.
- Improvement of a Contractor’s productivities.
- Temporary / construction power and other utility requirements.
- Signal, communication and electric traction modifications.

NJ TRANSIT may direct the Consultant or third parties to lead this exercise.

Deliverable:

Document findings of constructability reviews in a report to NJ TRANSIT .

TASK 12 - CONTRACT PACKAGING

The Consultant shall assess the various components, potential sub-projects, early action activities, constraints, and construction approaches and develop recommendations for contract packaging and procurement strategies that would produce the best overall value to NJ TRANSIT. The Consultant shall determine factors such as the size and types of contracts, project delivery approaches, and mitigation of constraints brought on by long-lead items. The Consultant shall advise NJ TRANSIT as to the efficacy of procurement methods such as “DBOM”, “EPC”, etc. and how they might be applied to the DG component phase of the NJ TRANSIT-DG Project. The Consultant shall consider and report on the benefits and drawbacks of each recommended approach, such as increased cost, level of risk, integration issues, and funding stream.

Deliverables:

Contract Packaging and Procurement Strategies’ Plan

TASK 13 - PREPARATION AND SUBSEQUENT SUPPORT OF CONTRACT BID DOCUMENTS AND BIDDING PROCESS

The Consultant shall prepare documentation necessary for the procurement of the design, construction, operation, and/or maintenance services to support operation of the DG component phase of the NJ TRANSIT-DG service in accordance with Federal, New Jersey State and NJ TRANSIT regulations, standards and requirements as applicable. The sequencing of contracting, i.e., whether to pursue construction and operation through a “Design-Build-Operate-Maintain” (“DBOM”) procurement or some other contracting vehicle, and the documentation that shall be required to be prepared shall be determined following due diligence by NJ TRANSIT including the outcome of Task 12.. In addition, the Consultant shall provide administrative and technical support to NJ TRANSIT in the solicitation, review and award of a successful bid.

The Consultant shall assist NJ TRANSIT in the preparation of bid documents, including the necessary bidding information, bidding forms and Special Provisions of the contract.

The Consultant shall assist in answering RFI's, producing Addenda, and preparation of Conformed Bid documents.

It is likely that any bid process shall involve at least a two-step process and the Consultant shall assist NJ TRANSIT in the evaluation of bidders technical and cost proposals

TASK 14 – ANALYSIS OF ANCILLIARY SERVICES MARKET REVENUE OPPORTUNITIES

Enabling legislation for the BPU is contained in P.L. 1999, chapter 23. The Consultant shall be thoroughly familiar with BPU requirements as applied to the construction and operation of the Project Electrical Power DG Generation, associated Distribution and provide NJ TRANSIT support necessary to satisfy said requirements as applicable. This support shall include but not be limited to Project design information necessary to categorize Project infrastructure in order to determine BPU regulatory applicability.

The Consultant shall assist NJ TRANSIT in determining if participation in any PJM market services is statutorily and technically feasible and shall result in further revenue optimization from the operation of the DG Power Generation infrastructure.

TASK 15 – AS DIRECTED BY NJ TRANSIT

Whenever the Contract Item “As Directed Cost by NJ TRANSIT” appears in the Proposal, NJ TRANSIT has provided an allowance for additional or Supplemental Design and Engineering Consultant Services not specifically designated and defined in this RFP. Such an allowance is provided for NJ TRANSIT to augment design and engineering efforts as necessary. This allowance is provided for the sole convenience of NJ TRANSIT and can only be used for work authorized by NJ TRANSIT's Contracting Officer.

All additional or supplemental tasks authorized under this provision shall be issued by Directive Letter and periodically incorporated into the Contract by Change Order pursuant to Article 5-Modification of Agreement. The Change Order shall describe the additional or supplemental task(s) with any associated cost changes and shall reduce

the as directed Cost allowance in the amount specified in the Change Order.

NJ TRANSIT anticipates an As Directed Contract Value equivalent to the cost associated with Resource Loading as detailed in the table below, “Estimated Effort Hours By Task and Job Classification”.

Estimated Effort Hours By Task and Job Classification												
Task	Task Description	Principal/Director	Project Manager	Senior Engineer	Staff Engineer Rail	Staff Engineer Power	Engineer	GIS/CADD Technician	Database Manager	Clerical	Non-DBE Subconsultants	DBE Subconsultants
Task 15	– As Directed by NJ TRANSIT	0	40	50	0	0	25	50	50	50	0	0

PHASE II - CONSTRUCTION ASSISTANCE/ENGINEERING SUPPORT

At NJ TRANSIT's direction, the Consultant shall provide the necessary qualified personnel to provide engineering support during project construction. Such forces shall be mobilized upon successful award of a separate contract for the Final Design, Construction and Operations of the Project. Additionally, NJ TRANSIT shall approve such staffing resources and any changes made to same. Consultant staff shall form an adjunct to NJ TRANSIT forces providing design change assessments, value engineering support, change order review support and cost estimating support deemed appropriate by NJ TRANSIT. Finally, the Consultant shall provide the engineering and design review oversight support to assist NJ TRANSIT staff in determining that all Project related permit and regulatory approval conditions are satisfied.

General Requirements:

Tasks that shall be performed by the Consultant during the construction phase of the Project include the following;

- Task 1: Shop Drawing Review
- Task 2: Technical Meetings and Workshops
- Task 3: CPM Schedule Review
- Task 4: Participation in Construction Progress Meetings
- Task 5: Risk Management
- Task 6: Systems Coordination and Testing
- Task 7: Support NJ TRANSIT in Dispute Resolutions
- Task 8: Change Order Analysis Support
- Task 9: NJ TRANSIT-DG Start-Up Support
- Task 10: Project Closeout Support
- Task 11: Alternate Designs
- Task 12: As-Directed by NJ TRANSIT

TASK 1 – SHOP DRAWING REVIEW

Shop drawings submitted by the construction, equipment and other contractors shall be reviewed by the Consultant for general conformance with plans and specifications. The

Consultant shall also observe and report on the construction contractor's development of procedures for final field check-out and commissioning of the completed project or system elements.

In a similar manner, the Consultant shall review manufacturer's drawings, catalog cuts and data sheets for the materials and or systems incorporated in the work.

Reviews shall be made of the Contractor's plans concerning structure, miscellaneous power and communication apparatuses, and other appurtenances for conformance with contract requirements.

A matrix outlining the submittal review schedule and responsible parties shall be established in coordination with NJ TRANSIT's Project Construction Manager. Unless superseded by other agreements, all reviews are to be performed within twenty-one (21) calendar days, based on a reasonable shop drawing submission schedule to be submitted for the Consultant's approval by each Contractor.

Consultant shall review all comments and changes to contractor submittals with NJ TRANSIT before submission to the contractor. Additional NJ TRANSIT comments shall be incorporated by the Consultant in submission responses.

TASK 2 - TECHNICAL MEETINGS AND WORKSHOPS

The Consultant shall attend pre-bid, pre-construction meetings and workshops, and shall answer design related technical questions during the duration of all construction and procurement contracts.

TASK 3 - CPM SCHEDULE REVIEWS

Each Contractor's schedule shall be reviewed by NJ TRANSIT's Construction Manager and incorporated into the project's Master Construction Schedule (MCS). The Consultant shall assist NJ TRANSIT's Construction Manager in reviewing the initial contractor and/or Force Account CPM schedule for inclusion into the MCS as required by NJ TRANSIT.

TASK 4 – CONSTRUCTION PROGRESS MEETINGS

The Consultant shall participate in construction meetings with the Contractor, NJ TRANSIT, NJ TRANSIT's Construction Manager, Public Utilities and any other project entities where such attendance is deemed important by NJ TRANSIT.

During the duration of the Construction Phase of the Project it is anticipated that progress meetings shall be held for each contract on a bi-weekly basis, or held more frequently as deemed necessary by the Construction Manager.

TASK 5 – RISK MANAGEMENT

The Consultant shall maintain the Risk Matrix and update the Risk Management Plan as necessary during the Final Design and Construction period

TASK 6 –SYSTEMS COORDINATION AND TESTING

The Consultant shall assist NJ TRANSIT's Construction Manager in preparing a detailed work plan for acceptance testing criteria, relevant power generation equipment, power distribution equipment, DG component microgrid to regional grid interconnections, microgrid control functions, natural gas supply/combustion fuel connection equipment, prior to final acceptance of these systems by NJ TRANSIT.

The Construction Manager, NJ TRANSIT, Amtrak, the Contractors and the manufacturer or vendor supplying such systems shall conduct a comprehensive testing program jointly and as applicable for the interconnection of all NJ TRANSIT-DG infrastructure and facilities.

TASK 7 – DISPUTE RESOLUTION SUPPORT

The Consultant shall provide all assistance as may be required to resolve any issue that may arise over the course of the Project as pertains to the interpretation of the plans and specifications.

Such assistance includes meeting attendance and providing assistance in the preparation of any dispute analysis, report or other response as may be required.

TASK 8 – CHANGE ORDER ANALYSIS SUPPORT

All contract changes shall require the approval of NJ TRANSIT Contracting Officer in accordance with NJT's Change Order procedures. The Consultant shall assist NJ TRANSIT's Construction Manager as directed by NJ TRANSIT in the analysis of the issue creating the changed condition and shall participate in the negotiations to perform such work, as deemed necessary by NJT.

The Consultant is reminded that it shall be liable to NJ TRANSIT for any costs incurred during the Construction Phase to correct, modify or redesign any drawings completed by the Consultant that are later found to be defective, or not in accordance with the provisions of this agreement as a result of any act, error or omission on the part of the Consultant or its agents, servants or employees. The Consultant shall be given reasonable opportunity to correct any deficiencies at no additional cost to NJT.

TASK 9 – NJ TRANSIT-DG START– UP, DG COMPONENTS SUPPORT

The Consultant shall provide technical assistance to NJ TRANSIT's Construction Manager as may be required when the microgrid DG component power and associated distribution systems , Network Communications and various remaining systems have been tested, approved and are ready for operation.

The Consultant shall also assist in the preparation of plans for initial start-up of operations and shall provide support to NJ TRANSIT before and after initiating operational service as directed by NJ TRANSIT.

TASK 10 – PROJECT CLOSEOUT SUPPORT

Upon determination by NJ TRANSIT's Construction Manager, when a contract is substantially complete, the Consultant shall check all As-Built drawings provided by the

Contractor for compliance with the contract plans and specifications, approved shop drawings and approved deviations.

TASK 11 – ALTERNATE DESIGNS

The Consultant shall perform reviews of all alternate designs proposed to be used or implemented by the Contractors (assuming NJ TRANSIT approval), equipment manufacturers and other business enterprises performing services for the Project. Such assistance includes the review of Contractor Value Engineering proposals.

Recommendations shall be made by the Consultant as to the validity and appropriateness of utilizing any proposed design, which deviates from the original plans and specifications.

TASK 12 – AS DIRECTED BY NJ TRANSIT

Whenever the Contract Item “As Directed Cost by NJ TRANSIT” appears in the Proposal, NJ TRANSIT has provided an allowance for additional or Supplemental Design and Engineering Consultant Services not specifically designated and defined in this RFP. Such an allowance is provided for NJ TRANSIT to augment design and engineering efforts as necessary. This allowance is provided for the sole convenience of NJ TRANSIT and can only be used for work authorized by NJ TRANSIT’s Contracting Officer.

All additional or supplemental tasks authorized under this provision shall be issued by Directive Letter and periodically incorporated into the Contract by Change Order pursuant to Article 5-Modification of Agreement. The Change Order shall describe the additional or supplemental task(s) with any associated cost changes and shall reduce the as directed Cost allowance in the amount specified in the Change Order.

As noted in the Phase I description of this RFP, NJ TRANSIT anticipates a baseline As Directed Contract Value equivalent to the cost associated with Resource Loading as detailed in the table below, “Estimated Effort Hours By Task and Job Classification”.

This estimate may be further modified during negotiations for Phase II Consultant services.

Estimated Effort Hours By Task and Job Classification												
Task	Task Description	Principal/Director	Project Manager	Senior Engineer	Staff Engineer Rail	Staff Engineer Power	Engineer	GIS/CADD Technician	Database Manager	Clerical	Non-DBE Subconsultants	DBE Subconsultants
Task 15	– As Directed by NJ TRANSIT	0	40	50	0	0	25	50	50	50	0	0

PROCUREMENT INFORMATION FOR PROPOSERS

A. Proposal Requirements

The technical submission shall consist of six (6) copies of the technical proposal. If requested by NJ TRANSIT, the cost submission shall consist of three (3) copies of the cost proposal. Technical and cost proposals shall be bound so that individual pages may be easily removed without resorting to cutting or tearing them (i.e. three-ring or similarly fastened binder). All proposals shall be prepared on 8 1/2" x 11 white paper. A limited number of 11" x 17" fold-out sheets for exhibits are acceptable. All pages are to be sequentially numbered.

Unnecessarily elaborate proposals are not being sought. Elaborate artwork, expensive paper and binding, and expensive visual and other preparation aids are not necessary or desirable. Copies of the technical proposals are to be delivered to NJ TRANSIT on or before the time specified in the RFP cover letter. Copies of the cost proposals are to be delivered to NJ TRANSIT on or before the time specified in its request letter.

Proposals shall be valid for the period of time it takes to negotiate an agreement and execute a contract with the successful Consultant. Said period of time will not exceed six (6) months from the due date of cost proposals. A duly authorized official of the Consultant or joint venture must sign such proposals.

B. Technical Proposal Format

Technical proposals shall follow the format outlined below. Should the proposal contain data which the Consultant does not want disclosed for any purpose other than evaluation of the proposal, such data may be so restricted, provided the Consultant identifies the appropriate pages of the proposal and places a label on those pages.

Cover Letter and Introduction - This section should summarize key points of the proposal and include any introductory or explanatory remarks. The Consultant will demonstrate an understanding of the overall project objectives, areas of concern and technical/managerial approaches to be emphasized in pursuing this work.

Qualifications of Consultant - This section shall contain information about the project organizational structure of the team and the personnel required for the project. The

availability of professional and technical staff for this project should be shown. Also show anticipated workload for the duration of this project taking into account resources involved with existing proposals and active projects.

Qualifications of Individuals - This section shall contain resumes of the key persons proposed to work on this project. Resumes shall cite formal education, professional licenses and certifications, entire work history, and training in industry skills. Specific skills and any other relevant experiences should be highlighted.

This section shall also demonstrate the key personnel's abilities to meet the Consultant's Qualifications identified in Section II Project Background and Description, Organizational Structure Section above.

This section must contain a certification that the listed key personnel are presently employed by the Consultant Team, or will be on board at the time of award, and will be assigned to the project in the manner prescribed.

References - A minimum of three client references must be provided for each Consultant on the consulting team, from completed assignments similar in scope and magnitude to the NJ TRANSIT project to be undertaken.

A minimum of three client references must be provided for each key project staff member. References should include client's name, title, address, telephone number, name of project worked on, start and end dates of assignment, and description of the assignment.

Each Consultant having performed services for NJ TRANSIT, as a prime Consultant or sub-Consultant, must provide references as stated above for prior NJ TRANSIT projects.

Work Plan: This section shall contain the work plan to accomplish the Scope of Services. The work plan shall address all tasks described in this RFP. Suggested improvements on the work plan as described in this RFP should be noted in this section. Additional narrative on the services to be performed, which can be used to evaluate the Proposer's understanding of the objectives and overall purpose of the project, is encouraged. This section shall carefully reflect all phases described in the RFP.

Team Organization/Resource Allocation - This section shall address the proposed management structure, manpower allocation, person-hour allocation and assigned individuals for performing the Scope of Services. Include a clear description of how the

management structure and assigned personnel fit into the execution of the Scope of Services (previously described), how staff assignments will vary over the project time frame and an explanation of the relationship of the on-site Consultant Project Manager to the top management of the Consultant, and the extent of his/her authority and responsibility. All other project positions and relationships comprising the project's organizational structure will be presented. The following information shall be included in this section:

- Team Organization Chart showing the reporting and contractual relationships of all Consultants included in the proposal.
- Matrix of Person-Hours (by name and level) by Consultant showing, by task, the total person-hours for the entire team and separately for each Consultant included in the team. The percentage of person-hours allocated to DBE Consultants should also be shown.
- Organization and Staffing Chart showing the organization of key personnel by name, title and reporting relationship.
- Matrix: Person-Hours by Individuals showing, for each project staff member, the number of man-hours proposed for each task.

Quality Assurance Plan - This section shall contain a summary of the Proposer QAP outlining the process which will be followed for checking and approval of the Consultant's work product to ensure it is consistent with NJ TRANSIT's expectations and needs. Typical titles of individuals responsible for checking, review and approval shall be identified along with descriptions of experience and/or other qualifications required for these positions. This section is not intended for inclusion of the complete QAP but should be detailed enough to provide for a clear understanding of the Consultant's QAP process.

Schedule - The Proposer shall prepare a schedule for completion of all the tasks contained in the RFP.

PROPOSERS ARE REQUIRED TO PROVIDE ONE (1) ORIGINAL COPY OF THE FOLLOWING.

CONSULTANT CERTIFICATIONS

The Technical Proposal shall include all certifications and affidavits required under this solicitation (i.e., Acknowledgment of Receipt of Addenda, DBE Forms and Affidavits, Contractors Certificate of Eligibility, Non-Collusion Affidavit, Affidavit of Compliance, Business Registration Certificate,

Certification for Contracts, Grants, Loans and Cooperative Agreements, Disclosure of Investment Activities in Iran, Source Disclosure and Vendor Certification and Political Contribution Disclosure Form.

CONTRACT REVIEW

The Technical proposal shall also contain any exceptions to NJ TRANSIT's Professional Services Agreement (Exhibit A) along with any proposed modifications to the Agreement. All exceptions, clarifications, and modifications must be specifically identified and explained in a clearly identified section of the proposal. Consultant's standard terms and conditions will not be considered as an exception, clarification, or modification. Exceptions, clarifications or modifications to NJ TRANSIT's Professional Services Agreement that are not provided with the Technical Proposal will not be entertained.

C. Cost Proposal Format

NJ TRANSIT will request a Cost proposal from the highest technically qualified Proposer.

All proposed expenses will be evaluated to determine their reasonableness and whether they are allowable and allocable. The Federal Transit Administration Cost Standards (Federal Acquisition Regulations Part 31; FAC 84-16, 17, 19) will be used as the guideline in determining the reasonableness of Consultant costs.

One (1) original and three (3) copies of a cost proposal must be provided within seven (7) days of the receipt of the written or verbal notification from NJ TRANSIT. If the Proposer cannot provide its cost proposal within seven (7) working days of request, NJ TRANSIT reserves the right to request a proposal from the next highest ranked proposer. The format in the cost proposal sheets provided by NJ TRANSIT in Attachment C shall be used for the preparation of the Cost Proposal.

Person-hours by discipline and title shall be separated by task and by salary rate. Direct expenses shall be itemized separately by category for each Task. Direct expenses to the Consultant are in addition to the compensation for payroll additives, salaries and profit and include actual expenditures made by the Consultant's professional and technical employees and sub Consultants for such expenses as:

1. Travel, sustenance and lodging - NJ TRANSIT will reimburse the Consultant in accordance with the NJ TRANSIT Travel Policy. See Exhibit B: Travel, Subsistence and Lodging Reimbursement Guidelines.
2. Model(s)

3. Reproduction of drawings, specifications and bid packages including plan sets, technical specifications and special provisions for proposal purposes.
- 4.
5. Testing
6. Special Equipment
7. Subcontracts less than \$10,000.00.
8. All permits necessary for completion of design. Also, fees associated with the review of plans and specifications for conformance to building codes (i.e., NJDCA, NJDEP, etc.). Where possible, NJ TRANSIT will pay permit fees directly.
9. Expense of the premium portion for overtime work requiring higher than regular rates, when authorized in writing by NJ TRANSIT.

The person-hours and direct expenses shall be summarized by Task and by Consultant in the Consultant's cost proposal and include overhead, profit, etc. Overhead and profit assumptions are to be shown as per Attachment C. Direct salary cost is defined as base salary paid to technical employees (excluding mandatory and customary benefits such as statutory employee benefits, insurance, sick leave, holidays and vacations, pensions and similar benefits). If clerical support is required and if it is not included in overhead or direct expenses, it must be itemized in the same fashion as other staff in the proposed cost detail.

The Proposer shall state and specifically identify the percentage of DBE participation by Phase and Task.

