KOSCIUSZKO BRIDGE PROJECT – PHASE 1  
(BIN 1075699)

PIN X731.24, Contract D900011

CONTRACT DOCUMENTS  
PART 3

PROJECT REQUIREMENTS

Final August 27, 2013
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SECTION 1 GENERAL

1.1 PURPOSE

This Part 3 establishes the basic Requirements of the Project. The Contract Documents, NYSDOT standard drawings, manuals and specifications shall be followed for the preparation of design and construction documents and the execution of the Work. Any proposed deviation from the Contract Documents shall be submitted to the Department’s Design Quality Assurance Engineer for review. Any proposed material changes shall be submitted in accordance with Part 5 – Special Provision SP 16 - Materials Approval Procedures for Design-Build Projects.

The Design shall be in conformance with the 2008 edition of the New York State Department of Transportation, Standard Specifications, with addenda, issued by the Office of Engineering, current as of the date of Proposal submission, except as noted in these Contract Documents.

The Design-Builder shall prepare Design Plans and Project Specifications, for Work Items not covered by the NYSDOT Standard Specifications or applicable Special Specifications, for the Project in accordance with NYSDOT standards for general content and format, and in conformance with the Contract.

Design is to be directed toward minimum maintenance expense and minimum disruption of local access and communities. Design and construction is also to be directed to minimize the number of construction truck trips on local streets to the maximum extent possible by utilizing barges and/or rail to transport materials and equipment to and from the project site.

All designs shall be prepared in U.S. Customary units.

1.2 SCOPE

The Design-Builder shall be responsible for complying with all terms of the Contract Documents, the Final Environmental Impact Statement (FEIS), Record of Decision (ROD) and the Reevaluation Statement as they apply to this Project. The Design-Builder shall thoroughly examine, review and understand all terms and conditions of the Contract Documents prior to the commencement of the Project. The Design-Builder shall be responsible for determining the full Scope of the Project by undertaking a thorough examination of the Contract Documents, the FEIS, ROD, the Reevaluation Statement, all information on the project website, and the Site. Any question, conflicts or ambiguities in these documents that affect the Design-Builder’s proposal shall be brought to the attention of the Department for clarification.

1.3 SCOPE OF WORK – MAJOR ITEMS

The Project will consist of the replacement of the Kosciuszko Bridge in Kings and Queens County, New York. The Project will include the work outlined below:

A) Design and Construction of:
• New Eastbound Main Span
• New Eastbound Brooklyn and Queens Approaches
• New Eastbound and Westbound Brooklyn Connector including the entrance and exit ramps (BIN 1075699A and BIN 1075699B)
• New Eastbound and Westbound Queens Connector including LIE Interchange Ramps
  • New Eastbound and Westbound Portion of Meeker Avenue Viaduct
  • New Pedestrian Bridge (at Laurel Hill Boulevard), Queens (BIN 1-06589-0)

B) Preliminary Design of:
• New Westbound Main Span
• New Westbound Brooklyn and Queens Approaches
• New Bikeway/Walkway

Preliminary Design of the Westbound structures shall include design for wind loads and wind tunnel testing and additional geotechnical investigation and design.

C) Demolition and removal of:
• Existing Main Span
• Existing Brooklyn and Queens Approaches
  • Existing Brooklyn Connector including the existing entrance and exit ramps ((BIN 1075699A and BIN 1075699B))
• Existing Queens Connector
• Existing Portion of Meeker Avenue Viaduct
  • Existing Buildings in acquired Right-of-Way
  • Existing Pedestrian Bridge (at Laurel Hill Boulevard), Queens (BIN 1-06589-0)

D) Design, erection, maintenance and removal of temporary bridges required to maintain six lanes of BQE traffic through-out construction with no detours or diversion of traffic to local streets;

E) Reconstruction and realignment of local streets within the project limits including but not limited to the realignment of Cherry Street between Vandervoorst Avenue and Stewart Avenue and the re-opening of Stewart Avenue from Thomas Street to Anthony Street;

F) Design and construction of new bridge drainage system;
G) Design and installation of new highway signage and pavement markings and installation of local street pavement markings, signage and traffic signals and ITS;

H) Design and installation of lighting for the new bridge as well as for local streets impacted by the project and preliminary lighting design for the westbound structure and the bikeway/walkway;

I) Work Zone Traffic Control;

J) Streetscaping improvements on reconstructed and realigned local streets;

K) Relocation and/or protection of existing utilities as defined in the Part 4 – Utilities;

L) Design and Construction of Retaining Walls;

M) Coordination with the MTA regarding relocation of existing Bus Stops as required;

N) Construction of cap on portions of the Former Phelps Dodge Refining Site (the Department to provide approved final design plans);

O) Design, Construction and Removal of any temporary docking facilities required if barges are utilized to transport construction materials to and from the site;

P) Means and methods for the handling and disposal of Contaminated and Hazardous Materials;

Q) Means and methods that minimize the number of construction truck trips on local streets to the maximum extent possible by utilizing barge and/or rail to transport materials to and from the project site; and

R) Coordination with the Department’s public outreach efforts.

If the Department chooses to exercise the Option, the Project will include the Base Project scope of work described above as well as the Design-Build services for a new westbound Cable-Stayed Main Span. The Option shall be designed and constructed to be fully compatible with the eastbound structure and be in compliance with the requirements of the Contract Documents.

1.4 COORDINATION WITH OTHER PROJECTS

The Design-Builder shall coordinate the Work with other projects occurring within or adjacent to the Contract limits. It is expected that the following projects will be in progress during construction of this Contract:

Project Description: Interim Repair Contract of the existing Kosciuszko Bridge XM13.52

WZTC: Short-term lane closures
Anticipated Dates of Work: October 2013 to December 2014
(Additional bridge maintenance repair work as needed from October 2013 to December 2016)

Project Description: Inspection of the existing Kosciuszko Bridge
WZTC: Short-term lane closures
Anticipated Dates of Work: September to November each year of the Design-Build Contract

Project Description: EPA – Newtown Creek Remedial Investigation and Feasibility Study – Field Work
Anticipated Dates of Work: March 2014 to February 2015

Project Description: EPA – Newtown Creek Dredging Contract
Anticipated Dates of Work: 2017

Project Description: Construction of the new Sgt. Dougherty Playground
Anticipated Dates of Work: Summer 2015 to Summer 2017

1.5 DESIGN CODES AND MANUALS

In addition to this Part 3, Project Requirements, the Design-Builder must comply with all other applicable engineering codes and standards, including those of the various Federal, State, and local jurisdictions.

Codes, standards and/or manuals in effect on the date of Contract execution shall be applicable to the Project. Responsibility for design remains with the Design-Builder in accordance with the terms and conditions of the Contract.

All work shall conform to current versions of the following documents. In the event of a conflict between the codes and reference documents listed below, the more stringent requirements, as determined by the Department, shall apply.

**AASHTO:**

- A Guide for Accommodating Utilities within Highway Right-of-Way
- A Policy on Design Standards - Interstate System
- A Policy on Geometric Design of Highways and Streets
New York State Department of Transportation

- Bridge Security Guidelines
- Construction Handbook for Bridge Temporary Works
- Guide for the Design of Pavement Structures (with Supplement)
- Guide for the Development of Bicycle Facilities
- Guide Specifications for Structural Design of Sound Barriers
- Guide Specifications for Bridge Temporary Works
- Guide Specifications for Design and Construction of Segmental Concrete Bridges
- Guide Specification for Highway Bridge Fabrication with HPS70W (HPS 485W) Steel
- Guide Specifications for Horizontally Curved Steel Girder Highway Bridges
- Guide Specifications for LRFD Seismic Bridge Design
- Guide Specifications for Seismic Isolation Design
- Guide Specifications - Thermal Effects in Concrete Bridge Superstructures
- LRFD Bridge Design Specifications
- LRFD Bridge Construction Specifications
- LRFD Guide Specifications for Design of Pedestrian Bridges
- Manual for Assessing Safety Hardware (MASH)
- Manual for Bridge Evaluation
- Manual on Subsurface Investigations
- Model Drainage Manual
- Mechanistic-Empirical Pavement Design Guide (MEPDG)
- Roadside Design Guide
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals

ACI:
- 117 Specification for Tolerances for Concrete Construction and Materials
- 207 Guide to Mass Concrete
• 318 Building Code Requirements for Structural Concrete and Commentary
• 305 Guide to Hot Weather Concreting
• 365 Service-Life Prediction - State-of-the-Art Report

**AEMA:**
• Recommended Performance Guidelines

**AISC:**
• Steel Construction Manual

**ANSI:**
• ANSI/AASHTO/AWS D1.5 Bridge Welding Code
• ANSI/IES Approved Recommended Practice for Roadway Lighting, RP-8-00
• ANSI/IES Approved Recommended Practice for Roadway Sign Lighting, RP-19-01

**AREMA – American Railway Engineering and Maintenance of Way Association**
• AREMA Manual for Railway Engineering

**ASCE:**
• Guidelines for the Design of Cable-Stayed Bridges

**Asphalt Institute:**
• Drainage of Asphalt Pavement Structures

**ASTM American Society of Testing Materials**

**FAA:**
• Advisory Circular 70/7460-1K, Obstruction Marking and Lighting,

**FDNY:**
• New York City Fire Code

**Federal Geographic Data Committee:**
• GIS Standards

**FHWA:**
• Design Guidelines for Arch and Cable-Supported Signature Bridges
• Geotechnical Engineering Publications
• Hydraulic Publications

• Manual of Uniform Traffic Control Devices (MUTCD)

• Pavement Publications


• Seismic Retrofitting Manual for Highway Bridges

• Standard Highway Signs and Markings (SHSM) Book

• **Steel Bridge Design Handbook**

  • Technical Advisory T6640.8A, 10/30/87 (environmental analyses)

  • Traffic Monitoring Guide

**MCEER:**

• Seismic Retrofitting Manual for Highway Structures: Part 1-Bridges,

**NFPA:**

• 70 – National Electrical Code (NEC)

• 70E Standard for Electrical Safety in the Workplace

• 502: Standard for Road Tunnels, Bridges, and Other Limited Access Highways

• 780 Standard for the Installation of Lightning Protection Systems.

**NYCDEP**

• Sewer Design Standards

• Title 15 of the Rules of the City of New York Chapter 20, Rules Governing and Restricting the Use and Supply of Water

• Title 15 of the Rules of the City of New York Chapter 31, Rules Governing House/Site Connections to the Sewer System

**NYCDOT:**

• Bureau of Traffic (Division of System Engineering) Standard Details

• Street Design Manual

• Department of Design and Construction Design Guidelines and Directives

• Standard Details of Construction
NYSDEC:
- Rules Governing Design and Construction of Private Sewers or Private Drains
- Sewer Design Standards
- Standards and Specifications for Erosion and Sediment Control (SESC)
- Stormwater Management Design Manual (SMDM)

NYSDOT:
- Access Management Requirements
- Annual Report titled "Axle Factor Update"
- Approved Materials List
- Bridge Detail Sheets US Customary (NYSDOT BD Sheets)
- Bridge Inspection Manual
- Bridge Inventory Manual
- Bridge Manual
- Bridge Safety Assurance Seismic Vulnerability Manual
- CADD Standards and Procedure Manual
- Comprehensive Pavement Design Manual
- Consultant Instructions
- Design Consultant Manual
- Engineering Bulletins
- Engineering Instructions and Directives
- Environmental Procedures Manual (EPM) / The Environmental Manual (TEM)
- General Design and Construction Requirements for Occupancies
- Geotechnical Engineering Bureau Manuals and Publications
- Guidelines For Design and Construction of Expanded Polystyrene Fill as a Lightweight Soil Replacement GEM-24
- GCP-17, Procedure for the Control of Granular Materials
• Highway Design Manual
• Land Surveying Standards and Procedures Manual
• LRFD Bridge Design Specifications (LRFD Blue Pages)
• Manual for Uniform Record Keeping
• New York State Supplement to the Manual on Uniform Traffic Control Devices
• Overhead Sign Structure Design Manual
• Policy on Highway Lighting
• Prestressed Concrete Construction Manual
• Project Development Manual
• Reference Marker Manual
• Rules and Regulations Governing the Accommodation of Utilities within the State Highway Right of Way
• Special Specifications
• Standard Sheets
• Standard Specifications for Construction and Materials
• Steel Construction Manual (SCM)
• Structures Design Advisories
• Structures Technical Advisories
• Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways
• U.S. Customary Standard Sheets
• Work Zone Traffic Control Manual

The above is a partial listing of applicable NYSDOT Engineering Manuals and Guidelines. The Design-Build shall perform the Work in conformance with all NYSDOT Engineering Manuals and Guidelines current at the time of award.

USCG:
• 33 CFR 118- Bridge Lighting and Other Signals
OSHA:
• PART 1926 - Safety And Health Regulations For Construction

PTI:
• Recommendations for Pre-stressed Rock and Soil Anchors
• Recommendations for Stay Cable Design, Testing and Installation

SPC:
• Society of Protective Coatings Standards

USDOJ:
• ADA Accessibility Guidelines for Buildings and Facilities

USDOT:
• ADA Standards for Transportation Facilities

The Design-Builder may utilize the engineering data provided in Part 7 – Engineering Data. However, the Design-Builder has the responsibility to validate any information it uses and the Design-Builder has the ultimate responsibility for the performance of the Project.

1.6 REQUIREMENTS

The Design-Builder shall develop its Definitive Design, Design Plans and Project Specifications in conformance with this Part 3 – Project Requirements.

The specific requirements in this Part 3 – Project Requirements may be more stringent and shall govern over the criteria given in the Standards. However, where a specific requirement in this Part 3 – Project Requirements is more stringent than the criteria specified in a Standard, said specific requirement shall become the basis for determining compliance. Non-standard features needing justification and FHWA approval are defined as those not meeting the criteria cited in the Standards listed in this Part 3 – Project Requirements and not previously approved in the Final Environmental Impact Statement (FEIS) or Reevaluation Statement.

1.7 DELIVERABLES

The subsection entitled “deliverables” in each section of this Part 3 – Project Requirement establishes the Department’s expectations. These shall supplement the Review Plan and consultation and written comment cycles cited in DB §111-7 through DB §111-14. The Design-Builder may submit deliverables for the Department’s consideration or consultation and written comment in addition to those requested. The Design-Builder shall include such additional submittals in its review plan and revise the review plan as necessary to incorporate sufficient advance notice to the Department.
Unless otherwise indicated in a specific section of this *Part 3 – Project Requirements*, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Bentley Microstation .dgn format and Bentley InRoads.alg and dtm format, Microsoft Word®, Microsoft Excel®, ArcMAP, or searchable portable document format (PDF) files, with no copy or password protection on the file content, unless otherwise indicated in a specific section of this Part 3 - Project Requirements or a Standard cited in a specific section of this Part 3 - Project Requirements.

### 1.8 INDICATIVE PLANS

The Indicative Plans provided to the Design-Builder in *Part 6 – RFP Plans*, in conjunction with, the Structure Justification Reports convey a potential solution to the Project’s needs that the Design-Builder may choose to consider in developing its design. The designs presented herein have been developed to a point sufficient to determine the impacts of the project, the basis for permit applications and to determine the extent of property acquisitions required. Note that the Work Zone Traffic Control Indicative Plans were developed based on a previous four contract Design-Bid-Build scheme and therefore do not reflect the current scope of the Design-Build Project. The Indicative Plans are not mandatory, with the exception of elements specifically mentioned elsewhere in this Part 3. The Design-Builder shall develop design solutions that achieve the Project Requirements.

### 1.9 DIRECTIVE PLANS

The Directive Plans provided to the Design-Builder in *Part 6 – RFP Plans are mandatory.*

### 1.10 ENVIRONMENTAL RE-EVALUATION

Decisions to deviate from the Indicative Plans may require a review in relation to the FEIS, Reevaluation Statement and other Environmental Approvals.

If it is determined that the proposed deviations require a further reevaluation of the FEIS or other Environmental Approvals, the Design-Builder shall revise the plans such that they are in conformance with all existing Environmental Approvals. Such revisions shall be carried out at no additional cost to the Department.

### 1.11 DOCUMENT CONTROL

The Design-Builder shall follow the procedures outlined in Part 5 Special Provision SP15 – Document Control.

### 1.12 SCHEDULE OF PROJECT COMPLETION
All work on the design and on the construction shall be completed in accordance with Part 1, DB Agreement, Article 2, Contract Time, but in no case shall the Project Completion Date be later than:

- December 30, 2017, if the Base Project has been selected for Award; or
- October 30, 2018, if the Base Project plus the Option has been selected for Award.

### 1.13 WORK PAYMENT SCHEDULE

Progress Payments will be made as each Work Item is completed to the satisfaction of the Department’s Construction Quality Assurance Engineer. Progress payments shall be subject to the requirements of DB §109-2.

#### WORK PAYMENT SCHEDULE

(Base Project)

<table>
<thead>
<tr>
<th>WORK ITEM</th>
<th>MAXIMUM PERCENT OF LUMP SUM PRICE</th>
<th>PERCENT OF LUMP SUM PRICE (To be completed by D-B)(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear ROW in Brooklyn (Including Building Demo)</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Clear ROW in Queens (Including Building Demo)</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Reconstruct existing beds of street in Brooklyn</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Reconstruct existing beds of street in Queens</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Relocate existing utilities in Brooklyn</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Relocate existing utilities in Queens</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Main Span - Superstructure</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Main Span - Substructure</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Brooklyn Approach - Superstructure</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Brooklyn Approach - Substructure</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Queens Approach - Superstructure</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Construct new EB Queens Approach - Substructure</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Construction new Brooklyn Connector - Superstructure</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Construction new Brooklyn Connector - Substructure</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Construction new Queens Connector - Superstructure</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Construction new Queens Connector - Substructure</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Erection and demolition of temporary bridge - Brooklyn</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Erection and demolition of temporary bridge - Queens</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>
Construct new bridge drainage sewer - Brooklyn & 1% 
Construct new bridge drainage sewer - Queens & 1% 
Demolition Main Span & 2% 
Demolition Brooklyn Approach & 5% 
Demolition Queens Approach & 3% 
Demolition Brooklyn Connector & 3% 
Demolition Queens Connector & 1% 
Streetscaping improvements - Brooklyn & 0.5% 
Streetscaping improvements - Queens & 0.5% 
Punch list work, Site Cleanup and Restoration, & 4% (fixed) 4% (fixed) 
Final Acceptance (Per DB §109-12.1) & 2%(fixed) 2%(fixed) 
Final Agreement (Per DB §109-12.2) & 4%(fixed) 4%(fixed) 

Note: (1) See Work Payment Schedule included in ITP, Appendix D.

### WORK PAYMENT SCHEDULE

(Base Project Plus Option)

<table>
<thead>
<tr>
<th>WORK ITEM</th>
<th>MAX. % OF LUMP SUM PRICE</th>
<th>PERCENT OF LUMP SUM PRICE(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear ROW in Brooklyn (Including Building Demo)</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Clear ROW in Queens (Including Building Demo)</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Reconstruct existing beds of street in Brooklyn</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Reconstruct existing beds of street in Queens</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Relocate existing utilities in Brooklyn</td>
<td>2%</td>
<td></td>
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<tr>
<td>Relocate existing utilities in Queens</td>
<td>1%</td>
<td></td>
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<tr>
<td>Construct new EB Main Span - Superstructure</td>
<td>8%</td>
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<tr>
<td>Construct new EB Main Span - Substructure</td>
<td>6%</td>
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<tr>
<td>Construct new EB Brooklyn Approach - Superstructure</td>
<td>10%</td>
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<tr>
<td>Construct new EB Brooklyn Approach - Substructure</td>
<td>8%</td>
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<td>Construct new EB Queens Approach - Superstructure</td>
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<td>Construct new EB Queens Approach - Substructure</td>
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<td>Construct new WB Main Span - Superstructure</td>
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<td>Construction new Brooklyn Connector - Superstructure</td>
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<td>Construction new Queens Connector - Superstructure</td>
<td>4%</td>
<td></td>
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<tr>
<td>Construction new Queens Connector - Substructure</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Erection and demolition of temporary bridge - Brooklyn</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Erection and demolition of temporary bridge - Queens</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Construct new bridge drainage sewer - Brooklyn</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Construct new bridge drainage sewer - Queens</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Demolition Main Span</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Demolition Brooklyn Approach</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Demolition Queens Approach</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Demolition Brooklyn Connector</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Demolition Queens Connector</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Streetscaping improvements - Brooklyn</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>Streetscaping improvements - Queens</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>Punch list work, Final Cleanup (Per DB § 104-12) and Restoration</td>
<td>4% (fixed)</td>
<td>4% (fixed)</td>
</tr>
<tr>
<td>Final Acceptance (Per DB §109-12.1)</td>
<td>2%(fixed)</td>
<td>2%(fixed)</td>
</tr>
<tr>
<td>Final Agreement (Per DB §109-12.2)</td>
<td>4%(fixed)</td>
<td>4%(fixed)</td>
</tr>
</tbody>
</table>

Note: (1) See Work Payment Schedule included in ITP, Appendix D.
SECTION 2 PROJECT MANAGEMENT

2.1 DESIGN-BUILDER’S ROLE

The Design-Builder shall have responsibility for controlling and managing the Work. This includes the Design-Builder’s responsibility for quality management as defined in the Contract Documents, Part 2 - DB §§ 111, 112 and 113.

2.2 DESIGN-BUILDER’S KEY PERSONNEL

The positions listed below shall be the Design-Builder’s key personnel for the Project. The Design-Builder shall provide personnel that meet these minimum requirements. The Design-Builder’s Project Manager shall be the Design-Builder’s representative and single point of contact.

A) **Project Manager:** Shall have a minimum of 20 years demonstrated experience in transportation construction and should have 10 years demonstrated experience as a project manager for construction of major transportation and infrastructure projects with similar type of work, and complexity as this Project, including projects constructed in urban areas, with environmental sensitivity, compressed timeliness and community information requirements. Such experience in construction and management-of-construction should include at least one (1) construction project having a construction value in excess of $200,000,000. The Project Manager, who preferably should have Design-Build experience and have extensive project management experience, can hold only this one Key Personnel position. It is preferred, but not required, that this individual be licensed as a Professional Engineer in the State of New York.

B) **Design Manager:** Shall be licensed as a Professional Engineer in the State of New York, shall be an owner or employee of the design firm and shall have a minimum of 15 years demonstrated experience in managing design for multi-disciplinary infrastructure, highway and bridge projects of similar scope and complexity as this Project. The Design Manager, who should have Design-Build experience, should have specific experience with highway design, bridge design (preferably including steel and concrete superstructures, continuous multi-span bridges, curved bridges and Cable-Stayed bridges), complex foundations, earth retaining structures and drainage structures, on projects of similar type.