The Contract will be a cost plus fixed fee type with a maximum amount not to be exceeded. The profit (fixed fee) shall be negotiable on a task-by-task basis and shall not exceed ten percent (10%) on labor overhead and fringe costs; there should be no profit on direct expenses. No overhead burden of profit (fixed fee) is allowed on subcontracting or direct costs.

Each Phase and Task in this contract will have a specified amount identified equal to the negotiated proposed cost for each Phase and Task. Expenditures greater than the identified amount and incurred by the Consultant during the course of the execution of the Contract shall not be reimbursed unless previously approved by NJ TRANSIT prior to the performance of the work.

The Consultant must demonstrate its financial capability, including financial resources to sustain operations between the time expenses are incurred and the time payment is made. The proposal shall include the latest year-end financial statement as prepared by an independent auditing Consultant.

Each Consultant on the Consultant's team must submit a listing of the items charged to the project overhead rate and the corresponding percentages. Overhead rates are not restricted, but must be documented by a recent (within the past three years) State, Federal or independent audit. Each Consultant is also required to submit their overhead projections in schedule format for the duration of the project.

All costs, including indirect cost items are subject to negotiation. NJ TRANSIT intends to negotiate provisional indirect cost rates, which are subject to audit and downward adjustment only.

D. Method of Selection

A. PROPOSAL DISTRIBUTION

NJ TRANSIT will provide a copy of each technical proposal to the Technical Evaluation Committee (TEC).

B. PROPOSAL EVALUATION

Each individual on the TEC will review and evaluate the written technical proposals based on quality and substance of the submitted proposal. Written technical proposals will be scored against the criteria enumerated in Attachment A for technical proposals. The written technical proposal evaluations will be used by NJ TRANSIT to determine the "competitive range". Consultants may be asked to be prepared for specific situational questions at the Oral Presentation.

Oral Presentations will be requested from at least three (3) qualified Proposers within the competitive range, except NJ TRANSIT may select fewer Proposers if fewer such Consultants respond to the solicitation or meet the qualifications for the project.

Oral Presentations will provide an opportunity for the Proposer to clarify or elaborate on its written technical proposal. The TEC will conduct the Oral Presentations. The TEC will use the Oral Presentations to Consultant and/or reassess its understanding of the written technical proposals, and incorporate that information into its evaluation by revising the written technical evaluation scores accordingly.

NJ TRANSIT reserves the right to assess and reassess its understanding of proposals and revise the rating and ranking of such proposals at any time prior to selection.

Reference checks will be performed for each Proposer deemed within the competitive range and the results furnished to the TEC. Although the reference checks will not be scored per se,

they will be used to validate information contained in the technical proposal.

C. NEGOTIATIONS

NJ TRANSIT will request a cost proposal from the highest technically qualified Consultant.

NJ TRANSIT will enter into negotiations with the highest technically qualified Consultant to reach an agreement on the Scope of Services and fees. If in the opinion of NJTRANSIT a satisfactory Contract cannot be negotiated with a selected Consultant, NJ TRANSIT will formally end negotiations and initiate negotiations with the next most technically qualified Consultant.

This negotiation procedure will be followed until a satisfactory Contract is negotiated. NJ TRANSIT considers all elements of the Proposer's proposal subject to negotiations.

D. APPROVAL AND AWARD

Once negotiations have been completed, a recommendation for award of the Contract to the Proposer, whose proposal conforming to the RFP, is in the best interest and provides the best value to NJ TRANSIT will be made for approval by NJ TRANSIT's Board of Directors. Upon approval of the recommendation for award of a contract, NJ TRANSIT will enter into the cost plus fixed fee contract found in Exhibit A.

Within ten (10) working days of receipt of Notice of Award, the successful Proposer shall properly execute two (2) copies of the Contract and deliver to NJ TRANSIT both signed copies of the Contract, the specified insurance certificates and any other document as may be specified in the Contract. NJ TRANSIT will execute both copies of the contract and will return one (1) executed copy to the Consultant.

E. PROTEST PROCEDURES

a. Purpose

This section describes the policies and procedures governing the receipt and resolution of vendor protests in connection with this Request for Proposal.

b. Policy

1. Parties: Only an interested party may file protest.
2. Types of Protests / Time Limits

c. Protests based upon alleged restrictive specifications or alleged improprieties in NJ TRANSIT's procurement process must be filed no later than five (5) days prior to the bid opening date, or no later than five (5) days prior to the closing date for receipt of initial proposals.

d. Protests based upon alleged improprieties of a Proposal shall be filed no later than five (5) days after the Protestor knows or should have known of the facts giving rise thereto.

e. Protests based upon the award of a contract shall be filed no later than five (5) days after the notification to the unsuccessful Consultants of NJ TRANSIT's intent to award, or no later than five (5) days after an unsuccessful Consultant becomes aware of NJ TRANSIT's intent to award a contract, whichever comes first.

f. All protests must be filed in writing. Oral protests will not be accepted.

3. Where to File

Protests must be filed directly with NJ TRANSIT's Contracting Officer, or designee, at the address indicated in the solicitation.

4. The Protest

a. The protest must contain the following information:

i. The name, address and telephone number of the protestor.

ii. Identity of the RFP (by number and description).

iii. A statement of the specific grounds for protest and any supporting documentation. Additional materials in support of the protest will only be considered if filed within the time limits set in Paragraph B.

iv. An indication of the ruling or relief desired from NJ TRANSIT.

b. If the protest is filed after notification of NJ TRANSIT's intent to award and prior to contract award, the Potential Consultant will be advised by NJ TRANSIT of the pending protest.

c. If deemed appropriate by NJ TRANSIT, an informal conference on the merits of the protest may be conducted with all interested parties allowed to attend.

5. Confidentiality of Protest

Material submitted by a protestor will not be withheld from any interested party, except to the extent that the withholding of

information is permitted or required by law or regulation. If the protestor considers that the protest contains proprietary material, which should be withheld, a statement advising of this fact must be affixed to the front page of the protest documents and the alleged proprietary information must be so identified wherever it appears.

6. Response to the Protest

NJ TRANSIT's Contracting Officer, or designee, will respond to the protest within a reasonable time after receipt of the protest by NJ TRANSIT. NJ TRANSIT's response shall address only the issues raised originally by the protestor.

7. Rebuttal to NJ TRANSIT's Response

The protestor may submit a written rebuttal to NJ TRANSIT's response, addressed to the Contracting Officer, but must do so within five (5) days after receipt of the original NJ TRANSIT response. New issues in the rebuttal will not be addressed by NJ TRANSIT. After receipt of the protestor's rebuttal, the Contracting Officer will review the protest and notify the protestor of his final decision.

8. Request for Additional Information

Failure of the protestor to comply expeditiously with a request for information as specified by NJ TRANSIT's Contracting Officer or designee may result in determination of the protest without consideration of the additional information. If any parties to the protest request information from another party, the request shall be made to NJ TRANSIT's Contracting Officer, or designee, and shall be complied with by the other party within five (5) days if NJ TRANSIT so directs.

9. Request for Reconsideration

If data becomes available that were not previously known, or there has been an error of law, a protestor may submit a request for reconsideration of the protest. NJ TRANSIT's Contracting Officer will again review the protest considering all currently available information. The Contracting Officer's determination will be made within a reasonable period of time, and his decision will be final.

10. Procurement Process Status

Upon timely receipt of a protest, NJ TRANSIT will delay the receipt of proposals until after resolution of the protest for

those protests filed prior to the proposal due date, or withhold award until after resolution of the protest for protests filed after receipt of proposals. However, NJ TRANSIT may receive proposals or award a contract whenever NJ TRANSIT, at its sole discretion, determines that:

- a. The items or work to be procured are urgently required; or
- b. Delivery or performance will be unduly delayed by failure to make the award promptly, or
- c. Failure to make prompt award will otherwise cause undue harm to NJ TRANSIT or the Federal Government.

11. Federal Transit Administration (FTA) Involvement

Where procurements are funded by the FTA, the protestor may protest to the FTA only where the protest alleges that NJ TRANSIT failed to have or to adhere to its protest procedures, failed to review a complaint or protest, or a violation of Federal law or regulation. Any protest to the FTA must be filed in accordance with FTA Circular 4220.1F.

12. Definitions

- a. "Days" means working days.
- b. "File or Submit" means date of receipt by NJ TRANSIT's Contracting Officer.
- c. "Federal Law or Regulation" means any valid requirement imposed by Federal statute or regulation governing contracts awarded pursuant to a grant agreement between NJ TRANSIT and the FTA. This includes the requirements as stated in FTA Circular 4220.1f.
- d. "Contracting Officer" means the NJ TRANSIT's Chief of Procurement and Support Services or his designee.
- e. "Interested Party" means all proposers. It may also include a subcontractor or supplier provided they have a substantial economic interest in a portion of the RFP.
- f. "Potential Consultant" means the proposer that is in line for award of the contract in the event that the protest is denied.

NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) No. 16-001

ATTACHMENTS

NEW JERSEY TRANSIT CORPORATION

RFP No. 16-001

ATTACHMENT A

PROPOSAL EVALUATION CRITERIA

(LISTED IN DESCENDING ORDER OF IMPORTANCE)

PROPOSAL EVALUATION CRITERIA

- 1. Qualifications and Experience of the Proposal Team Project Manager: Does the proposed project manager for the proposal team have the appropriate background, skills, experience to successfully lead, manage and control a multi-million dollar design/engineering effort in providing design, construction assistance and commissioning of Distributed Energy Resources, including experience and working knowledge of advanced, smart-grid technologies as a way to improve the reliability, security, and resiliency of the electric grid during a disruptive event and in accordance with the qualifications of the RFP?**
- 2. Qualifications and Experience of the Proposal Team Deputy Project Manager: The Consultant Deputy Project Manager (DPM) shall have demonstrated experience of ten (10) years or more working with commuter rail or inter-city rail environments. Specifically, the DPM shall have experience working with passenger rail design and engineering as related to the civil, structural, geotechnical engineering, design and construction of electrical power transmission/interconnection compatible with existing commuter rail infrastructure in the Project Area, station design and integration of bus and ferry facilities into the NJ TRANSIT transportation network. The DPM shall demonstrate requisite prior experience that shall ensure the successful integration of all NJ TRANSIT and passenger ferry infrastructure with Distributed Generation aspects of the NJ TRANSIT-DG electric power systems as outlined in this RFP.**
- 3. Qualifications and Experience of Key Individuals on the Proposal Team: (task leaders, key project staff). Do the proposed task leaders and key staff members have the appropriate background, skills, experience (supported by references) to successfully advance manage and control a multi-million dollar design/engineering effort in providing design, construction assistance and commissioning of Distributed Energy Resources, including experience and working knowledge of advanced, smart-grid technologies as a way to improve the reliability, security, and resiliency of the electric grid during a disruptive event and in accordance with the qualifications of the RFP?**
- 4. Experience and Expertise of Firm(s) on the Proposal Team: The Consultant Team must possess a working knowledge and expertise in the areas of Regulatory Compliance as applicable to the registration, certification and operation of DG power generating equipment as well as the distribution of such electric power and in accordance with the requirements set forth in the RFP. Management and successful completion of NJ TRANSIT sponsored PE, FE and construction projects on the Northeast Corridor and/or NJ TRANSIT's M&E and HBLR lines as well as rail stations, bus maintenance facilities and ferry facilities;**
- 5. Understanding, Approach and Methodology Regarding Scope of Services: Does the written (and oral presentations, if applicable) demonstrate a proper and complete understanding of project and contract scope including unique project requirements? Was the scope for each task developed? Was the written (and oral presentations, if applicable) responsive to the RFP? Were they complete and thorough, clearly organized, well presented and professional? If the Proposer offers reasonable exceptions and modifications to the proposed Scope of Services, did**

these shorten the time required to complete the work or improve the quality of the work. Has the Proposer demonstrated how its work can satisfy environmental and regulatory compliance requirements for rail projects as prescribed by FTA policies and regulations? Has the Proposer shown how to advance the public outreach component quickly while satisfying Federal requirements for public involvement?

6. Organization, Amount, Allocation, Availability and Proximity of Resources: Are key and support staff readily available without significant travel? Has the proposer committed a sufficient but not excess amount of resources to the project? Do the firms and proposed key individuals appear to be available to the degree necessary to successfully complete our project? Does the proposer/team have sufficient offices, support staff and equipment to sufficiently support the proposed project team? Are the human and physical resources located in close enough proximity to the project site and NJ TRANSIT offices to ensure timeliness, quick response times and proper support? Are the individual firms and proposed staff organized in a logical and proper way? Does the proposal have appropriate person hour allocation for each task?

7. Schedules: Do the task and subtasks schedules show logical task durations, sequencing and progression? Do the schedules provide for adequate review time and milestones that can be used to keep the project on schedule?

8. DBE Participation: Are DBE firms effectively employed and have the goals been met?

Sample Reference Check Questions:

1. Was the client satisfied with the performance of Consultant's duties and/or the Project Manager?
2. Would the reference(s) hire the firm again?
3. Did the firm satisfactorily achieve the objective of the contract, especially:
 - (a) quality product?
 - (b) on time completion?
 - (c) within budget?
4. Were there any significant problems with the work and how problems were resolved?
5. Was the firm responsive and easy to work with?

Completed reference interview forms will be supplied to all members of the TEC for their review.

NEW JERSEY TRANSIT CORPORATION

RFP No. 16-001

ATTACHMENT B

PROPOSAL FORMAT

DESIRED
ITEM PAGE LIMIT

1. Cover Letter (Key Issues and Project Approach)
2. Qualifications of Firm(s)
3. Qualifications of Individuals (Resumes) As required
4. References Up to
5. Technical Approach
6. Team Organization/Resource Allocation
7. Quality Assurance Program
8. Schedule
9. Forms/Certifications As required

Note: All proposals shall be in letter format, Two Hundred Fifty (250) page maximum (exclusive of resumes and certifications), and discuss the issues identified above.

Note: The transmittal letter shall not be considered part of the written proposal. Transmittal letters shall not exceed three typed pages in length.

NEW JERSEY TRANSIT CORPORATION

RFP No. 16-001

ATTACHMENT C
COST Proposal Format

See Excel Spreadsheet attached

NEW JERSEY TRANSIT CORPORATION

REQUEST FOR PROPOSAL (RFP) No. 16-001

**DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE
AND
OTHER TECHNICAL SERVICES
FOR THE
NJ TRANSIT- PROJECT DISTRIBUTED GENERATION**

EXHIBITS

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) No. 16-001**

**EXHIBIT A.
NJ TRANSIT'S PROFESSIONAL SERVICE AGREEMENT**

AGREEMENT NO. 16-001
BETWEEN
NEW JERSEY TRANSIT CORPORATION
AND
FOR PROFESSIONAL SERVICES

This Agreement made as of _____ 20____, between the New Jersey Transit Corporation (hereinafter "NJ TRANSIT"), a public instrumentality of the State of New Jersey and _____ having its principal place of business at _____ (hereinafter the "Consultant").

WITNESSETH:

WHEREAS, the Board of Directors of NJ TRANSIT, at its meeting of _____, authorized the Executive Director to enter into this Agreement ("Agreement" or "Contract") with the Consultant for DESIGN, ENGINEERING, CONSTRUCTION ASSISTANCE AND OTHER TECHNICAL SERVICES FOR THE NJ TRANSIT- PROJECT DISTRIBUTED GENERATION; and

WHEREAS, the said Consultant, for and in consideration of the payments hereinafter specified and agreed to be made by NJ TRANSIT, hereby covenants and agrees to commence and complete the work as follows:

NOW, THEREFORE, in consideration of the mutual covenants and conditions herein contained, the parties hereto covenant and agree with each other as follows:

1. **CONSULTANT SERVICES:** The Consultant, at the direction of NJ TRANSIT, shall provide to NJ TRANSIT services in conformance with the description of services, deliverables, standards of performance, and acceptance criteria set forth in Exhibit A (Scope of Services), annexed hereto and made a part hereof.

2. **COMPENSATION:** This Agreement is a cost plus fixed fee contract. NJ TRANSIT shall, subject to the availability of funds and audits, pay the Consultant for work identified in

Exhibit A (Scope of Services). The Consultant's total costs and fees have been identified as an amount not to exceed \$_____ as set forth in Exhibit B (Cost Information), annexed hereto and made part hereof. The costs have been identified as \$_____ for direct labor, \$_____ for indirect costs, and \$_____ for direct expenses. The fixed fee has been identified as \$_____. Payment shall only be made for work which is actually performed and accepted by NJ TRANSIT. The Consultant shall render monthly invoices for direct and indirect charges incurred pursuant to this Agreement no later than two (2) weeks after the end of the month. NJ TRANSIT will make payment within thirty (30) days after approval of the Consultant's invoice. The invoices shall be detailed in accordance with procedures and formats prescribed by NJ TRANSIT.

All costs incurred under this Agreement by the Consultant and approved sub-Consultants, including those costs resulting from changes to, modifications of and termination of the Agreement, at a minimum, must be considered allowable and allocable in accordance with the cost principles of Part 31 of the Federal Acquisition Regulations (48 CFR, Part 31). The Contracting Officer's determination on the allowability, allocability and reasonableness of incurred costs shall be final and conclusive. The Contracting Officer for NJ TRANSIT shall be the Chief of Procurement & Support Services or his/her designees within NJ TRANSIT's Procurement Department.

Direct labor rates shall be the wages or salaries actually paid to employees, principals or partners directly charging time to the project for work performed as required by Exhibit A (Scope of Services).

Maximum provisional indirect cost rates (e.g. fringes, overhead, G&A, etc.) have been computed by the Consultant for it and its sub-Consultants and are considered acceptable by NJ TRANSIT. The following provisional rates shall be in effect for the duration of the Agreement unless revised as mutually agreed or adjusted as provided below:

<i>Firm</i>	<i>Contract Year XX</i>	<i>Contract Year XX</i>	<i>Contract Year XX</i>

Should the Consultant's or any of its sub-Consultant's actual indirect cost rates for their fiscal year be determined to be less than the established maximum provisional indirect cost rates, and should the amount invoiced by and paid to the Consultant exceed those rates for that fiscal year, then the amounts invoiced shall be adjusted downward as compared to the actual indirect cost rate and overpayment amounts including the corresponding fixed fee shall be remitted to NJ TRANSIT.

Direct expenses shall be only those costs which are necessary to accomplish the scope of services and not excludable as direct costs by the Federal Acquisition Regulations or not otherwise compensated under the Consultant's direct labor and indirect cost rates. All direct expense purchases of goods, materials and services made by the Consultant on behalf of NJ TRANSIT shall be competitively procured wherever practicable.

Direct expense compensation for travel, subsistence and lodging costs shall comply with the NJ TRANSIT Travel and Business Reimbursement Guidelines (Exhibit C).

Direct labor rates, hours and costs, indirect labor rates and costs and direct expenses invoiced by the Consultant and paid by NJ TRANSIT are subject to audit and downward adjustment by NJ TRANSIT, in its sole discretion. Any determination of an overpayment by NJ TRANSIT as a result of an audit shall be final and conclusive of the amounts to be refunded. All overpayments shall be reimbursed to NJ TRANSIT within thirty (30) days of notification. Alternatively, NJ TRANSIT may deduct the overpayment amount from payments owed to the Consultant under this or any other agreement with NJ TRANSIT. No upward adjustments shall be allowed.

Within 180 days after the end of the Consultant's and Sub-Consultant's fiscal year or for accounting periods of no less than three months should the contract terminate, the Consultant and Sub-Consultants shall furnish NJ TRANSIT with a Statement of Indirect Labor Costs (Statement of Overhead) attesting that the statement has been prepared in conformity with accounting principles generally accepted in the United States and reflect all adjustments required by Part 31 of the Federal Acquisition Regulations. Such fiscal year or stub period statements must be certified by an independent public accountant. Failure to provide the requisite Statement of Indirect Labor Costs (Statement of Overhead) in a format acceptable to NJ TRANSIT may result in NJ TRANSIT withholding payment of fee and all or a portion of Indirect Labor Costs in an amount determined by NJ TRANSIT.

Interest payable on excess direct labor cost, indirect labor costs (overhead) or any other excess amounts paid to the Consultant by NJ TRANSIT, and not previously remitted to NJ TRANSIT within thirty (30) days of notification by NJ TRANSIT, shall accrue at the prime rate as established by the United States Federal Reserve and published in The Wall Street Journal. Interest shall be applied to balances owed to NJ TRANSIT in excess of \$5,000. Application of interest to excess payments made in the preceding fiscal year shall begin six (6) months after the close of the Consultant's fiscal year. Interest shall continue to accrue monthly at the prime rate until all amounts have been remitted to NJ TRANSIT, unless amounts owed NJ TRANSIT, including accrued interest, have been deducted by NJ TRANSIT from any payments owed the Consultant on this or any other agreement.

Costs incurred above the contract amounts identified in Exhibit B (Cost Information) are not reimbursable, except as authorized by the Contracting Officer in writing in accordance with Article 5, MODIFICATION OF AGREEMENT.

3. LIMITATION OF FUNDS:

A.) The Consultant estimates that performance of this Agreement will not cost NJ TRANSIT more than the estimated amount specified in Exhibit B (Cost Information). The Consultant agrees to make every effort to perform the work specified in Exhibit A (Scope of Services) and all obligations under this Agreement within the estimated amount specified in Exhibit B (Cost Information).

B.) The Purchase Order specifies the amount presently available for payment by NJ TRANSIT and allotted to the Scope of Services and the tasks the allotted amount will cover. The parties contemplate that NJ TRANSIT will allot additional funds incrementally to the Purchase Order up to the full estimated cost as specified in Exhibit B (Cost Information) inclusive of all fees. The Consultant agrees to perform, or have performed, work on the Agreement up to the point at which the total amount paid and payable by NJ TRANSIT under the Agreement approximates but does not exceed the total amount actually allotted by NJ TRANSIT for each of the tasks identified in the Agreement.

C.) The Consultant shall notify the Contracting Officer in writing whenever it has reason to believe that within the next sixty (60) days the costs it expects to incur under this Agreement to complete the Scope of Services, when added to all costs previously incurred, will exceed seventy-five percent (75%) of the total amount so far allotted by NJ TRANSIT. The notice shall state the estimated

amount, if any of additional funds required to continue and complete performance of the Scope of Services, as specified in Exhibit A (Scope of Services), beyond the total allotted amount specified in Exhibit B (Cost Information).

D.) If, after notification by the Consultant pursuant to paragraph C above, additional funds are not allotted for the Scope of Services, the Contracting Officer may terminate this Agreement, in whole or in part, in accordance with the provisions of Article 14, TERMINATION OF THE AGREEMENT FOR CONVENIENCE.

E.) Except as required by other provisions of this Agreement:

1.) NJ TRANSIT is not obligated to reimburse the Consultant for costs incurred in excess of the amount allotted in total by NJ TRANSIT for this Agreement; and

2.) The Consultant is not obligated to continue performance under this Agreement (excluding actions under Article 14, TERMINATION OF THE AGREEMENT FOR CONVENIENCE) or otherwise incur costs in excess of the amount then allotted to the Agreement by NJ TRANSIT until the Contracting Officer notifies the Consultant in writing that the amount allotted by NJ TRANSIT has been increased and specifies an increased amount, which shall then constitute the total amount allotted by task and in total by NJ TRANSIT for this Agreement.

F.) No notice, communication, or representation in any form other than that specified by the Contracting Officer in writing shall affect the amount allotted by NJ TRANSIT to this Agreement. In the absence of the notice specified in Paragraph C, NJ TRANSIT is not obligated to reimburse the Consultant for any costs in excess of the total costs and fees specified in Exhibit B (Cost Information) to this Agreement, whether incurred during the course of the Agreement or as a result of termination.

G.) Change Orders shall not be considered an authorization to exceed the amount allotted by NJ TRANSIT specified in Exhibit B (Cost Information), unless they contain a statement increasing the amount allotted.

H.) Nothing in this clause shall affect the right of NJ TRANSIT to terminate this Agreement.

I.) If NJ TRANSIT does not allot sufficient funds to allow completion of the work, the Consultant will be entitled to the actual costs incurred plus a percentage of the fixed fee specified in

Exhibit B (Cost Information) not to exceed the percentage of completion of the work contemplated by this Agreement.

4. EFFECTIVE DATE AND TERM OF AGREEMENT: This Agreement shall become binding upon the parties hereto when executed on behalf of NJ TRANSIT by the Contracting Officer or his designee. The Consultant shall commence work upon the Scope of Services within five (5) working days upon receipt of a written Notice to Proceed to that effect which shall be issued on behalf of NJ TRANSIT by its Contracting Officer or his designee upon the execution of the Agreement by NJ TRANSIT. The Consultant shall complete the Scope of Services by

5. MODIFICATION OF AGREEMENT:

A.) The Scope of Services set forth in Exhibit A of this Agreement may be reduced, modified or expanded within the scope of this Agreement by written contract modifications executed by NJ TRANSIT and the Consultant.

Except as provided in Paragraph B, below, in the event that NJ TRANSIT requires a reduction, expansion, or modification of the Scope of Services, the Contracting Officer shall issue to the Consultant a written notification which specifies such reduction, expansion, or modification. Within fifteen (15) days after receipt of the written notification, the Consultant shall provide the Contracting Officer with a detailed cost and schedule proposal for the work to be performed or to be reduced. This proposal may be accepted by NJ TRANSIT or modified by negotiations between the Consultant and NJ TRANSIT. A contract modification (Change Order) shall be effective only if executed in writing by both parties.

B.) Notwithstanding Paragraph A. above, the Contracting Officer may at any time, by written order, make changes within the general scope of this Agreement to the work to be performed by the Consultant. If any such change causes an increase or decrease in the estimated cost of, or the time required for, the performance of any part of the work under this Agreement, whether or not changed by the order, the Contracting Officer may make such adjustments as are appropriate and equitable and shall modify the Agreement in writing accordingly. Any claim by the Consultant for adjustment under this clause must be asserted within thirty (30) days from the date of receipt by the Consultant of the notification of change; provided however, that the Contracting Officer, if he decides that the facts justify

such action, may receive and act upon such claim asserted at any time prior to final payment under this Agreement. Failure to agree to any adjustment shall be a dispute within the meaning of Article 34, DISPUTES. However, nothing in this clause shall excuse the Consultant from proceeding with the Agreement as changed.

C.) No services for which an additional cost or fee will be charged by the Consultant shall be furnished without the prior express written authorization of the Contracting Officer.

D.) Unless specified in a written contract modification, no change, reduction, modification or expansion of the Scope of Services within or beyond the scope of this Agreement shall serve to modify the terms and conditions of this Agreement.

E.) Whenever an "AS DIRECTED TASK" appears in Exhibit A (Scope of Services) and Exhibit B (Cost Information), NJ TRANSIT has provided an allowance for additional or supplemental work that has not yet been defined. This allowance is provided for the sole convenience of NJ TRANSIT and may only be used for work authorized by NJ TRANSIT.

All additional or supplemental work authorized under this provision will be incorporated into the Agreement by Change Order pursuant to Article 5, MODIFICATION OF AGREEMENT. The Change Order will describe the additional or supplemental work with any associated cost changes and will reduce the "AS DIRECTED TASK" allowance in the amount specified in the Change Order. Residual amounts remaining in the "AS DIRECTED TASK" allowance may be deleted from the Agreement by NJ TRANSIT at any time at NJ TRANSIT's sole discretion or at the completion of all work.

6. STATUS REPORTS: The Consultant shall submit to NJ TRANSIT a monthly or more frequently, at the discretion of NJ TRANSIT, a written status report outlining the status of the Project to date. Each status report shall be a concise narrative description of activities to date and planned activities for the coming month or other period and include, at a minimum: the period's accomplishments by deliverable and/or task; status of deliverables; work-in-progress; next steps; listings and status of documents/data requested; potential impacts to the scope of work, cost or schedule; items or issues identified; total weekly and cumulative hours by task, deliverable, and person; projected hours to complete each task/deliverable; and any other information NJ TRANSIT may require. A final report, one

(1) original and seven (7) copies, and one copy in an electronic format acceptable to NJ TRANSIT shall be submitted by the Consultant upon completion of the project.

7. REVIEWS: Until the completion of the Scope of Services by the Consultant and the final payment made by NJ TRANSIT, the Consultant shall allow representatives of NJ TRANSIT to visit the offices and other places of work of the Consultant periodically without prior notice to monitor the Consultant's work completed or in progress pursuant to this Agreement. NJ TRANSIT shall, within a reasonable time, review and act upon all documents submitted by the Consultant. Both parties agree that if either party deems it advisable to hold either a conference or any inspection of work in progress, all parties shall be notified and may participate.

8. ACCEPTANCE OF THE CONSULTANT'S WORK: All services and deliverables that the Consultant must provide and deliver to NJ TRANSIT as specified in Exhibit A (Scope of Services) shall be provided and delivered to the designated NJ TRANSIT Project Manager. The Project Manager shall examine and inspect the deliverables and shall have the right in his/her reasonable judgment to refuse to accept any services or deliverables if they do not meet the requirements of the Scope of Services. Such inspection does not relieve the Consultant of its liability regarding any deficiencies in the performance of the Scope of Services or deliverables, whether obvious or not. If any deliverables are not accepted, NJ TRANSIT may terminate this Agreement, in whole or in part, in accordance with Article 15, TERMINATION OF THE AGREEMENT FOR CAUSE.

9. OVERPAYMENTS: If at any point NJ TRANSIT determines that the Consultant has been overpaid, NJ TRANSIT shall notify the Consultant in writing of the overpayment. The Consultant shall repay the amount of overpayment to NJ TRANSIT within thirty (30) days of said notification including interest as applicable.

10. ASSIGNMENT, SUBCONTRACT AND DISPOSITION APPROVAL: The Consultant shall not sell, transfer or otherwise dispose of this Agreement or its interest therein to any other parties without the prior written consent of NJ TRANSIT. The Consultant shall not, without the prior written approval of NJ TRANSIT, assign or subcontract any of the Scope of Services under this Agreement. Neither shall any assignee or sub-Consultant, without the prior written approval of NJ TRANSIT, further assign or subcontract any of the work to be performed pursuant to this Agreement.

The terms of this Agreement shall be incorporated into and made part of any assignment or subcontract pursuant to this Agreement. As a condition of obtaining NJ TRANSIT's approval of any proposed assignee or sub-Consultant, the Consultant shall provide NJ TRANSIT with sufficient documentation regarding the proposed sub-Consultant or assignee for NJ TRANSIT's review and approval and shall provide to NJ TRANSIT a copy of the agreement established between the Consultant and its sub-Consultant or assignee. Any assignment or subcontract of work to be performed under this Agreement, entered into without prior written approval by NJ TRANSIT, shall be void and unenforceable unless NJ TRANSIT subsequently gives written approval or consent.

If the Consultant's assignee or sub-Consultant fails to perform in accordance with the terms of its assignment or subcontract, the Consultant shall complete or pay to have completed the work which the assignee or sub-Consultant failed to complete at no additional cost to NJ TRANSIT.

11. INDEMNIFICATION: The Consultant shall defend, indemnify and save harmless the State of New Jersey, NJ TRANSIT and its subsidiaries, and their officers, employees, servants and agents ("Indemnified Parties") from all suits, actions, demands or claims of any character including, but not limited to, expenditures and costs of investigations, hiring of witnesses, court costs, counsel fees, settlements, judgments or otherwise, brought because of any injuries or damage received or sustained by any person, persons, or property arising from the performance of the work in this Agreement by said Consultant or its sub-Consultants including, but not limited to, any act, omission, neglect, or misconduct of said Consultant or its sub-Consultant; or from any claims or amounts arising or recovered under the Worker's Compensation Act, or any other law, ordinance, order, or decree. So much of the money due the said Consultant under and by virtue of this Agreement as may be considered necessary by NJ TRANSIT for such purpose may be retained for the use of NJ TRANSIT; except that money due to the Consultant will not be withheld when the Consultant produces satisfactory evidence that it is adequately protected by the insurance coverages required in Article 12, INSURANCE. NJ TRANSIT shall, as soon as practicable after a claim has been made against it, give written notice thereof to the Consultant along with full and complete particulars of the claim. If the suit is brought against NJ TRANSIT, NJ TRANSIT shall promptly forward to the Consultant every claim, demand, complaint, notice, summons, pleading or other process received by NJ TRANSIT. NJ TRANSIT shall have the right, but not the obligation, to participate,

to the extent it deems appropriate, in the defense of the matter and must concur in the terms of any settlement or other voluntary disposition of the matter. In the defense of any such claims, demands, suits, actions and proceedings, the Consultant shall not raise or introduce, without the express written permission in advance of the Office of the Attorney General of the State of New Jersey, any defense involving in any way the immunity of NJ TRANSIT or the State of New Jersey, the jurisdiction of the tribunal over NJ TRANSIT or the State of New Jersey, or the provisions of any statutes respecting suits against NJ TRANSIT or the State of New Jersey.

The Consultant is an independent professional firm contracting with NJ TRANSIT to provide specialized services. The Consultant, its officers, partners, employees, agents and servants are not to be deemed employees, agents, extensions of staff or servants of NJ TRANSIT. The Consultant assumes full responsibility for liability arising out of its conduct and the conduct of its sub-Consultants whether by action or inaction. NJ TRANSIT assumes no liability or responsibility for the acts of the Consultant, its officers, partners, employees, agents, or servants, by virtue of entering into this Agreement.

12. INSURANCE: The Consultant agrees to carry and shall require its assignees and sub-Consultants, if any, to carry professional liability insurance of the type necessary to protect the Consultant from professional liability arising out of the negligent acts, errors or omissions of the Consultant in connection with the performance of the Consultant's services pursuant to this Agreement. Said insurance shall be in an amount not less than \$5,000,000 for any one claim and annual aggregate with a deductible not to exceed \$50,000 for any one claim, unless approved otherwise by NJ TRANSIT. The Consultant agrees to maintain this coverage for three (3) years after completion of this Agreement including any amendments thereto. There shall be no exclusions in coverage for the insured's interest in a joint venture or Limited Liability Company or Limited Liability Partnership. There shall be no exclusions in coverage for pollution, mold or asbestos. The policy shall include contractual liability coverage.

The Consultant agrees to carry, and shall require its assignees and sub-Consultants, if any, to carry, commercial general liability insurance using ISO Occurrence Form CG0001 10/93 or equivalent. The policy shall provide a minimum amount of \$5,000,000 each occurrence, \$5,000,000 personal and advertising injury, \$5,000,000 general aggregate and \$5,000,000 products completed

operations aggregate. Coverage provided under this liability policy shall be on an occurrence basis and shall include, but not be limited to, bodily injury and property damage coverage including products liability/completed operations coverage, premises operations liability, blanket contractual liability, personal injury liability, advertising injury coverage, independent contractors liability, mobile equipment, damage from explosion, collapse and underground hazards, and cross liability and severability of interests clause. Additional insured endorsement CG2026 11/85, CG 2010 11/85 or CG 2010 10/93 (but only if modified to include both ongoing and completed operations) naming NJ TRANSIT and the Indemnified Parties and coverage must apply on a primary and non-contributory basis. The policy shall allow the Consultant to waive its and its insurer's rights of subrogation. There shall be no coverage exceptions for property containing or adjacent to railroad facilities or other transportation facilities. The Consultant shall furnish completed operations insurance written to the limits stipulated herein for Commercial General Liability Insurance. Coverage shall be required and maintained in force for a minimum of three (3) years following acceptance of the overall Contract, regardless of any beneficial occupancy by NJ TRANSIT during the Contract term.

The Consultant agrees to carry, and shall require its assignees and sub-Consultants, if any, to carry automobile liability insurance applicable to all owned, non-owned, hired or leased vehicle with a minimum of \$1,000,000 combined single limit for bodily injury and property damage. With respect to said insurance, NJ TRANSIT and the Indemnified Parties shall be named as an additional insured at no additional cost to NJ TRANSIT.

The Consultant shall take out, secure and maintain during the term of this Agreement and shall require its assignees and sub-Consultants, if any, to secure and maintain during the term of this Agreement, a policy of workers' compensation insurance in compliance with the laws of the state where the work is to be performed. In case any class of employees on the project under this Agreement is not protected under the Worker's Compensation Statute, the Consultant shall provide and shall cause each sub-Consultant to provide employer's liability insurance for the protection of each of its employees as are not otherwise protected. Limits of Employer Liability are as follows: Employer's Liability: \$1,000,000 each accident / \$1,000,000 each employee disease / \$1,000,000 policy limit – disease.

The Consultant agrees to carry, and shall require its assignees and sub-Consultants, if any, to carry, contractor's pollution liability insurance covering the liability arising out of any sudden and/or non-sudden pollution or impairment of the environment, including clean-up and disposal costs and defense that arise from the operation of Consultant or its sub-Consultants. Coverage under this policy shall have limits of liability with a minimum of \$2,000,000 per occurrence. Transport of any hazardous waste generated under this Agreement shall require Hazardous Waste Haulers Insurance (MCS90) in an amount of \$2,000,000 per occurrence or statutory minimum, whichever is greater. This policy shall name NJ TRANSIT and the Indemnified Parties as additional insured at no cost to NJ TRANSIT.

Should it be required, NJ TRANSIT will provide Railroad Protective Comprehensive General Liability Insurance coverage for this Agreement.

All policies are to be written by insurance companies authorized to do business in New Jersey with an A.M. Best and Company rating of "A-" or better (or equivalent rating). All policies shall contain an endorsement that if the policy is canceled, non-renewed or is subject to any material reduction in limits, the Insurer will provide written notice to NJ TRANSIT at least thirty (30) days prior to the occurrence of such event in accordance with Article 33, NOTIFICATION with a copy to NJ TRANSIT's Senior Director of Risk Management as follows:

NJ TRANSIT
One Penn Plaza East
Newark, New Jersey 07105-2246
Attn: Ms. Lisa A. Gatchell
Senior Director, Risk Management

The foregoing insurance coverage is not intended to nor does it limit the liability of the Consultant to hold the Indemnified Parties harmless.

The Consultant shall provide NJ TRANSIT with evidence of the Consultant's insurance. Said insurance shall be maintained in full force and effect by the Consultant, sub-Consultant and assignee, if any, from the effective date of this Agreement until completion of and final payment for the Scope of Services. If the Consultant (sub-Consultant or assignee) shall fail or refuse to renew its insurance, as necessary, NJ TRANSIT may cancel or refuse to make payment of any further monies due under this Agreement. In lieu of requiring its assignees or sub-Consultants to carry this coverage, the Consultant may elect to cover them under its policies of insurance.

13. AUDIT AND INSPECTION OF RECORDS: The Consultant shall retain all records, data, documents, reports, payroll, and material relating to the Agreement and Scope of Services (collectively, "Records") from the effective date hereof through and until the expiration of five (5) years after completion of and final payment for the Scope of Services. The Consultant shall permit authorized representatives of NJ TRANSIT and, pursuant to N.J.S.A. 52:15C-14(d), the Office of the State Comptroller, upon request, to inspect, audit, and photocopy all Records of it and its sub-Consultants and assignees, if any..

NJ TRANSIT shall have the right to inspect all services hereunder and specifically reserves the right to conduct on-site visits and perform financial audits and operational reviews. Any inspection, audit or review or lack thereof shall not relieve the Consultant of responsibility for satisfactory performance of the Scope of Services. Consultant shall maintain a true and correct set of Records for all charges and in sufficient detail to permit reasonable verification or correction of charges and performance in accordance with this Agreement.

Any such audit shall be conducted at Consultant's principal place of business during Consultant's normal business hours and at NJ TRANSIT's expense, provided all costs incurred by NJ TRANSIT in conducting any such audit shall be reimbursed by Consultant in the event such audit reveals an aggregate discrepancy in any invoice or cumulative invoice not previously audited by NJ TRANSIT of more than two percent (2%) of the final total costs and fees for the period under audit as determined by NJ TRANSIT.

The Consultant further agrees to include in all its subcontracts hereunder a provision whereby sub-Consultant agrees that it will keep all Records until the expiration of (5) years after final payment under the subcontract, and that the authorized representatives of NJ TRANSIT and the Office of State Comptroller shall, have access to and the right to inspect, audit and photocopy all Records related to the sub-Consultant's performance and costs under the subcontract.

Documents of every nature prepared pursuant to this Agreement shall be available to and become the property of NJ TRANSIT, and basic notes and other pertinent data shall be made available to NJ TRANSIT upon request without restriction as to their future use. Such documents shall be provided or made available within thirty (30) days of NJ TRANSIT's request.