C) **Bridge (Main Span) Lead Designer:** Shall be licensed as a Professional Engineer in the State of New York and shall have demonstrated at least 15 years experience in bridge design and shall have completed the design of at least one (1) Cable-Stayed structure of similar span length and scope that has been successfully constructed.

D) **Construction Manager:** Should preferably be licensed as a Professional Engineer in the State of New York and should have a minimum of 15 years of demonstrated construction experience in civil works projects with experience in managing the site work
of bridge construction projects. Experience should include work of the nature anticipated in the Project, and should preferably include Design-Build contracts

E) **Project Superintendent:** Should have at least 15 years of demonstrated experience overseeing work on major bridge and highway construction projects having similar type of work, and complexity as this Project, including projects with compressed schedule having multiple operations ongoing simultaneously. Experience as a Project Superintendent should include at least one (1) project having a construction value in excess of $100,000,000. Experience should include directing and coordinating the activities of a contractor’s workforce, including all subcontractors, ensuring work progressed according to schedule, within budget and that material and equipment were delivered to the site on time.

F) **Quality Manager:** Should have demonstrated experience in bridge design and major infrastructure construction with at least 10 years experience in quality assurance and quality control activities, including preparation and implementation of Quality Plans and procedures for design and construction. The Quality Manager can hold only this Key Personnel position. The Quality Manager should have experience of quality systems based on ISO 9001, and preferably should have experience with the quality systems of the Department.

G) **Resident Engineer:** Shall be licensed as a Professional Engineer in the State of New York and shall have demonstrated at least 15 years experience in major bridge and highway construction inspection and 10 years experience as a Resident Engineer. Experience shall include at least one (1) construction project having a construction value in excess of $100,000,000. Experience with NYSDOT projects preferred.

H) **Safety Manager:** The Design-Builder shall provide a Safety Manager who shall report directly to the Project Manager and shall be available to the site for the duration of the Project. The Safety Manager shall have the authority to stop Work when unsafe conditions are present. The Safety Manager shall have not less than 15 years of experience in the management of complex infrastructure projects, which shall include at least 5 years of major construction management of major bridges. Must be familiar with FHWA work zone safety regulations and must have at least 10 years of experience working with roadway work zone safety and OSHA regulation.

I) **DBE / Civil Rights Compliance Manager:** The Design-Builder shall provide a Project DBE / Civil Rights Compliance Manager who shall have a minimum of 10 years of experience in civil rights compliance and who shall be responsible for monitoring all Civil Rights Compliance requirements and achieving the DBE goals and EEO goals described in the Contract documents. The DBE / Civil Rights Compliance Manager shall have knowledge of: the principles and practices of Contract compliance for DBE programs and related Federal, State, and local rules and regulations, including the M/WBE Program (managed by NYS’s Economic Development Corporation), and DBE program development, evaluation and management. The DBE / Civil Rights Compliance Manager shall also have the ability to organize, implement, and direct a DBE program for NYSDOT; consult with and advise management on a wide variety of DBE and contract
J) **Risk Manager:** Should have demonstrated experience in bridge design and major infrastructure construction with at least 10 years experience in risk management activities, including preparation and implementation of Risk Management Plans, Risk Registers, and procedures for managing, mitigating and avoiding risks. The Risk manager should hold only this Key Personnel position. The Risk Manager preferably should have a certificate of completion of training in Risk Management from an accredited educational institution, or membership in the Institute of Risk Management or similar professional risk management organization.

K) **Foundations Lead Designer:** Shall be licensed as a Professional Engineer in the State of New York and should have demonstrated at least 15 years experience in foundation design, including deep foundations, high capacity foundations, seismic design of drilled shafts and piles, and bridge foundations.

L) **Lead Demolition Engineer:** Shall be licensed as a Professional Engineer in the State of New York and shall have demonstrated at least 15 years experience in the development and execution of demolition plans. Experience related to sequenced unloading of bridges is particularly valuable.

M) **Bridge (Approaches & Connectors) Lead Designer:** Shall be licensed as a Professional Engineer in the State of New York and shall have demonstrated at least 15 years experience in bridge design, including steel and concrete superstructures, continuous multi-span bridges, and curved bridges. Experience shall include at least one (1) project having a construction value in excess of $30,000,000.

N) **Lead Civil Engineer:** Shall be licensed and currently registered as a Professional Engineer in the State of New York and shall have at least 15 years experience in civil roadway design, including Work Zone Traffic Control. NYSDOT experience is preferred. Experience shall include at least one (1) project having a construction value in excess of $30,000,000.

O) **Seismic Specialist:** The Design-Builder shall provide a Seismic Specialist who shall be a qualified Professional Engineer licensed in the State of New York. The seismic specialist shall have a minimum of 15 years practicing earthquake engineering. The seismic specialist shall have a background in both structural and geotechnical disciplines. The prior project experience of the Seismic Specialist shall include at a minimum: ground motion evaluation, spatial variability, and soil structure interaction effects, liquefaction analyses, evaluation of pile demonstration programs and derivation of soil-pile parameters, finite element modeling of complete soil-pile-structure interaction including pile-to-pile interaction and kinematic effects.
P) **Environmental Compliance Manager:** Shall have a minimum of 10 years demonstrated experience in the environmental permitting process and associated requirements, environmental design, and construction management and compliance on large, complex transportation projects with complex environmental permitting requirements and commitments. This experience should be in relation to federal permitting requirements and environmental regulatory agencies and should preferably also include experience of New York State permitting requirements. The Environmental Compliance Manager should have experience in managing others in environmental activities, with highway and bridge engineering drawings and concepts, and working cooperatively and effectively with design engineers and construction staff.

Q) **Lead Architectural Designer:** Shall be a licensed architect registered in the State of New York and should have at least 15 years demonstrated experience as a bridge architectural designer, including experience as lead architect.

R) **Lead ITS Engineer:** Shall be licensed and currently registered as a Professional Engineer in the State of New and shall have at least 15 years experience in the design of Intelligent Transportation Systems (ITS) for transportation infrastructure projects;

S) **Lead Public Involvement Person:** Should have a minimum of 10 years experience addressing general project related questions from the public and stakeholders on transportation infrastructure projects having similar scope and complexity. Questions from elected and public officials, and the media will be addressed by NYSDOT.

T) **Geotechnical Instrumentation Engineer:** The Design-Builders shall provide a Project Geotechnical Instrumentation Engineer. The Geotechnical Instrumentation Engineer shall be a licensed Professional Engineer in the State of New York and shall have at least 10 years of experience in instrumentation work similar to the scope of that in this Project. The Geotechnical Instrumentation Engineer experience shall include:

1) Demonstrated competence in geotechnical engineering area of practice.

2) Experience in installing and monitoring geotechnical and structural instruments for similar ground condition and type of structures in this project. Instrumentation type shall include: seismographs, piezometers, settlement platforms, automated total stations, tilt meters, beam sensors, fiber optics, inclinometers, crack gauges, and data acquisition systems.

3) Experience in analyses, evaluation, and interpretation of geotechnical and structural instrumentation data.

4) Reference to two projects of similar magnitude where the proposed Geotechnical Instrumentation Engineer has performed similar duties and responsibilities.

2.3 **MANAGEMENT PLANS AND SCHEDULES**
2.3.1 Management Plans and Schedule Requirements

The Design-Builder shall submit to the Department’s Project Manager, for review and comment or approval (as applicable), all the Management Plans listed in Table 2.3-1. Following receipt of the Department’s acceptance or approval of the individual Management Plans, as described in the Contract Documents, the Management Plans shall be resubmitted to the Department’s Project Manager as the Design-Builder’s consolidated Project Management Plan for the Project.

Table 2.3-1 – Project Management Plans

<table>
<thead>
<tr>
<th>Management Plan Title</th>
<th>Contract Document Reference</th>
<th>Initial Plan to be Submitted with Proposal</th>
<th>Successful Proposer Deadline</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce Participation Plan</td>
<td>DB §102-9.4B</td>
<td>No</td>
<td>45 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Safety Plan</td>
<td>DB §107-7.5</td>
<td>No</td>
<td>30 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Site Security Plan</td>
<td>DB §107-8.2</td>
<td>No</td>
<td>60 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Quality Control Plan</td>
<td>DB §113</td>
<td>Yes</td>
<td>25 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Overall Design-Build Team Organization Plan</td>
<td>Project Requirement Section 2.3.6</td>
<td>Yes</td>
<td>25 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Design Management Plan</td>
<td>Project Requirement Section 2.3.7</td>
<td>Yes</td>
<td>30 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Construction Management Plan</td>
<td>Project Requirement Section 2.3.8</td>
<td>Yes</td>
<td>45 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Transportation Management Plan</td>
<td>Project Requirement Section 2.3.9</td>
<td>Yes</td>
<td>30 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Risk Management Plan</td>
<td>Project Requirement Section 2.3.10</td>
<td>Yes</td>
<td>45 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Performance Management Plan</td>
<td>Project Requirement Section 2.3.11</td>
<td>No</td>
<td>60 Days after NTP</td>
<td></td>
</tr>
<tr>
<td>Public Involvement Plan (PIP) Support Plan</td>
<td></td>
<td>No</td>
<td>30 Days after NTP</td>
<td></td>
</tr>
</tbody>
</table>

2.3.2 Workforce Participation Plan

The Design-Builder shall develop a Workforce Participation Plan to meet the requirements of DB §102-9.4B and submit it to the Department’s Project Manager for review and comment.
2.3.3 Safety Plan

The Design-Builder shall develop a Safety Plan to meet the requirements of Part 2 DB §107-7.5 and submit it to the Department’s Project Manager for written approval in accordance with DB §107-7.8.

2.3.4 Site Security Plan

The Design-Builder shall update the Initial Site Security Plan submitted with the Technical Proposal, develop it, as necessary to meet the requirements of DB §107-8.1 and Project Requirement, Section 17, and submit it to the Department’s Project Manager for written approval in accordance with DB §107-8.2.

2.3.5 Quality Control Plan

The Design-Builder shall use the Initial Quality Control Plan submitted with the Technical Proposal and develop it, as necessary, to include the content required by Part 2, and submit it to the Department’s Project Manager for written approval in accordance with Part 2 DB §113. The Quality Control Plan shall be revised and resubmitted to the Department’s Project Manager within 14 calendar days of receipt of the Department’s written comment and resubmitted as required until Approved by the Department’s Project Manager. No offsite fabrication Work or Construction Work shall commence before the Quality Control Plan has been approved by the Department’s Project Manager.

2.3.6 Overall Design-Build Team Organizational Plan

The Design-Builder shall update the Initial Overall Design-Build Team Organization Plan describing the design and construction organizational arrangements it has implemented. The organizational arrangements described should clearly identify responsibilities and reporting lines of staff, particularly relating to Key Personnel.

The Design-Builder shall include an organization chart (on an 11”x17” sheet of paper), illustrating the Proposer’s Key Personnel and their prospective roles and responsibilities, as well as other principal participants and any known Subcontractors having a material role in the Project’s design Work, design check Work, construction Work and construction inspection Work. The Design-Builder shall include the resumes (maximum of two 8.5” x 11” pages per person) for all personnel listed in the organization charts.

The Design-Builder shall describe the interrelationships and interfaces between each discipline within the Proposer’s organization (e.g., design, design check, shop drawing preparation and review, construction, and quality management).

The Overall Design-Build Team Organization Plan shall also describe the interrelationships and interfaces between the Design-Builder’s organization, the Department and other governmental agencies, utility owners, stakeholders, businesses, the public and other contractors working in the vicinity and impacted by the construction of the Project. This description shall, at a minimum, address the following activities:
A) Reviews of plans and permits;

B) Progress, workshop, partnering and utility coordination meetings; and

C) Construction, engineering and inspection activities.

2.3.7 Design Management Plan

The Design-Builder shall update the Initial Design Management Plan submitted with its Proposal and submit it to the Department’s Project Manager for Review and Comment. The Design Management Plan shall describe the Design-Builder’s design management concept for the Project. The description shall, at a minimum, include: (i) the structure of the Design-Builder’s design organization; (ii) the names of the individuals the Design-Builder has committed to use in its design check Work; (iii) the design and check sequencing; and (iv) the resources and personnel needed for timely implementation of design and design check activities taking into account construction schedule requirements.

The Design Management Plan shall also describe the Design-Builder’s approach to design deliverables, including definition, packaging of Design Units, submission, review, approval and issue for construction, together with the names of the key individuals involved in the process. The Design Management Plan shall also describe any fast track design item(s) that may be proposed.

The Design-Builder shall include an organization chart (on an 11”x17” sheet of paper) titled “Design Organization”, illustrating the design organization, the responsibilities and structure of the design staff, independent design check staff, down to and including discipline leads and the staff positions proposed in each discipline. The Design Organization chart shall identify individuals assigned to undertake QC reviews and independent checks of the design.

2.3.8 Construction Management Plan

The Design-Builder shall update the Initial Construction Management Plan submitted with its Proposal and submit it to the Department’s Project Manager for Review and Comment. The Construction Management Plan shall describe the Design-Builder’s construction management concept. The description shall, at a minimum, include: (i) the structure of the Design-Builder’s construction organization; (ii) the resources and personnel needed to effectively and efficiently manage the Project during the construction phase; (iii) the management and integration of Subcontractors and suppliers; and (iv) the management of the construction inspection.

The Design-Builder shall include an organization chart (on an 11”x17” sheet of paper) titled “Construction Organization”, illustrating the construction organization, indicating the responsibilities and structure of the construction staff, down to and including field superintendents and the staff positions proposed under each field superintendent for all shifts. The Design-Builder shall also describe the proposed Construction Inspection staffing to be provided throughout construction.
2.3.9 Transportation Management Plan

2.3.9.1 Traffic Management Strategy:

The Design-Builder shall develop and maintain a comprehensive Transportation Management Plan, including a plan for sequencing the project phasing and construction progress. The Plan must comply with 23 CFR Part 630 Subpart J - Work Zone Safety and Mobility, and shall include a Temporary Traffic Control (TTC) plan and address both Transportation Operations (TO) and Public Information (PI) components.

The Design-Builder shall provide for effective maintenance of traffic during construction and shall develop congestion and incident management plans in partnership with the Department’s Traffic Control Center, the New York City Police, Fire, and EMS services, NYC Traffic Department, MTA Transit and Bus services, and other affected entities so that pre-planned procedures can be immediately put into action should an incident cause congestion. The Design-Builder shall take these Plans into account when developing and implementing the traffic control Plan.

The plan shall also provide for maintaining pedestrian and vehicle access into and from local businesses and residences.

2.3.9.2 Road Traffic Management

The Transportation Management Plan shall include, at a minimum, a narrative that describes:

A) How traffic will be maintained in accordance with Section 16 of this Project Requirements;

B) How coordination will be provided with all interested or impacted agencies and organizations throughout the project duration;

C) How labor, equipment and materials will access and be delivered to the site for each phase of construction;

D) How work will be phased and the impact on traffic for each phase of construction;

E) The traffic impact during the tie-in period when traffic is directed from the existing roadways to the new eastbound structure, including duration of the tie-in construction activities and any required detours; the description of any required detour routes and associated construction.; The details shall include how all traffic disruptions and inconveniences to commuters, residents and local businesses in the vicinity of the Kosciuszko Bridge will be kept at a minimum.

F) How any impacts to local transit and bus services will be minimized;

G) How transport of materials and equipment utilizing Newtown Creek will minimize impacts to road traffic; and
H) How continuous updates shall be made as per Project Requirement 16.3 at the implementation of any change in traffic patterns to effectively provide safe and timely traffic operations and notification to the public.

The Traffic Management Plan shall include drawings as appropriate to describe the proposed actions.

2.3.9.3 Newtown Creek Traffic Management

The Design-Builder shall prepare a narrative explaining how the Design-Builder will coordinate with the US Coast Guard and other regulatory agencies as necessary to develop plans for management of construction activities impacting Newtown Creek.

2.3.10 Project Risk Management Plan

The Design-Builder shall prepare a Risk Management Plan (RMP) and submit it to the Department’s Project Manager for review and approval. The RMP shall include a risk register and perform risk assessment for the Project consistent with the guidance in the Project Management Institute’s Project Management Body of Knowledge (PMBOK) and the NYSDOT Risk Management Guide for Project Development.

The Design-Builder’s RMP shall cover all phases of the Project including design, construction and demolition, and shall include but not be limited to the following elements as a minimum:

A) The Design-Builder’s risk management policy for the Project;

B) Project team roles and responsibilities concerning risk management;

C) Approach to risk identification and assessment, for all phases including design, construction and demolition; and including regular reviews and updates at appropriate milestones and whenever risk levels change, and/or when new risks are identified that may impact risks already identified. The Department may elect to observe risk identification workshops;

D) Risk monitoring and control approach, including reporting; and

E) Risk registers that identify at a minimum potential risks to cost, schedule and the quality of the Work.

The Design-Builder shall provide a copy of the RMP and the Project risk register to the Department within 30 days after NTP and at any time there is substantive change to the RMP or the register. The Department may review and provide written comment on any item in the risk register that, in the opinion of the Department, is of relevance or concern to the Department.

2.3.11 Performance Management Plan

The Design-Builder shall submit the Performance Management Plan to the Department’s Project Manager for review within 30 days of the Notice to Proceed and on a monthly basis thereafter.
Managing performance is integral to achieving successful results and outcomes. Performance data will be collected, tracked and reported on a regularly scheduled, systematic basis.

2.3.11.1 Data Collection

Data used for performance management purposes will be of standard quality that meets the test of reliability, credibility, currency, accuracy and availability requirements. Sound, timely and systematic data collection practices from reliable source systems using sound processes are essential for effective management, analysis and decision making capability. The Design-Builder shall collect and report performance indicator data and their respective measures on a monthly basis. The Design-Builder shall perform sampling and testing of the data periodically as required to ensure accuracy, completeness and reliability. As much as possible data collection shall utilize automated information systems.

2.3.11.2 Performance Indicators and Measures

The Design-Builder shall review and update the performance metrics on a regular basis depending on audience requirements. The Design-Builder shall develop a draft of all performance metrics and submit to the Department for review and comment. Metrics shall be available in both hard copy and digital on-line formats.

The Design-Builder shall provide the data as indicated in Performance Reporting Table A.

2.3.11.3 Performance Reporting

Performance status reports will be required as indicated in Table A.

Performance Reporting Table A

<table>
<thead>
<tr>
<th>#</th>
<th>Indicator</th>
<th>Measure</th>
<th>Reporting Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Innovation</td>
<td>1</td>
<td>ATC proposed and approved changes</td>
<td>Quarterly</td>
</tr>
<tr>
<td>2. Risk</td>
<td>1</td>
<td>Risks identified from risk register and strategies to manage, mitigate and avoid them.</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Utilities: Number of and extent of impact</td>
<td>Quarterly</td>
</tr>
<tr>
<td>3. Schedule</td>
<td>1</td>
<td>Planned and actual per prior milestone*</td>
<td>Monthly</td>
</tr>
<tr>
<td>4. Cost</td>
<td>1</td>
<td>Resources Used to develop the RFQ, RFP and Final Design. Total resources expended to prepare and complete (staff, consultant-special expertise, data, plant, equipment)</td>
<td>Monthly</td>
</tr>
<tr>
<td>5. Quality</td>
<td>1</td>
<td>Constructability; bidability, buildability</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Contract claims and disputes</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Orders on Contract</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 # of Addenda, # clarification questions</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Safety/Accidents (During construction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Property Damage</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 # Persons Injured</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 # Fatalities</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Employment (Construction and construction support)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 # Employees</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 # Hours</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Dollar amount paid</td>
<td>Monthly</td>
<td></td>
</tr>
</tbody>
</table>

2.3.11.4 Performance Analytics

The Design-Builder shall perform comparative analytics based on program and Project development requirements. The Design-Builder shall use analytics, including statistical quality control to support decision making necessary for achieving optimum results, project and program requirements and legislation renewal.

2.3.12 Public Involvement Plan (PIP) Support Plan

The Design-Builder shall support the Public Involvement Plan (PIP) activities in accordance with Project Requirement 8 – Public Involvement.

2.4 BASELINE PROGRESS SCHEDULE

The Design-Builder shall expand and update the Initial Baseline Progress Schedule submitted with the Technical Proposal and develop it, as necessary, in accordance with DB §108-1 and Part 5, Special Provision SP 15 – Critical Path Method Schedule.

Design shall be considered complete when all Design related documents have been completed and accepted by the Department including all calculations, specifications, records of design quality control reviews and procedures, any substandard features as a result of the design, resolution of any non-conformance reports and submission of “As Built” drawings.

Construction shall be considered complete when entire Scope of Work has been completed, any damage to the area caused by the Design-Builder’s performance of the Work has been repaired to the satisfaction of the Department, all construction quality control documents, test and inspection reports and forms have been completed, As-Built drawings completed, and the work sites cleaned of any debris.

2.5 MEETINGS

The Design-Builder shall convene or participate in meetings as indicated in Part 2 DB §105-17.
It is the Department’s policy to use the principles of partnering to guide the management of Design-Build contracts and the Design-Build program within the parameters covered by the laws, regulations, and other policies that govern the work. The Design-Builder shall convene or participate in meetings designed to foster the principles of partnering in accordance with Part 2 DB §103-2.

The Design-Builder shall record the minutes for each meeting.

2.6 SPECIAL DBE REQUIREMENTS

The Disadvantaged Business Enterprise (DBE) Program will be coordinated by the DBE / Civil Rights Compliance Manager.

The Design-Builder shall maintain ongoing communications with the Agency’s Public Involvement Coordinator to ensure that commitments to the community concerning DBE objectives and initiatives are honored and that information regarding the status of the DBE program and goal attainment is communicated to the public throughout the Contract period.

2.7 COMPUTER AND NETWORKING REQUIREMENTS

The Design-Builder shall provide Computer and Networking equipment to the Construction Inspection Professional Engineering Firm. As a minimum, twenty-four (24) Notebook PCs (one per Construction Inspector) shall be provided. Each Notebook computer shall include the following:

- 2/HM65 Chipset, and Intel HD Graphics 3000 (or equivalent)
- 2nd Generation Intel Core i5 2620M Processor, 2.70GHz (Turbo up to 3.40GHz), 1333MHz, 4MB L3 Cache
- Mobile Intel HM65 Chipset
- 14” diagonal LED-backlit HD anti-glare (1366x768)
- Intel HD Graphics 3000
- 4 GB 1333 MHz DDR3 SDRAM – Dual Channel Active
- 250 GB 7200 RPM 2.5 inch hard drive – or 120 GB Intel SSD
- DVD R/W SuperMulti DL Drive
- Full Keyboard
- Broadcom 4313 GN 802.11 g/b/n 1x1 WiFi Adapter
- 65W Hardware Kit
- 6 cell Li-ion Battery
- Integrated Gigabit Ethernet
Computers shall have Citrix Receiver installed, which can be accessed at:

http://receiver.citrix.com/

2.8 DEPARTMENT’S CONSULTATION AND WRITTEN COMMENTS

The Department’s normal review, Oversight, audit, and inspection activities are referred to as “consultation and written comment” (see Part 2, DB §105-16. The Department’s consultation and written comment will be confirmed to the Design-Builder in writing by the Department. The Design-Builder shall be responsible for addressing the Department’s comments and shall indicate in writing whether it concurs with the comment. If the Design-Builder does not concur with the Department’s comments, then the Department and Design-Builder will work together to resolve the issue before proceeding.