The periods of access and examination described above, for Records which relate to: (1) appeals under Article 34, DISPUTES; (2) litigation or the settlement of claims arising out of the performance of this Agreement; or (3) costs and expenses of this Agreement as to which exception has been taken by NJ TRANSIT or the Office of State Comptroller or any of their authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

14. TERMINATION OF THE AGREEMENT FOR CONVENIENCE: NJ TRANSIT may terminate the Consultant's services in whole or in part for any reason at any time before completion. In that event, the Consultant shall be given written notice by the Contracting Officer of such termination specifying the effective date thereof. Compensation shall be paid to the Consultant pursuant to the terms of Article 2, COMPENSATION for the work actually performed prior to such date. All documents begun or completed by the Consultant pursuant to this Agreement shall become the property of NJ TRANSIT. After receipt of such written notice, the Consultant shall not incur any new obligations without the prior written approval of the Contracting Officer and shall cancel as many outstanding obligations so related as possible. NJ TRANSIT will evaluate each obligation deemed non-cancellable by the Consultant in order to determine its eligibility for inclusion in compensable costs. No damages of any nature shall be claimed against NJ TRANSIT in the event it exercises this right of termination.

15. TERMINATION OF THE AGREEMENT FOR CAUSE: NJ TRANSIT may terminate this Agreement in whole or in part at any time if the Consultant has materially failed to comply with terms of the Agreement. In the event of such failure, NJ TRANSIT shall promptly give written notification to the Consultant of its intent to terminate and the reasons therefor. The Consultant shall have ten (10) days, or such additional time as NJ TRANSIT may grant, after receipt of notice to cure its failure. If the failure is not cured to the satisfaction of NJ TRANSIT, NJ TRANSIT may terminate this Agreement (in whole or in part) effective immediately.

After receipt of notice of termination, the Consultant shall not incur any new obligations without the approval of NJ TRANSIT and shall cancel as many outstanding obligations as possible. NJ TRANSIT will evaluate each obligation deemed non-cancelable by the Consultant in order to determine its eligibility for inclusion in compensable costs. Compensation shall be made for Scope of

Services identified in Exhibit A (Scope of Services) pursuant to the terms of this Agreement for work actually performed, completed and approved by NJ TRANSIT prior to the date of termination.

If this Agreement or any part thereof is terminated for cause, NJ TRANSIT may procure services similar to those so terminated. The Consultant shall be liable to NJ TRANSIT for any reasonable excess costs incurred for such similar services.

No damages of any nature shall be claimed against NJ TRANSIT in the event it exercises this right of termination. The rights and remedies available to NJ TRANSIT in this Article shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Agreement.

If, after notice of termination of this Agreement under the provisions of this Article, it is determined for any reason that the Consultant was not in default under the provisions of this Article, or that the default was excusable under the provisions of this Article, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to Article 14, TERMINATION FOR CONVENIENCE.

16. BUSINESS REGISTRATION NOTICE: In accordance with N.J.S.A. 52:32-44, all New Jersey and out of State business organizations must obtain a Business Registration Certificate (BRC) from the Department of the Treasury, Division of Revenue. It is requested that proof of valid business registration be submitted by a proposer with its proposal. Failure to submit such valid business registration with a proposal will not render the proposal materially non-responsive. If not submitted with the proposal, the Business Registration Certificate (BRC) must be submitted prior to award of an Agreement. The certificate must be valid at time of award. The Business Registration Certificate (BRC) form (Form NJ-REG) can be found online at <http://www.state.nj.us/treasury/revenue/gettingregistered.shtml>.

No contract with a Sub-Consultant shall be entered into by any Consultant unless the sub-Consultant first provides proof of valid business registration. The Consultant shall maintain a list of the names of any sub-Consultants and their current addresses, updated as necessary during the course of the contract performance and the Consultant shall submit the complete and accurate list to NJ TRANSIT before final payment is made for services rendered under the Agreement.

The Consultant and any Sub-Consultant performing services under the Agreement, and each of their affiliates, shall, during the term of the contract, collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act, P.L. 1966, c. 30 (N.J.S.A. 54:32B-1 et seq.) on all their sales of tangible personal property delivered into the State.

17. SOURCE DISCLOSURE:

A. Under N.J.S.A. 52:34-13.2, all contracts primarily for services awarded by NJ TRANSIT shall be performed within the United States, except when the Contracting Officer certifies in writing a finding that a required service cannot be provided by a Consultant or sub-Consultant within the United States and the certification is approved by the Executive Director of NJ TRANSIT.

All Consultants seeking a contract primarily for services with NJ TRANSIT must disclose the location, by country, where services under the contract, including subcontracted services, will be performed.

If any of the services cannot be performed within the United States, the Consultant shall state with specificity the reasons why the services cannot be so performed. NJ TRANSIT's Contracting Officer shall determine whether sufficient justification has been provided by the proposer to form the basis of his certification that the services cannot be performed in the United States and whether to seek the approval of the Executive Director.

B. Breach of Contract for Shift of Services outside the United States

If, during the term of the Agreement, the Consultant or sub-Consultant, who had on contract award declared that services would be performed in the United States, proceeds to shift the performance of the services outside the United States, the Consultant shall be deemed to be in breach of the Agreement, which shall be subject to termination for cause pursuant to Article 15, TERMINATION OF THE AGREEMENT FOR CAUSE, unless previously approved by NJ TRANSIT.

18. USE OF BRAND NAME PRODUCTS IN DESIGN: Consultants engaged to prepare specifications or to perform design work, or both, for NJ TRANSIT shall prepare such specifications to encourage full and open competition. A situation considered to be restrictive of competition involves specifying only a "brand name" product instead of allowing "an equal" product to be offered and listing the

products' salient characteristics. Accordingly, Consultants engaged in preparing specifications or performing design work for NJ TRANSIT are required to include the salient characteristics of a product when it is identified by "brand name" and allow for an equivalent. Consultants may define salient characteristics by using language similar to the following:

- (a) 'Original Equipment Manufacturer (OEM) part #123 or approved equal that complies with the original equipment manufacturer's requirements or specifications and will not compromise any OEM warranties'; or
- (b) 'Original Equipment Manufacturer part #123 or approved equal that is appropriate for use with and fits properly in [describe the bus, engine, or other].

19. PATENT RIGHTS AND RIGHTS IN DATA:

A.) Rights in Data

1.) The term "subject data" as used herein means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under this Agreement. The term includes graphic or pictorial delineations in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards; magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to, computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term does not include financial reports, cost analyses, and similar information incidental to contract administration.

2.) All "subject data" first produced in the performance of this Agreement shall be the sole property of NJ TRANSIT. The Consultant agrees not to assert any rights at common law or equity and not to establish any claim to statutory copyright in such data. Except for its own internal use, the Consultant shall not publish or reproduce such data in whole or in part, or in any manner or form, nor authorize others to do so, without the written consent of NJ TRANSIT until such time as NJ TRANSIT may have released such data to the public.

3.) The Consultant agrees to grant and does hereby grant to NJ TRANSIT and to its officers, agents, and employees acting within the scope of their official duties, a royalty-free, nonexclusive, and irrevocable license throughout the world:

a.) To publish, translate, reproduce, deliver, perform, use, and dispose of, in any manner, any and all data not first produced or composed in the performance of this Agreement, but which is incorporated in the work furnished under this Agreement; and

b.) To authorize others so to do.

4.) The Consultant shall indemnify and save and hold harmless NJ TRANSIT, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Consultant of proprietary rights, copyrights, or rights of privacy, arising out of the publication, translation, reproduction, delivery, performance, use, or disposition of any data furnished under this Agreement.

5.) Nothing contained in this Article shall imply a license to NJ TRANSIT under any patent or be construed as affecting the scope of any license or other right otherwise granted to NJ TRANSIT under any patent.

6.) Paragraphs 3 and 4, above, are not applicable to material furnished to the Consultant by NJ TRANSIT and incorporated in the work furnished under the Agreement; provided that such incorporated material is identified by the Consultant at the time of delivery of such work.

7.) In the event that the project, which is the subject of this Agreement, is not completed, for any reason whatsoever, all data generated under this Agreement shall become subject data as defined in this clause and shall be delivered as NJ TRANSIT may direct.

B.) Patent Rights

1.) If any invention, improvement, or discovery of the Consultant is conceived or first actually reduced to practice in the course of or under this Agreement, which invention, improvement or discovery may be patentable under the laws of the United States of America or any foreign country, the Consultant shall immediately notify NJ TRANSIT.

2.) The rights and responsibilities of NJ TRANSIT and the Consultant with respect to such invention, improvement, or discovery will be determined in accordance with applicable Federal laws, regulations, policies and any waiver thereof.

20. PUBLICATION AND PUBLICITY: The Consultant, its sub-Consultants, assignees, employees or agents shall not release or publish any information or material generated from this project to others outside of NJ TRANSIT without the express written permission of NJ TRANSIT except as specified in the Scope of Services.

21. EQUAL EMPLOYMENT OPPORTUNITY: The parties to this Agreement do hereby agree that the provisions of N.J.S.A. 10:5-31 et seq. (P.L. 1975, c.127) set forth in the State of New Jersey Equal Employment Opportunity Provisions for Professional Service Contracts, annexed hereto, are hereby made a part of this Agreement as Exhibit D.

In accordance with the provisions of N.J.S.A. 10:2-1 through 10:2-4 as amended and supplemented and the rules and regulations promulgated pursuant thereto, the Consultant agrees that:

- a. In the hiring of persons for the performance of work under this Agreement or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this Agreement, no Consultant, nor any person acting on behalf of such Consultant or sub-Consultant, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation, or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;
- b. No Consultant, sub-Consultant, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this Agreement or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such Agreement, on account of age, race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation, disability, nationality, or sex;

- c. There may be deducted from the amount payable to the Consultant by the contracting public agency, under this Agreement, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the Agreement; and
- d. This Agreement may be canceled or terminated by the contracting public agency and all money due or to become due hereunder may be forfeited, for any violation of this Article of the Agreement occurring after notice to the Consultant from the contracting public agency of any prior violation of this Article of the Consultant.

22. EQUAL OPPORTUNITY FOR INDIVIDUALS WITH DISABILITIES: The Consultant and NJ TRANSIT agree that the provisions of Title II of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. 12101 et seq.), which prohibit discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated thereto, are made a part of this Agreement. In providing any aid, benefit, or service on behalf of NJ TRANSIT pursuant to this Agreement, the Consultant agrees that the performance shall be in strict compliance with the Act. In the event that the Consultant, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this Agreement, the Consultant shall defend NJ TRANSIT and the State of New Jersey in any action or administrative proceeding commenced pursuant to this Act. The Consultant shall indemnify, protect, and save harmless NJ TRANSIT and the State, their agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The Consultant shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. If any action or administrative proceeding results in an award of damages against NJ TRANSIT or the State or if NJ TRANSIT or the State incur any expense to cure a violation of the ADA, the Consultant shall satisfy and discharge the same at its own expense.

NJ TRANSIT shall, as soon as practicable after a claim has been made against it, give written notice thereof to the Consultant along with full and complete particulars of the claim. If any action

or administrative proceeding is brought against NJ TRANSIT or any of its agents, servants, and employees, NJ TRANSIT shall expeditiously forward to the Consultant every demand, complaint, notice, summons, pleading, or other process received by it or its representatives.

It is expressly agreed and understood that any approval by NJ TRANSIT of the services provided by the Consultant pursuant to this Agreement will not relieve the Consultant of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless NJ TRANSIT pursuant to this paragraph.

The Consultant expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the Contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the Consultant from any liability, nor preclude NJ TRANSIT from taking any other actions available to it under any other provisions of this Agreement or otherwise at law.

23. DISADVANTAGED BUSINESS ENTERPRISES: Disadvantaged Business Enterprises, as defined in 49 CFR Part 26, shall have the maximum opportunity to participate in the performance of this Agreement and any subcontract under it. NJ TRANSIT and the Consultant shall take all necessary and reasonable steps, in accordance with 49 CFR Part 26 and the provisions set forth in Exhibit E, annexed hereto, to ensure that Disadvantaged Businesses have equal opportunity to participate. Failure by the Consultant to carry out the requirements of this Article shall be deemed a material breach of this Agreement.

24. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAW: The Consultant shall comply with applicable laws, ordinances, and codes of the United States, the State of New Jersey and local governments within the State. If NJ TRANSIT determines that the Consultant has violated or failed to comply with applicable federal, state or local laws with respect to its performance under this Agreement, NJ TRANSIT may withhold payments for such performance and take such other action that it deems appropriate under the circumstances until compliance or remedial action has been accomplished by the Consultant to the satisfaction of NJ TRANSIT. The Consultant acknowledges that federal requirements may change and the changed requirements will apply to the project as required, unless the Federal Government determines otherwise.

25. CONFLICT OF INTEREST: In the event that the Consultant deems that any work currently being performed by it on other projects or any work to be performed on future projects is in conflict directly or indirectly with this Agreement, the Consultant shall immediately so notify NJ TRANSIT. NJ TRANSIT, in its sole discretion, shall have the right to terminate this Agreement in accordance with Article 14, TERMINATION OF THE AGREEMENT FOR CONVENIENCE hereof.

26. CONSULTANT'S EMPLOYEES: All personnel employed on this project and their daily rates shall be approved in writing by NJ TRANSIT prior to assignment to this project and, in addition, any employee of the Consultant or its sub-Consultants declared undesirable by NJ TRANSIT shall be relieved of any work under this Agreement.

The Consultant must receive NJ TRANSIT's prior written approval of any change in the project organization/manpower and sub-Consultant project team approved for this project.

27. PROHIBITED INTEREST: No member, officer, or employee of NJ TRANSIT or its subsidiaries shall have any interest, direct or indirect, in this Agreement or the proceeds thereof. No former member, officer or employee of NJ TRANSIT or its subsidiaries who, during his tenure, had a direct, substantial involvement with matters that are closely related to this Agreement, shall have any interest, direct or indirect, in this Agreement or the proceeds thereof.

28. INTERESTS OF MEMBERS OF OR DELEGATES TO CONGRESS: No member of or delegate to the Congress of the United States shall be admitted to any share or part of this Agreement or to any benefit arising therefrom.

29. NJ TRANSIT CODE OF ETHICS FOR CONSULTANTS:

A.) The Consultant shall not employ any NJ TRANSIT officer or employee in the business of the Consultant or in professional activity in which the Consultant is involved with the NJ TRANSIT officer or employee.

The Consultant shall not offer or provide any interest, financial or otherwise, direct or indirect, to any NJ TRANSIT officer or employee, in the business of the Consultant or professional activity in which the Consultant is involved with the NJ TRANSIT officer or employee.

The Consultant shall not cause or influence, or attempt to cause or influence, any NJ TRANSIT officer or employee to act in his or her official capacity in any manner which might tend to impair the objectivity or independence of judgment of that NJ TRANSIT officer or employee.

The Consultant shall not cause or influence, or attempt to cause or influence, any NJ TRANSIT officer or employee to use or attempt to use his or her official position to secure any unwarranted privileges or advantages for that Consultant or any other person.

The Consultant shall not offer any NJ TRANSIT officer or employee any gift, favor, service or other thing of value under circumstances from which it might be reasonably inferred that such gift, service or other thing of value was given or offered for the purpose of influencing the recipient in the discharge of his or her official duties. In addition, employees or officers of NJ TRANSIT will not be permitted to accept breakfasts, lunches, dinners, alcoholic beverages, tickets to entertainment and/or sporting events, or any other item which could be construed as having more than nominal value.

B.) In accordance with N.J.A.C. 16:72-4.1, the Consultant may be suspended and/or debarred if the Consultant:

1.) Makes any offer or agreement to pay or to make payment of, either directly or indirectly, any fee, commission, compensation, gift, gratuity, or other thing of value of any kind to any NJ TRANSIT Board member, officer, or employee or to any member of the immediate family of such Board member, officer, or employee, or any partnership, firm, or corporation with which they are employed or associated, or in which such Board member, officer, or employee has an interest within the meaning of N.J.S.A. 52:13D-13g;

2.) Fails to report to the Attorney General and to the Executive Commission on Ethical Standards in writing forthwith the solicitation of any fee, commission, compensation, gift, gratuity or other thing of value by any NJ TRANSIT Board member, officer, or employee;

3.) Undertakes, directly or indirectly, any private business, commercial, or entrepreneurial relationship with, whether or not pursuant to employment, contract or other agreement, express or implied, or sale, directly or indirectly of any interest in such Consultant to, any NJ TRANSIT Board member, officer, or employee having any duties or responsibilities in connection with the purchase, acquisition, or sale of any property or services by or to NJ TRANSIT, or with any person, firm, or entity

with which he is employed or associated or in which he has an interest within the meaning of N.J.S.A. 52:13D-13g. Any relationship subject to this provision shall be reported in writing forthwith to the Executive Commission on Ethical Standards, which may grant a waiver of this restriction upon application of the NJ TRANSIT Board member, officer, or employee upon a finding that the present or proposed relationship does not present the potential, actuality, or appearance of a conflict of interest;

4.) Influences or attempts to influence or causes to be influenced, any NJ TRANSIT Board member, officer, or employee in his official capacity in any manner which might tend to impair the objectivity or independence of judgment of such Board member, officer, or employee; or

5.) Causes or influences or attempts to cause or influence, any NJ TRANSIT Board member, officer, or employee to use, or attempt to use, his official position to secure unwarranted privileges or advantages for the Consultant or any other person.

30. POLITICAL ACTIVITY PROHIBITED: None of the funds or services contributed by NJ TRANSIT or the Consultant under this Agreement shall be used for any partisan political activity, or to further the election or defeat of any candidate for public office.

31. NONSOLICITATION: The Consultant warrants that it has not retained any party other than a bona fide employee working for the Consultant to solicit this Agreement, and that it has not paid or agreed to pay any outside party consideration in any form contingent upon securing this Agreement. For breach of this warranty, NJ TRANSIT shall have the right to terminate this Agreement for cause.

32. MERGER AND SEVERABILITY: This Agreement embodies the entire agreement between the parties. If any provision herein is held invalid, it shall be considered deleted herefrom and shall not invalidate the remaining provisions hereof.

33. NOTIFICATION: Any request, demand, authorization, direction, notice, consent, waiver or other document provided or permitted by this Agreement to be made upon, given or furnished to, or filed with one party by another party shall be in writing and shall be delivered by hand or by deposit in the mails of the United States, postage paid, in an envelope addressed as follows:

If to NJ TRANSIT:

Mr. James Schworn
Chief of Procurement & Support Services
NJ TRANSIT
One Penn Plaza East
Newark, New Jersey 07105-2246
Attn: Thomas J. Fusco
Principal Contract Specialist

With a copy to:

NJ TRANSIT
One Penn Plaza East
Newark, New Jersey 07105-2246
Attn: Nick Marton
Senior Director, NJ TRANSITGrid

If to the Consultant:

Attn: _____

Either party to the Agreement may redesignate the recipient or change the address of the recipient of notifications hereunder by notifying the other party to this Agreement, in writing, of such change.

34. DISPUTES: Disputes arising in the performance of this Agreement which are not resolved by agreement of the parties will be decided in writing by the authorized representative of the Contracting Officer. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, the Consultant mails or otherwise furnishes a written appeal to the Contracting Officer. In connection with any such appeal, the Consultant shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the Contracting Officer shall be binding upon the Consultant and the Consultant shall abide by the decision. The New Jersey Contractual Liability Act, N.J.S.A. 59:13-1 et seq., shall govern any action which may be brought by the Consultant as a result of NJ TRANSIT's decision.

35. OUT OF STATE CORPORATIONS: If the Consultant is a corporation organized under laws of a state other than New Jersey, the Consultant shall have a certificate of authority to do business in New Jersey in accordance with N.J.S.A. 14A:13-3. In addition, pursuant to N.J.S.A. 14A:4-1 et seq., the Consultant shall maintain a registered office in New Jersey, have a registered agent with a

business office in New Jersey and shall file with the Secretary of State the name of said agent and address of said office and provide a copy thereof to NJ TRANSIT.

Inquiries should be directed to:

State of New Jersey
Department of State
Division of Commercial Recording
CN-308
Trenton, New Jersey 08625
www.state.nj.us/njbgs

36. SUCCESSORS: This Agreement shall bind the heirs, representatives, successors, and assignees of the Consultant.

37. GOVERNING LAW: The Agreement shall be governed by and interpreted pursuant to the laws of the State of New Jersey.

38. QUALITY ASSURANCE PLAN: The Consultant shall perform all work according to the highest standards of professional care. The Consultant shall establish and maintain a Quality Assurance Plan, subject to NJ TRANSIT's approval, setting forth the Consultant's policy for quality assurance and procedures for implementing that policy. Such plan must apply to all persons engaged in work under this Agreement, include regular and written procedures for performance of all Project activities, and provide sufficient information to senior managers to enable effective supervision of the Project. The procedures shall provide for sufficient documentation to allow review and audit by NJ TRANSIT, and NJ TRANSIT may, in its discretion, review the Consultant's implementation of the procedures.

39. PROJECT SUPERVISION: If engineering, design, architectural or surveying services are provided under this Agreement, the Consultant shall assign an engineer or architect authorized to practice in the State of New Jersey to supervise the Scope of Services. The design and engineering services for this project shall be performed and/or approved by a Professional Engineer or Registered Architect licensed to practice in the State of New Jersey.

The Consultant shall exercise all due care in the preparation of contract documents for construction to ensure that they conform to all applicable legal and other requirements in effect at the time of issuance of the contract documents. The approval of plans and specifications which have been

submitted to NJ TRANSIT is not to be construed as authority to violate, cancel or set aside any provisions of such requirements or this Agreement. Nothing contained in this Agreement is intended to relieve the Consultant of responsibility for maintaining adequate supervision over the design in order to guard against deficiencies in the design work.

The Consultant shall be liable to NJ TRANSIT for any reasonable costs incurred by NJ TRANSIT to correct, modify or redesign any drawings submitted by the Consultant that are found to be defective or not in accordance with the provisions of this Agreement as a result of any act, error or omission on the part of the Consultant, or its agents, servants or employees. The Consultant shall be given reasonable opportunity to correct any deficiencies at no additional cost to NJ TRANSIT.

The Consultant shall also be liable to NJ TRANSIT for any reasonable costs incurred to correct, modify or reconstruct contractor work which was done based on any drawings submitted by the Consultant that are found to be defective or not in accordance with the provisions of this Agreement as a result of any act, error or omission on the part of the Consultant, or its agents, servants or employees. The Consultant shall be given reasonable opportunity to correct any deficiencies at no additional cost to NJ TRANSIT.

40. HISTORIC PRESERVATION: The Consultant shall submit to NJ TRANSIT, pursuant to this Agreement, a final design which meets the "Standards for Rehabilitation" established and published by the United States Department of the Interior at 36 CFR Part 67, which standards are applied by the Commissioner of Environmental Protection in the statutory review, required by N.J.S.A. 13:1B-15.131, of projects which will encroach upon a site included in the New Jersey Register of Historic Places. In the event that the final design for the Project is submitted for review pursuant to N.J.S.A. 13:1B-15.131 and is not approved or is approved with conditions by the Commissioner of Environmental Protection, for reasons that the final design does not meet said standards, the Consultant shall correct or modify said design immediately upon notification of non-approval, or shall reimburse NJ TRANSIT for any reasonable costs incurred by NJ TRANSIT to correct or modify the design, so that it may be approved by the Commissioner of Environmental Protection.

41. FALSE OR FRAUDULENT STATEMENTS AND CLAIMS:

A.) The Consultant recognizes that the requirements of the Program Fraud Civil Remedies Act of 1986, as amended, 31 USC § 3801 et seq. and USDOT regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions pertaining to the project. Accordingly, by signing the Agreement, the Consultant certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, or it may make pertaining to the Agreement. In addition to other penalties that may be applicable, the Consultant also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986, as amended, on the Consultant to the extent the Federal Government deems appropriate.

B.) The Consultant also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government in connection with an urbanized area formula project financed with Federal Assistance authorized by 49 USC § 5307, the Government reserves the right to impose on the Consultant the penalties of 18 USC § 1001 and 49 USC § 5307(n)(1), to the extent the Federal Government deems appropriate.

42. NO FEDERAL GOVERNMENT OBLIGATIONS TO THIRD PARTIES: The Consultant agrees that, absent the Federal Government's express written consent, the Federal Government shall not be subject to any obligations or liabilities to any subrecipient, any third party contractor, or any other person not a party to the contract in connection with the performance of the project. Notwithstanding any concurrence provided by the Federal Government in or approval of any solicitation, subagreement, or third party contract, the Federal Government continues to have no obligations or liabilities to any party, including the subrecipient and third party contractor.

43. EXCLUSIONARY OR DISCRIMINATORY SPECIFICATIONS: Apart from inconsistent requirements imposed by Federal statute or regulations, the Consultant agrees that it will comply with the requirements of 49 USC § 5323(h)(2) by refraining from using any Federal Assistance awarded by FTA to support procurements using exclusionary or discriminatory specifications.

44. CLEAN WATER AND CLEAN AIR ACTS: If this Agreement shall be in an amount greater than \$100,000, the Consultant shall comply with Section 306 of the Clean Air Act (42 USC 1857(h)), Section 508 of the Clean Water Act (33 USC 1368), Executive Order 11738,

Environmental Protection Agency Regulations (40 CFR Part 15), and any other applicable standard, order or requirement issued pursuant to Federal statute or regulation. The Consultant shall report violations to NJ TRANSIT, FTA and to the USEPA Assistant Administrator for Enforcement.

45. ENERGY CONSERVATION: The Consultant shall comply with mandatory standards and policies relating to energy efficiency contained in applicable State of New Jersey Energy Conservation Plans issued in compliance with the Energy Policy and Conservation Act (42 USC 6321 et seq.).

46. CIVIL RIGHTS: During the performance of this Contract, the Consultant, for itself, its assignees and successors in interest and its sub-Consultant at every tier (hereinafter referred to as the "Consultant") agrees as follows:

(a) Compliance with Regulations

The Consultant shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the United States Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.

(b) Nondiscrimination

In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Consultant agrees that it will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, age, or disability. In addition, the Consultant agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(c) Equal Employment Opportunity

The following equal employment opportunity requirements apply to the underlying contract:

(1) Race, Color, Religion, National Origin, Sex

In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Consultant agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq ., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect activities undertaken in the course of the Project. The Consultant agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, national origin, sex, sexual orientation, gender identity, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Consultant agrees to comply with any implementing requirements FTA may issue.

(2) Age

In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and Federal transit law at 49 U.S.C. § 5332, the Consultant agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Consultant agrees to comply with any implementing requirements FTA may issue.

(3) Disabilities

In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Consultant agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Consultant agrees to comply with any implementing requirements FTA may issue.

(d) The Consultant also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

(e) Information and Reports

The Consultant shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or NJ TRANSIT or the FTA to be pertinent to ascertain compliance with such Regulations, orders and instruction. Where any information is required or a Consultant is in the exclusive possession of another who fails or refuses to furnish this information, the Consultant shall so certify to NJ TRANSIT, or the FTA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(f) Sanctions for Noncompliance

In the event of the Consultant's noncompliance with the nondiscrimination provisions of this Contract, NJ TRANSIT shall impose such contract sanctions as it or the FTA may determine to be appropriate, including but not limited to:

(1) Withholding of payments to the Consultant under the Contract until the Consultant complies; and/or

(2) Cancellation, termination or suspension of the Contract, in whole or in part.

47. CONTRACT WORK HOURS AND SAFETY STANDARDS: During the performance of this Agreement, the Consultant, for itself, its assignees and successors in interest (hereinafter referred to as the "Consultant") agrees as follows:

A.) Overtime Requirements: No Consultant or sub-Consultant contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any work week in which he or she is employed on such work to work in excess of forty hours in such work week unless such laborer or mechanic receives compensation at rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such work week, whichever is greater.

B.) Violation; Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in subparagraph (b)(1) of 29 CFR Section 5.5, the Consultant and any sub-Consultant responsible therefore shall be liable for the unpaid wages. In addition, such Consultant and sub-Consultant shall be liable to the United States (in case the work done under contract for the District of Columbia or a territory, to such district or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (b)(1) of 29 CFR Section 5.5 in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of eight hours or in excess of the standard work week of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (b)(1) of 29 CFR Section 5.5.

C.) Withholding for Unpaid Wages and Liquidated Damages: NJ TRANSIT shall upon its own action or upon written request of an authorized representative of the U.S. Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the Consultant or sub-Consultant under any such contract or any other Federal contract with the same prime Consultant, or any other Federally-assigned contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Consultant, such sums as may be determined to be necessary to satisfy any liabilities of such Consultant or sub-Consultant for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (B)(2) of 29 CFR Section 5.5.

D.) Nonconstruction Grants: The Consultant or sub-Consultant shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three (3) years from the completion of the Agreement for all laborers and mechanics, including guards and watchmen, working on the Agreement. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. These records shall be made available by the Consultant or sub-Consultant for inspection, copying, or transcription by authorized representatives of NJ TRANSIT, the FTA and the Department of Labor, and the Consultant or sub-Consultant will permit such representatives to interview employees during working hours on the job.

E.) Subcontracts: The Consultant or sub-Consultant shall insert in any subcontracts the clauses set forth in Paragraphs A through E of this Section and also a clause requiring the sub-Consultants to include these clauses in any lower tier subcontracts. The prime Consultant shall be responsible for compliance by any sub-Consultant or lower tier sub-Consultant with the clauses set forth in Paragraphs A through E of this Section.

48. CERTIFICATIONS REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTION

By signing this agreement, the lower tier participant, defined as the Consultant and its sub-Consultants, is providing the certification set out below.

The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, NJ TRANSIT may pursue available remedies, including suspension and/or debarment.

The lower tier participant shall provide immediate written notice to NJ TRANSIT if at any time the lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

Certain terms used in this clause have the meanings set out in 2 CFR Part 1200 and 2 CFR Part 180.

The lower tier participant agrees by signing this agreement that it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized in writing by NJ TRANSIT.

The lower tier participant further agrees by signing this agreement that it will include the clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transaction”, without modification, in all lower tier covered transactions (valued at \$25,000 or more) and in all solicitations for lower tier covered transactions.

A participant in a covered transaction may rely upon a certification of a participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from

the covered transaction, unless it knows that the certification is erroneous. Each participant shall check the U.S. Government System for Award Management (SAM) database.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

Except for transactions authorized under the fifth paragraph above, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to all remedies available to the Federal Government, NJ TRANSIT may pursue available remedies including suspension and/or debarment.

The lower tier participant certifies by signing this agreement that neither it nor its "principals" (as defined 2 CFR 180.995) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. A participant may decide the method and frequency by which it determines the eligibility of its principals.

When the lower tier participant is unable to certify to the statements in this certification, such participant shall submit a written explanation.

The lower tier participant shall also be currently registered and active with no exclusion on the U.S. Government System for Award Management (SAM) database.

49. LIMITATIONS ON LOBBYING: The Consultant and its sub-Consultants shall comply with 31 USC 1352, entitled "Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions".

A.) No appropriated funds may be expended by the recipient of a Federal contract, grant, loan or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the

entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan or cooperative agreement.

B.) Any Consultant and any sub-Consultant at any tier who requests or receives a Federally-assisted contract or subcontract in excess of \$100,000 from NJ TRANSIT shall file with NJ TRANSIT the certification attached to this Agreement and entitled "Certification for Contracts, Grants, Loans and Cooperative Agreements" which certifies that the Consultant or sub-Consultant, as applicable, has not made, and will not make, any payment prohibited by paragraph A.) of this Article.

C.) Any Consultant and any sub-Consultant who has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action) which would be prohibited under paragraph A.) of this Article if paid for with appropriated funds, shall file with NJ TRANSIT a disclosure form entitled "Disclosure of Lobbying Activities", which is available from NJ TRANSIT.

D.) Any certification or disclosure form filed under paragraphs B.) and C.) of this Article shall be forwarded from tier to tier until received by NJ TRANSIT. Any certification or disclosure form shall be treated as a material representation of fact upon which all receiving tiers shall rely. All liability arising from an erroneous representation shall be borne solely by the tier filing that representation and shall not be shared by any tier to which the erroneous representation is forwarded.

E.) The prohibition on the use of appropriated funds does not apply in the case of a payment of reasonable compensation to an officer or employee of a Consultant or sub-Consultant if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

F.) The prohibition on the use of appropriated funds does not apply in the case of any reasonable payment to an officer or employee of a Consultant or sub-Consultant or to a person, other than an officer or employee of a Consultant or sub-Consultant, if the payment is for professional or technical services rendered directly in the preparation, submission or negotiation of any bid, proposal or application for a Federal contract, grant, loan or cooperative agreement.

50. BUY AMERICA DESIGN REQUIREMENTS: The Consultant shall design the project to ensure that the plans and specifications produced by the Consultant under this Agreement permit compliance with Section 165 of the Surface Transportation Assistance Act of 1982 (P.L. 97-424).

All iron, steel and manufactured products specified by the Consultant shall be of domestic manufacture or origin, except as otherwise approved by NJ TRANSIT. Whenever the Consultant lists a product by make, manufacturer or model number in the specifications, the Consultant shall first ensure that the product is of domestic manufacture or origin. Should the Consultant find it necessary to specify iron, steel, or manufactured products which are not produced in the United States in sufficient and reasonably available quantities, then the Consultant shall submit a written justification to the Contracting Officer describing in detail the product, its estimated cost, the rationale for its use in the project and the basis for the Consultant's belief that the product is of limited domestic availability. NJ TRANSIT, in its sole discretion, will determine whether to seek a waiver of the Buy America requirements from the U.S. Secretary of Transportation. Should NJ TRANSIT determine that there is insufficient basis for seeking a waiver or if a waiver request is denied by USDOT, the Consultant shall redesign the project to conform with Buy America requirements at no additional cost to NJ TRANSIT.

51. FLY AMERICA REQUIREMENTS: The Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and subrecipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S. Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

52. SEISMIC SAFETY: The Contractor agrees that any new building or addition to an existing building will be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 CFR Part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract including work performed by a subcontractor is in compliance with the

standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

53. SETTING OFF TAX ARREARS AGAINST SUMS OWED: Whenever a taxpayer under contract with the State of New Jersey is indebted for any State Tax in accordance with N.J.S.A. 54:49-19, the State of New Jersey shall seek to set off the indebtedness as follows:

Whenever any taxpayer under contract to provide goods or services to the State of New Jersey or its agencies or instrumentalities, and including the legislative and judicial branches of State government, is entitled to payment for the goods or services or on that construction project and at the same time the taxpayer is indebted for any State tax, the Director of the Division of Taxation shall seek to set off so much of that payment as may be necessary to satisfy the indebtedness. The Director, in consultation with the Director of the Division of Budget and Accounting in the Department of the Treasury, shall establish procedures and methods to effect a set-off. The Director shall give notice of the set-off to the taxpayer, the provider of goods or services or the contractor or subcontractor of construction projects and provide an opportunity for a hearing within thirty (30) days of such notice under the procedures for protests established under N.J.S.A. 54:49-18, but no request for conference, protest, or subsequent appeal to the Tax Court from any protest under this Article shall stay the collection of the indebtedness. No payment shall be made to the taxpayer, the provider of goods or services or the contractor or subcontractor of construction projects pending resolution of the indebtedness. Interest that may be payable by the State pursuant to N.J.S.A. 52:32-32 et seq. to the taxpayer, the provider of goods and services or the contractor or subcontractor of construction projects shall be stayed.

54. DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN: Pursuant to N.J.S.A. 52:32-55 et seq., any person or entity that submits a proposal or otherwise proposes to enter into or renew a contract must complete the certification to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>. Consultants must review this list prior to completing the Disclosure of Investment Activities In Iran Certification. If NJ TRANSIT finds a person or entity to be in violation of law, NJ TRANSIT shall take action as may be

appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.

55. ATTACHMENTS/EXHIBITS: All Appendices, Attachments and Exhibits, as listed below, are incorporated into this Contract:

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed the _____ day of _____ to be effective as of the day and year first above written.

WITNESS:

NEW JERSEY TRANSIT CORPORATION

By: _____
Title
Designee

By: _____
Contracting Officer or Duly Authorized

WITNESS:

CONSULTANT

By: _____
Title

By: _____
Title

The aforementioned Agreement has been reviewed and approved as to form only.

JOHN J. HOFFMAN
ACTING ATTORNEY GENERAL OF NEW JERSEY

By: _____
Deputy Attorney General

NJ TRANSIT AGREEMENT No. 16-001
EXHIBIT B – TRAVEL AND BUSINESS REIMBURSEMENT GUIDELINES

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DEFINED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
AL	Birmingham	Jefferson / Shelby			\$92	\$56
AL	Gulf Shores	Baldwin	October 1	February 28	\$100	\$51
AL	Gulf Shores	Baldwin	March 1	July 31	\$128	\$51
AL	Gulf Shores	Baldwin	August 1	September 30	\$100	\$51
AL	Huntsville	Madison / Limestone			\$86	\$51
AL	Mobile	Mobile	October 1	December 31	\$86	\$51
AL	Mobile	Mobile	January 1	February 28	\$95	\$51
AL	Mobile	Mobile	March 1	September 30	\$86	\$51
AR	Hot Springs	Garland			\$100	\$46
AR	Little Rock	Pulaski			\$89	\$61
AZ	Grand Canyon / Flagstaff	Coconino / Yavapai less the city of Sedona	October 1	February 28	\$83	\$66
AZ	Grand Canyon / Flagstaff	Coconino / Yavapai less the city of Sedona	March 1	September 30	\$112	\$66
AZ	Kayenta	Navajo			\$109	\$61
AZ	Phoenix / Scottsdale	Maricopa	October 1	December 31	\$106	\$71
AZ	Phoenix / Scottsdale	Maricopa	January 1	March 31	\$141	\$71
AZ	Phoenix / Scottsdale	Maricopa	April 1	May 31	\$113	\$71
AZ	Phoenix / Scottsdale	Maricopa	June 1	August 31	\$83	\$71
AZ	Phoenix / Scottsdale	Maricopa	September 1	September 30	\$106	\$71
AZ	Sedona	City Limits of Sedona	October 1	February 28	\$131	\$66
AZ	Sedona	City Limits of Sedona	March 1	May 31	\$150	\$66
AZ	Sedona	City Limits of Sedona	June 1	September 30	\$131	\$66
AZ	Tucson	Pima	October 1	January 31	\$86	\$56
AZ	Tucson	Pima	February 1	May 31	\$100	\$56
AZ	Tucson	Pima	June 1	August 31	\$83	\$56
AZ	Tucson	Pima	September 1	September 30	\$86	\$56
CA	Antioch / Brentwood / Concord	Contra Costa			\$122	\$66
CA	Bakersfield / Ridgecrest	Kern			\$92	\$51
CA	Barstow / Ontario / Victorville	San Bernardino			\$98	\$56
CA	Death Valley	Inyo			\$100	\$46
CA	Eureka / Arcata / McKinleyville	Humboldt	October 1	June 30	\$91	\$61
CA	Eureka / Arcata / McKinleyville	Humboldt	July 1	August 31	\$109	\$61
CA	Eureka / Arcata / McKinleyville	Humboldt	September 1	September 30	\$91	\$61
CA	Fresno	Fresno			\$89	\$61
CA	Los Angeles	Los Angeles / Orange / Ventura / Edwards AFB less the city of Santa Monica			\$138	\$71
CA	Mammoth Lakes	Mono	October 1	November 30	\$102	\$61
CA	Mammoth Lakes	Mono	December 1	March 31	\$128	\$61