If agreement cannot be reached, the issue must be resolved as provided in the Contract Documents for dispute resolution in accordance with Part 2 DB §109-10.

2.9 DEPARTMENT’S ROLE IN DESIGN QUALITY ASSURANCE

The Department’s Oversight role during design and Design Review consists of monitoring and auditing design progress, interpreting contract requirements, and verifying design compliance with contract requirements.

The following listing of activities is an overview of the Department’s Oversight roles and activities relating to Design Quality Assurance of the Project. Refer to DB §§ 111 and 112 and DB Appendix 112C for more details regarding the Department’s role in Design Quality Assurance.

A) Assisting in providing interpretation and answers regarding contract requirements on a “real time” basis, often on a daily basis (such involvement is often termed “over-the-shoulder” review);

B) Providing input and participation in the review process as agreed during the design workshop;

C) Verifying that the design meets the overall contract requirements;

D) An independent design check of the Cable-Stayed Main Span per DB §111;

E) Verifying through monitoring and audits of design QC records that the Design-Builder's Design QC Manager is fulfilling his/her responsibilities and that the design quality procedures contained in the Quality Control Plan are being followed. An audit may include detailed checks of plans and calculations in some cases;

F) Verifying Design-Builder’s design progress for payment purposes; and
G) Providing consultation and written comment at the successful completion of each Design Review that the design appears to meet the requirements of the Contract Documents.

H) Participating in release for construction Design Reviews and reviews of Work Plans

2.10 DEPARTMENT’S ROLE IN CONSTRUCTION QUALITY ASSURANCE AND INDEPENDENT ASSURANCE

The following listing of activities is an overview of the Department’s Oversight roles and activities relating to construction Quality Assurance of the Project. Refer to DB §§ 111 and 112 and DB Appendix 112C for more details regarding the Department's role in Construction Quality Assurance.

A) Verifying that current stamped and signed Design Plans and Project Specifications are on-site;

B) Confirming that the Design-Builder’s Construction QC:

1) have the specified qualifications, licenses, and/or certifications;

2) are present to observe and control the work;

3) are performing their duties in accordance with contract requirements, specifically those specified in DB §112; and

4) are conducting sampling and testing of materials at the proper frequencies.

C) Confirming if differing site conditions and/or significant changes in the character of the work occur;

D) Verifying progress, reviewing and approving payment requests;

E) Auditing the Design-Builder’s construction QC records to verify that the Design-Builder is maintaining quality and is performing its QC responsibilities, and, if necessary, issuing Non-Conformance Reports for the Design-Builder to conform to the Quality Control Plan and to make corrections and preventive actions;

F) Verifying records of Force Account Work. The Design-Builder will be responsible for maintaining the Force Account records, but the Department’s staff will spot-check the labor, equipment, and materials being used;

G) Spot-checking measurements of any work paid on the basis of quantities and Unit Prices;

H) Auditing safety and security records and checking of the qualifications of safety and security personnel;
I) Spot-checking for compliance with Design Plans and Project Specifications, conducting verification (QA) sampling and testing and comparing Department’s CQAE records with the Design-Builder’s construction QC Inspection results;

J) Reviewing and spot-checking Design-Builder’s Work Zone Traffic Control activities and installations;

K) Participating in release for construction Design Reviews and reviews of Work Plans;

L) Participating in the reviews of As-built Plans;

M) Ensuring the Design-Builder is complying with the QC plan processes and procedures;

N) Assisting the Design-Builder in coordinating with appropriate State or federal agencies should unknown, unidentified Hazardous Materials be encountered;

O) Spot-checking the Design-Builder’s QC Inspectors’ records for the remediation of Hazardous Materials;

P) Performing Construction QA and testing of materials to verify the Design-Builder’s QC materials test data

Q) Monitoring Design-Builder’s Utility Relocations and installations;

R) Verifying qualifications of Design-Builder’s environmental staff, spot-checking of Design-Builder’s compliance with environmental requirements; and, auditing of Design-Builder’s environmental monitoring records.
SECTION 3   ENVIRONMENTAL COMPLIANCE

3.1   SCOPE

Except as otherwise detailed herein, the Design-Builder shall be responsible for preparing its design, carrying out its construction activities and undertaking other activities as needed to ensure compliance with the Project’s Environmental Requirements, which include:

A)  The terms and conditions of Environmental Approvals as listed within Section 3.4 herein required from various state, local and federal agencies;

B)  The requirements as set forth herein; and

C)  All applicable Environmental Laws and Regulations.

3.2   REQUIREMENTS

3.2.1   General

A)  Unless otherwise indicated in the Contract Documents, the Department will be responsible for obtaining all Environmental Approvals as identified in Table 3.4-1. Refer to Part 7 – Engineering Data for permit applications submitted to date by the Department. For those Environmental Approvals not secured as of the date of this Contract, the Design-Builder shall cooperate with and assist the Department in securing the approvals and monitoring during construction as identified in Exhibit B to this Project Requirement;

B)  In the event the Design-Builder requests changes to the permits obtained by the Department, the Design-Builder shall obtain any required permit modifications. The Design-Builder shall be responsible for the preparation of all information including materials, investigations, testing and documentation, as necessary to support said permit modification. The Department will not be responsible for any delay or additional cost associated with the Design-Builder's requested permit modification;

C)  The Design-Builder shall be responsible for obtaining all new Environmental Approvals and any changes to existing Environmental Approvals required for by the Design-Builder's design but not previously permitted. For any such approvals required to be obtained by the Design-Builder that must formally be issued in the Department's name, the Department will cooperate with the Design-Builder as reasonably requested by the Design-Builder, including execution and delivery of appropriate applications and other documentation prepared by Design-Builder in a form approved by the Department;

D)  The Design-Builder shall procure all Environmental Approvals as needed for all Design-Builder-located areas, including staging and disposal sites, and any other areas used by the Design-Builder in the construction of the Project for its convenience;
E) For the Design-Builder-located areas, the Design-Builder shall notify the Department of scheduled meetings with regulatory agencies and provide to the Department copies of any documentation regarding environmental compliance;

F) The Design-Builder shall be solely responsible for compliance with and violations of any Environmental Requirements;

G) The Design-Builder shall indemnify the Department and the State of New York for any fines, violations or damages incurred by reason of failure of the Design-Builder to comply with Environmental Approvals.

H) The Design Builder shall construct a cap including fencing and drainage on a portion of the former Phelps Dodge Refining Site in Queens per the Directive Drawings included in Part 6 – RFP Plans. The cap shall be installed by the Design-Builder before construction on and adjacent to the area to be capped can begin. The construction activities on the cap are subject to the loading restrictions included in the Directive Plans. The Design-Builder shall relocate the unused stockpiled soil from Parcel 1A to Parcels 2 and 1C as indicated in the Capping Plans. The Design-Builder shall provide a minimum of 10 days notice to Phelps Dodge Refining Corporation (PDRC) before the movement of the stockpiled soil on Parcel 1A to allow for a PDRC inspector to be onsite during any such movement.

I) The Design-Builder shall provide access to the PDRC inspector and NYSDEC personnel on Parcels 1A and 2 for monitoring and maintenance of the existing Ground Water Treatment System as required.

J) The Design-Builder shall be responsible for complying with the Monitoring Program on the Laurel Hill Site. See Part 6 – RFP Plans. The Department will install the monitoring program prior to award of the Design-Build Contract. The intent of the program is to monitor soil movements and groundwater movements associated with the sheet pile wall that is intended to prevent movement of groundwater from the site into Newtown Creek. Based on readings taken during the RFP phase, the Department intends to establish allowable tolerances for the monitoring program. A layout of the plan is indicated on the capping plans. Two months after award of the contract the Design-Builder shall take over responsibility for maintaining the monitoring and for continuing the readings. If the readings indicate that due to the Design Builder’s activities, the wall has been compromised and that groundwater from the site is moving through the wall into the creek, it may be necessary to halt construction in the vicinity of the wall and remediate the wall until the work can be restarted at the site. The Design Builder shall be responsible for any such delays if they are attributed to the activities of the Design-Builder.

JK) The Design-Builder shall take the appropriate actions to limit the potential for propeller scour in Newtown Creek. Provisions shall include limiting the drafts, horsepower and operating speeds of tugboats in the Creek as required. The requirements for monitoring turbidity are described in 3.2.5N below.
The Design-Builder shall coordinate with PDRC on all aspects of the project that will affect the Laurel Hill site, including the following: capping of Parcels 1A, 9A and 2; construction of the temporary platform on the northern side of Newtown Creek; construction of the temporary bridge over the barrier wall installed as part of the groundwater collection and treatment system (“GWTS”); geotechnical borings for and construction of support piers on Parcels 2 and 5; implementation of the monitoring program; and removal of any temporary piers from the construction of the temporary platform and temporary bridge over the barrier wall (collectively, “Laurel Hill Activities”). Coordination with PDRC shall include providing a) a minimum of 5 days notice to PDRC of any Laurel Hill Activities so that such representative may be present to observe any such activities, if deemed necessary by PDRC b) relevant progress reports required by DOT and/or DEC to PDRC at the same time they are submitted to the agencies, c) PDRC or its representative 5 business days to review and comment on any significant design modifications or field decisions related to Laurel Hill Activities; and d) PDRC or its representative an opportunity to take split samples of any sampling conducted in accordance with the required monitoring plan or otherwise.

3.2.2 Construction Noise

The Design Builder shall conduct all work to meet the commitments made in the ROD and the requirements of the NYC Noise Code.

3.2.3 Cultural Resources Protection

Per the 2008 Memorandum of Agreement between FHWA, the Department and NYSHPO, the Department has prepared a revised Archaeological Area of Potential Effect (APE), Archaeological Work Plan (AWP), Historic American Engineering Record (HAER), and Construction Protection Plan for Old Calvary Cemetery (CPP). The Department has obtained FHWA and NYSHPO approval for the APE, AWP, HAER and CPP. Before the start of construction the Design-Builder shall revise, if required, the approved Archaeological Work Plan and approved Construction Protection Plan provided by the Department and obtain Department, FHWA and NYSHPO approval of the revised Plans. It is noted that the plan identifies possible significant shipwrecks that are in the project area in Newtown Creek. The Design-Builder shall carry out the requirements set forth in the approved plans including requirements for an on-site archaeologist.

3.2.4 Ecological Management

The Design Builder shall be required to comply with all conditions of the permits.

3.2.5 Contaminated Materials Management

A) The Design-Builder is advised that previous investigations identified contaminated soil, groundwater, and soil vapor at the project site. The results of previous investigations conducted by the Department for the project are available in the Contaminated Material Investigation Findings Report, Kosciuszko Bridge Reconstruction Project, Brooklyn and
Queens, NY, May 30, 2012 (EPM, Inc.). The conditions identified include non-
hazardous and hazardous contaminated soil, groundwater impacted with petroleum,
chlorinated solvents, and heavy metals, and soil vapor with elevated levels of volatile
organic compounds (VOCs) and methane gas.

B) There are several ongoing State and Federal investigation and remediation projects
located within the project limits. These projects include the NYSDEC Meeker Avenue
Solvent Plume; the ExxonMobil Greenpoint Oil Spill; the Phelps Dodge Laurel Hill
NYSDEC Class 2 Inactive Hazardous Waste Site, and the USEPA listing of Newtown
Creek on the Federal National Priority List (Superfund). Summary information for these
four sites is contained in the aforementioned May 2012 Contaminated Material
Investigation Findings Report. The Design-Builder will be required to maintain an up-to-
date understanding of the ongoing investigation and remediation work being performed
on these projects and the implications to construction. Publically available information
for these sites is available at local document repositories including Brooklyn Community
Board One and the Greenpoint Branch of the NYC Public Library.

C) There are numerous groundwater monitoring wells located across the project site in
Brooklyn related to the Greenpoint Oil Spill and the Meeker Avenue Solvent Plume, and
in Queens on the Phelps Dodge Inactive Hazardous Waste Site. The Design-Builder is
responsible for protecting existing groundwater monitoring wells from damage and
providing access to these wells by the responsible parties and regulatory agencies as
necessary. At no time will any existing monitoring wells associated with the ongoing
investigation and remediation projects be removed or relocated without written
permission from NYSDEC.

D) With exception of work within the limits of the Phelps Dodge Laurel Hill Inactive
Hazardous Waste Site (see E below), the Design-Builder shall perform all work in
accordance with the Contaminant Management Plan (CMP) and Construction Health
and Safety Plan (CHASP) provided to the Design-Builder by the Department. These
documents have been reviewed by NYSDEC. If the Design-Builder proposes alternative
methods to those included in the project’s CMP and CHASP, the Design-Builder is
required to submit such alternatives to NYSDEC for approval prior to beginning the work.
Written approval from NYSDEC of the alternative methods shall be provided to the
Engineer prior to start of work.

E) For all intrusive work on the Phelps Dodge Laurel Hill Inactive Hazardous Waste Site,
the Design-Builder is required to follow the existing Phelps Dodge Health and Safety
Plan for the site. A Site Management Plan (SMP) for the Laurel Hill Site prepared by
Phelps Dodge is currently under review by NYSDEC and will be provided in the Final
RFP to Proposers by Addendum. The Design-Builder will be required to follow the
NYSDEC-approved SMP for all work on the Phelps Dodge Laurel Hill Site.

F) Excavated soil shall be managed under Item 205.02 - Segregation and Storage of
Contaminated Materials. The Design-Builder shall segregate any suspected grossly
contaminated soil from apparent non-contaminated soil as described in Item 205.02.
Soil exhibiting photo-ionization detector (PID) readings of 25 parts per million (ppm) or
greater, petroleum-staining, unusual odors, or visible contamination will be staged separately for disposal from apparent lesser impacted soils. The soil shall be staged on polyethylene plastic (minimum 10-mil thick) at an agreed upon location for disposal characterization. While staged, the Design-Builder shall maintain a minimum 6-mil polyethylene cover over the soil pile(s) to prevent water from entering the soil pile. Berms constructed of hay bales, jersey barriers, and/or silt fence shall be constructed around soil piles to prohibit soil runoff from the pile(s).

G) The Design-Builder shall conduct vapor monitoring during all excavation in accordance with Item 205.03 – Field Organic Vapor Monitoring, for the purpose of segregating potentially greater contaminated soil from lesser contaminated soil per Item 205.02.

H) Stockpiled soils shall be characterized for disposal as determined by the results of analytical testing performed by the Design-Builder per Item 205.04 – Laboratory Analysis, and in accordance with all applicable State and Federal Regulations, and meeting disposal facility requirements. After characterization, the Design-Builder shall load the soils into lined trucks and the material shall be transported and disposed of at a NYSDEC (or other state environmental agency) approved facility. Dependant on the waste characterization results, the Design-Builder shall dispose of these soils in accordance with Item 205.0501 – Disposal of Contaminated Hazardous Waste Soil and/or Item 205.0502 – Disposal of Contaminated Non-Hazardous Waste Soil.

H) The Design-Builder should be aware that the cost of any additional analyses required by the disposal facility shall be included in the Unit Bid Price for the disposal Items 205.0501 and 205.0502.

I) At no time may excavated soil be reused as backfill at the project site or at other locations without explicit written permission from NYSDEC. Should the Design-Builder obtain NYSDEC approval to reuse excavated soil, this work shall be performed in accordance with Item 205.06 – Reuse of Contaminated Soil.

J) The Design-Builder shall be responsible for handling, treating, discharging and/or disposing of any contaminated water removed from excavations per the Part 5 – Special Provisions – Handling and Treatment of Contaminated Construction Dewatering Fluids. The Design-Builder is responsible for designing, providing and operating a treatment system in compliance with the permit requirements. The Department will provide the Design-Builder with a NYSDEC SPDES Permit for dewatering of excavations in Queens. If the Design-Builder’s work necessitates dewatering in Brooklyn or requires changes to the expected dewatering scope in Queens, the Design-Builder is responsible for obtaining additional or modified dewatering discharge permits from NYSDEC.

K) Current plans are to locally dewater the excavations in Queens by sump (trash) pumps. If the Design-Builder elects to install dewatering wells to lower the water table in either Queens or Brooklyn, the Design-Builder is responsible for obtaining a NYSDEC Long Island Well Permit.
L) Driven piles are preferred by NYSDEC to eliminate the generation of contaminated spoils brought to the surface, particularly in Brooklyn in the vicinity of the Greenpoint Oil Spill and Meeker Avenue Solvent Plume. Should the Design-Builder choose an alternative pile method, the Design-Builder must develop methods to contain and dispose of the contaminated spoils, and provide written proof to the Department that such methods are acceptable to NYSDEC. Regardless of the type of piles that are selected, the depths of the piles may not extend more than 10 feet above the Raritan Clay confining layer in order to avoid cross contamination of the deeper aquifer.

M) Dredging of Newtown Creek sediment is not expected based on the preliminary design. If the Design-Builder determines that dredging is necessary, the Design-Builder is responsible for obtaining a NYSDEC Dredging Permit. The dredged material would require dredging, handling and offsite disposal as contaminated material. Any dredging or work in general within Newtown Creek will require coordination with USEPA based on the creek’s listing on the Federal NPL.

N) The Design-Builder will be responsible for performing Water Quality Monitoring of Newtown Creek per Part 5 Special Provisions – Turbidity Monitoring, and in accordance with all applicable permit requirements.

O) The Design-Builder will be required to take precautions to avoid damage to the underground components of the groundwater remediation system that currently operates on the Phelps Dodge Laurel Hill Inactive Hazardous Waste Site. In addition, the Design-Builder shall take over the maintenance and operation of the Laurel Hill Site Geotechnical and Environmental Instrumentation and Monitoring as described in Section 10.43.9.

P) The Design-Builder will be responsible for providing worker exposure air monitoring for hazardous atmospheres during all ground intrusive activities, including for VOCs, particulates, and methane. The Design-Builder will be responsible for abating any unsafe conditions related to harmful vapors detected during the worker exposure monitoring.

Q) The Design-Builder shall maintain odor control materials onsite at all times and shall institute odor control as necessary and as directed by the Engineer.

R) The Design-Builder shall institute a Community Air Monitoring Plan (CAMP) as described in the provided CHASP and CMP and in accordance with the NYSDOH guidance for developing a CAMP contained in NYSDEC DER-10: Technical Guidance for Site Investigation and Remediation. Prior to any ground intrusive work or structure demolition, the Design-Builder shall submit to the Engineer and NYSDEC for approval a detailed site specific CAMP. No ground intrusive or demolition work may commence until written proof of NYSDEC acceptance of the CAMP is provided to the Engineer. Based on the results of the CAMP monitoring, the Design-Builder shall be responsible to modify work actions as needed to maintain acceptable air quality throughout operations. Work activities shall at all times be performed to minimize the generation of dust.
S) The Design-Builder will provide the Engineer with copies of all analytical test data and disposal documentation as soon as feasible but not to exceed the timeframes stipulated under the specifications.

T) All employees involved in contaminated material work related to the project must be properly trained as identified in OSHA Standard 29 CFR 1910.120. This includes all individuals involved in all portions of the work, including managing, supervising, designing, inspecting or performing the work.

U) The Design-Builder shall provide the Engineer with a complete set of record documents, including chain-of-custody records, worker sign in/out sheets, proof of worker training, results of daily monitoring, manifests and disposal record documents and other such records as requested by regulations and specifications and within the time frame required within the specifications.

V) The Design-Builder will be responsible for proper abatement and disposal of all hazardous and contaminated materials contained in the buildings to be demolished, including but not limited to asbestos, tanks, drums, containers, and universal waste.

W) The Design-Builder will be responsible for preparing all work plans and reports required by the Specifications and CMP, including but not limited to, an Environmental Sampling and Analysis Plan, an Environmental Sampling Quality Assurance Project Plan, a Waste Management Plan, a Water Quality Monitoring Plan, a CAMP, and a Final Closure Report. The Final Closure Report must contain a certification from a Professional Engineer licensed in the State of New York that the Project’s CMP has been followed. The Final Closure Report shall include at a minimum:

- All final executed waste disposal manifests and the corresponding weight ticket from the receiving facilities;
- The results of all analytical testing performed for the project;
- A Tank Closure Report for all underground and aboveground petroleum storage tanks that are removed during construction, along with copies of any PBS Modification Forms that are required;
- A summary of the final volumes of soil removed from the project site for offsite disposal, volume of soil excavated and reused on the project site as backfill, and the final volume of imported fill;
- Documentation of soil import sources and export locations;
- Laboratory results for soil imported to the project site, for soil reused on the project site (if pre-approved by NYSDEC), and soil exported for beneficial reuse elsewhere (if pre-approved by NYSDEC) will require a NYS ASP Category B Data Deliverable and will require a Third Party Data Usability Report.
• A Final Engineering Report for the site cap constructed on the Phelps Dodge parcels that includes As-Built Drawings certified by a Professional Engineer licensed in the State of New York; and,

• Plans showing the locations where a) soil was removed from the site, b) locations where soil excavated from the project site was reused on the project site (if any), and c) the locations where imported fill is placed.

3.2.6 Environmental Plans

3.2.6.1 Environmental Compliance Plan

The Design-Builder shall further develop the Initial Environmental Compliance Plan submitted with its Proposal, implement the Plan and update it as necessary throughout the duration of the Project. The Environmental Compliance Plan shall detail the Design-Builder’s measures and procedures to ensure compliance with all EPCs, as well as compliance with all other Environmental Requirements.

A fully developed version of the Environmental Compliance Plan shall be submitted prior to the start of construction for consultation and written comment by the Department.

At a minimum, the Environmental Compliance Plan shall include the following elements:

A) Environmental team

1) Environmental personnel: names, titles and Project responsibilities, training, years of relevant experience, licensing and applicable training; and

2) Environmental team organization.