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DERIVED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
CA	Mammoth Lakes	Mono	April 1	September 30	\$ 102	\$ 61
CA	Mill Valley / San Rafael / Novato	Marin			\$ 133	\$ 56
CA	Modesto	Stanislaus			\$ 85	\$ 51
CA	Monterey	Monterey	October 1	June 30	\$ 131	\$ 71
CA	Monterey	Monterey	July 1	August 31	\$ 166	\$ 71
CA	Monterey	Monterey	September 1	September 30	\$ 131	\$ 71
CA	Napa	Napa	October 1	November 30	\$ 171	\$ 66
CA	Napa	Napa	December 1	January 31	\$ 131	\$ 66
CA	Napa	Napa	February 1	September 30	\$ 171	\$ 66
CA	Oakhurst	Madera	October 1	May 31	\$ 87	\$ 56
CA	Oakhurst	Madera	June 1	August 31	\$ 111	\$ 56
CA	Oakhurst	Madera	September 1	September 30	\$ 87	\$ 56
CA	Oakland	Alameda			\$ 124	\$ 61
CA	Palm Springs	Riverside	October 1	December 31	\$ 110	\$ 71
CA	Palm Springs	Riverside	January 1	May 31	\$ 128	\$ 71
CA	Palm Springs	Riverside	June 1	September 30	\$ 90	\$ 71
CA	Point Arena / Gualala	Mendocino			\$ 96	\$ 66
CA	Redding	Shasta			\$ 89	\$ 61
CA	Sacramento	Sacramento			\$ 107	\$ 61
CA	San Diego	San Diego			\$ 142	\$ 71
CA	San Francisco	San Francisco	October 1	October 31	\$ 251	\$ 71
CA	San Francisco	San Francisco	November 1	December 31	\$ 209	\$ 71
CA	San Francisco	San Francisco	January 1	August 31	\$ 219	\$ 71
CA	San Francisco	San Francisco	September 1	September 30	\$ 251	\$ 71
CA	San Luis Obispo	San Luis Obispo			\$ 111	\$ 66
CA	San Mateo / Foster City / Belmont	San Mateo			\$ 155	\$ 61
CA	Santa Barbara	Santa Barbara	October 1	June 30	\$ 151	\$ 66
CA	Santa Barbara	Santa Barbara	July 1	August 31	\$ 200	\$ 66
CA	Santa Barbara	Santa Barbara	September 1	September 30	\$ 151	\$ 66
CA	Santa Cruz	Santa Cruz	October 1	May 31	\$ 128	\$ 66
CA	Santa Cruz	Santa Cruz	June 1	August 31	\$ 168	\$ 66
CA	Santa Cruz	Santa Cruz	September 1	September 30	\$ 128	\$ 66
CA	Santa Monica	City limits of Santa Monica	October 1	December 31	\$ 190	\$ 71
CA	Santa Monica	City limits of Santa Monica	January 1	May 31	\$ 202	\$ 71
CA	Santa Monica	City limits of Santa Monica	June 1	August 31	\$ 230	\$ 71
CA	Santa Monica	City limits of Santa Monica	September 1	September 30	\$ 190	\$ 71
CA	Santa Rosa	Sonoma			\$ 121	\$ 61
CA	South Lake Tahoe	El Dorado			\$ 114	\$ 71
CA	Stockton	San Joaquin			\$ 93	\$ 56
CA	Sunnyvale / Palo Alto / San Jose	Santa Clara			\$ 162	\$ 56

May 2015

RFP No. 16-001

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DEFINED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
CA	Tahoe City	Placer			\$87	\$61
CA	Truckee	Nevada			\$106	\$71
CA	Visalia / Lemoore	Tulare / Kings			\$88	\$61
CA	West Sacramento / Davis	Yolo			\$108	\$51
CA	Yosemite National Park	Mariposa	October 1	November 30	\$90	\$71
CA	Yosemite National Park	Mariposa	December 1	May 31	\$113	\$71
CA	Yosemite National Park	Mariposa	June 1	August 31	\$124	\$71
CA	Yosemite National Park	Mariposa	September 1	September 30	\$90	\$71
CO	Aspen	Pitkin	October 1	November 30	\$116	\$71
CO	Aspen	Pitkin	December 1	March 31	\$270	\$71
CO	Aspen	Pitkin	April 1	May 31	\$117	\$71
CO	Aspen	Pitkin	June 1	August 31	\$201	\$71
CO	Aspen	Pitkin	September 1	September 30	\$116	\$71
CO	Boulder / Broomfield	Boulder / Broomfield			\$114	\$61
CO	Colorado Springs	El Paso			\$89	\$66
CO	Cortez	Montezuma	October 1	May 31	\$88	\$51
CO	Cortez	Montezuma	June 1	September 30	\$111	\$51
CO	Crested Butte / Gunnison	Gunnison			\$95	\$51
CO	Denver / Aurora	Denver / Adams / Arapahoe / Jefferson			\$163	\$66
CO	Douglas	Douglas			\$108	\$61
CO	Durango	La Plata	October 1	May 31	\$97	\$61
CO	Durango	La Plata	June 1	September 30	\$141	\$61
CO	Fort Collins / Loveland	Larimer			\$98	\$56
CO	Montrose	Montrose			\$87	\$56
CO	Silverthorne / Breckenridge	Summit	October 1	November 30	\$94	\$56
CO	Silverthorne / Breckenridge	Summit	December 1	March 31	\$138	\$56
CO	Silverthorne / Breckenridge	Summit	April 1	May 31	\$83	\$56
CO	Silverthorne / Breckenridge	Summit	June 1	September 30	\$94	\$56
CO	Steamboat Springs	Routt	October 1	November 30	\$99	\$56
CO	Steamboat Springs	Routt	December 1	March 31	\$172	\$56
CO	Steamboat Springs	Routt	April 1	September 30	\$99	\$56
CO	Telluride	San Miguel	October 1	November 30	\$127	\$71
CO	Telluride	San Miguel	December 1	March 31	\$334	\$71
CO	Telluride	San Miguel	April 1	May 31	\$136	\$71
CO	Telluride	San Miguel	June 1	September 30	\$174	\$71
CO	Vail	Eagle	October 1	November 30	\$116	\$71
CO	Vail	Eagle	December 1	March 31	\$312	\$71
CO	Vail	Eagle	April 1	June 30	\$126	\$71
CO	Vail	Eagle	July 1	August 31	\$151	\$71
CO	Vail	Eagle	September 1	September 30	\$116	\$71

May 2015

RFP No. 16-001

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DERIVED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
CT	Bridgeport / Danbury	Fairfield			\$ 125	\$ 71
CT	Cromwell / Old Saybrook	Middlesex			\$93	\$ 61
CT	Hartford	Hartford			\$ 116	\$ 56
CT	New Haven	New Haven			\$94	\$ 61
CT	New London / Groton	New London			\$98	\$ 61
DC	District of Columbia	Washington DC (also the cities of Alexandria, Falls Church and Fairfax, and the counties of Arlington and Fairfax, in Virginia; and the counties of Montgomery and Prince George's in Maryland)	October 1	October 31	\$ 222	\$ 71
DC	District of Columbia	Washington DC (also the cities of Alexandria, Falls Church and Fairfax, and the counties of Arlington and Fairfax, in Virginia; and the counties of Montgomery and Prince George's in Maryland)	November 1	February 28	\$ 177	\$ 71
DC	District of Columbia	Washington DC (also the cities of Alexandria, Falls Church and Fairfax, and the counties of Arlington and Fairfax, in Virginia; and the counties of Montgomery and Prince George's in Maryland)	March 1	June 30	\$ 229	\$ 71
DC	District of Columbia	Washington DC (also the cities of Alexandria, Falls Church and Fairfax, and the counties of Arlington and Fairfax, in Virginia; and the counties of Montgomery and Prince George's in Maryland)	July 1	August 31	\$ 162	\$ 71
DC	District of Columbia	Washington DC (also the cities of Alexandria, Falls Church and Fairfax, and the counties of Arlington and Fairfax, in Virginia; and the counties of Montgomery and Prince George's in Maryland)	September 1	September 30	\$ 222	\$ 71
DE	Dover	Kent	October 1	April 30	\$83	\$ 46
DE	Dover	Kent	May 1	September 30	\$ 101	\$ 46
DE	Lewes	Sussex	October 1	June 30	\$ 88	\$ 46
DE	Lewes	Sussex	July 1	August 31	\$ 137	\$ 46
DE	Lewes	Sussex	September 1	September 30	\$88	\$ 46

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
DE	Wilmington	New Castle			\$ 120	\$ 56
FL	Boca Raton / Delray Beach / Jupiter	Palm Beach / Hendry	October 1	December 31	\$ 97	\$ 71
FL	Boca Raton / Delray Beach / Jupiter	Palm Beach / Hendry	January 1	April 30	\$ 157	\$ 71
FL	Boca Raton / Delray Beach / Jupiter	Palm Beach / Hendry	May 1	September 30	\$ 97	\$ 71
FL	Bradenton	Manatee	October 1	January 31	\$ 83	\$ 56
FL	Bradenton	Manatee	February 1	March 31	\$ 119	\$ 56
FL	Bradenton	Manatee	April 1	September 30	\$ 83	\$ 56
FL	Cocoa Beach	Brevard			\$ 105	\$ 51
FL	Daytona Beach	Volusia	October 1	January 31	\$ 83	\$ 51
FL	Daytona Beach	Volusia	February 1	March 31	\$ 110	\$ 51
FL	Daytona Beach	Volusia	April 1	July 31	\$ 90	\$ 51
FL	Daytona Beach	Volusia	August 1	September 30	\$ 83	\$ 51
FL	Fort Lauderdale	Broward	October 1	December 31	\$ 134	\$ 71
FL	Fort Lauderdale	Broward	January 1	March 31	\$ 188	\$ 71
FL	Fort Lauderdale	Broward	April 1	May 31	\$ 140	\$ 71
FL	Fort Lauderdale	Broward	June 1	September 30	\$ 109	\$ 71
FL	Fort Myers	Lee	October 1	December 31	\$ 93	\$ 56
FL	Fort Myers	Lee	January 1	April 30	\$ 142	\$ 56
FL	Fort Myers	Lee	May 1	September 30	\$ 93	\$ 56
FL	Fort Walton Beach / De Funiak Springs	Okaloosa / Walton	October 1	October 31	\$ 129	\$ 51
FL	Fort Walton Beach / De Funiak Springs	Okaloosa / Walton	November 1	February 28	\$ 86	\$ 51
FL	Fort Walton Beach / De Funiak Springs	Okaloosa / Walton	March 1	May 31	\$ 145	\$ 51
FL	Fort Walton Beach / De Funiak Springs	Okaloosa / Walton	June 1	July 31	\$ 196	\$ 51
FL	Fort Walton Beach / De Funiak Springs	Okaloosa / Walton	August 1	September 30	\$ 129	\$ 51
FL	Gainesville	Alachua			\$ 94	\$ 51
FL	Gulf Breeze	Santa Rosa	October 1	May 31	\$ 83	\$ 51
FL	Gulf Breeze	Santa Rosa	June 1	July 31	\$ 108	\$ 51
FL	Gulf Breeze	Santa Rosa	August 1	September 30	\$ 83	\$ 51
FL	Key West	Monroe	October 1	November 30	\$ 183	\$ 71
FL	Key West	Monroe	December 1	January 31	\$ 230	\$ 71
FL	Key West	Monroe	February 1	March 31	\$ 279	\$ 71
FL	Key West	Monroe	April 1	September 30	\$ 183	\$ 71
FL	Miami	Miami-Dade	October 1	December 31	\$ 152	\$ 66
FL	Miami	Miami-Dade	January 1	March 31	\$ 203	\$ 66
FL	Miami	Miami-Dade	April 1	May 31	\$ 146	\$ 66

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
FL	Miami	Miami-Dade	June 1	September 30	\$ 119	\$ 66
FL	Naples	Collier	October 1	December 31	\$ 136	\$ 61
FL	Naples	Collier	January 1	April 30	\$ 203	\$ 61
FL	Naples	Collier	May 1	September 30	\$ 116	\$ 61
FL	Orlando	Orange			\$ 115	\$ 56
FL	Panama City	Bay	October 1	February 28	\$ 83	\$ 51
FL	Panama City	Bay	March 1	July 31	\$ 119	\$ 51
FL	Panama City	Bay	August 1	September 30	\$ 83	\$ 51
FL	Pensacola	Escambia	October 1	February 28	\$ 94	\$ 46
FL	Pensacola	Escambia	March 1	August 31	\$ 121	\$ 46
FL	Pensacola	Escambia	September 1	September 30	\$ 94	\$ 46
FL	Punta Gorda	Charlotte	October 1	January 31	\$ 83	\$ 51
FL	Punta Gorda	Charlotte	February 1	March 31	\$ 123	\$ 51
FL	Punta Gorda	Charlotte	April 1	September 30	\$ 83	\$ 51
FL	Sarasota	Sarasota	October 1	December 31	\$ 92	\$ 56
FL	Sarasota	Sarasota	January 1	April 30	\$ 126	\$ 56
FL	Sarasota	Sarasota	May 1	September 30	\$ 92	\$ 56
FL	Sebring	Highlands			\$ 99	\$ 46
FL	St. Augustine	St. Johns			\$ 107	\$ 56
FL	Stuart	Martin			\$ 91	\$ 51
FL	Tallahassee	Leon	October 1	December 31	\$ 88	\$ 46
FL	Tallahassee	Leon	January 1	April 30	\$ 104	\$ 46
FL	Tallahassee	Leon	May 1	September 30	\$ 88	\$ 46
FL	Tampa / St. Petersburg	Pinellas / Hillsborough	October 1	December 31	\$ 104	\$ 51
FL	Tampa / St. Petersburg	Pinellas / Hillsborough	January 1	February 28	\$ 115	\$ 51
FL	Tampa / St. Petersburg	Pinellas / Hillsborough	March 1	September 30	\$ 104	\$ 51
FL	Vero Beach	Indian River	October 1	January 31	\$ 109	\$ 51
FL	Vero Beach	Indian River	February 1	April 30	\$ 155	\$ 51
FL	Vero Beach	Indian River	May 1	September 30	\$ 109	\$ 51
GA	Athens	Clarke			\$ 91	\$ 46
GA	Atlanta	Fulton / DeKalb / Cobb			\$ 135	\$ 56
GA	Augusta	Richmond			\$ 91	\$ 51
GA	Jekyll Island / Brunswick	Glynn	October 1	October 31	\$ 148	\$ 56
GA	Jekyll Island / Brunswick	Glynn	November 1	February 28	\$ 110	\$ 56
GA	Jekyll Island / Brunswick	Glynn	March 1	September 30	\$ 148	\$ 56
GA	Savannah	Chatham			\$ 101	\$ 56
IA	Cedar Rapids	Linn			\$ 88	\$ 51
IA	Dallas	Dallas			\$ 114	\$ 51
IA	Des Moines	Polk			\$ 97	\$ 51
ID	Bonner's Ferry / Sandpoint	Bonner / Boundary / Shoshone	October 1	June 30	\$ 83	\$ 61

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
LA	New Orleans	Orleans / St. Bernard / Jefferson / Plaquemine Parishes	July 1	September 30	\$ 107	\$ 71
MA	Andover	Essex			\$ 101	\$ 56
MA	Boston / Cambridge	Suffolk, city of Cambridge	October 1	October 31	\$ 258	\$ 71
MA	Boston / Cambridge	Suffolk, city of Cambridge	November 1	March 31	\$ 179	\$ 71
MA	Boston / Cambridge	Suffolk, city of Cambridge	April 1	June 30	\$ 231	\$ 71
MA	Boston / Cambridge	Suffolk, city of Cambridge	July 1	August 31	\$ 210	\$ 71
MA	Boston / Cambridge	Suffolk, city of Cambridge	September 1	September 30	\$ 258	\$ 71
MA	Burlington / Woburn	Middlesex less the city of Cambridge			\$ 127	\$ 71
MA	Falmouth	City limits of Falmouth	October 1	June 30	\$ 110	\$ 51
MA	Falmouth	City limits of Falmouth	July 1	August 31	\$ 184	\$ 51
MA	Falmouth	City limits of Falmouth	September 1	September 30	\$ 110	\$ 51
MA	Hyannis	Barnstable less the city of Falmouth	October 1	June 30	\$ 97	\$ 56
MA	Hyannis	Barnstable less the city of Falmouth	July 1	August 31	\$ 157	\$ 56
MA	Hyannis	Barnstable less the city of Falmouth	September 1	September 30	\$ 97	\$ 56
MA	Martha's Vineyard	Dukes	October 1	June 30	\$ 124	\$ 71
MA	Martha's Vineyard	Dukes	July 1	August 31	\$ 265	\$ 71
MA	Martha's Vineyard	Dukes	September 1	September 30	\$ 124	\$ 71
MA	Nantucket	Nantucket	October 1	May 31	\$ 137	\$ 61
MA	Nantucket	Nantucket	June 1	September 30	\$ 289	\$ 61
MA	Northampton	Hampshire			\$ 106	\$ 56
MA	Pittsfield	Berkshire			\$ 122	\$ 61
MA	Plymouth / Taunton / New Bedford	Plymouth / Bristol			\$ 99	\$ 56
MA	Quincy	Norfolk			\$ 133	\$ 51
MA	Springfield	Hampden			\$ 104	\$ 51
MA	Worcester	Worcester			\$ 106	\$ 61
MD	Aberdeen / Bel Air / Belcamp	Harford			\$ 94	\$ 56
MD	Annapolis	Anne Arundel	October 1	October 31	\$ 121	\$ 61
MD	Annapolis	Anne Arundel	November 1	April 30	\$ 100	\$ 61
MD	Annapolis	Anne Arundel	May 1	September 30	\$ 121	\$ 61
MD	Baltimore County	Baltimore			\$ 98	\$ 61
MD	Baltimore City	Baltimore City	October 1	November 30	\$ 153	\$ 71
MD	Baltimore City	Baltimore City	December 1	February 28	\$ 118	\$ 71
MD	Baltimore City	Baltimore City	March 1	August 31	\$ 150	\$ 71
MD	Baltimore City	Baltimore City	September 1	September 30	\$ 153	\$ 71
MD	Cambridge / St. Michaels	Dorchester / Talbot	October 1	May 31	\$ 124	\$ 61
MD	Cambridge / St. Michaels	Dorchester / Talbot	June 1	August 31	\$ 170	\$ 61
MD	Cambridge / St. Michaels	Dorchester / Talbot	September 1	September 30	\$ 124	\$ 61
MD	Centreville	Queen Anne	October 1	October 31	\$ 121	\$ 51
MD	Centreville	Queen Anne	November 1	January 31	\$ 105	\$ 51

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
NC	Fayetteville	Cumberland			\$99	\$51
NC	Greensboro	Guilford	October 1	October 31	\$97	\$56
NC	Greensboro	Guilford	November 1	January 31	\$89	\$56
NC	Greensboro	Guilford	February 1	September 30	\$97	\$56
NC	Kill Devil	Dare	October 1	March 31	\$93	\$61
NC	Kill Devil	Dare	April 1	May 31	\$107	\$61
NC	Kill Devil	Dare	June 1	August 31	\$162	\$61
NC	Kill Devil	Dare	September 1	September 30	\$93	\$61
NC	New Bern / Havelock	Craven			\$90	\$46
NC	Raleigh	Wake			\$98	\$66
NC	Wilmington	New Hanover			\$94	\$56
ND	Dickinson / Beulah	Stark / Mercer / Billings			\$118	\$56
ND	Minot	Ward			\$102	\$56
ND	Williston	Williams / Mountrail / McKenzie			\$161	\$56
NE	Omaha	Douglas			\$102	\$61
NH	Concord	Merrimack			\$88	\$51
NH	Conway	Carroll	October 1	February 28	\$119	\$61
NH	Conway	Carroll	March 1	June 30	\$99	\$61
NH	Conway	Carroll	July 1	August 31	\$158	\$61
NH	Conway	Carroll	September 1	September 30	\$119	\$61
NH	Durham	Strafford			\$97	\$46
NH	Laconia	Belknap	October 1	October 31	\$112	\$51
NH	Laconia	Belknap	November 1	May 31	\$84	\$51
NH	Laconia	Belknap	June 1	September 30	\$112	\$51
NH	Lebanon / Lincoln / West Lebanon	Grafton / Sullivan			\$115	\$56
NH	Manchester	Hillsborough			\$92	\$56
NH	Portsmouth	Rockingham	October 1	June 30	\$106	\$61
NH	Portsmouth	Rockingham	July 1	August 31	\$140	\$61
NH	Portsmouth	Rockingham	September 1	September 30	\$106	\$61
NJ	Atlantic City / Ocean City / Cape May	Atlantic / Cape May			\$94	\$66
NJ	Belle Mead	Somerset			\$135	\$56
NJ	Cherry Hill / Moorestown	Camden / Burlington			\$97	\$61
NJ	Eatontown / Freehold	Monmouth			\$103	\$56
NJ	Edison / Piscataway	Middlesex			\$109	\$51
NJ	Flemington	Hunterdon			\$114	\$61
NJ	Newark	Essex / Bergen / Hudson / Passaic			\$134	\$61
NJ	Parsippany	Morris			\$136	\$56
NJ	Princeton / Trenton	Mercer			\$127	\$61