B) Environmental compliance tracking and reporting procedures

1) Process meetings and reporting requirements, including purpose and frequency of reports;

2) Environmental compliance schedule;

3) Method of reporting emergencies and alleged violations of Environmental Requirements to the Department of; and

4) QA/QC procedures for environmental compliance; and

C) Environmental Approvals

1) Identify any increase in environmental impacts associated with the Design-Builder’s design that are greater than those disclosed in the Project environmental permits or other Environmental Requirements. Identify all additional permits and Environmental Approvals required for implementation of the Design-Builder's design; and
2) Describe the Design-Builder’s plan to obtain all additional permits and Environmental Approvals identified and how they fit into the Design-Builder’s schedule.

3.2.6.2 Other Environmental Plans

The Design-Builder shall be responsible for preparing the following documents, and all other required documents, in conformity with all Environmental Requirements. In each of the documents listed below, the Design-Builder shall identify the frequency of submission of compliance reports to the Department.

A) Spill Prevention, Control, and Countermeasures (SPCC) Plan;
B) Construction Noise Control Plan;
C) Rodent Control Plan;
D) Lead Compliance Plan;
E) Stormwater Pollution Prevention Plan (SWPPP) (Draft provided by the Department, the Design Builder is responsible for updating as necessary, obtaining final approval and implementing);
F) Project-Generated Waste Management Plan;

3.3 ENVIRONMENTAL APPROVALS

The Environmental Approvals required for the Project as it is scoped in the RFP as well as the current status are listed in Table 3.4-1. This list may not be comprehensive and the Design-Builder is responsible to obtain all approvals as needed for the Project.

Updates to the status of Environmental Approvals will be provided by the Department by Addenda.

<table>
<thead>
<tr>
<th>Issuing Agency</th>
<th>Permit/Process/Approval</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>USACE</td>
<td>Permit authorization will meet the requirements of Section 404 of the Clean Water Act (33 USC 1251-1387) and Section 10 of the Rivers and Harbors Act of 1899. Anticipate authorization under Nationwide Permit No. 15 US Coast Guard Approved Bridges</td>
<td>Permit application submitted on 8/20/12. Permit application acknowledged by the USACE on 1/4/13.</td>
</tr>
<tr>
<td>Issuing Agency</td>
<td>Permit/Process/Approval</td>
<td>Status</td>
</tr>
<tr>
<td>---------------------</td>
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</tr>
<tr>
<td>USFWS</td>
<td>Endangered Species Act (ESA) (16 USC §§1531-1544; 50 CFR Part 402)</td>
<td>Per the 5/22/02 and 1/24/05 correspondence between NYSDOT and USFWS, except for transient individuals, no known federally listed threatened or endangered species are known to exist in the project area.</td>
</tr>
<tr>
<td></td>
<td>Fish and Wildlife Coordination Act (FWCA)</td>
<td>FWCA recommendation issued in 5/15/07 letter from NOAA to NYSDOT.</td>
</tr>
<tr>
<td>NOAA – NMFS</td>
<td>Endangered Species Act (16 USC §§1531-544; 50 CFR Part 402)</td>
<td>NOAA letter dated 8/18/2005 states that no federally listed threatened or endangered species are present at the project site and no further consultation under Section 7 of the Endangered Species Act is necessary (page IV-79 of the EIS)</td>
</tr>
<tr>
<td>NYSDEC</td>
<td>Tidal Wetlands Law (ECL, Article 25)</td>
<td>Permit has been issued by NYSDEC.</td>
</tr>
<tr>
<td></td>
<td>The Protection of Water (ECL, Article 15)</td>
<td>Permit has been issued by NYSDEC.</td>
</tr>
<tr>
<td></td>
<td>Excavation and fill in navigable waters</td>
<td>Permit has been issued by NYSDEC.</td>
</tr>
<tr>
<td></td>
<td>Section 401 of the Clean Water Act Water Quality Certification</td>
<td>Permit has been issued by NYSDEC.</td>
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</table>
### Table 3.3-1 – Environmental Approvals/Permits and Status

<table>
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<th>Issuing Agency</th>
<th>Permit/Process/Approval</th>
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<tr>
<td></td>
<td>New York State Environmental Quality Review Act (SEQR)</td>
<td>ROD issued March 9, 2009 (EIS satisfies NEPA and SEQR)</td>
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<td>Section 4(f) evaluation</td>
<td>Included as part of the FEIS.</td>
</tr>
<tr>
<td></td>
<td>23 CFR 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise</td>
<td>Noise mitigation measures per the Record of Decision</td>
</tr>
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<td></td>
<td>EO 11990 Wetland Finding</td>
<td>Included as part of the FEIS.</td>
</tr>
<tr>
<td></td>
<td>EO 11988 Floodplain Management</td>
<td>Included as part of the FEIS.</td>
</tr>
<tr>
<td>NYSDOS</td>
<td>Coastal Zone Consistency Determination</td>
<td>Consistency Determination (General Concurrence) issued on 2/12/2013</td>
</tr>
<tr>
<td>NYCDCP</td>
<td>Coastal Zone Consistency Determination</td>
<td>Consistency Determination (General Concurrence) issued on 2/12/2013</td>
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<tr>
<td>NYCDCP</td>
<td>ULURP Application</td>
<td>In progress by the Department</td>
</tr>
</tbody>
</table>

### 3.4 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 3.5-1 for the Department’s consultation and written comment.

Each of the deliverables listed in Table 3.5-1 shall be provided to the Department by the earlier of: (i) 120 days after NTP; and (ii) 30 days prior to the relevant on site activity, including start of construction. Any other needed Environmental document shall be delivered in a timely manner to allow for Department review.

### Table 3.4-1 – Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Number of Copies</th>
<th>Reference Section</th>
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<td>Hardcopy</td>
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<td>Environmental Compliance Plan</td>
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<td>1</td>
</tr>
<tr>
<td>Deliverable</td>
<td>Number of Copies</td>
<td>Reference Section</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------</td>
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</tr>
<tr>
<td>Contaminant Management Plan (Draft provided by the Department)</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Construction Noise Control Plan</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Construction Health and Safety Plan (Draft provided by the Department)</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rodent Control Plan</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Lead Compliance Plan</td>
<td>3</td>
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<tr>
<td>Project-Generated Waste Management Plan</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
SECTION 4 GENERAL PROJECT SCOPE OF WORK

4.1 SCOPE

The Design-Builder shall perform all Work necessary to prepare the Project site for construction, perform the required construction, maintain the site in suitable condition during all stages of construction and provide cleanup and restoration of the construction site and all disturbed areas. The major items of the Project Scope of Work are identified in Section 1.3.

4.2 STANDARDS AND REFERENCES

The Design-Builder shall perform the Work in accordance with the applicable Standards, Codes and Manuals cited in Section 1.5, unless otherwise stipulated in this Project Requirement.

4.3 REQUIREMENTS

The Design-Builder shall prepare site work plans showing the extent of site works, disposal and storage locations, and facility removal details, approximate volumes and shall provide for uninterrupted New York City Department of Transportation and Department maintenance and operations. All regulated waste shall be handled according to Section 3 – Environmental Compliance.

The site work shall include but not be limited to: clearing and grubbing; excavation and embankment; removal of pavement and pavement markings, road barriers, soil, drainage facilities, fencing, signs, and miscellaneous structures; subgrade preparation and stabilization; dust control; removal of abandoned above-ground and shallow piping and wiring, standpipes, valves, meters, and other waste materials; and aggregate surfacing.

Unless specified otherwise in the Contract Documents, the Design-Builder shall remove all obstructions down to a minimum of 2 feet below the existing or proposed surrounding ground elevation or to the elevation necessary to properly construct the Work, whichever is lower.

The Design-Builder shall grade disturbed areas to match the existing surrounding ground elevation. The Design-Builder shall cut pavement or sidewalk to full depth with straight lines at removal terminations.

The Design-Builder shall over-excavate as necessary to remove unsuitable material from under the footprint of pavements and structures and backfill with properly compacted suitable material. Topsoil may be stripped, stockpiled, and reused within the Project Limits.

For minor structures, including buildings and sheds not covered by Project Requirement 23 – Demolition of Buildings, the Design-Builder shall remove and properly dispose of all objects encountered as part of or within the structures, buildings and/or sheds, including hazardous and regulated materials, foundations and underground tanks.
The existing Bridge and ramps shall be removed and disposed of as described in Section 22.

The Design-Builder may only reuse materials on the Project that meet the requirements for grading and backfill materials. Disposal of obsolete, unsuitable, and surplus material is not allowed within the Right-of-Way and shall be removed. All material to be removed shall become the property of the Design-Builder and shall be disposed of off-site.

4.3.1 Salvage

The two existing “Kosciuszko Bridge” plaques located on the steel through truss of the Main Span shall be removed and returned to the Department.

4.3.2 Engineer’s Field Office, Laboratory and Equipment

The Design-Builder shall provide a Field Office, Field Laboratory and the related equipment as described in Section 637 of the Standard Specifications for the exclusive use of the Department, Department representatives and consultants for the duration of the Project with the following exceptions:

1. Pager communication equipment and service will not need to be provided.
2. A Two way radio system will not need to be provided.
3. A rain gage will not need to be provided.
4. Mobile Telephones will not need to be provided.

A Type 5 Field Office shall be required to be provided as described Section 637-2.01 and in Table 637-1 and in Table 637-2.

The Design-Builder shall provide two inspection vehicles for the Department’s use per Section 637-3.10. A Type A Inspection Boat as described in Section 637-2.11 will be required to be provided, however it shall have a minimum length of 18 feet.

The following office technology supplies shall be provided by the Design-Builder as part of the initial setup of the Field Office (additional supplies will be required to be provided over the duration of the construction contract):

Removable Storage Media

Provide one set of the following accessories per computer (desktop or portable) in the office:

- (*) optical discs as needed
- (*) Data media storage containers as follows:
  < 2 containers for 50 CDs, with locking capability (minimum)

Data Storage Media

- (*) USB flash drives as needed
• (*) external hard disk drives as needed

Paper Supplies

• (*) 5000 sheets of 8 ½”x11”, 20# weight, paper suitable for printers and copiers

(minimum)

• (*) 5000 sheets of 11”x17”, 20# weight, paper suitable for printers and copiers

(minimum)

• (*) 200 sheets of 8 ½” x 11”, photo quality, printer paper

If a specification is followed by "(minimum)" then the stated requirement or better is acceptable. Otherwise, only the stated requirement is acceptable. For accessories proceeded by "(*)", the Contractor shall replenish these items, as required by the Engineer and be of a type, size, quality, and capacity acceptable to the Engineer. These items shall remain the property of the Department.

The cost of providing and maintaining the Engineer's Field Office, Laboratory and Equipment as described in Section 637 shall be included in the Lump Sum price in the Design-Builder's Proposal. No separate payment will be made for the provision of the Engineer's Field Office and Equipment. However the Department will reimburse the Design-Builder for fifty percent (50%) of the cost for the Partnering Workshop as described in Section 637-5.13 of the Standard Specifications
SECTION 5  SURVEYING AND GIS

5.1 SCOPE

The Design-Builder shall perform all surveying tasks necessary to undertake and complete the Project including but not limited to: acquisition of terrain data (topography); mapping of roadways and appurtenances features, buildings, bridges, and utilities; locating boundaries; waterway surveys and hydraulic surveys, bathymetric surveys; construction and stakeout surveys; As-Built surveys; surveys that arise from other Project Requirements; asset inventory; and all other surveying services as necessary.

The Design-Builder shall update the topographic survey and mapping and keep it current throughout the duration of the Project.

The Design-Builder shall review and coordinate DB §105-8 with this Project Requirement. In instances where they differ, this Project Requirement shall govern.

5.2 STANDARDS AND REFERENCES

The Design-Builder shall perform the surveying activities in accordance with the applicable Standards, Codes and Manuals cited in Section 1.5, unless otherwise stipulated in this Project Requirement.

5.3 REQUIREMENTS

5.3.1 Survey Manager

The Design-Builder shall designate a survey manager for the Project. The survey manager shall be currently registered to practice in New York State as a licensed Land Surveyor. The survey manager shall manage all survey activities and mapping associated with the Project, shall be responsible for directing and reviewing all Project survey and mapping work, and serve as the point of contact for all survey and mapping activities. The survey manager shall have thorough knowledge and understanding of all aspects of the Standards identified in Section 5.2 herein.

5.3.2 Project Survey Control

The Design-Builder shall use available project survey control information from the Department and shall supplement that information as necessary to perform all the necessary survey required.

5.3.3 Department-supplied Data

The Department will make available the following data. Error! Reference source not found. The Design-Builder shall be responsible for verifying any data used for the Project.

A) Horizontal and Vertical Control Points;
B) ROW Highway Boundary;
C) Photogrammetric mapping;
D) Acquisition Maps;
E) Records Plans;
F) Preliminary Design CADD Files; and
G) USACE Bathymetric Survey (2009).

5.3.4 Survey Reports, Records and Maps

The Design-Builder shall submit to the Department’s Construction Quality Assurance Engineer, all information listed under the ‘Documentation’ sub-section of each chapter of the NYSDOT Land Surveying Standards and Procedures Manual that is applicable to its survey work. The Design-Builder shall index and submit all calculations, notes, computer files, raw data, project reports, meeting notes, correspondence, digital images, maps, corner records, records of survey, aerial photogrammetric products, centerline alignment maps, and other maps and related items.

The Design-Builder shall be responsible for ensuring that information submitted is compatible with the applicable NYSDOT CADD standards, software and operating systems and formats.

All survey reports and maps, including bathymetric survey plans, shall be signed-and-sealed by a licensed professional land surveyor.

5.3.5 3-D GIS Spatial Model

The Design-Builder shall provide a 3-D GIS spatial model of the Site that includes base mapping layers such as aerial photography, topography, infrastructure and buildings. The 3-D GIS spatial model shall include all the Proposer’s design elements, including the Bridge, buildings and staging areas. The 3-D GIS spatial model shall incorporate and host a geospatial digital photographic documentation record by the Design-Builder of the construction, including for all photographic images the date, time, location, orientation and descriptor. The 3-D GIS spatial model shall allow for interactive simulation in a virtual reality system, including visualization of the staging, sequence of the Works, the bridge, approach roadways and the potential visual impacts. The 3-D GIS spatial model shall include interactivity to enable the Department to review sequence of construction, and shall provide 3-D interactive viewing capability to a functional level typical of commercial proprietary software.

5.4 SURVEYING AND GIS DELIVERABLES

At a minimum, the Design-Builder shall submit the items listed in Table 5.4-1 –Survey and GIS Deliverables.

Electronic measurement raw data shall be provided in electronic format only.
Where applicable, electronic copies of deliverables listed in Table 5.4-1 –Survey and GIS Deliverables shall be supplied as per the specifications given in NYSDOT CADD Standards and Procedure Manual. All relevant Bentley MicroStation® files (including .DGN files) and Bentley InRoads® files (including DTM, ALG files) shall be compatible with the MicroStation XM and InRoads XM software versions.

Table 5.4-1 –Survey and GIS Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Number of Copies</th>
<th>Delivery Schedule</th>
<th>Reference Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>All survey records</td>
<td>1, 1</td>
<td>Not more than 60 days after Physical Completion</td>
<td>5.3.4</td>
</tr>
<tr>
<td>Survey reports</td>
<td>1, signed and sealed, 1</td>
<td>Within 30 days of completion of each survey</td>
<td>5.3.4</td>
</tr>
<tr>
<td>3D digital terrain model (DTM) file of the bridge</td>
<td>- 1</td>
<td>Not more than 60 days after substantial completion</td>
<td>-</td>
</tr>
<tr>
<td>Survey base map and As-Built surveys (including GIS-format data)</td>
<td>1, signed and sealed, 1</td>
<td>Not less than 60 days after Physical Completion</td>
<td>-</td>
</tr>
<tr>
<td>3-D GIS spatial model, including geospatial photographic construction record of construction</td>
<td>- 1</td>
<td>First version not more than 60 days after Notice to Proceed and updated at least quarterly</td>
<td>5.3.5</td>
</tr>
</tbody>
</table>
SECTION 6  THIRD PARTY AGREEMENTS AND PERMITS

6.1  SCOPE

The Design-Builder shall comply with and perform the commitments contained in the agreements/permits identified in Table 6.1-1, except to the extent that DB § 102-5.2 and Part 4 – Utility Agreements provide for any such commitments to be performed by others. The Design-Builder is responsible for obtaining rights of entry from Long Island Rail Road and shall comply with all requirements relating to such rights of entry.

The Design-Builder shall comply with the commitments contained in the agreements/permits prepared by the Department as listed in Table 6.1-1.

The Design-Builder shall coordinate the Project Requirements herein with DB §102-5.

6.2  CURRENT LIST OF THIRD PARTY AGREEMENTS

Table 6.2-1 identifies current agreements the Department has entered into with third parties, certain occupancy permits, work permits and agreements the Department has entered into with utility owners and land owners. Copies of such agreements and permits, to the extent available, are included in the Contract Documents as provided in the Reference column of the table. An incomplete list of potential and executed agreements is presented in Table 6.2-1, and is current as at the date of issue of the RFP.

Table 6.2-1 – List of Third Party Agreements

<table>
<thead>
<tr>
<th>Type</th>
<th>Third Party</th>
<th>Agency</th>
<th>Permit Type</th>
<th>RFP Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility</td>
<td>Buckeye Partners, L.P.</td>
<td>NYSDOT</td>
<td>Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td></td>
<td>Con Edison Co. of New York</td>
<td>NYSDOT</td>
<td>Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td></td>
<td>National Grid</td>
<td>NYSDOT</td>
<td>Draft Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td></td>
<td>RCN Telecom Services of New York</td>
<td>NYSDOT</td>
<td>Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td></td>
<td>Time Warner Cable of NYC</td>
<td>NYSDOT</td>
<td>Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td></td>
<td>Empire City Subway Ltd. / Verizon Comm.</td>
<td>NYSDOT</td>
<td>Preliminary Utility Work Agreement</td>
<td>Part 4 - Utilities</td>
</tr>
<tr>
<td>NYCDEP</td>
<td>New York City Department of Environmental Conservation</td>
<td>NYSDOT</td>
<td>Draft Preliminary Sewer Work Agreement</td>
<td>Part 47 – Engineering DataUtilities</td>
</tr>
<tr>
<td>Type</td>
<td>Third Party</td>
<td>Agency</td>
<td>Permit Type</td>
<td>RFP Reference</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>NYCDEP</td>
<td>New York City Department of Environmental Conservation</td>
<td>NYS DOT</td>
<td>Draft Preliminary Water main Work Agreement</td>
<td>Part 74 – Engineering Utilities</td>
</tr>
<tr>
<td>Railroad</td>
<td>Long Island Rail Road</td>
<td>NYS DOT</td>
<td></td>
<td>Part 7 – Engineering Data</td>
</tr>
</tbody>
</table>
SECTION 7   RIGHT-OF-WAY

7.1    SCOPE

The Right of Way (ROW) for the Project has been acquired, as identified in Table 7-1, and is shown on the Directive Plan included in Part 6 – RFP Plans. The Design-Builder shall perform all the permanent Project Work within the limits of the ROW for the Project. Any additional property the Design-Builder requires for any purpose shall be acquired by the Design-Builder at no cost to the Department. The Design–Builder will not be allowed to acquire any additional permanent ROW beyond what is shown on the Acquisition Plans.

The Design-Builder shall be responsible for coordinating the Project Requirements herein with DB §107-1, DB §107-22 and DB §107-30.

7.2    STANDARDS

Section not used.

7.3    REQUIREMENTS

7.3.1    ROW Provided by the Department

The ROW within the Project Limits shown on the Acquisition Maps shows the Fee, Temporary Easements and Permanent Easements immediately available to the Project. The Acquisition Plan and Maps are available on the Department’s Project website. All property acquisitions indicated on the Plans have been completed except for as noted in Table 7.3-1. See the Directive Plans in Part 6 – RFP Plans for further information regarding the acquired properties and associated requirements and restrictions.

Table 7.3-1 –Remaining Properties to be Acquired

<table>
<thead>
<tr>
<th>Property Owner</th>
<th>Map and Parcel Numbers</th>
<th>Type of Acquisition</th>
<th>Anticipated Acquisition Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sagres 9 LLC</td>
<td>M121 P 173</td>
<td>Temporary Easement</td>
<td>August 1, 2013; September 6, 2013</td>
</tr>
<tr>
<td>JMDH Real Estate of Maspeth Parking, LLC</td>
<td>M122 P174</td>
<td>Temporary Easement</td>
<td>August 1, 2013</td>
</tr>
</tbody>
</table>

15 foot (minimum) wide clearance zones must be provided beyond the new bridge fascias but within the Permanent Easements to facilitate future maintenance and inspection of the structures. The fascias of the new permanent works structures shall not encroach into the 15 foot wide clearance zones as measured perpendicular to the Permanent Easement limits.
All acquired property is vacant except as noted in Table 7.3-2.

Right of ownership of all ROW and the improvements made thereon by the Design-Builder shall remain at all times with the Department. The Design-Builder's right to entry and use of the ROW arises solely from permission granted by the Department under the Contract.

Table 7.3-2 – Occupied Properties within NYSDOT Acquired ROW – Vacancy Pending

<table>
<thead>
<tr>
<th>Tenant</th>
<th>Map and Parcel Numbers</th>
<th>Anticipated Vacancy Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>IESI NY Corporation</td>
<td>M9 P49</td>
<td>August 2013</td>
</tr>
<tr>
<td>NYPD</td>
<td>M1 P3, P4, P5</td>
<td>September-August 31, 2013</td>
</tr>
<tr>
<td>CCR Sheet Metal, Inc.</td>
<td>M28 P46, P47, P48</td>
<td>To be determined</td>
</tr>
<tr>
<td>Lanoves, Inc.</td>
<td>M28 P46, P47, P48</td>
<td>To be determined March 1, 2014</td>
</tr>
<tr>
<td>Sunny Lumber Supply NY, Inc.</td>
<td>M28 P46, P47, P48</td>
<td>To be determined May 15, 2014</td>
</tr>
<tr>
<td>Karp Associates, Inc.</td>
<td>M31, P54, P55, P56, P57</td>
<td>To be determined May 15, 2014</td>
</tr>
<tr>
<td>O’Connell Contracting</td>
<td>M106 P145, P146</td>
<td>August 1, 2013</td>
</tr>
</tbody>
</table>

The Design-Builder should proceed under the assumption that Sunny Lumber (Map 28) and Karp Associates (Map 31) will not be vacated until after Notice to Proceed. The Design-Builder should make provisions in their proposal to accommodate for these is properties being occupied until May 15, 2014.

7.3.2 Notification of Property Owners

The Design-Builder shall coordinate with property owners and/or tenants so as to minimize impact on the property owners’ and/or tenants’ operations when performing work in the Permanent and Temporary Easements. The Design-Builder shall inform the property owners and/or tenants 72 hours in advance of occupying any Permanent or Temporary Easement, and shall provide the Department with a two week look ahead schedule of planned operations that may impact or affect property owners or tenants.

7.3.3 Property Interests Identified by the Design-Builder for its Convenience

The Design-Builder shall be responsible for the acquisition and all costs associated therewith for any temporary land or other property required for the Design-Builder’s convenience outside the ROW Limits, such as for staging, lay-down, access, office space, temporary works, or other purposes. The Design-Builder shall assume responsibility for satisfying all Federal and State regulations, identifying, analyzing, and documenting the environmental impacts associated with the additional space and securing all necessary consent, including that of the Department, prior to initiating use of the space, in accordance with DB §107-1.
The Design-Builder shall be aware that the acquisition of temporary land or other property beyond what is shown on the indicative plans may require a review in relation to the FEIS, Reevaluation Statement and other Environmental Approvals. If it is determined that the proposed acquisitions require a further reevaluation of the FEIS or other Environmental Approvals, the Design-Builder shall revise the plans such that they are in conformance with all existing Environmental Approvals. Such revisions shall be carried out at no additional cost to the Department.

7.3.4 ROW Coordination

ROW coordination shall be in accordance with DB §107-22.
SECTION 8  PUBLIC INVOLVEMENT

8.1  SCOPE

The goal of the public involvement activities is to inform the public and agency participants by providing timely information throughout the design and construction process. The Design-Builder shall support the Department’s Public Involvement Program (PIP) as outlined in this section from 60 days after Notice to Proceed through Final Acceptance. The Design-Builder shall coordinate with the Department and the Department’s independent public involvement consultant, who will direct the public involvement program.

The Design-Builder shall conduct the public involvement activities, communications and community liaison as outlined in the following sections.

8.2  STANDARDS

The Design-Builder shall provide the PIP support activities in conformance with the NYSDOT Project Development Manual: Appendix 2, Public Involvement Manual.

8.3  REQUIREMENTS

8.3.1  Public Outreach

The Design-Builder will have a subordinate role in public outreach to the Regional Public Involvement Coordinator (RPIC) and the Regional Public Information Officer (RPIO) and shall coordinate public information through the Department’s Construction QA Engineer. This will primarily involve notifying key stakeholders (road users, general public, area residences, educational institutions, emergency services, businesses, etc.) with road closure information, project milestones or construction related activities in proximity to adjacent and affected homeowners, businesses or tenants.

This project is subject to various public information requirements. Coordination and advance notice, with the Regional Public Information Officer, is required prior to making any significant changes to traffic patterns.

8.3.2  Media Relations

Media Inquiries: All media inquiries, requests for interviews from local print or broadcast news media, trade magazines or other must be referred to the RPIO in the Regional Director’s Office. The Department’s Project Manager, under direction of RPIO, or the RPIO will coordinate and respond to all media requests.

Travel Advisories: To allow for timely public information notice, two weeks advance notice of start of work, any lane closures, full road closures, or change to traffic patterns is required to be given to the RPIC via the Department’s Project Manager.
These strategies are consistent with the requirements of Part 3 Section 16 – Work Zone Traffic Control and Access, and shall include Construction Bulletins published by the Department, based on information provided by the Design-Builder, especially focused on traffic changes, night time work, higher-noise construction periods or locations, or other construction activities of potential concern to the public. The Design-Builder will be responsible for the daily interaction with the affected homeowners, tenants and businesses with regards to issues including but not limited to, security of and access to their property or properties, utility services, night time operation, etc.

8.3.3 Community Liaison Office

The Design-Builder shall provide a Community Liaison Office (CLO) which may be part of the Design-Build Office or an independent office. The CLO shall be staffed by a Community Liaison provided by the Department. The Design-Builder shall provide the CLO with a desk, chair, computer, printer, storage capacity for hard copy files, and smart phone for 24/7 availability and email capability. The CLO shall have a phone hotline for individuals to call with concerns or questions. The phone number of the hotline shall be posted by the Design-Builder on signs within the affected neighborhoods, on the Project website, and in the Project newsletter.

8.3.4 Community Meetings

The Design-Builder shall support community meetings to inform the general public (Open Houses) and the Kosciuszko Bridge Stakeholders Advisory Committee (SAC) about the project and construction activities. The meetings shall include formal PowerPoint presentations and informal discussion about the planned work, design issues, upcoming construction activities, Work Zone Traffic Control (WZTC), traffic impacts and detours, construction impacts such as noise, dust and vibrations and mitigation of construction impacts. The Design-Builder shall support these meetings and presentations providing applicable staff, photos, graphics, visualizations and drawings. General topics and schedule for SAC meetings and Open Houses are as follows:

<table>
<thead>
<tr>
<th>Community Meeting Schedule</th>
<th>Meeting Types</th>
<th>Meeting Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 60 days of Notice to Proceed</td>
<td>• 1 SAC Meeting</td>
<td>• Design-Build Team</td>
</tr>
<tr>
<td></td>
<td>• Brooklyn &amp; Queens (B/Q) Open Houses</td>
<td>• Overview of Design-Build Process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Presentation of Bridge Visuals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Construction Schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Construction Impacts and Mitigation</td>
</tr>
<tr>
<td>Within 30 days of start of construction</td>
<td>• 1 SAC Meeting</td>
<td>• Upcoming construction</td>
</tr>
<tr>
<td></td>
<td>• B/Q Open House</td>
<td>• WZTC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Traffic impacts and mitigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Construction impacts and mitigation</td>
</tr>
</tbody>
</table>
Community Meeting Schedule | Meeting Types | Meeting Topic
--- | --- | ---
Prior to start of existing bridge demolition | • 1 SAC Meeting  
• B/Q Open Houses | • Upcoming construction  
• WZTC  
• Traffic impacts and mitigation  
• Construction impacts and mitigation

8.3.5 Website

The Department will host and maintain the Project’s website. The Design-Builder shall support the Department by providing applicable photos, graphics, visualizations and drawings. These materials will primarily be prepared for other outreach activities but may need to be reformatted for use on the website.

8.3.6 Weekly Press Releases

The Design-Builder shall prepare draft weekly press releases that provide the upcoming week’s daily work scope and schedule, highlighting any lane closures and related traffic impacts. The final press releases will be distributed by the Department.

8.3.7 Project Newsletters

The Design-Builder, in coordination with the Department, shall support the preparation of biannual Project Newsletters. The Project newsletters shall provide the public with updates on Project activities, schedule of key events, and related information, including locations on the Project website or elsewhere where further information can be obtained by the public. The Design-Builder shall support preparation of the newsletters by providing input on proposed upcoming activities and providing applicable photos, graphics, visualizations and drawings.

8.3.8 Technical Media

The Design-Builder shall be responsible throughout the duration of the Project (until Final Acceptance) for preparing public information videos for use in various public involvement activities, including the Project website and public meetings. The Design-Builder shall provide appropriate technical media and materials that: (1) provide the public with up-to-date information through the Project’s website that demonstrates the progress on the Project’s construction; (2) use text, graphics, live video and video simulations to document relevant aspects of the Project’s design and construction; and (3) use strategically positioned videocam systems and time-lapse imagery of the construction of the project. The Design-Builder shall be responsible for preparing and providing to the Department all videos, videocam systems and any other technical visual tools. The Design-Builder shall be responsible for storing the entire Project’s video documentation in a database to which the Department shall have access and which shall become the property of the Department at Final Acceptance.
SECTION 9 UTILITIES

9.1 SCOPE

The utility requirements set forth in Part 4 – Utility Requirements and DB §102-5 present the Design-Builder’s responsibilities as they relate to existing and/or new utilities, the manner in which utilities shall be protected, relocated, upgraded, constructed or incorporated into the construction, and responsibilities for the Work.

9.2 STANDARDS

The Design-Builder shall perform all utility activities in accordance with the Contract Requirements, the applicable Standards, Codes and Manuals listed in Section 1.5 and the standards required by the various utility companies affected by the work.

9.3 GENERAL REQUIREMENTS

The Design-Builder shall examine the record plans of the work site, make a field survey of the work site and examine all other available documents to determine the type and location of all utilities that may be affected by the work. Before any work begins the Design-Builder shall inform the Department’s Project Manager what utilities are present and how they may be affected by the work.

The Design-Builder in coordination with the Department’s Project Manager (or designee) and the Regional Utility Engineer shall meet with all the affected Utility owners or operators for the purpose of discussing the effect on the utility facilities and to agree on a plan to maintain, protect, relocate, reinstall, or other action that may be necessary for the work to progress.

All utilities must be maintained, supported and protected during construction. Any damage due to the Design-Builder’s operations shall be repaired at the Design-Builder’s expense.

The Design-Builder shall make good any damage and consequential damages to those utilities caused by his operations. If the nature of the damage is such as to endanger the satisfactory operations of the utilities and the necessary repairs are not immediately made by the Design-Builder, the work may be done by the respective owning companies and the cost thereof charged against the Design-Builder.

The Design-Builder shall provide notice to the Department’s Project Manager at least 10 days before construction begins on any portion of the project. The Department’s Project Manager will notify the Regional Utility Engineer of the pending construction and of any planned interruptions to service.

9.3.1 Utility Relocation Agreements

Preliminary Utility Agreements have been executed between the Department and several utilities within the project limits including Buckeye Pipeline, Con Edison Co. of New York, RCN
Telecom Services of New York, Time Warner Cable of NYC and Empire City Subway Ltd. / Verizon Comm. In addition, the Department is currently coordinating with National Grid to finalize and execute a Preliminary Utility Agreement to be included in the Final RFP provided to Proposers by Addendum. A draft of this agreement is included in Part 4 – Utilities.

It is anticipated that final utility relocation agreements will be executed between the Department, the Design-Build and the impacted utilities once the Design-Build has determined the final locations of the impacted utilities. See Part 4 for details on utility inventory, coordination and relocations.

The Design Builder shall be responsible for the design and construction of these facilities as outlined in the Preliminary Utility Agreements in Part 4 - Utilities and all associated costs shall be included in the bid.

9.3.2 Electrical Power Supply and Distribution

9.3.2.1 General requirements

The Design-Builder shall be responsible for the design and implementation of the necessary normal electricity supply commensurate with the Design-Builder’s design, and for all planning and liaison necessary with relevant utility suppliers for the arrangements for provision of the necessary normal power supply. The Design-Builder’s design shall maximize the reliability of the normal power while minimizing the total installation cost and future electricity and maintenance costs.

The Design-Builder shall purchase and install all necessary components required to deliver the normal electricity supply and distribution systems from Consolidated Edison Company of New York or an approved equal.

All electrical work performed by the Design Builder shall be performed by or under the supervision of a Master Electrician licensed in the State of New York and New York City. Final approval and acceptance of the work shall be granted by the utility owner.

9.3.2.2 Bridge Structure Normal Electric Power Redundancy

The normal electricity supply to the bridge shall include full redundancy from two electric feeds, from both Brooklyn and Queens. Full redundancy includes automatic facilities to transfer without interruption all the loads energized by one source to the other source, in the event of a utility power outage. Full redundancy includes the ability to power the entire bridge with electricity supplied by one feed in the event either feed service is disrupted. See Section 15 – Intelligent Transportation System of these Project Requirements for additional electric power needs.

9.3.2.3 Power Supply and Distribution Staging

The electrical supply to the existing bridge, including existing NYCDOT Street lighting, or existing ITS power, shall remain fully operational throughout construction of the new bridge structures. The Design-Builder is responsible for permanent and temporary electrical
components on the existing bridge and the proposed bridge structures. When the electricity supply to the existing bridge is discontinued, and with prior approval of the Department, the Design-Builder shall remove from the Project site any extraneous electrical supply components that are not needed for operation of the proposed lighting or future ITS systems.
SECTION 10  GEOTECHNICS

10.1 SCOPE

The Design-Builder shall be responsible for geotechnical design and construction of all permanent and temporary structures, including assessing available information, geotechnical analysis and reporting, geotechnical instrumentation and monitoring, and protection of existing infrastructure, structures and utilities in accordance with the requirements of the Contract Documents.

These requirements are considered as a minimum and do not include all possible conditions that may be encountered in the Design-Builder’s final design.

The Department has performed subsurface investigations in the vicinity of the Project Site. Boring logs and laboratory test data from these previous subsurface investigations are provided on the Department's Project website. The soil and rock samples obtained during these previous subsurface investigations are available for inspection by the Design-Builder at the Main Office NYSDOT Soils Laboratory located in Building 7 at the State office Campus, 1220 Washington Ave, Albany, NY 12206. The Design-Builder shall be responsible for making any arrangements to view the samples from the previous subsurface investigations, by first seeking the prior consent of the NYSDOT’s Project Manager and then making an appointment in advance with Mr. Robert Dalsass (Regional Geotechnical Engineer); telephone 718-482-4511; email Robert.Dalsass@dot.ny.gov. Information from these previous subsurface investigations shall be considered part of the Contract Documents only to the extent that they are used to represent soil conditions at the depths indicated within the respective borings drilled at the approximate locations shown. Presentation of this information in no way implies that subsurface conditions are the same at other locations and different times. The Design-Builder shall form its own interpretation of the existing geotechnical data and satisfy itself as to the nature and behavior of the ground and sub-soil, the form and nature of the Site, and nature of the Work that may affect its detailed design, construction method, and tools.

10.2 STANDARDS AND REFERENCES

The Design-Builder shall perform geotechnical activities in accordance with the Contract Requirements, the applicable Standards, Codes and Manuals cited in Section 1.5.

10.3 DESIGN REQUIREMENTS

The Design-Builder shall at a minimum provide the following to the Department Project Manager for review and comment:

A) Geotechnical work plan (see Section 10.4.1);

B) Geotechnical investigation plan (see Section 10.4.2);
C) Geotechnical data report (see Section 10.4.6);

D) Seismic assessment report (see Section 10.4.7);

E) Geotechnical Instrumentation and construction monitoring plans (see Section 10.4.8);

F) Foundation design reports (see Section 10.4.9).

10.3.1 Geotechnical Work Plan

The Design-Builder shall prepare a geotechnical work plan for the project. The plan shall identify the required geotechnical scope of work that the Design-Builder plans to complete for the design and construction of the Project. The geotechnical work plan shall include the following:

A) Design-Builder’s knowledge and understanding of the geotechnical, geologic, hydrogeology and seismic settings of the Project Site and how the nature and behavior of the soil, rock, groundwater and subsurface conditions will affect the investigation, design and methods of construction;

B) Anticipated methods of analysis and design for the bridge foundations and a discussion of the foundation optimization process and rationale for selection of the foundation types;

C) Identify key Project constraints and describe how the geotechnical activities will be designed and constructed to meet these constraints;

D) Identification of all principal geotechnical deliverables and activities;

E) A narrative describing the approach to quality control during design and construction of the geotechnical Works;

F) A risk register identifying all major design and construction risks of the geotechnical activities, and describe how these risks are managed and mitigated;

G) Resumes of the Foundations Lead Designer, Geotechnical Instrumentation Engineer, and Seismic Specialist;

H) Types of subsurface investigations to be carried out for the Bridge design, including minimum number and depth of borings and other field testing with a narrative of the in-situ tests and laboratory tests to be carried out;

I) Minimum numbers, and types of axial load tests for each foundation type, size and subsurface condition;

J) Minimum numbers, and types of lateral load tests for each foundation type and subsurface condition;

K) Minimum percentage and/or numbers of driven piles as tested piles to be dynamically tested;
L) Crosshole sonic logging shall be done on all drilled shafts according to NYSDOT specifications. Thermal integrity profiling shall be done on all demonstration shafts, in addition to the first three production shaft of each diameter size. Thermal integrity data shall be collected continuously and remotely through embedded sensors.

10.3.2 Geotechnical Investigation Plan

The Design-Builder shall prepare a geotechnical investigation plan, including specifications for performing the Work. The geotechnical investigation plan shall include the criteria or rationale used in developing the plan, and shall identify the locations of all field investigation sites, and borings, together with their depths, sampling intervals, and a description of both the field and laboratory testing programs utilized. The geotechnical investigation plan shall be prepared and signed and sealed by the Design-Builder’s Lead Designer. The geotechnical investigation plan shall include details of borehole abandonment procedures and a list of all permits required to perform the geotechnical investigation.

The Design-Builder shall plan and conduct subsurface investigations in accordance with the NYSDOT and AASHTO Standards for subsurface exploration programs, and as deemed necessary by the Design-Builder’s Lead Designer to establish the geotechnical conditions and to perform all geotechnical and foundation design and analysis.

The Design-Builder shall determine the coordinate location and ground surface elevation for each boring and field investigation position, and shall show the coordinates, station and offset, and elevation for each individual boring log or investigation record in accordance with NYSDOT standards. Coordinates and station and offsets for the borings shall be referenced to the NY 347 mainline stationing. Elevations shall be referenced to the Project datum and horizontal control system. Boring horizontal coordinates shall be accurate to +/- 1.0 foot; vertical coordinates shall be accurate to +/- 0.5 foot.

10.3.3 Minimum Number of Borings

Table 10.4-1 summarizes the minimum number of borings and minimum investigation depths required for various structures.

<table>
<thead>
<tr>
<th>Geotechnical Feature</th>
<th>Minimum Number of Borings</th>
<th>Minimum Investigation Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>At tower foundation</td>
<td>4</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>Geotechnical Feature</td>
<td>Minimum Number of Borings</td>
<td>Minimum Investigation Depth</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>At each bridge pier pile cap having any side exceeding 100 ft in length</td>
<td>2</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>All other pier pile caps or footings</td>
<td>1</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>Non-redundant drilled shaft foundations</td>
<td>1 for each drilled shaft within footprint of the drilled shaft</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>Bridge abutment</td>
<td>A minimum of two within a 50 feet radius of the centroid of the substructure. At least one of the two borings shall be within the footprint of the foundation substructure.</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>Retaining walls</td>
<td>Two borings at each retaining wall. For retaining walls more than 100 feet in length, spacing between borings shall be no greater than 100 feet. Spacing of borings shall be at least adequate for design for bearing, settlement, and stability.</td>
<td>In accordance with AASHTO LRFD Bridge Design Specifications, and as required by the Foundations Lead Designer</td>
</tr>
<tr>
<td>Ancillary structures</td>
<td>As required by Foundations Lead Designer</td>
<td>As required by Foundations Lead Designer</td>
</tr>
</tbody>
</table>

Information from existing borings provided on the Department’s Project website may be combined by the Design-Builder with the Design-Builder’s subsurface investigation to comply with the requirements presented in Table 10.4-1. It is the sole responsibility of the Design-Builder’s Foundations Lead Designer to determine if the existing borings are suitable for use in the Project.
10.3.4 Subsurface Investigation Records

The Design-Builder shall be responsible for keeping a continuous and accurate log of the materials encountered and a complete record of the operation of progressing the casing. Where driving is used, a record of the number of blows required to advance the sampling barrel, each 6 inches in the soil where each sample is taken, shall be kept. Records shall be kept using the NYSDOT Subsurface Exploration Log Form (US Units).

10.3.5 Software Requirements

The Design-Builder shall use Bentley gINT® or similar commercial software to develop and maintain an electronic database of subsurface information including in-situ test and laboratory test results, and to produce boring records.

10.3.6 Geotechnical Data Report

The Design-Builder shall prepare a geotechnical data report, signed and sealed by the Foundations Lead Designer. The geotechnical data report shall serve as a factual depiction of the subsurface conditions and at a minimum it shall include:

A) A detailed description of the investigation methods;

B) Complete records (typed logs using NYSDOT log format) with summary tables of investigation;

C) Complete records with summary tables of laboratory test results;

D) Exploratory hole location plan, showing locations of any existing (pre-award) exploratory holes for which data was used by the Design-Builder plus locations of post-award exploratory hole locations undertaken by the Design-Builder; and

E) Plots of laboratory test results versus elevations for separate areas and soil types.

10.3.7 Seismic Assessment Report

The replacement bridge shall be classified as a “critical” bridge. The bridge shall be designed for two levels of design earthquake: a lower level event (functional evaluation/design level) having a 1000-year return period and an upper level 2500-year return period event in accordance with the NYSDOT LRFD Blue Pages provisions for Downstate bridges.

The Design-Builder shall prepare a seismic assessment report for the Project, including:

A) Evaluation of liquefaction potential. Should this show that liquefaction is a potential hazard at the Site, the risk potential on the Bridge shall be evaluated by the Design Builder, and any remediation solutions proposed by the Design-Builder shall be demonstrated by analytical and field methods.

B) Site-specific seismic response analysis shall be performed to develop design free-field response spectra in accordance with FHWA publication FHWA-NHI-11-032
The Design-Builder shall develop dynamic soil/rock properties for use in the seismic analysis based on PS-Logging data as well as widely-used empirical correlations. Spatial variation of ground motions shall be accounted for, as applicable.

C) Seismic soil structure interaction evaluation of deep foundations shall include determination of the maximum imposed curvatures and bending from earthquake ground motions and structure response, including free-field soil strains modified for soil-foundation-structure interaction coupled with deep foundation deformations associated with earthquake loads imparted to the foundation by the structure (i.e. inertial response).

10.3.8 Geotechnical Instrumentation & Construction Monitoring Plan

The Design-Builder shall develop, implement, and maintain a geotechnical instrumentation and construction monitoring plan to monitor vibrations, accelerations, vertical settlement, and lateral movement of temporary support structures and adjacent ground, and existing structures and infrastructure during construction including the existing bridge, the new bridge, ancillary structures and infrastructure within the zone of influence of construction.

Wherever vibration-producing activities could affect a structure, building, or utility, the Design-Builder shall prepare a Vibration Monitoring and Control Plan to address the potential impacts to nearby receptors due to construction or demolition activities associated with this Project. The term “receptor” includes buildings, structures, utilities, and sensitive operations/processes for which construction impacts or Work above recommended limits may be detrimental. The plan shall include ground and air-blast vibration threshold limits.

The monitoring plan shall address how the Design-Builder intends to complete vibration-related activities and meet the following minimum requirements:

A) Develop a list of all anticipated vibration producing activities and where they are expected to occur;

B) Develop a list of all potentially impacted receptors from these activities;

C) Provide a vibration susceptibility analysis for each identified receptor, and establish a vibration control limit to preclude damage, including threshold damage, to each of the identified receptors.

D) Provide a plan for notifying the public of potential vibration impacts, responsible Project personnel, receptors requiring precondition surveys, and vibration monitoring activities;

E) Monitor construction related ground movement and vibrations at the nearest and most critical receptor(s), and notify appropriate project personnel immediately if established vibration limits are exceeded;

F) Provide instrumentation locations, monitoring procedures, and a description of the monitoring devices and/or manufacturers’ brochures in the submitted plan;
G) Assess any sensitive community or business operations that may be affected by ground movements and vibrations;

H) Provide recommendations for vibration-limiting methods to meet the established maximum safe vibration levels.