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
NJ	Springfield / Cranford / New Providence	Union			\$ 115	\$ 56
NJ	Toms River	Ocean	October 1	May 31	\$ 83	\$ 51
NJ	Toms River	Ocean	June 1	August 31	\$ 93	\$ 51
NJ	Toms River	Ocean	September 1	September 30	\$ 83	\$ 51
NM	Carlsbad	Eddy	October 1	March 31	\$ 127	\$ 51
NM	Carlsbad	Eddy	April 1	June 30	\$ 120	\$ 51
NM	Carlsbad	Eddy	July 1	September 30	\$ 127	\$ 51
NM	Las Cruces	Dona Ana			\$ 91	\$ 56
NM	Los Alamos	Los Alamos			\$ 86	\$ 51
NM	Santa Fe	Santa Fe			\$ 94	\$ 71
NM	Taos	Taos			\$ 92	\$ 66
NV	Incline Village / Reno / Sparks	Washoe	October 1	June 30	\$ 95	\$ 51
NV	Incline Village / Reno / Sparks	Washoe	July 1	August 31	\$ 130	\$ 51
NV	Incline Village / Reno / Sparks	Washoe	September 1	September 30	\$ 95	\$ 51
NV	Las Vegas	Clark			\$ 96	\$ 71
NV	Stateline / Carson City	Douglas / Carson City			\$ 87	\$ 61
NY	Albany	Albany			\$ 111	\$ 61
NY	Binghamton / Owego	Broome / Tioga			\$ 97	\$ 46
NY	Buffalo	Erie			\$ 108	\$ 56
NY	Floral Park / Garden City / Great Neck	Nassau			\$ 149	\$ 66
NY	Glens Falls	Warren	October 1	June 30	\$ 101	\$ 66
NY	Glens Falls	Warren	July 1	August 31	\$ 159	\$ 66
NY	Glens Falls	Warren	September 1	September 30	\$ 101	\$ 66
NY	Ithaca / Waterloo / Romulus	Tompkins / Seneca			\$ 115	\$ 46
NY	Kingston	Ulster			\$ 112	\$ 66
NY	Lake Placid	Essex	October 1	November 30	\$ 117	\$ 61
NY	Lake Placid	Essex	December 1	February 28	\$ 129	\$ 61
NY	Lake Placid	Essex	March 1	June 30	\$ 105	\$ 61
NY	Lake Placid	Essex	July 1	August 31	\$ 166	\$ 61
NY	Lake Placid	Essex	September 1	September 30	\$ 117	\$ 61
NY	New York City	Bronx / Kings / New York / Queens / Richmond	October 1	December 31	\$ 304	\$ 71
NY	New York City	Bronx / Kings / New York / Queens / Richmond	January 1	February 28	\$ 197	\$ 71
NY	New York City	Bronx / Kings / New York / Queens / Richmond	March 1	June 30	\$ 268	\$ 71
NY	New York City	Bronx / Kings / New York / Queens / Richmond	July 1	August 31	\$ 235	\$ 71

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
NY	New York City	Bronx / Kings / New York / Queens / Richmond	September 1	September 30	\$ 304	\$ 71
NY	Niagara Falls	Niagara	October 1	June 30	\$ 83	\$ 51
NY	Niagara Falls	Niagara	July 1	August 31	\$ 108	\$ 51
NY	Niagara Falls	Niagara	September 1	September 30	\$ 83	\$ 51
NY	Nyack / Palisades	Rockland			\$ 110	\$ 61
NY	Poughkeepsie	Dutchess			\$ 105	\$ 66
NY	Riverhead / Ronkonkoma / Melville	Suffolk			\$ 121	\$ 71
NY	Rochester	Monroe			\$ 105	\$ 51
NY	Saratoga Springs / Schenectady	Saratoga / Schenectady	October 1	June 30	\$ 116	\$ 56
NY	Saratoga Springs / Schenectady	Saratoga / Schenectady	July 1	August 31	\$ 178	\$ 56
NY	Saratoga Springs / Schenectady	Saratoga / Schenectady	September 1	September 30	\$ 116	\$ 56
NY	Syracuse / Oswego	Onondaga / Oswego			\$ 96	\$ 56
NY	Tarrytown / White Plains / New Rochelle	Westchester			\$ 145	\$ 71
NY	Troy	Rensselaer			\$ 102	\$ 51
NY	Watertown	Jefferson			\$ 96	\$ 56
NY	West Point	Orange			\$ 106	\$ 51
OH	Akron	Summit			\$ 104	\$ 51
OH	Canton	Stark			\$ 109	\$ 51
OH	Cincinnati	Hamilton / Clermont			\$ 132	\$ 56
OH	Cleveland	Cuyahoga			\$ 119	\$ 56
OH	Columbus	Franklin			\$ 106	\$ 56
OH	Dayton / Fairborn	Greene / Darke / Montgomery			\$ 89	\$ 56
OH	Hamilton	Butler / Warren			\$ 98	\$ 51
OH	Medina / Wooster	Wayne / Medina			\$ 95	\$ 51
OH	Mentor	Lake			\$ 94	\$ 46
OH	Sandusky / Bellevue	Erie / Huron			\$ 94	\$ 46
OH	Youngstown	Mahoning / Trumbull			\$ 95	\$ 51
OK	Enid	Garfield			\$ 109	\$ 56
OK	Oklahoma City	Oklahoma			\$ 94	\$ 66
OR	Beaverton	Washington			\$ 114	\$ 51
OR	Bend	Deschutes	October 1	June 30	\$ 104	\$ 61
OR	Bend	Deschutes	July 1	August 31	\$ 144	\$ 61
OR	Bend	Deschutes	September 1	September 30	\$ 104	\$ 61
OR	Clackamas	Clackamas			\$ 97	\$ 61
OR	Eugene / Florence	Lane			\$ 99	\$ 51
OR	Lincoln City	Lincoln	October 1	June 30	\$ 95	\$ 56
OR	Lincoln City	Lincoln	July 1	August 31	\$ 123	\$ 56
OR	Lincoln City	Lincoln	September 1	September 30	\$ 95	\$ 56

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
OR	Portland	Multnomah			\$ 137	\$ 66
OR	Seaside	Clatsop	October 1	June 30	\$ 100	\$ 51
OR	Seaside	Clatsop	July 1	August 31	\$ 148	\$ 51
OR	Seaside	Clatsop	September 1	September 30	\$ 100	\$ 51
PA	Allentown / Easton / Bethlehem	Lehigh / Northampton			\$ 88	\$ 51
PA	Bucks	Bucks			\$ 99	\$ 71
PA	Chester / Radnor / Essington	Delaware			\$ 95	\$ 51
PA	Erie	Erie			\$ 91	\$ 46
PA	Gettysburg	Adams	October 1	October 31	\$ 105	\$ 51
PA	Gettysburg	Adams	November 1	March 31	\$ 83	\$ 51
PA	Gettysburg	Adams	April 1	September 30	\$ 105	\$ 51
PA	Harrisburg	Dauphin County excluding Hershey			\$ 108	\$ 51
PA	Hershey	Hershey	October 1	May 31	\$ 103	\$ 51
PA	Hershey	Hershey	June 1	August 31	\$ 154	\$ 51
PA	Hershey	Hershey	September 1	September 30	\$ 103	\$ 51
PA	Lancaster	Lancaster			\$ 100	\$ 56
PA	Malvern / Frazer / Berwyn	Chester			\$ 122	\$ 51
PA	Mechanicsburg	Cumberland			\$ 91	\$ 56
PA	Montgomery	Montgomery			\$ 125	\$ 66
PA	Philadelphia	Philadelphia	October 1	November 30	\$ 166	\$ 66
PA	Philadelphia	Philadelphia	December 1	February 28	\$ 139	\$ 66
PA	Philadelphia	Philadelphia	March 1	June 30	\$ 171	\$ 66
PA	Philadelphia	Philadelphia	July 1	August 31	\$ 142	\$ 66
PA	Philadelphia	Philadelphia	September 1	September 30	\$ 166	\$ 66
PA	Pittsburgh	Allegheny			\$ 128	\$ 71
PA	Reading	Berks			\$ 94	\$ 56
PA	Scranton	Lackawanna			\$ 89	\$ 56
PA	State College	Centre			\$ 87	\$ 56
RI	East Greenwich / Warwick / North Kingstown	Kent / Washington			\$ 91	\$ 56
RI	Jamestown / Middletown / Newport	Newport	October 1	October 31	\$ 165	\$ 71
RI	Jamestown / Middletown / Newport	Newport	November 1	April 30	\$ 96	\$ 71
RI	Jamestown / Middletown / Newport	Newport	May 1	September 30	\$ 165	\$ 71
RI	Providence / Bristol	Providence / Bristol			\$ 131	\$ 71
SC	Aiken	Aiken			\$ 88	\$ 46
SC	Charleston	Charleston / Berkeley / Dorchester	October 1	October 31	\$ 157	\$ 56
SC	Charleston	Charleston / Berkeley / Dorchester	November 1	February 28	\$ 142	\$ 56
SC	Charleston	Charleston / Berkeley / Dorchester	March 1	May 31	\$ 186	\$ 56
SC	Charleston	Charleston / Berkeley / Dorchester	June 1	September 30	\$ 157	\$ 56
SC	Columbia	Richland / Lexington			\$ 94	\$ 51

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
SC	Hilton Head	Beaufort	October 1	March 31	\$ 104	\$ 61
SC	Hilton Head	Beaufort	April 1	July 31	\$ 133	\$ 61
SC	Hilton Head	Beaufort	August 1	September 30	\$ 104	\$ 61
SC	Myrtle Beach	Horry	October 1	March 31	\$ 83	\$ 51
SC	Myrtle Beach	Horry	April 1	May 31	\$ 101	\$ 51
SC	Myrtle Beach	Horry	June 1	August 31	\$ 143	\$ 51
SC	Myrtle Beach	Horry	September 1	September 30	\$ 83	\$ 51
SD	Hot Springs	Fall River / Custer	October 1	October 31	\$ 89	\$ 46
SD	Hot Springs	Fall River / Custer	November 1	May 31	\$ 83	\$ 46
SD	Hot Springs	Fall River / Custer	June 1	August 31	\$ 128	\$ 46
SD	Hot Springs	Fall River / Custer	September 1	September 30	\$ 89	\$ 46
SD	Rapid City	Pennington	October 1	May 31	\$ 83	\$ 51
SD	Rapid City	Pennington	June 1	August 31	\$ 133	\$ 51
SD	Rapid City	Pennington	September 1	September 30	\$ 83	\$ 51
SD	Sturgis / Spearfish	Meade / Butte / Lawrence	October 1	May 31	\$ 83	\$ 51
SD	Sturgis / Spearfish	Meade / Butte / Lawrence	June 1	August 31	\$ 113	\$ 51
SD	Sturgis / Spearfish	Meade / Butte / Lawrence	September 1	September 30	\$ 83	\$ 51
TN	Brentwood / Franklin	Williamson			\$ 107	\$ 56
TN	Chattanooga	Hamilton			\$ 94	\$ 56
TN	Knoxville	Knox			\$ 88	\$ 56
TN	Memphis	Shelby			\$ 102	\$ 61
TN	Nashville	Davidson	October 1	June 30	\$ 132	\$ 66
TN	Nashville	Davidson	July 1	August 31	\$ 123	\$ 66
TN	Nashville	Davidson	September 1	September 30	\$ 132	\$ 66
TN	Oak Ridge	Anderson			\$ 84	\$ 46
TX	Arlington / Fort Worth / Grapevine	Tarrant County / City of Grapevine			\$ 144	\$ 56
TX	Austin	Travis	October 1	November 30	\$ 126	\$ 71
TX	Austin	Travis	December 1	March 31	\$ 139	\$ 71
TX	Austin	Travis	April 1	September 30	\$ 126	\$ 71
TX	Big Spring	Howard			\$ 148	\$ 46
TX	College Station	Brazos			\$ 102	\$ 56
TX	Corpus Christi	Nueces			\$ 103	\$ 51
TX	Dallas	Dallas	October 1	December 31	\$ 125	\$ 71
TX	Dallas	Dallas	January 1	March 31	\$ 135	\$ 71
TX	Dallas	Dallas	April 1	September 30	\$ 125	\$ 71
TX	El Paso	El Paso			\$ 92	\$ 51
TX	Galveston	Galveston	October 1	May 31	\$ 95	\$ 56
TX	Galveston	Galveston	June 1	August 31	\$ 124	\$ 56
TX	Galveston	Galveston	September 1	September 30	\$ 95	\$ 56
TX	Greenville	Hunt County			\$ 84	\$ 51

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	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
TX	Houston (L.B. Johnson Space Center)	Montgomery / Fort Bend / Harris	October 1	May 31	\$ 132	\$ 71
TX	Houston (L.B. Johnson Space Center)	Montgomery / Fort Bend / Harris	June 1	September 30	\$ 121	\$ 71
TX	Laredo	Webb			\$ 98	\$ 56
TX	McAllen	Hidalgo			\$ 88	\$ 56
TX	Midland	Midland	October 1	March 31	\$ 162	\$ 56
TX	Midland	Midland	April 1	May 31	\$ 172	\$ 56
TX	Midland	Midland	June 1	September 30	\$ 162	\$ 56
TX	Pearshall	Frio / Medina / La Salle			\$ 137	\$ 46
TX	Piano	Collin			\$ 108	\$ 61
TX	Round Rock	Williamson			\$ 93	\$ 51
TX	San Angelo	Tom Green	October 1	March 31	\$ 147	\$ 51
TX	San Angelo	Tom Green	April 1	May 31	\$ 126	\$ 51
TX	San Angelo	Tom Green	June 1	September 30	\$ 147	\$ 51
TX	San Antonio	Bexar			\$ 115	\$ 66
TX	South Padre Island	Cameron	October 1	May 31	\$ 88	\$ 56
TX	South Padre Island	Cameron	June 1	July 31	\$ 112	\$ 56
TX	South Padre Island	Cameron	August 1	September 30	\$ 88	\$ 56
TX	Waco	McLennan			\$ 89	\$ 51
UT	Moab	Grand	October 1	October 31	\$ 130	\$ 56
UT	Moab	Grand	November 1	February 28	\$ 83	\$ 56
UT	Moab	Grand	March 1	September 30	\$ 130	\$ 56
UT	Park City	Summit	October 1	November 30	\$ 115	\$ 71
UT	Park City	Summit	December 1	March 31	\$ 246	\$ 71
UT	Park City	Summit	April 1	September 30	\$ 115	\$ 71
UT	Provo	Utah			\$ 87	\$ 51
UT	Salt Lake City	Salt Lake / Tooele	October 1	December 31	\$ 106	\$ 61
UT	Salt Lake City	Salt Lake / Tooele	January 1	March 31	\$ 117	\$ 61
UT	Salt Lake City	Salt Lake / Tooele	April 1	September 30	\$ 106	\$ 61
VA	Abingdon	Washington			\$ 96	\$ 46
VA	Blacksburg	Montgomery			\$ 96	\$ 46
VA	Charlottesville	City of Charlottesville / Albemarle / Greene			\$ 125	\$ 56
VA	Fredericksburg	City of Fredericksburg / Spotsylvania / Stafford / Caroline			\$ 84	\$ 56
VA	Loudoun	Loudoun			\$ 96	\$ 61
VA	Lynchburg	Campbell / Lynchburg City			\$ 90	\$ 51
VA	Norfolk / Portsmouth	Cities of Norfolk / Portsmouth			\$ 87	\$ 61
VA	Prince William / Manassas	Prince William / City of Manassas			\$ 85	\$ 56

May 2015

RFP No. 16-001

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DERIVED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
VA	Richmond	City of Richmond			\$ 113	\$ 66
VA	Roanoke	City limits of Roanoke			\$ 102	\$ 51
VA	Virginia Beach	City of Virginia Beach	October 1	May 31	\$ 94	\$ 56
VA	Virginia Beach	City of Virginia Beach	June 1	August 31	\$ 172	\$ 56
VA	Virginia Beach	City of Virginia Beach	September 1	September 30	\$ 94	\$ 56
VA	Wallops Island	Accomack	October 1	June 30	\$ 92	\$ 56
VA	Wallops Island	Accomack	July 1	August 31	\$ 147	\$ 56
VA	Wallops Island	Accomack	September 1	September 30	\$ 92	\$ 56
VA	Warrenton	Fauquier			\$ 108	\$ 46
VA	Williamsburg / York	James City / York Counties / City of Williamsburg	October 1	March 31	\$ 83	\$ 51
VA	Williamsburg / York	James City / York Counties / City of Williamsburg	April 1	August 31	\$ 96	\$ 51
VA	Williamsburg / York	James City / York Counties / City of Williamsburg	September 1	September 30	\$ 83	\$ 51
VT	Burlington / St. Albans / Middlebury	Chittenden / Franklin / Addison	October 1	October 31	\$ 125	\$ 66
VT	Burlington / St. Albans / Middlebury	Chittenden / Franklin / Addison	November 1	April 30	\$ 104	\$ 66
VT	Burlington / St. Albans / Middlebury	Chittenden / Franklin / Addison	May 1	September 30	\$ 125	\$ 66
VT	Manchester	Bennington	October 1	October 31	\$ 107	\$ 71
VT	Manchester	Bennington	November 1	June 30	\$ 90	\$ 71
VT	Manchester	Bennington	July 1	September 30	\$ 107	\$ 71
VT	Montpelier	Washington			\$ 110	\$ 61
VT	Stowe	Lamoille			\$ 125	\$ 71
VT	White River Junction	Windsor			\$ 97	\$ 56
WA	Anacortes / Coupeville / Oak Harbor	Skagit / Island / San Juan			\$ 85	\$ 61
WA	Everett / Lynnwood	Snohomish			\$ 107	\$ 61
WA	Ocean Shores	Grays Harbor	October 1	June 30	\$ 83	\$ 51
WA	Ocean Shores	Grays Harbor	July 1	August 31	\$ 104	\$ 51
WA	Ocean Shores	Grays Harbor	September 1	September 30	\$ 83	\$ 51
WA	Olympia / Tumwater	Thurston			\$ 98	\$ 61
WA	Port Angeles / Port Townsend	Clallam / Jefferson	October 1	June 30	\$ 95	\$ 61
WA	Port Angeles / Port Townsend	Clallam / Jefferson	July 1	August 31	\$ 128	\$ 61
WA	Port Angeles / Port Townsend	Clallam / Jefferson	September 1	September 30	\$ 95	\$ 61
WA	Richland / Pasco	Benton / Franklin			\$ 92	\$ 46
WA	Seattle	King	October 1	May 31	\$ 156	\$ 71
WA	Seattle	King	June 1	August 31	\$ 190	\$ 71
WA	Seattle	King	September 1	September 30	\$ 156	\$ 71
WA	Spokane	Spokane			\$ 88	\$ 61
WA	Tacoma	Pierce			\$ 109	\$ 61

May 2015

RFP No. 16-001

FY 2015 Per Diem Rates - Effective October 1, 2014

STATE	DESTINATION	COUNTY / LOCATION DERIVED	SEASON BEGIN	SEASON END	FY2015 Lodging Rate	FY2015 M&IE
	Standard CONUS rate applies to all counties not specifically listed. Cities not listed may be located in a listed county.				\$83	\$46
WA	Vancouver	Clark / Cowlitz / Skamania			\$ 137	\$ 56
WI	Appleton	Outagamie			\$ 88	\$ 46
WI	Brookfield / Racine	Waukesha / Racine			\$ 95	\$ 56
WI	Madison	Dane	October 1	October 31	\$ 116	\$ 56
WI	Madison	Dane	November 1	August 31	\$ 97	\$ 56
WI	Madison	Dane	September 1	September 30	\$ 116	\$ 56
WI	Milwaukee	Milwaukee			\$ 107	\$ 61
WI	Sheboygan	Sheboygan	October 1	May 31	\$ 83	\$ 51
WI	Sheboygan	Sheboygan	June 1	August 31	\$ 93	\$ 51
WI	Sheboygan	Sheboygan	September 1	September 30	\$ 83	\$ 51
WI	Sturgeon Bay	Door	October 1	June 30	\$ 83	\$ 56
WI	Sturgeon Bay	Door	July 1	August 31	\$ 90	\$ 56
WI	Sturgeon Bay	Door	September 1	September 30	\$ 83	\$ 56
WI	Wisconsin Dells	Columbia	October 1	May 31	\$ 91	\$ 61
WI	Wisconsin Dells	Columbia	June 1	August 31	\$ 110	\$ 61
WI	Wisconsin Dells	Columbia	September 1	September 30	\$ 91	\$ 61
WV	Charleston	Kanawha			\$ 105	\$ 51
WV	Morgantown	Monongalia			\$ 98	\$ 46
WV	Shepherdstown	Jefferson			\$ 86	\$ 56
WV	Wheeling	Ohio			\$ 106	\$ 46
WY	Cody	Park	October 1	November 30	\$ 93	\$ 51
WY	Cody	Park	December 1	March 31	\$ 86	\$ 51
WY	Cody	Park	April 1	May 31	\$ 96	\$ 51
WY	Cody	Park	June 1	September 30	\$ 130	\$ 51
WY	Evanston / Rock Springs	Sweetwater / Uinta			\$ 91	\$ 51
WY	Gillette	Campbell			\$ 85	\$ 51
WY	Jackson / Pinedale	Teton / Sublette	October 1	June 30	\$ 117	\$ 56
WY	Jackson / Pinedale	Teton / Sublette	July 1	August 31	\$ 179	\$ 56
WY	Jackson / Pinedale	Teton / Sublette	September 1	September 30	\$ 117	\$ 56

NOTE: The first and last calendar day of travel is calculated at 75 percent.