List of receptors shall include:

A) Existing Bridge foundation elements

B) Utilities

C) Storage tanks

D) Buildings

E) Newly constructed elements

F) Existing structures within zone of influence of vibration producing activities

G) Calvary Cemetery

The Design-Builder’s construction monitoring plan shall include details of the proposed program of instrumentation and monitoring, monitoring frequency, assesses the impacts to existing structures and utilities, establishes threshold values of the monitored parameters, and describes the response plan that will be implemented when threshold parameters are exceeded. Construction monitoring of the Bridge shall include vertical, horizontal, and tilt movements and vibration of bridge piers in sufficient locations as to determine adequate performance and safety of the Bridge and its foundations during construction.

The Design-Builder shall ensure that the instrumentation can be read remotely and that data shall be uploaded to a website provided by the Design-Builder, and which shall be accessible remotely by both the Design-Builder and the NYSDOT. Remote-access functionality shall include the ability to extract data and to isolate an individual monitoring point or multiple points. The presentation system shall include the functionality to modify the extents and scale of data plotting such that arbitrary views are available.

The Design-Builder shall provide weekly construction instrumentation monitoring reports to the NYSDOT. Monitoring reports shall be interpretive in nature, and shall enumerate any corrections applied to the data including, but not limited to any notification measures taken regarding data. The weekly reports shall include clear and explicit statements of exceedances of any pre-determined threshold values. The Design-Builder shall maintain the instrumentation and monitor the measurements during and after construction up to Final Acceptance.
10.3.9 Laurel Hill Site Geotechnical and Environmental Instrumentation and Monitoring

Two months after award until 3 months after completion of all field work at the site, the Design-Builder shall assume responsibility for monitoring and maintaining the environmental, geotechnical, and structural instruments at the Laurel Hill Site as described in Part 6 – RFP Plans.

10.3.10 Foundation Design Reports

The Design-Builder shall prepare a foundation design report for all structures included in the Project. The foundation design report shall detail the analysis and design of each foundation element, including any foundation optimization process such as foundation element pile spacing, and shall detail the anticipated total and differential settlements over time. The foundation design report shall be signed and sealed by the Foundations Lead Designer.

The following information shall be included in the Foundation Design Report.

A) Subsurface Information

1) As drilled boring location plan and subsurface profiles along new bridge alignment, and cross-sections, as appropriate

2) Description of geology and subsurface conditions within the Project site

3) Summary of lab and field test results

B) Recommended Geotechnical Design Parameters

1) Evaluation of the engineering properties of all soil and rock types, including the expected average and range of soil and rock strengths, index properties and mechanical properties

C) Design Method and Foundation Recommendations

1) Design assumptions

2) Design methods

3) Software used

4) Design criteria

5) Selection of foundation systems

6) Summary of loads

7) Summary of resistance
8) Foundation recommendations, including type, size, depth, arrangement of foundation elements

D) Construction Considerations

1) Obstructions

2) Planned field testing programs, including pile and drilled shaft integrity and load testing

3) Slope stability, support of excavation and groundwater control considerations

4) Time-related settlement and lateral deformation and determination of the resulting effects on adjacent structures

5) Protection of existing structures and utilities

10.3.10.2 Bridge Foundation Design

The Design-Builder shall design and construct permanent foundations based on the requirements of NYSDOT LRFD Bridge Design Specifications, AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Construction Specifications.

The Design-Builder shall not use auger cast piles, screw piles, timber piles, buoyant foundations or re-use any existing foundations.

The Design-Builder shall evaluate the effects of ground movement around, or movement of, existing foundations due to proposed structures and consider downdrag loads on deep foundations, where applicable.

Seismic design of foundations shall be in accordance with Section 3.10 of the AASHTO LRFD Specifications, considering the effects of inertial loading from the superstructure and kinematic effects due to loading from the soil (soil-structure interaction).

A) Drilled Shafts. If drilled shafts are designed to be socketed into rock, the rock socket length shall not be less than two times the rock socket diameter.

Subcontractor shall submit documentation before the start of construction that he has successfully completed at least three drilled shafts projects and at least installed 100 drilled shafts within the last three years with drilled shafts diameters and lengths similar to those anticipated for this project. Documentation shall include the general contractor and owner’s name and current contact information with descriptions of each project. A design geotechnical engineer is required to design drilled shafts. The design engineer shall be a licensed Professional Engineer in the State of New York and shall have at least 10 years of experience in designing drilled shafts and deep foundations with capacities and in subsurface conditions similar to those of this project.
Permanent casings may be considered to contribute to the capacity of the drilled shafts by designing them as composite columns, the casing thickness shall be assumed to be reduced to account for corrosion loss by not less than 1/8 inch. A site is considered highly corrosive, if the following condition exists in the soil and/or water:

<table>
<thead>
<tr>
<th>Table 10.3-2 – Corrosive Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorides</td>
</tr>
<tr>
<td>Sulfates</td>
</tr>
<tr>
<td>pH</td>
</tr>
<tr>
<td>Resistivity</td>
</tr>
</tbody>
</table>

Additional corrosion protection (beyond the 1/8 inch) shall be provided at foundation locations that exceeds the values in Table 10.3. Additional corrosion protection measures may include:

1) Allowance for additional sacrificial metal loss
2) Barrier coating such as coal tar epoxy and/or cathodic protection

The bottom of drilled shafts shall be inspected using a shaft inspection device (SID) in accordance with NYSDOT Specification. Uplift resistance of the drilled shaft shall be taken as the minimum of either the side shear resistance of the drilled shaft rock socket or the shear wedge capacity of the surrounding rock.

The lateral resistance of a single drilled shaft and a group of shafts shall be analyzed for all limit states. Group efficiency and lateral load reduction factors shall be considered based on the shaft spacing as specified in the AASHTO LRFD Specifications. Center-to-center spacing between adjacent drilled shafts shall not be less than 2.5 times the diameter of the drilled shafts.

In Brooklyn, in the vicinity of the Meeker Avenue Solvent Plume between Varick Avenue and Vandervoort Avenue, the method of installation of the drilled shaft shall be such as not to cause cross contamination below that Clay layer. The Design-Builder shall be responsible for obtaining the approval of NYSDEC for the method of installation.

For drilled shaft foundations, include the following information in the Foundation Design Report:

1) Nominal Axial Compressive Resistance and resistance factors
2) Factored Axial Compressive Resistance
3) Nominal Uplift Resistance and resistance factors
4) Factored Uplift Resistance
5) Top of Drilled Shaft elevation
6) Top of Rock Socket Elevation
7) Tip of Drilled Shaft Elevation
8) Drilled Shaft Diameter
9) Rock Socket Diameter and depth
10) Reinforcement Cage cross sections
11) Concrete and reinforcement steel properties

B) Driven Piles. Calculate the axial resistance of production piles in accordance with AASHTO LRFD specifications. Drive all piles to competent bearing material in accordance with the production pile driving criteria developed based on the Pile Load Test Results. Analyze the lateral resistance of a single pile and a group of piles for all limit state load conditions.

Consider group efficiency and lateral load reduction factors based on the pile spacing in accordance with AASHTO LRFD Specifications. Verify overstress conditions on piles by determining the stresses on the piles under combined loads and moments. Center-to-center pile spacing shall not be less than 2.5 times the diameter or side dimension of the pile.

In Brooklyn, in the vicinity of the Meeker Avenue Solvent Plume between Varick Avenue and Vandervoort Avenue all piles shall be driven to a depth so that they are a minimum of 10 feet above the Raritan Clay Layer (Silty Clay) to avoid cross contamination below that Clay layer. Piles penetrating the Raritan Clay Layer shall not be allowed unless the Design-Builder obtains approval from NYSDEC.

For steel piles, casing thickness shall be assumed to be reduced by not less than 1/8 inch to account for corrosion loss by not less than 1/8 inch. Additional protection measures for highly corrosive locations (Table 10.34-2) shall be provided.

Do not locate splices between the top of the pile and a minimum of five times the pile diameter below the point of fixity. Pile splices must be full penetration weld with a structural capacity equal to or greater than the pile section.

For driven pile foundations, include the following information in the Foundation Design Report:

1) Nominal Axial Compressive Resistance and resistance factors
2) Factored Axial Compressive Resistance
3) Nominal Driving Axial Compressive Resistance: Obtain the Nominal Driving Axial Compressive Resistance by including the nominal side resistance from soils susceptible for downdrag, and other unsuitable materials not utilized as part of the nominal axial compression resistance determination.

4) Nominal Uplift Resistance and resistance factors

5) Factored Uplift Resistance

6) Nominal Lateral Resistance and resistance factors

7) Factored Lateral Resistance

8) Maximum Driving Resistance: Perform a pile drivability analysis to verify adequacy of proposed pile driving equipment, assess axial compression resistance and driving stresses for full length of driving. Report analysis results along with the Maximum Driving Resistance.

9) Minimum Pile Tip Elevation: Define the Minimum Pile Tip Elevation as the elevation corresponding to the minimum required depth of penetration.

10) Estimated Pile Tip Elevation: Report the elevation corresponding to the depth where nominal axial compression resistance was derived as the Estimated Pile Tip Elevation.

11) Pile type, size, cut-off elevation and tip elevation

12) Reinforcement details, pile point details, splicing details

C) Micropiles. Small diameter drilled and grouted non-displacement pile with a reinforcing casing and a center reinforcing bar. Permanent casings and load testing are required. Design micropiles in accordance with AASHTO LRFD specifications. A Micropile specialty Subcontractor is required.

Subcontractor shall submit documentation before the start of construction that he has successfully completed at least three micropile projects and at least installed 150 micropiles within the last three years with Micropile diameters and lengths similar to those anticipated for this project. Documentation shall include the general contractor and owner’s name and current contact information with descriptions of each project. A design geotechnical engineer is required to design micropiles. The design engineer shall be a licensed Professional Engineer in the State of New York and shall have at least 10 years of experience in designing micropiles and drilled foundations with capacities and in subsurface conditions similar to those of this project.

Double corrosion protection shall be provided to micropile central reinforcing steel bar in accordance with FHWA-SA-97-070_FHWA-NHI-05-039 recommendations. Maintain a minimum of 3 inches grout cover to the reinforcing bar along the entire length of the...
micropile. Galvanize exposed reinforcing and permanent casing that connect directly to caps.

In Brooklyn, in the vicinity of the Meeker Avenue Solvent Plume between Varick Avenue and Vandervoort Avenue, the method of installation of the micropiles shall be such as not to cause cross contamination below that Clay layer. The Design-Builder shall be responsible for obtaining the approval of NYSDEC for the method of installation.

For Micropile foundations, include the following information in the Foundation Design Report:

1) Micropile layout, diameter, inclination, minimum reinforcing casing and center rebar, and pile to cap connection

2) Micropile tip elevations, and bond lengths. If socketed in to rock, use a minimum bond length of ten feet. Neglect tip resistance in tension and compression

3) Nominal Axial Compressive Resistance and resistance factors

4) Factored Axial Compressive Resistance

5) Nominal Uplift (tension) Resistance and resistance factors

6) Factored Uplift Resistance

7) Nominal Lateral Resistance and resistance factors

8) Factored Lateral Resistance

Do not install reinforcing casing or begin drilling within six times pile diameter, center to center or five feet, whichever is greater until grout in piles reaches initial set. Grout the micropiles the same day the bond length is drilled.

**10.3.10.3 Foundation Load Testing**

The Design-Builder shall carry out sufficient axial load tests to verify the design nominal resistance for each production pile/shaft type, diameter and subsurface condition type (specifically, either founded within soil only, or founded within or upon rock). For each type and diameter of pile/shaft per subsurface condition type, a minimum of 1% of the total number of piles/shafts but no less than one static load test shall be performed.

The Design-Builder shall carry out lateral load tests to verify the lateral resistance for each production pile/shaft type and subsurface condition type. For each type and diameter of pile/shaft per subsurface condition type, a minimum of one static lateral load tests shall be performed. Lateral load tests will not be required for foundation using battered piles to resist applied lateral loads.
After completion of a pile/shaft load test, the Design-Builder shall be responsible for either fully removing the test pile from the ground or for cutting off the test pile at 2 feet below final grade.

A) Load Testing for Drilled Shafts

1) Install demonstration shafts to demonstrate successful drilled shaft installation means and methods prior to installing load test shafts. Perform axial compression load test for each drilled shaft size on demonstration shaft to verify the design assumptions and construction procedures. Select test locations to represent different subsurface conditions and/or construction methods. Perform additional axial load tests based on site variability as specified in the AASHTO LRFD Specifications. If the Design-Builder chooses to alter construction methods, an additional axial load test will be required on a test shaft constructed with the new method. Perform axial load tests using Osterberg Cell load equipment in accordance with ASTM D1143. Other test methods such as a Statnamic Test are not allowed.

2) Conduct a minimum of one lateral load test for each drilled shaft size and construction methodology. Lateral load testing requirements and details are provided in FHWA reference publication FHWA-NHI-10-016 (http://www.fhwa.dot.gov/engineering/geotech/ foundations/nhi10016/nhi10016.pdf)

3) Perform integrity testing on all demonstration shafts and production drilled shafts. At a minimum, integrity testing requirements shall comprise crosshole sonic logging on all drilled shafts. In addition, the Design-Builder shall carry out thermal integrity profiling testing to investigate the integrity of the cover concrete and the shaft perimeter behavior on all demonstration shafts.

B) Load Testing for Driven Piles

1) Perform a minimum of two axial compression load tests for each pile size, each pile type and subsurface condition type as defined by AASHTO. The additional number of axial static load tests on piles shall be determined by the Foundations Lead Designer, strictly adhering to the effect of their load testing program on the selection of pile design resistance factors given in Table 10.5.5.2.3-1 of the AASHTO LRFD Specifications. Perform a minimum of two axial tensile load tests when piles are designed with resultant uplift forces for each pile size, each pile type and subsurface condition type as defined by AASHTO. Complete load testing in accordance with the requirements and details provided in NYSDOT Static Pile Load Test Manual.

2) Perform a minimum of two lateral load tests for each pile size and for each pile type. Complete load testing in accordance with the requirements and details provided in FHWA Design and Construction of Driven Pile Foundations Reference Manual FHWA NHI-05-42 and FHWA NHI-05-043.
3) Complete all pile load testing for a given size and nominal resistance prior to driving production piles of that size and nominal resistance.

4) Develop production pile driving criteria from the static load test results, dynamic (PDA) test results, static calculations, and wave equation analysis in accordance with FHWA Reference Manual. Include the following in the pile driving criteria:

a. Hammer type;

b. Hammer blow rate along with the stroke;

c. Hammer and pile cushion type, size and thickness;

d. Hammer blows at the end of initial drive and for restrike.

For each substructure supported with driven piles, a minimum of 5% but no less than two of all the piles to be installed within that substructure unit or pile group shall be driven and dynamically tested during the entire initial drive and all restrikes. A pile driving analysis using Pile Driving Analyzer (PDA) shall be used to measure the hammer energy and the dynamic testing with signal matching Case Pile Wave Analysis Program (CAPWAP) shall be used to analyze the data on these piles. Dynamic pile testing shall be performed in accordance with the FHWA Design and Construction of Driven Pile Foundations Reference Manual.

C) Load Testing for Micropiles

1) Install demonstration micropile to demonstrate micropile subcontractor’s ability to successfully install micropiles. Perform axial compression load test for each micropile size on demonstration micropiles to verify the design assumptions and construction procedures. Select test locations to represent different subsurface conditions and/or construction methods. Perform additional axial load tests based on site variability as specified in the AASHTO LRFD Specifications. If the Design-Builder chooses to alter construction methods, an additional axial load test will be required on a test micropile constructed with the new method.

2) For static compression load tests, use Davisson’s failure criteria in accordance with FHWA Design and Construction of Pile Foundations, consider only friction component of elastic deformation of the micropile plus 0.15 inch. Ignore end bearing component. For elastic deformation calculations, consider the micropile total length minus half the bond length.

D) Reports

1) The Design-Builder shall prepare a Pile or Shaft Geotechnical Nominal Resistance Test Implementation Report containing test procedures, instrumentation plan including measurements along the piles or shafts, calibration procedures, test pile locations, pile sizes, and types being tested and equipment used. At a minimum, drilled shaft load test piles shall be instrumented
along the length to establish load transfer (t-z) curves for each soil layer and (q-z) curve for the bearing layer(s). Include crosshole sonic logging and thermal integrity profiling results for drilled shafts.

2) The Design-Builder shall prepare a Pile Geotechnical Nominal Resistance Test Results Report containing test results per pile size and type tested; production pile/shaft installation and/or driving system, and production piling acceptance criteria. The Design-Builder shall interpret the load test results and use them in the Design of Foundation such that the axial and lateral deformations of the pile or shaft do not exceed the structural limit.

10.3.10.4 Retaining Walls

A) The Design-Builder shall design and construct retaining walls in accordance with Project Requirement 11 – Structures. The Design-Builder shall provide retaining wall designs to address internal, external, and global (overall) stability and settlements (total and differential) of the walls in accordance with the AASHTO LRFD Bridge Design Specifications.

B) All retaining walls supporting bridge approaches shall be designed for seismic events.

C) The Design-Builder shall assess settlement induced by fill placements, including immediate settlement in granular soils, and both immediate and consolidation (time-dependent) settlements in cohesive soils in accordance with ASASHTO LRFD Specifications.

D) The Design-Builder shall evaluate the stability of all retaining walls within or affected by the Project, and ensure for the stability of these walls.

10.3.10.5 Embankments & Cuts

A) Settlement. The Design-Builder shall assess settlement induced by fill placements, including immediate settlement in granular soils, and both immediate and consolidation (time-dependent) settlements in cohesive soils in accordance with AASHTO LRFD Specifications.

B) Global Stability. The Design-Builder shall evaluate the stability of all existing slopes, new fill and cut slopes (permanent and temporary) within or effected by the Project, and ensure for the stability of these slopes.

The Design-Builder shall design new fill and cut slopes, and check existing slopes for the static case in accordance with FHWA NHI-05-123 -FHWA Soil Slope and Embankment Designs and for the seismic case in accordance with FHWA-NHI-11-032. The Design-Builder shall be responsible for ensuring that the following minimum requirements are satisfied:
1) The minimum factors of safety from limit equilibrium analysis for static load conditions for permanent slopes shall be 1.3 for non-critical slopes and 1.5 for critical slopes (at bridge abutments, wingwalls and existing structures);

2) The minimum factor of safety for seismic load cases shall be 1.0 for non-critical slopes and 1.1 for critical slopes and the Design-Builder shall be responsible for establishing the acceptable deformations the slopes can accommodate for the design seismic events;

3) The minimum factor of safety for a rapid drawdown condition shall be 1.1;

4) For non-permanent slopes, the minimum safety factor shall be 1.3 under static load conditions.

10.4 CONSTRUCTION REQUIREMENTS

10.4.1 Deep Foundation Installation Records

As part of the As-Built Plans, the Design-Builder shall provide installation records for all piles/shafts installed.

For driven piles, the pile driving records shall include hammer make and model number, hammer stroke, fuel setting, final pile tip elevations, driving resistance for each foot of driving for the entire length of driving, resistance achieved, pile lengths used, and details of the cap, cap block and cushion system, depth and distance of any pre-drilling used. Inspection records for drilled shafts shall be in accordance with NYSDOT Geotechnical Engineering Manual GEM-18 Drilled Shaft Inspector’s Guidelines. Inspection records for micropiles shall be in accordance with NYSDOT Geotechnical Engineering Manual GEM-25 Micropile Inspector Guidelines.

For drilled shaft, the installation records shall include drilling equipment used, temporary and permanent casing, materials encountered, bottom cleaning, SID results, top and bottom elevations, shaft and socket dimensions, concrete placement time, etc. For all drilled shafts with rock sockets or bearing on rock, the rock socket and the base of the drilled shaft shall be inspected utilizing an underwater video recorder. The video recorder shall be capable of capturing the depth of the recording. A digital copy of the video recording shall be submitted to the NYSDOT as part of the drilled shaft installation record.

10.4.2 Dewatering and Groundwater Control

The Design-Builder shall be responsible for evaluating the potential need for dewatering and groundwater control, and for implementing such measures as appropriate, and shall evaluate the effects on existing facilities resulting from any dewatering and draw down.
10.4.3 Condition Surveys

10.4.3.1 Pre-Construction Condition Survey

The Design-Builder shall conduct a pre-construction inspection and survey of the existing condition of all structures and properties for the purposes of generating photographic and video documentation of existing damage, leaks and cracks. The pre-construction condition survey shall form the basis against which all new cracks, existing progressive cracks, or damage will be measured. The spatial extent of the pre-construction survey shall encompass the Project Limits plus certain areas beyond the Project Limits, as detailed herein.

The full spatial extent of the Design-Builder’s pre-construction condition survey necessarily depends upon the Design-Builder’s design and proposed means and methods of construction. In its preparation for the pre-construction survey, the Design-Builder shall be responsible for predicting anticipated vibration and settlement effects at various offset distances from the Project Limits, and for ensuring that the pre-construction condition survey encompasses at a minimum all properties within areas that are identified by the Design-Builder to be potentially prone to: (i) ground vibration levels, expressed as resultant peak particle velocity, in excess of 0.50 inches per second; and (ii) predicted ground settlements of greater than ¼ inch.

In addition, the spatial extent of the pre-construction condition survey shall be integrated with the Design-Builder’s implementation of its strategy for conformance with the Environmental Performance Commitments related to the protection of cultural resources (see Project Requirement 3 – Environmental Compliance, Exhibit B). This strategy shall include properties within designated historic districts.

For the pre-construction condition survey of the Kosciuszko Bridge, the Design-Builder can in place of undertaking its own survey elect to utilize the most recent biennial inspection report for the existing bridge, as undertaken by the NYSDOT in 2012. If the Design-Builder elects to use the 2012 biennial inspection report as the pre-construction condition survey of the existing bridge, the Design-Builder shall there by agree and affirm that the 2012 biennial survey report presents an accurate and comprehensive survey of the pre-construction condition of the existing bridge. The 2012 biennial inspection report of the existing bridge is a confidential document, and will be made available to the Design-Builder in response to a written request sent to the NYSDOT.

The Design-Builder shall submit to the NYSDOT the records and photographic and video documentation of the pre-construction condition survey, which shall be signed and stamped by a Professional Engineer registered in the State of New York.