		The M&IE rates differ by travel location. View the per diem rate for your primary destination to determine which M&IE rates apply.					
M&IE Total		\$46	\$51	\$56	\$61	\$66	\$71
Continental Breakfast/ Breakfast	\$7	\$8	\$9	\$10	\$11	\$12	\$13
Lunch	\$11	\$12	\$13	\$15	\$16	\$18	\$19
Dinner	\$23	\$26	\$29	\$31	\$34	\$36	\$39
Incidentals	\$5	\$5	\$5	\$5	\$5	\$5	\$5
First & Last Day of Travel	\$34.50	\$38.25	\$42	\$45.75	\$49.50	\$53.25	\$57

NJ TRANSIT AGREEMENT No. 16-001

**EXHIBIT C – STATE OF NEW JERSEY EQUAL EMPLOYMENT OPPORTUNITY
PROVISIONS FOR PROFESSIONAL SERVICE CONTRACTS**

**STATE OF NEW JERSEY
EQUAL EMPLOYMENT OPPORTUNITY PROVISIONS
FOR PROCUREMENT, PROFESSIONAL AND SERVICE CONTRACTS**

I. BID REQUIREMENTS

This contract is subject to the provisions of N.J.S.A. 10:2-1 through 10:2-4 and N.J.S.A. 10:5-31 et seq. (P.L. 1975, c.127), and in accordance with the rules and regulations promulgated pursuant thereto, the proposer agrees to comply with the following:

At the time the signed contract is returned to NJ TRANSIT, the said proposer (contractor) shall submit one of the following three documents:

1.A Federal Affirmative Action Plan Approval which consists of a valid letter from the Office of Federal Control Compliance Programs; or

2.A Certificate of Employee Information Report from the State of New Jersey, Department of Treasury, Division of Public Contracts Equal Employment Opportunity Compliance; or

3.A Division of Public Contracts Equal Employment Opportunity Compliance Employee Information Report (Form AA 302).

A contractor shall not be eligible to submit an employee information report unless contractor certifies and agrees that it has never before applied for a certificate of employee information report in accordance with rules promulgated pursuant to N.J.S.A. 10:5-31 et seq.; and agrees to submit immediately to the Division of Public Contracts Equal Employment Opportunity Compliance a copy of the employee information report.

Contractors that have previously filed an Employee Information Report are required to apply for a renewal of the Certificate of Employee Information Report with the Department of Treasury, Division of Public Contracts Equal Employment Opportunity Compliance and submit a valid Certificate of Employee Information Report.

(NOTE: FOR THE PURPOSE OF THIS CONTRACT THE "PUBLIC AGENCY COMPLIANCE OFFICER" REFERENCED BELOW IS NJ TRANSIT'S ASSISTANT EXECUTIVE DIRECTOR, DIVERSITY PROGRAMS AND THE "PUBLIC AGENCY" IS NJ TRANSIT.)

II. SUBCONTRACTS; EQUAL EMPLOYMENT GOALS

The contractor agrees to incorporate these State of New Jersey EEO Provisions for Procurement, Professional and Service Contracts in its subcontracts for services.

In accordance with N.J.A.C. 17:27, Contractors and subcontractors are required to make a good faith effort to provide equal employment opportunity for minorities and women. Failure to make good faith efforts to provide equal employment opportunity for minorities and women may result in sanctions including fines/penalties, withholding of payment, termination of the contract, suspension/debarment or such other action as provided by law.

III. MANDATORY CONTRACT LANGUAGE

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE

N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)

N.J.A.C. 17:27

GOODS, PROFESSIONAL SERVICE AND GENERAL SERVICE CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and

employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer advising the labor union of the contractor's commitments under this chapter and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq. as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to meet targeted county employment goals established in accordance with N.J.A.C. 17:27-5.2.

The contractor or subcontractor agrees to inform in writing appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, and labor unions, that it does not discriminate on the basis of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personal testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

In conforming with the targeted employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity, or expression, disability, nationality or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

Letter of Federal Affirmative Action Plan Approval

Certificate of Employee Information Report

Employee Information Report Form AA302 (electronically provided by the Division and distributed to the public agency through the Division's website at www.state.nj.us/treasury/contract_compliance)

The contractor and its subcontractors shall furnish such reports or other documents to the Division of Purchase & Property, CCAU, EEO Monitoring Program as may be requested by the office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Purchase & Property CCAU EEO Monitoring Program for conducting a compliance investigation pursuant to Subchapter 10 of the Administrative Code (N.J.A.C. 17:27).

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT D - DBE REQUIREMENTS

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT E - ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

NEW JERSEY TRANSIT CORPORATION

RFP NO. 16-001

ACKNOWLEDGMENT OF RECEIPT OF ADDENDA

Proposers are required to acknowledge receipt of all addenda issued prior to the proposal due date. This acknowledgment is made by the Proposer, if an individual; by a partner, if a partnership; or by an officer of the corporation, if a corporation.

The undersigned acknowledges receipt of the following addenda.

<u>Addendum Number</u>	<u>Date</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

By: _____
Signature of Company Official

Official's Title

Company Name

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT F – STATEMENT OF JOINT VENTURE (IF APPLICABLE)

**STATEMENT OF JOINT VENTURE
FOR
PROFESSIONAL SERVICES**

WE, THE UNDERSIGNED, BEING DULY SWORN ACCORDING TO LAW, UPON OUR RESPECTIVE OATHS DEPOSE AND SAY THAT:

1. THE CONSULTANT, UNDER WHOSE NAME WE HAVE AFFIXED OUR RESPECTIVE SIGNATURES, HAS DULY AUTHORIZED AND EMPOWERED US TO EXECUTE THIS STATEMENT OF JOINT VENTURE IN THE NAME OF AND ON BEHALF OF SUCH CONSULTANT FOR THE PURPOSES HEREIN FURTHER SET FORTH.

2. THE FOLLOWING NAMED CONSULTANTS:

(a) ; ;

() Individual () Partnership () Corporation

(b) ; ;

() Individual () Partnership () Corporation

(c) ; ;

() Individual () Partnership () Corporation

HAVE ENTERED INTO A JOINT VENTURE FOR THE SPECIAL PURPOSE OF CARRYING ON THE WORK AND PROFESSIONAL SERVICES HEREINAFTER DESCRIBED.

3. UNDER THE PROVISIONS OF SUCH JOINT VENTURE THE ASSETS OF EACH OF THE CONSULTANTS NAMED IN PARAGRAPH 2 HEREOF, AND IN CASE ANY CONSULTANT SO NAMED ABOVE IS A PARTNERSHIP THE ASSETS OF THE INDIVIDUAL MEMBERS OF SUCH PARTNERSHIP, WILL BE AVAILABLE FOR THE PERFORMANCE OF SUCH JOINT VENTURE AND LIABLE THEREFOR AND FOR ALL OBLIGATIONS INCURRED IN CONNECTION THEREWITH.

4. THIS STATEMENT OF JOINT VENTURE IS EXECUTED SO THAT THE NAMED CONSULTANTS MAY, UNDER SUCH JOINT VENTURE, PROPOSE TO PERFORM THE WORK AND PROFESSIONAL SERVICES HEREIN MENTIONED AND THEY MAY, IF THE SUCCESSFUL PROPOSER THEREFOR, BE AWARDED THE CONTRACT FOR SUCH WORK AND PROFESSIONAL SERVICES. ANY CONTRACT RELATING TO THE WORK AND PROFESSIONAL SERVICES HEREINAFTER SPECIFIED SHALL BE EXECUTED BY ANY PERSON AUTHORIZED TO BIND ANY MEMBER OF THIS JOINT VENTURE, AND WHEN SO EXECUTED SHALL BIND THIS JOINT VENTURE AND EACH AND EVERY CONSULTANT NAMED HEREIN, SEVERALLY AND JOINTLY. SIMULTANEOUS WITH THE EXECUTION OF THE CONTRACT THE JOINT VENTURERS SHALL DESIGNATE AND APPOINT A PROJECT MANAGER/DIRECTOR TO ACT AS THEIR TRUE AND LAWFUL AGENT WITH FULL POWER AND AUTHORITY TO DO AND PERFORM ANY AND ALL ACTS OR THINGS NECESSARY TO CARRY OUT THE WORK AND PROFESSIONAL SERVICES SET FORTH IN SAID CONTRACT.

5. AS JOINT VENTURERS, WE BIND THE CONSULTANT FOR WHOM WE RESPECTIVELY EXECUTE THIS STATEMENT OF JOINT VENTURE IN FIRM AGREEMENT WITH NJ TRANSIT THAT EACH OF THE REPRESENTATIONS HEREIN SET FORTH IS TRUE.

6. THE WORK AND PROFESSIONAL SERVICES FOR WHICH THIS JOINT VENTURE HAS BEEN ENTERED INTO IS IDENTIFIED AS:

.....
.....
.....

.....
.....
..... SUBSCRIBED AND SWORN TO BEFORE
ME,
THIS DAY OF
....., 20

(a)
.....
.....
(Name of Consultant)
BY
.....
.....
(Also type or print name of signer)

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT G - NON-COLLUSION AFFIDAVIT

NEW JERSEY TRANSIT CORPORATION

RFP NO. 16-001

NON-COLLUSION AFFIDAVIT

STATE OF NEW JERSEY

ss:

COUNTY OF

I, _____ of the City of _____
in the County of _____ and the State of _____
of full age, being duly sworn according to law on my oath depose and say that:

I am _____
of the firm of _____
the bidder making the Proposal for the above named project, and that I executed the said Proposal with full authority so to do; that said bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge that the State of New Jersey relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____

(Name of Contractor).

(Also type or print name of affiant under signature)

Subscribed and sworn to before me this

_____ day of _____, 20_____

Notary Public of _____

My commission expires _____ 20_____

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT H - CONTRACTOR'S CERTIFICATION OF ELIGIBILITY

NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001
CONTRACTOR'S CERTIFICATION OF ELIGIBILITY

The _____ (Insert Name of Company) hereby certifies that it is not listed on the State of New Jersey, Department of Labor and Workforce Development, Division of Wages and Hour Compliance, Prevailing Wage Debarment List or on the State of New Jersey, Department of Treasury, Consolidated Debarment Report.

_____ (Insert Name of Company) is currently registered and active with no exclusion on the consolidated U.S. Government, Systems for Award Management (SAM) database.

Signature

Type or Print Name

Title

Date

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

EXHIBIT I- AFFIDAVIT OF COMPLIANCE (CODE OF VENDOR ETHICS)

NEW JERSEY TRANSIT CORPORATION

RFP NO. 16-001

AFFIDAVIT OF COMPLIANCE

I, _____ (*name of individual*), executing this document on behalf of the undersigned company, partnership, corporation, or entity hereinafter referred to as "Contractor", presently seeking to do business with NJ TRANSIT by way of a Request for Proposals ("RFP") or Invitation for Bids ("IFB"), hereby warrant and affirm to NJ TRANSIT as follows:

1. I warrant and affirm that Contractor has received a copy of NJ TRANSIT's Code of Vendor Ethics and that I have read and studied this document and distributed this document to all of Contractor's personnel involved in seeking to do business with NJ TRANSIT and required said personnel to fully read this document. In addition, I further warrant and affirm that Contractor has received from NJ TRANSIT a document entitled "Important Notice to All Contractors and Consultants" and that I have read and studied this document, including the page setting forth various New Jersey statutory provisions, and that Contractor has distributed this document to all of Contractor's personnel involved in seeking to do business with NJ TRANSIT and required said personnel to fully read this document.

2. Contractor warrants and affirms that it has issued written instructions to all of Contractor's personnel involved in seeking to do business with NJ TRANSIT instructing and requiring same to strictly adhere to the Contractor's responsibilities as set forth in NJ TRANSIT's Code of Vendor Ethics and in the "Important Notice to All Contractors and Consultants".

3. Contractor warrants and affirms that during the bidding or proposal process for the contract with NJ TRANSIT, no gratuities or other inducements have been offered or given or will be offered or given in any form including gifts, gratuities, benefits, inducements, meals (other than *de minimis* valued snacks such as coffee, tea, soda, pretzels, cookies, or similar non-meal items), entertainment, or any other thing of value or favors of any kind to any member of NJ TRANSIT's Board of Directors, officer or employee of NJ TRANSIT.

4. The Contractor warrants and affirms that during the RFP or IFB process for the contract with NJ TRANSIT, Contractor has not and will not make any offers of employment to any member of the NJ TRANSIT Board of Directors, officer or employee directly involved with this contract or solicit or interview therefor, directly or indirectly, without first seeking and obtaining written approval from NJ TRANSIT's

Ethics Liaison Officer.

5. The Contractor warrants and affirms that during the RFP or IFB process for the contract with NJ TRANSIT it has and shall promptly report in writing to NJ TRANSIT every instance that comes to the Contractor's attention and knowledge regarding any member of NJ TRANSIT's Board of Directors, officer or employee of NJ TRANSIT who has solicited or asked Contractor to provide gifts, gratuities, benefits, inducements, meals (other than *de minimis* valued snacks such as coffee, tea, soda, pretzels, cookies, or similar non-meal items), entertainment or any other thing of value or favors of any kind or has made any solicitation or request, directly or indirectly, for employment with or through the Contractor.

6. The Contractor acknowledges and accepts that for breach or violation of the foregoing warranties and affirmations, NJ TRANSIT shall have the discretion and legal right to disqualify Contractor from bidding or proposing for a contract between the Contractor and NJ TRANSIT.

(Print Name of Contractor)

(Signature of Authorized Principal or Officer)

(Print Name and Title of Signator)

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

**EXHIBIT J – CERTIFICATION OF CONTRACTS, GRANTS, LOANS &
COOPERATIVE AGREEMENTS**

NEW JERSEY TRANSIT CORPORATION

RFP NO. 16-001

**CERTIFICATION FOR CONTRACTS, GRANTS, LOANS
AND COOPERATIVE AGREEMENTS**

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal Contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal Contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal Contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit "Disclosure of Lobbying Activities," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Signature of Authorized Official

Print Name

Title

Firm

Date

**NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001**

**EXHIBIT K - STATE OF NJ DIVISION OF PURCHASE AND
PROPERTY DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN**

DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

RFP No.: 16-001

Firm: _____

PART 1: CERTIFICATION

BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

FAILURE TO CHECK ONE OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the State of New Jersey, Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found at the following Website: <http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>.

Bidders must review this list prior to completing the below certification. Failure to complete the certification will render a bidder's proposal non-responsive. If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party
PLEASE CHECK THE APPROPRIATE BOX:

☐ I certify, pursuant to Public Law 2012, c. 25, that neither the bidder listed above nor any of the bidder's parents, subsidiaries, or affiliates is listed on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. I will skip Part 2 and sign and complete the Certification below.

OR

☐ I am unable to certify as above because the bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below. Failure to provide such will result in the proposal being rendered as nonresponsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.

**PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION.
IF YOU NEED TO MAKE ADDITIONAL ENTRIES, PLEASE COPY AND COMPLETE
THIS SHEET AND SUBMIT IT WITH YOUR BID.**

Name _____	Relationship to Bidder/Offeror _____
Description of Activities _____	

Duration of Engagement _____	Anticipated Cessation Date _____
Bidder/Offeror Contact Name _____	Contact Phone Number _____

Name _____	Relationship to Bidder/Offeror _____
Description of Activities _____	

Duration of Engagement _____	Anticipated Cessation Date _____
Bidder/Offeror Contact Name _____	Contact Phone Number _____

Certification: I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the above-referenced person or entity. I acknowledge that the State of New Jersey is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of any contracts with the State to notify the State in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreement(s) with the State of New Jersey and that the State at its option may declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): _____ Signature: _____

Title: _____ Date: _____

NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001

EXHIBIT L. Source Disclosure

N.J.S.A 52:34-13.2 CERTIFICATION

SOURCE DISCLOSURE CERTIFICATION FORM

Consultant: _____

Contract Number: 16-001

I hereby certify and say:

I have personal knowledge of the facts set forth herein and am authorized to make this Certification on behalf of the Consultant.

The Consultant submits this Certification as part of its proposal in response to the referenced solicitation issued by NJ TRANSIT, in accordance with the requirements of N.J.S.A. 52:34-13.2.

The following is a list of every location where services will be performed by the Consultant and all sub-Consultants.

Consultant or Sub-Consultant
Description of Services
Performance Location[s] by Country

Any changes to the information set forth in this Certification during the term of any contract awarded under the referenced solicitation or extension thereof will be immediately reported by the Consultant to the Director of Contracts, NJ TRANSIT Corporation, One Penn Plaza East, Newark, NJ 07105.

I understand that, after award of a contract to the Consultant, it is determined that the Consultant has shifted services declared above to be provided within the United States to sources outside the United States prior to a written determination by the Contracting Officer, that the services cannot be performed in the United States, the Consultant shall be deemed in breach of contract, which contract will be subject to termination for cause pursuant to Article 14 of the Professional Services Agreement.

I further understand that this Certification is submitted on behalf of the Consultant in order to induce NJ TRANSIT to accept a proposal, with knowledge that NJ TRANSIT is relying upon the truth of the statements contained herein.

I certify that, to the best of my knowledge and belief, the foregoing statements by me are true. I am aware that if any of the statements are willfully false, I am subject to punishment.

Consultant: _____
[Name of Organization or Entity]

By: _____ Title: _____

Print Name: _____ Date: _____

NEW JERSEY TRANSIT CORPORATION
REQUEST FOR PROPOSAL (RFP) NO. 16-001

EXHIBIT M

PUBLIC LAW 2005 Vendor Certification and CHAPTER 271 Political
Contribution Disclosure Form Contract Reference: _____ Vendor:

At least ten (10) days prior to entering into the above-referenced contract, the Vendor must complete this Certification and Disclosure Form, in accordance with the directions below and submit it to the State contact for such contract.

Please note that the disclosure requirements under Public Law 2005, Chapter 271 are separate and different from the disclosure requirements under Public Law 2005, Chapter 51 (formerly Executive Order 134). Although no vendor will be precluded from entering into a contract by any information submitted on this form, a vendor's failure to fully, accurately and truthfully complete this form and submit it to the appropriate State agency may result in the imposition of fines by the New Jersey Election Law Enforcement Commission.

Disclosure

Following is the required Vendor disclosure of all Reportable Contributions made in the twelve (12) months prior to and including the date of signing of this Certification and Disclosure to: (i)
RFP 16-001 **44** **FEDERAL**

any State, county, or municipal committee of a political party, legislative leadership committee, candidate committee of a candidate for, or holder of, a State elective office, or (ii) any entity that is also defined as a “continuing political committee” under N.J.S.A. 19:44A-3(n) and N.J.A.C. 19:25-1.

The Vendor is required to disclose Reportable Contributions by: the Vendor itself; all persons or other business entities owning or controlling more than 10% of the profits of the Vendor or more than 10% of the stock of the Vendor, if the Vendor is a corporation for profit; a spouse or child living with a natural person that is a Vendor; all of the principals, partners, officers or directors of the Vendor and all of their spouses; any subsidiaries directly or indirectly controlled by the Vendor; and any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the Vendor, other than a candidate committee, election fund, or political party committee.

“Reportable Contributions” are those contributions that are required to be reported by the recipient under the “New Jersey Campaign Contributions and Expenditures Reporting Act,” P.L. 1973, c.83 (C.19:44A-1 et seq.), and implementing regulations set forth at N.J.A.C. 19:25-10.1 et seq. As of January 1, 2005, contributions in excess of \$300 during a reporting period are deemed “reportable.”

Rev: 02/07/2006 DPP c271 C&D Page 1 of 2 PUBLIC LAW 2005 CHAPTER 271 Vendor:	Date of Contribution	Amount of Contribution	Contributor's Name
<hr/> ____ Name and Address of Committee to Which Contribution Was Made			
Indicate " <u>none</u> " if no Reportable Contributions were made. Attach Additional Pages As Needed			