10.4.3.2 Post-Construction Condition Survey

The Design-Builder shall conduct a post-construction condition survey of the zone and properties covered by the pre-construction conditions survey (see Section 10.5.3.1 herein). The post-construction condition survey shall be performed by the Design-Builder at Physical Completion, and it shall compare the post-construction conditions with the conditions recorded in the pre-construction condition survey. The location and scope of the post-construction condition survey shall match those of the pre-construction condition survey. The complete
documentation of the post-construction survey, describing the comparison with the preconstruction conditions and signed by a Professional Engineer registered in the State of New York, shall be submitted to the NYSDOT.

10.5 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 10.6-1 for the NYSDOT’s consultation and written comment.

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<td>60 days after NTP</td>
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<tr>
<td>Geotechnical investigation plan</td>
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<td>Pile Geotechnical Nominal Resistance Test Implementation Report</td>
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<td>Foundation Design Reports</td>
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SECTION 11 STRUCTURES

11.1 SCOPE

The Design-Builder shall be responsible for all Work necessary for the design and construction of all permanent and temporary structures, including permanent bridges, bikeway/walkway, retaining walls, barriers, sign structures and miscellaneous structures. The design and construction of all structural systems and components shall provide functionality, durability, ease of inspection and maintenance, safety, and pleasant aesthetics.

The Design-Builder shall be responsible for the review and approval of all shop drawings needed for the scope of work. The review and approval process shall be in conformance with the Design-Builder's Quality Plan.

The Design Quality Assurance Engineer shall provide oversight of the design, as well as the design and shop drawing review and approval process.

11.2 STANDARDS

The Design-Builder shall perform the structural design and construction activities in accordance with the Contract Requirements, the applicable Standards, Codes and Manuals cited in Section 1.5, unless otherwise stipulated in this Project Requirement.

11.3 DESIGN REQUIREMENTS

11.3.1 Bridge Structure

The Bridge Structure shall comply with the Directive Plans in Part 6 – RFP Plans and the requirements of Part 1 – DB Agreement. The bridge is a critical bridge. The value of the operational importance factor in AASHTO LRFD Bridge Design Specifications Section 1.3.5 shall be taken as 1.05 for the strength limit state and 1.0 for all other limit states.

The Design-Builder shall perform the design and construction for a portion of the Meeker Avenue Viaduct, the Brooklyn and Queens Connectors, the Eastbound Brooklyn Approach, the Eastbound Queens Approach and the Eastbound Main Span.

The Design-Builder shall develop the design of the new Westbound Approaches and Westbound Main Span to the degree necessary to fully ensure that it is compatible and consistent with the proposed design of the new Eastbound structure and that it is constructible with the Eastbound structure in place. The piers on the Eastbound approaches shall be aligned with the piers for the Westbound approaches and shall not be staggered. The plans shall include but not be limited to the geometric, aesthetic and structural features including clearances.

If the Department chooses to exercise the Option, the Design-Builder shall also perform the design and construction of a new Westbound Cable-Stayed Main Span structure in...
conformance with the requirements of the Eastbound Cable-Stayed Main Span structure and the Directive Plans in Part 6 and the Contract documents.

11.3.1.1 Bridge Structural Type

A single tower Cable-Stayed structure will be required for the new Main Span. The Proposers shall propose structure types for the remaining segments of the Kosciuszko Bridge. These alternatives shall be consistent with the requirements contained elsewhere in the RFP, Final EIS, ROD, Reevaluation Statement and permits, and that they maintain six (6) lanes of traffic on the BQE and current access ramp capacities throughout construction.

The Design Builder shall comply with the requirements of the FAA Determination of No Hazard to Air Navigation, which are included in Part 7 – Engineering Data, including the height of the main span towers. The structure shall be marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, red lights - Chapters 4,5(Red),&12. As per the “Determination of No Hazard to Air Navigation” it is required that FAA Form 7460-2, Part 1 be completed and returned within at least 10 days prior to start of construction and Form 7460-2, Part II must be completed and returned to the FAA within 5 days after the construction reaches its greatest height. In addition, the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit must be filed.

11.3.1.2 Geometrics

The alignment and profile of the deck shall comply with the Directive Plans, and requirements specified in Project Requirement 24 – Highway Design. No structural member, including potential future loading components, shall penetrate the horizontal and vertical clearance envelopes specified for the navigation channel, roadways and existing railway at any time during the service life of the bridge.

11.3.1.3 Bridge Design Security

The Department will provide design criteria for security, and process and procedure for safeguarding secure information.

11.3.1.4 Components

A) Barriers, Railings and Pedestrian Fencing

1) Temporary traffic barriers shall meet the testing requirements of TL 3 and permanent traffic barriers shall meet the testing requirements of TL 5. The development of any new railing and barrier systems must meet the requirements established in the AASHTO Manual for Assessing Safety Hardware (MASH).

2) Railings and fencing shall be designed to meet the project’s Visual Quality goals. Where the bridge crosses over the Long Island Rail Road tracks and New York City streets, fencing shall be provided as required by the Long Island Rail Road and New York City Department of Transportation, respectively. Fencing shall
also be provided in Brooklyn wherever the edge of the new structure passes over an existing building to remain.

3) Protection shall be provided to all superstructure elements above the deck. Rigid traffic barriers shall be used to separate roadway shoulders from the towers and the stay cables. The level of protection shall be in accordance with Security Requirements provided by the Department.

4) Barriers, railings and/or fencing that will be designed and constructed to contain users and materials, shall be detailed to prevent people from climbing, provide for maximum safety and security, minimize weather (wind, rain, snow) impacts and maximize viewing opportunities.

B) Decks. Precast panel and/or cast in place decks are allowed except at steel girder Approach and Connector spans where cast-in-place decks will be required. Filled, overfilled or unfilled steel grating decks and orthotropic steel decks are not permitted. Steel stay in place forms are not permitted. All decks must be protectively sealed.

C) Deck Joints. The number of deck joints shall be minimized to the extent practical to minimize future maintenance. Where the range of movement is 2-½ inches or less Armorless Bridge Joint Systems per the NYSDOT BD Sheets shall be used unless the nature of the movement (i.e. significant transverse movement) precludes their use. For larger movements, modular type joints shall be used in the roadway sections. For the joint between the cable-stayed main span and approach structure, movement and rotations shall be accounted for in the joint design. Deck joints in the bikeway/walkway shall be bicycle-safe.

D) Superstructures

1) The interior of any superstructure element such as box girders shall be accessible for inspection and maintenance. Means to facilitate safe access to interior spaces shall be provided.

2) Structural steelwork shall be fully painted, metalized or galvanized. This includes the interior of steel box girders, if utilized. However, if uncoated weathering steel is provided both the exterior faces and the girder ends at expansion joints shall be coated in accordance with the NYSDOT Standards. If weathering steel is not used, the inside of steel box girders, if utilized, require primer and intermediate coat of white color, or shall be metalized or galvanized.

3) The interior of any box girders shall be illuminated and provided with 120V outlets as required in Project Requirement 14 - Lighting.

4) Drain holes shall be provided at all low points in box girder cells to ensure no ponding occurs in the event of water leakage into the box. All drain holes shall be protected with type 316 stainless steel bird screens.
E) Bearings. Design and location of bearings shall provide for maintenance, accessibility and future replacement. Jacking points with sufficient capacity (full dead load and live load) to allow the superstructure to be lifted for bearing replacement under live load shall be provided. The plans shall include the location of the jacking points and the jacking loads.

F) Piers and Cap Beams

1) Access shall be provided to the interior of all hollow pier sections. All access provisions shall meet the requirements of OSHA. Any access hatches shall be Type 316 stainless steel and shall meet the requirements of Section 17 – Security Requirements.

2) The tops of all piers below expansion joints shall be coated with penetrating type protective sealers. Stainless Steel reinforcement shall be utilized in all pier caps and bridge seats below expansion joints. Refer to the Bridge Manual for primary reinforcement requirements.

3) The pier shape shall be such as to have aesthetic appeal in a similar manner to those shown in the Indicative Plans in accordance with the Visual Quality and Lighting Plan. See Part 5 – Special Provisions – Architectural Requirements.

4) The tops of all piers and cap beams shall be pigeon proofed using type 316 stainless steel bird spikes or type 316 stainless steel screens.

G) Abutments. Abutments shall be designed and constructed in accordance with the Visual Quality and Lighting Plan.

H) Foundations and Piles

1) The Design-Builder shall calculate settlements for the different founding conditions along the bridge. Settlements likely to occur during construction shall be calculated separately from long term settlements. Particular attention shall be given to the differential settlements likely to occur between piers with piled/drilled shaft foundations to rock and piers supported by soil. The effects of settlements, differential settlements, and down-drag shall be fully accounted for in the design and construction.

2) In Brooklyn, in the vicinity of the Chlorinated Solvent Plume between Varick Avenue and Vandervoort Avenue, all piles shall be installed to a depth so that they are a minimum of 10 feet above the Raritan Clay Layer to avoid cross contamination below that clay layer.

I) Lightning Protection. Lightning Protection shall be provided in accordance with Project Requirement 14 - Lighting.

J) Lighting. Lighting shall be in accordance with Project Requirements 14 – Lighting and Section 18-Visual Quality.
K) Drainage

1) Deck drainage system shall be designed and constructed to minimize maintenance needs, and cleanouts shall be provided at appropriate locations. Scuppers in the roadway shall meet Department requirements for truck loading. Scuppers in the bikeway/walkway shall be grated with removable bicycle-safe grates. Scuppers shall be provided on the uphill side of all expansion joints.

2) Drain holes shall be provided at all low points in box girder cells to ensure no ponding occurs in the event of water leakage into the box. Drainage shall also be provided for all hollow piers. All drain holes shall be protected with type 316 stainless steel bird screens.

3) Additional drainage requirements are outlined in Project Requirement 20 – Drainage and Stormwater. The drainage design and construction will require review and approval from the New York City Department of Environmental Protection.

L) Fire Protection

1) All voided or enclosed spaces on the bridge not specifically addressed elsewhere in Part 3 that contain mechanical or electrical equipment including but not limited to elevators, electrical panels, control systems and security subsystems that can pose a fire hazard shall be provided with fire detection and protection systems in conformance with applicable New York State and NFPA standards. Voided spaces without mechanical or electrical systems but with inspection access, lighting and electrical outlets are exempt from this requirement. Design of Fire Protection elements will require review and approval from the New York City Fire Department. See Project Requirement 17 – Security for FDNY requirements.

2) The Design-Builder shall provide fire lines and pipes and make operational prior to opening to traffic. The fire standpipe system installation shall be as per FDNY requirements as well as NFPA 14 and portable fire extinguishers selection and installation shall be as per NFPA 10.

3) The Design-Builder shall provide combination air relief-vacuum valves at each high point on the structures.

4) Six foot wide crosswalks at the BQE roadway level shall be provided between the EB and WB structures, with a maximum spacing of approximately 360 feet on the approaches and 450 feet on the main span preferably located at the piers, so that emergency personnel can cross by foot between structures. The crosswalks shall be secured with climbing resistant locked gates and shall be accessed by climbing over the roadway barrier. The location of the crossovers shall be coordinated with the location of the standpipe discharge points. The crosswalks shall be a minimum of 6 feet wide and shall be designed for pedestrian live loading per the NYSDOT Bridge Manual. The Design-Builder’s design shall
include the crosswalks per these Project Requirements along the length of the Project. The Design-Builder shall construct the crosswalks as required in locations where both the Eastbound and Westbound structures are constructed under this Project. In locations where the Westbound structure is not constructed under this Project, the Design-Builder shall design and construct the Eastbound structure to allow for future installation of these crosswalks.

M) Dampers. Dampers shall only be used for the stay cables and shall not be used for structure damping.

N) Stay Cable System

1) The Stay Cable system shall be in accordance with Part 5 – Special Provisions – Stay Cables. Security measures shall be incorporated into the design per the security requirements provided by the Department and the Department’s review and approval. In addition, an icing prevention system shall be incorporated in the design and construction of the towers and the cable stays over the roadway.

2) A 1’-6” foot minimum offset shall be provided from the back face of the roadway barrier to any stay cable at a height of 18 feet above the bridge deck for stay cables adjacent to traffic lanes. For stay cables adjacent to the sidewalk bikeway, a one foot minimum offset shall be provided from the outside face of the bikeway/walkway railing to the stay cables at a height of 10 feet above the bikeway/walkway deck.

3) The bridge shall be designed so that each stay cable can be replaced one at a time without temporary supports. The bridge shall be designed so that cable(s) loss will not result in failure of the bridge. The loss of cables shall be determined from analysis as specified in the Security Requirements provided by the Department.

4) The non-linear effects due to large deformations shall be considered for cable replacement and cable loss cases. Non-linear analysis considering the P-Δ effect of the tower pylon shall be performed.

11.3.1.5 Bikeway/Walkway

1) The geometrical design criteria for the Bikeway/Walkway are specified in Project Requirement 24 – Highway Design. The Bikeway/Walkway shall have a minimum clear width of 20 feet along its full length on the bridge and approaches. Design of the Bikeway/Walkway shall accommodate all users including high-speed bicyclists, low-speed bicyclists, runners, in-line skaters, pedestrians, and persons with disabilities; and separation of bicyclists and pedestrians shall be provided by pavement markings or other clearly defined attributes.
2) Fences or railings shall be anti-climbing. Pedestrian railings along the walkway/bikeway shall be designed to withstand the horizontal pressure of 50 psf.

11.3.1.6 Materials

A) Concrete

1) The compressive strength of concrete shall be 10,000 psi maximum in prestressed or precast applications.

2) Use of concrete classes and corresponding mixtures defined under NYSDOT Standard Specification Section 501 are pre-approved, but are not required. If the Design-Builder proposes the use of alternative concrete mixtures, then the mixture design shall require trial batching and testing in accordance with NYS Standard Specifications. All materials used in alternative mixes shall be in accordance with NYS Standard Specifications, Section 555 – Structural Concrete.

3) Hot weather concreting shall be performed as per the recommendations of ACI 305 Guide to Hot Weather Concreting.

4) Cold weather concreting shall be performed as per the recommendations of ACI 306 Guide to Cold Weather Concreting.

4+5) Whenever a concrete placement is four feet or thicker, the recommendations of ACI 207 Guide to Mass Concrete shall be followed.

5+6) All concrete construction shall be in accordance the tolerances stated in ACI 117 unless otherwise specified in the NYS Standard Specifications.

B) Reinforcement. Reinforced concrete decks shall utilize solid Stainless Steel Bar Reinforcement. For all other reinforced concrete elements the reinforcement may be epoxy coated, or uncoated steel provided that they will meet the 100 year design life. The use of different types of bars in a structure shall only be allowed where provisions for preventing corrosion due to mixing dissimilar metals has been incorporated into the project.

C) Structural Steel. Structural steel shall be any appropriate combination of ASTM A709 Grade 50W, Grade HPS 50W Grade HPS 70W and/or Grade HPS 100W. If utilized, weathering steel will require a protective coating at deck joints and along fascias as indicated above.

11.3.1.7 Design Parameters (For All Eastbound and Westbound Structures)

A) Service Life. Service Life shall be in accordance with ACI 365 Service-Life Prediction - State-of-the-Art Report and Service Life shall be defined as the time in service until spalling of concrete occurs.
B) Vehicular and Pedestrian Loading. Vehicular and pedestrian live loads for the bridge shall be as per the NYSDOT LRFD Blue Pages.

C) Seismic Loading

1) The Design-Builder shall perform seismic analyses of all bridge components in order to establish the seismic design and bridge performance criteria, definition of the relevant bridge site characteristics, determination of the site response, as well as analytical modeling and seismic evaluation of the bridge performance. The analyses shall incorporate interaction effects between adjacent structural components, including impact between each other during a seismic event.

2) The seismic analysis of the bridge shall include non-linear time history modeling of the Main Spans plus a minimum of 700 ft of approach spans on each side of the Main Spans. The remainder of the approach spans may be investigated using non-linear time history modeling, or multi-modal response spectrum analysis combined with static inelastic (pushover) analysis.

3) All analyses shall be based on the following requirements:
   a. The bridge shall be designed in accordance with the NYSDOT LRFD Blue Pages provisions for Downstate bridges;
   b. The bridge is categorized as a critical structure;
   c. The bridge shall be analyzed for two earthquake hazard design levels: a lower level event (functional evaluation/design level) for 1000 years return period and an upper level event (safety evaluation/design level) for 2,500 year return period. A site specific analysis shall be performed. For the Main Span, the effects of spatial variation on the seismic ground motions shall also be considered;
   d. The bridge shall survive the upper level event (2,500 years return period) with repairable damage. The definition of repairable damage is as per the NYSDOT LRFD Blue Pages. Traffic access following this event may be limited: specifically, access shall be within 48 hours for emergency/defense vehicles and within 2 months for general public traffic;
   e. After the lower level event (1,000 years return period) the bridge shall suffer minimal damage, no damage to primary structural members and minimal damage to other components. The definition of minimal damage is as per the NYSDOT LRFD Blue Pages. Access after this event shall be immediate for all traffic, with an allowance of a few hours for inspection;

The Design-Builder shall also review the structural life safety systems on the bridge such as fire standpipes, elevators, and bridge lighting/electrical systems, as applicable, and
ensure these systems are designed consistently with the corresponding seismic requirements.

D) Water Loads. No portion of the bridge shall be exposed to Newtown Creek, therefore there are no water loads.

E) Ship Impact. No portion of the bridge shall be exposed to Newtown Creek, therefore there are no ship impact loads.

F) Wind Load and Design

The Design-Builder shall carry out a wind study and generate site specific wind climate data obtained from an analysis of long-term wind data available from reliable data sources in the area. The study shall include the impacts of climate change in determining the required wind speeds for stability and structural design of the main span bridge(s). The site-specific climate properties should be compared with wind speed information in codified sources. The Design-Builder shall be responsible for assessing and verifying the return period and wind loads to be used for construction stage analysis. As a minimum, the following shall apply:

1) Design wind speed shall be 100-year mean-hourly speed at the deck level, with a corresponding 10-minute mean value;

2) Design flutter speed shall be 10,000- year 10-minute mean speed;

3) Design wind speed for the construction phase shall be mean-hourly and 10-minute mean values for a 20-year return period; and

4) Design flutter speed for the construction phase shall be for 1,000-year return 10-minute speed.

G) Wind Study Testing

1) The Design-Builder shall perform sectional and full aeroelastic model testing of the Main Spans, including not less than 700 feet of the Approach Spans adjacent to each end of the Main Spans in the bridge’s completed form and throughout all critical stages of construction. The tests shall be carried out prior to completion of final design and shall be used by the Design-Builder to verify the satisfactory aeroelastic performance of the Main Spans.

2) All wind tunnel studies shall fully represent the aerodynamic and aeroelastic interactions of the eastbound and westbound bridge structures, both in their final completed state as well as critical construction stages, including when the existing truss is in place prior to its demolition. For sectional wind tunnel tests, this may entail dynamically representing both superstructure models (i.e. spring supporting both superstructures) in the wind tunnel to capture the in-phase and out-of-phase vibrations and the resulting aerodynamic effects.
3) Static aerodynamic coefficients (lift, drag, and moment), aeroelastic flutter coefficients, and vortex-induced aerodynamic motions shall be obtained from wind tunnel tests using a detailed sectional model of the bridge using an appropriate scale determined by an aerodynamicist. Static aerodynamic coefficients shall be determined for a +/-10 degree angle of attack. Dynamic response shall be determined for a +/-5 degree angle of attack.

4) The Design-Builder shall submit a wind tunnel test report which shall include, at a minimum:
   a. Introduction;
   b. Wind climate and site analysis, including introduction, data sources, methodology, results, conclusions, and recommendations;
   c. Section model test information, including objectives and criteria, model description, wind tunnel test procedures, aerodynamic stability results, and static force and moment coefficients; and
   d. Results of wind buffeting analyses, including background information, mean and background fluctuating wind loads, inertial loads due to wind-induced bridge motions, and wind load distributions for structural design.

Critical construction stages shall be determined by the Design-Builder, and at a minimum, shall include two construction stage conditions consisting of a stand-alone tower, if any, and fully extended cantilever conditions just prior to mid-span and bent closures.

The Design-Builder shall prepare a separate wind engineering study report with the results of the full aeroelastic model testing of the bridge to determine wind design forces based on the wind tunnel tests findings. The wind engineering study report shall include, at a minimum:

1) Description of the aeroelastic model and its design;
2) Description of the wind tunnel simulation;
3) Description of the wind tunnel test and instrumentation;
4) Aerodynamic stability from wind tunnel test results;
5) Response to turbulent winds from wind tunnel test results;
6) Response comparisons between the sectional and aeroelastic test results;
7) Comparison of simultaneous peak moments at the base of the tower, if any, or main span supports, predicted by the buffeting analysis and measured during the aeroelastic tests;
8) Conclusions and recommendations.

Wind buffeting analysis shall be performed by the Design-Builder in accordance with AASHTO LRFD Bridge Design Specifications, current edition, with NYSDOT Amendments and ASCE 7-10. Both static and dynamic wind effects shall be considered, utilizing computer models of the bridge that incorporate the results of wind tunnel tests of sectional models of the deck. Wind tunnel tests shall be carried out for both smooth and turbulent flow, and a range of inherent structural damping values.

The Design-Builder shall provide a cable dampening system, if required, for stability.

H) Wind Events

1) The Design-Builder shall complete wind analysis and design considering both a high-probability serviceability event and a lower-probability aerodynamic stability event. The wind analysis and design shall consider both the completed bridge and critical construction stages.

2) The serviceability wind event shall have a probability consistent with a mean return period of 100 years as defined in ASCE 7-10, but the resulting mean-hourly wind speed shall not be less than the mean hourly wind speed of a 100 year return period from wind climate data. During all phases of construction, a mean-hourly wind speed of not less than wind climate data shall be applied.

3) Vertical deck accelerations shall not exceed 0.03g for winds up to 30 mph and 0.10g for winds between 30 mph and 45 mph (where g denotes acceleration due to gravity). The completed bridge shall show no signs of flutter instability up to a 10,000 year return wind event and during all phases of construction for the 20-year wind event. If the bridge shows any sign of aerodynamic instability during the serviceability wind event or does not meet deck acceleration limits, the cross-section or other bridge design features shall be revised and all wind tunnel tests repeated. All revisions are subject to the Department’s approval. During construction, temporary remedial measures to counteract any distress shall be implemented as required without obstructing river navigation.

I) Bridge Load Rating. The Design-Builder shall load rate the bridges according to the NYSDOT EI 05-034 Level 1 rating, and the AASHTO Manual for Bridge Evaluation.

11.3.1.8 Design for Durability

The Design-Builder shall provide a bridge that meets the required design service life either by selecting materials with reduced corrosion potential, by selecting materials and details, which resist degradation or by other mean acceptable to the Department. Due to the extensive use of de-icing salts during the future operation, the bridge shall be considered to be subjected to severe corrosive conditions. For reinforced concrete elements the service life shall be determined using the STADIUM (Software for Transport and Degradation in Unsaturated Materials) model.
The service life of the structure shall be 100 years as outlined in Table 11.3-1, except as outlined in Table 11.3-2 for replaceable components.

<table>
<thead>
<tr>
<th>Table 11.3-1 – Minimum Service Life for Non-Replaceable Components</th>
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<tbody>
<tr>
<td>Non-Replaceable Components</td>
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<tr>
<td>---------------------------</td>
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<tr>
<td>Towers, piles, pile caps, piers, pier caps, deck and superstructure</td>
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<table>
<thead>
<tr>
<th>Table 11.3-2 – Minimum Service Life for Replaceable Components</th>
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<tr>
<td>Replaceable Components</td>
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<tr>
<td>------------------------</td>
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<tr>
<td>Stay cables and tie-down cables</td>
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<tr>
<td>External post-tensioning cables</td>
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<tr>
<td>Bridge bearings</td>
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<tr>
<td>Expansion joints</td>
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<tr>
<td>Concrete barriers</td>
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<tr>
<td>Bridge rail / approach guide rail</td>
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<tr>
<td>Separate bridge deck wearing surface</td>
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<tr>
<td>Overhead sign structures</td>
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<tr>
<td>Drainage system</td>
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<tr>
<td>Internal access ladders, platforms etc.</td>
</tr>
<tr>
<td>Access elevators in towers</td>
</tr>
<tr>
<td>Inspection travelers</td>
</tr>
<tr>
<td>Stay cable dampers</td>
</tr>
<tr>
<td>Electrical and mechanical parts</td>
</tr>
</tbody>
</table>

11.3.1.9 Critical Maintenance and Inspection Components

The following items are representative items that have been identified which require special design and/or detailing in the interest of inspections and maintenance. This is not an all inclusive listing and it is the responsibility of the Design-Build to identify all such components in the Inspection and Maintenance Manual.

A) Tower/Stay Cable Anchorage Connection: The anchorage connection/assembly must be fully accessible for inspection. The connection assembly shall be detailed to shed water and sealed to prevent water and moisture intrusion.

B) Composite Steel Member Stay Cable Attachment: Composite steel member to stay cable attachments shall be detailed to shed water and sealed to prevent water and moisture intrusion to the steel/concrete interface.
11.3.1.10 Moisture Control and Interior Drainage System

A) Ventilation: The design and detailing of voided towers shall promote natural ventilation to aid in preventing in the accumulation of moisture within the towers and stagnant air. Openings to promote ventilation shall be provided with appropriate screening to prevent entry of birds and pests. Openings shall be arranged such that to prevent water entry.

B) Access Doors: All horizontal access doors shall be provided with appropriate seals to prevent moisture from entering the piers, towers and superstructure.

C) Drainage Details: Floors of voided piers, towers and box sections shall be contoured and weep holes provided to promote the drainage of water and prevent moisture accumulation. Any holes shall be screened to prevent the entry of birds and pests.

11.3.2 Stay Cables

Stay cables shall be designed in accordance with the PTI Recommendations for Stay Cable Design, Testing and Installation, and Part 5 – Special Provisions – Stay Cables.

11.3.3 Inspection and Maintenance Access

11.3.3.1 Inspection and Maintenance Platform/Traveler

A) The Design-Builder shall design, furnish, and install maintenance and inspection self-propelled travelers to provide for future inspection and maintenance access to the full underside and fascia of the superstructure of the cable-stayed bridge. The inspection and maintenance self-propelled travelers shall be designed in detail to provide easy connection and implementation when needed. The travelers shall provide “hands on” accessibility to all areas of the underside and fascia of the superstructure of the cable-stayed Bridge. Suitable means shall be provided to access bearings, expansion joints, navigation lights and other components. The travelers shall be able to accommodate up to three (3) workers and associated equipment. The total minimum load requirement, including three workers and associated equipment is 1500 lbs. The travelers shall provide uninterrupted access from anchor pier to anchor pier (proposed Pier EB 22 to EB 24 and proposed Pier WB 23 to WB 25).

B) The Design-Builder shall provide multiple connection / support points to facilitate rigging operation as a back up to the main span traveler(s). The support points shall be independent of the traveler rail supports.

C) The work shall include designing and fabricating structural, mechanical, hydraulic and electrical components, assembling of components, erecting the assembled platforms and or travelers and testing.

D) The inspection and maintenance traveler shall not be used for construction of the cable-stayed bridge. The travelers shall ride on an independent rail system and may not ride on bridge edge girders.
E) The Design-Builder shall provide operations and maintenance information on the system within the Inspection and Maintenance Manual.

11.3.3.2 Superstructure Interior Access Considerations

The interior of all box girder sections, regardless of construction material, shall provide a minimum vertical clearance of 6'-0". Access openings for box sections shall be a minimum of 3'-0" horizontally by 4'-0" high. Access doors shall be located at pier and tower locations, and shall provide direct access between the hollow pier/tower and box section. Design entrances to any box girders with in-swinging, hinged, solid doors. Design doors in diaphragms with in-swinging, hinged, 0.25-inch galvanized mesh screen doors. Equip all doors with a lock and hasp. All locks on the bridge be keyed alike. Provide an access opening through all interior diaphragms of any box sections. If the bottom of the diaphragm access opening is not flush with the bottom flange, provide concrete ramps to facilitate equipment movement. Indicate on plans that diaphragm access openings are to remain clear and are not to be used for utilities or other attachments. If utilities are required, provide additional areas or openings.

11.3.3.3 Substructure Interior Access Considerations

Access to the interior of voided piers shall be provided at the top of the piers. Safety Platform and Ladder System, including fall protection system shall be provided for inspection and maintenance access for substructure. Hatches shall be provided at the top that provide direct access to the interior of superstructure box sections.

Elevators that provide maintenance access within the tower legs shall be provided from the tower base to the elevation of the cable anchorages. A minimum of one elevator shall be provided in each tower. The elevator shall conform to the requirements for Industrial Elevator in accordance with the New York City Building Code and shall be have a minimum interior clear space of 5 feet by 6 feet in plan. All elevator machinery, cables, and electrical components shall be readily accessible with work platforms, hatches, and ladders necessary to perform routine inspections and maintenance. The elevator shall be provided with emergency lighting. All electrical components shall be U.L. listed for the application, and comply with NEC workspace clearances. Cables and raceways shall comply with NEC requirements for the application. The installation shall include all structures, clamps, bolts, hangers, drive mechanisms, control devices and safety devices as required for the operation of the elevators and shall be in compliance with ASME A17.1, A17.2, and A17.3 and all local codes and ordinances. Megger test cables before putting them into service. Test results shall become part of the Inspection and Maintenance Manual for reference. The elevators shall be inspected and maintained by qualified service personnel. Maintenance shall be performed per the manufacturer’s recommendations and inspections shall be at durations as required by the New York City regulations. These requirements will be outlined in the Inspection and Maintenance Manual.

Access ladders shall be provided from the top of the elevators to the top of the towers. Secure access doors shall be provided at the tower base, tower top and at either the roadway or at the maintenance travelers. All areas where access is provided shall have OSHA compliant fall protection (railings, etc.).
11.3.3.4 Conceptual Design Report

The Design-Builder shall submit a conceptual design report for all the Eastbound and Westbound Main Span, Approach, Connector, Viaduct and Interchange structures for the Department’s review and written response. The Conceptual Design Report shall include, as a minimum, the following:

A) Overview plan, including tasks;
B) General plan and elevation;
C) Typical cross sections for the various structures that compose the bridge;
D) Design criteria including methodology for design and verification (independent check). This shall include details of materials, design rules and standards and clearance checks;
E) Submission of models and calculations;
F) Elevation and cross sections for the retaining walls and abutments; and
G) Aesthetic features.

11.3.3.5 Bridge Inventory Forms

As part of the final design, Bridge Inventory Forms shall be completed and submitted for each bridge and ramp structure as per the NYSDOT Bridge Inventory Manual. NYSDOT will provide new Bridge Identification Numbers (B.I.N. numbers) for each bridge and ramp structure.

11.3.3.6 Service Life and Corrosion Protection Plan

The Design-Builder shall prepare a detailed service life and corrosion protection plan for the bridge. The Design-Builder shall submit the service life and corrosion protection plan for the Department’s Project Manager to review and provide written comment. The service life and corrosion protection plan shall include:

A) A conceptual approach to achieving the required service life for non-replaceable members;
B) Identification of each bridge component with the corresponding environmental exposure conditions for each component (e.g., buried, submerged, exposed to atmosphere, exposed to corrosive chemicals);
C) Identification of relevant degradation and protective mechanisms for each bridge component. Quantify degradation processes and resistances to these processes with respect to time. Models shall use a probabilistic approach to evaluate the time-related changes in performance depending on the component, environmental conditions, and any proposed protective measures. Models shall be listed in the plan;
Confirmation of the expected service life of each bridge component (refer to Tables 11.3-1 and 11.3-2), based on the proposed material, exposure condition, relevant degradation mechanism, and any proposed protective measures, taking into account the proposed inspection/maintenance schedule. List any corrosion allowances and thresholds used. Include the level of reliability or probability of the predicted Service Life of each element as well as the expected interval of replacement or renewal of the protective measures within the service life duration (e.g., thickness of coats, number of times to recoat paint that protects steel members);

Explanation of what will be done during construction to ensure that a suitably high quality products are achieved (including ensure uniform compaction of the concrete, adequate concrete cover, proper curing for the element);

Summary, in a tabular format, for each component listed Tables 11.3-1 and 11.3-2 and other relevant elements, and of an estimate of life-cycle costs for the service life of the bridge. The life-cycle cost analysis for the bridge components shall be consistent with the methodology and process steps described in FHWA 02 047, Life-Cycle Cost Analysis Primer, and shall use a discount rate of 3.0% per year to convert future costs to present worth in 2013.

Additional specific requirements for the service life and corrosion protection plan shall include:

A) List of the manufacturers of all proposed coatings, inhibitors, sealers, and membranes
B) Schedule for corrosion inspection of the bridge components
C) Proposed maintenance schedule for items/materials that could be affected by corrosion
D) Anticipated impacts to traffic operations Active electric current cathodic protection and passive sacrificial anodes shall not be used to mitigate expected corrosion effects in structures, including piles.

11.3.4 Software

The Design-Builder shall use commercially-available computer bridge analysis programs to complete the bridge analysis and design, including seismic modeling. Programs shall be generally accepted in the industry, with a proven track record of use on projects of this nature.

Unless otherwise specified, the Design-Builder shall ensure the most current version of the relevant software is used.

11.3.5 Permanent Retaining Walls and Abutments

The Design-Builder shall determine the location(s) and types of retaining walls. Wall type selection and design by the Design-Builder shall meet all applicable Project Requirements.
Bridge wingwalls shall be considered as part of the retaining walls. All walls including abutments shall have the same architectural treatment facing. Gabion and crib walls are not permitted.

11.3.6 Sign Structures

The Design-Builder shall design and construct all sign structures on the bridge in accordance with NYSDOT Standards. Secured access shall be provided from ground to walkway and horizontal access platform shall be provided for maintenance walkway of variable message sign (VMS) structures.

11.3.7 Inspection and Maintenance Manual

The Design-Builder shall develop a project specific Inspection and Maintenance Manual (Manual) for the Project. The Manual shall provide guidelines and suggested procedures for inspecting and maintaining special items not covered by the Department’s routine maintenance procedures, such as cable stay systems, post tensioning systems, maintenance travelers, elevators, decorative lighting, etc. structures. As a minimum, the Manual shall cover the following:

- Chapter 1: Introduction:
  A. Purpose of the Manual; and
  B. Description of Bridge.

- Chapter 2: Bridge Design Considerations:
  A. Overall Concept of Design; and
  B. Descriptions of Design Loadings.

- Chapter 3: Structural Role of Major Bridge Elements:
  A. Substructure Elements;
  B. Superstructure Elements including Stay Cables; and
  C. Identification of Critical Inspection and Maintenance Elements.

- Chapter 4: Construction:
  A. General;
  B. Unique Construction Techniques (Superstructure and Substructure)
  C. Design Modifications during Construction
  D. Repairs Made During construction
  E. Permanent Record of Stay Cable Installation

- Chapter 5: Inspection Personnel and Equipment
  A. Inspection Personnel
  B. Inspection Access
C. Special Inspection Equipment

- Chapter 6: Inspection Program and Schedule
  
  A. Inspection Program
  B. Inspection Schedule
  C. Event Driven Inspection (including earthquakes, high speed wind events, fire, etc.)

- Chapter 7: Inspection Procedures
  
  A. General
  B. Deficiencies (Common, Superstructure, Substructure)
  C. Other Considerations
  D. Detailed Inspection Procedures
  E. Checklist –Forms to record observations

- Chapter 8: Maintenance (including Preventative Maintenance) and Repair Procedures
  
  A. General
  B. Post-Tensioning Systems
  C. Stay Cable System
  D. Stay Cable Vibration Suppression System (External dampers)
  E. Mechanical / Electrical System (Including access elevators)
  F. Lightning Protection System
  G. Differential Settlements
  H. Deck Replacement Procedures/Details (for non segmental concrete bridge only)
  I. Wearing Course Maintenance and Replacement Procedure/Details
  J. Stay Cable Replacement Procedures/Details
  K. Stay Cable Vibration Suppression System - Dampers Replacement Procedure/Details

11.4 CONSTRUCTION REQUIREMENTS

11.4.1 Erection Procedures

The Design-Builder shall develop erection procedures for all segments of the bridge that include complete detailed erection sequence drawings; erection stresses in permanent and temporary members; bent and falsework reactions determined for each construction stage.

The Design-Builder shall include step-by-step erection procedures with complete details of fabrication, erection, and stressing operations. Details of contemplated elevations, cable lengths, adjustments, and shims required shall be shown for each erection stage.

Geometry control specification shall be developed by the Design-Builder. For the edge girders of the cable stayed main span, progressive assembly shall be used in the shop.
Prior to construction, the Design-Builder shall issue an erection procedure report that shall include details of camber, stay-cable forces at each stage, anticipated stage deflections and rotations of all bridges to be construction. The method of monitoring shall also be included within the report.

11.5 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 11.5-1 for the Department’s consultation and written comment.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Number of Copies</th>
<th>Delivery Schedule</th>
<th>Reference Section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hardcopy</td>
<td>Electronic</td>
<td></td>
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<tr>
<td>Erection procedure report</td>
<td>3</td>
<td>1</td>
<td>At Readiness for Construction Review</td>
</tr>
<tr>
<td>Conceptual design report</td>
<td>3</td>
<td>1</td>
<td>At Definitive Design Review</td>
</tr>
<tr>
<td>Bridge Inventory Forms</td>
<td>3</td>
<td>1</td>
<td>At Final Design Review</td>
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<tr>
<td>Corrosion protection plan</td>
<td>3</td>
<td>1</td>
<td>At Definitive Design Review</td>
</tr>
<tr>
<td>Inspection and Maintenance Manual</td>
<td>3</td>
<td>1</td>
<td>At Final Design Review</td>
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<tr>
<td>Bridge load rating</td>
<td>3</td>
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<td>At Final Design Review</td>
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<tr>
<td>Wind tunnel test report</td>
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<td>1</td>
<td>At Final Design Review</td>
</tr>
<tr>
<td>Design Plans</td>
<td>3</td>
<td>1</td>
<td>At Design Reviews</td>
</tr>
</tbody>
</table>
SECTION 12 LANDSCAPE ARCHITECTURE

12.1 SCOPE

The Design-Builder shall complete all landscaping required for the Project. The Work includes preparation and implementation of a landscape development plan (LDP), which the Design-Builder shall develop in collaboration with the Design-Builder's visual quality management plan (see Project Requirement 13 – Visual Quality). The LDP shall include aesthetic guidelines for landscape elements within the Project Limits that integrates with the surrounding environment.

The Design-Builder shall be responsible for care of planting in accordance with NYSDOT Standard Specification §611-3.05 Care of Planting. The Design-Builder shall remain responsible for the maintenance and monitoring of all areas landscaped and planted by the Design-Builder until Final Acceptance. This obligation shall include replacement of any trees and other plantings that fail to establish or thrive prior to Final Acceptance.

12.2 STANDARDS AND REFERENCES

The Design-Builder shall perform the landscape architectural activities in accordance with the NYCDOT Street Design Manual and the New York City Department of Parks and Recreation requirements regarding the removal and planting of street trees.

12.3 REQUIREMENTS

12.3.1 Vegetation Inventory

The Design-Builder shall develop and provide a comprehensive vegetation inventory including survey of trees within the Project Limits and any projected areas of impact on neighboring properties. Trees proposed for removal and potentially subject to impact shall be documented. Plans shall be submitted to the Department's landscape architect for review and comment.

The Design-Builder’s Arborist shall be responsible for identifying which trees are proposed for removal and which trees are potentially subject to impact within the Project Limits and on neighboring properties, and shall assess whether preservation is feasible for trees potentially subject to impact.

12.3.2 On-site Protection Zones and Monitoring

The Design-Builder shall be responsible for limiting the removal of existing vegetation including trees within the Project Limits and for minimizing removal in adjacent areas, such as may be needed for the operation of construction vehicles or similar.

The Design-Builder shall be responsible for ensuring that all tree and vegetation protection zones shall be clearly marked in the field for ease of identification by the Design-Builder's construction personnel.
For trees that are not to be removed, the Design-Builder shall be responsible for the preservation and protection of sufficient root zone protection to achieve a high likelihood of survival of the tree.

The Design-Builder shall be responsible for establishing and implementing sufficiently frequent monitoring of construction activities to ensure that all requirements for tree and vegetation protection are met.

The Design-Builder shall be responsible for actively monitoring the condition of trees and vegetation in protected zones, and for taking active steps to remediate and improve any aspects of the Design-Builder’s protection system that do not provide adequate protection.

12.3.3 Landscape Development Plan

The Design-Builder shall develop and implement a LDP under the direction of landscape architect(s) licensed in the State of New York with demonstrated qualification in suburban highway design, stormwater management, integration of utility service areas, grading of steep terrain, community design reviews, and preparation of formalized project-specific aesthetic design guidelines. The Design-Builder’s landscape team shall also include a qualified arborist, who shall be suitably certified by the International Society of Arboriculture (ISA).

The LDP shall address landscape elements both during and post-construction including the development of sidewalk plantings for streetscapes for the areas of new or disturbed sidewalks, including but not limited to the realigned Cherry Street. The LDP shall be compatible with the Project’s overall visual quality management plan (see Project Requirement 13 – Visual Quality). The LDP shall include the Details of tree replacements, including locations where replacement trees shall be planted according to tree size and type and the replacement ratio per local zoning codes.

12.3.4 Permits and Approvals

The Design Builder shall coordinate with the NYCDO T, the New York City Department of Parks and Recreation and the Department of Forestry in both Brooklyn and Queens to obtain all necessary approvals and permits for the removal of street trees and trees within Sgt. Dougherty Playground; working around existing trees; and planting of new trees.

12.4 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 12.4-1 for the Department’s consultation and written comment.

<table>
<thead>
<tr>
<th>Table 12.4-1 –Deliverables</th>
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<tbody>
<tr>
<td><strong>Deliverable</strong></td>
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<tr>
<td>Vegetation Inventory</td>
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<tr>
<td>Deliverable</td>
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<tr>
<td>Landscape Development Plan</td>
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</tbody>
</table>
SECTION 13 SIGNING PAVEMENT MARKING AND SIGNALS

13.1 SCOPE

The Design-Builder shall be responsible for all Work necessary to design and provide all temporary and permanent signing, pavement marking and traffic signalization required for the Project. The Design-Builder shall install and maintain all components during the period of construction as necessary for a complete and functional system meeting the following requirements:

A) Provides for the orderly and predictable movement of all traffic;

B) Provides such regulation, guidance, warnings and advisories as are needed to ensure safe and informed operation;

C) Is fully and seamlessly integrated into the existing signing elements outside the Project Limits;

D) Is integrated into the regional intelligent transportation system (ITS);

E) Meets the operational needs of the ITS;

F) Traffic signalization that conforms to the NYCDOT standards.

The Design-Builder shall be responsible for preparing and implementing the necessary engineering studies and applicable design reports to justify all signing, pavement marking, and traffic signalization components to be incorporated into the Project, including Phase 2, the new Westbound structure that is to be constructed in a future contract.

The Design-Builder shall be responsible for identifying, designing, detailing fabricating, delivering and installing all permanent sign panels and shall provide all other signing and pavement marking materials and shall install all components necessary for a complete and functional system which, in addition to meeting the design and construction criteria specified above, meets the following requirements:

A) Is fully and seamlessly integrated into the existing signing elements beyond the Project limits;

B) Is integrated into the existing intelligent transportation system (ITS);

The Design-Builder shall coordinate with the Department and affected local agencies to ensure the appropriate design methods, procedures, submittals, plan preparation, analysis, methodology, review and comment processes, approval procedures, specifications and construction requirements are met and conform to the policies of the jurisdictional agency.

13.2 STANDARDS AND REFERENCES
The Design-Builder shall perform the signage, pavement marking and traffic signal activities in accordance with the Contract Requirements, Standards, Codes and Manuals listed in Section 1.5, unless otherwise stipulated in this Project Requirement.

13.3 REQUIREMENTS

13.3.1 Design Requirements

The Design-Builder shall be responsible for the production of an inventory of all existing signs, sign structures, traffic signal equipment and pavement markings within the Project Limits and also any existing signs and pavement markings located beyond the Project Limits that may be impacted by the Project.

The Design-Builder shall develop a signing and pavement marking plan for the Project that shall:

A) Provide for all components as called for in this Project Requirement;

B) Provide for the removal of existing sign panels, sign supports and sign support structures.

C) Encompass the replacement of all existing signs with new signs on the Department’s system and those impacted on the state/local system within the Project Limits;

D) Provide for modification to the existing signs on the I-278 mainline immediately approaching the Project Limits that are rendered inaccurate, confusing, or unnecessary due to the Project improvements. Such modifications shall include the addition, alteration, removal, and/or replacement of signs controlled by the NYSDOT. The Design-Builder shall coordinate with the NYSDOT for signing work on the approaches to the Project Limits, and shall conform to the NYSDOT standards in designing and implementing the new signage.

E) Include all necessary traffic control devices for all highways and local streets affected by the Project;

F) Provide signing, signals and pavement markings for bicycle and pedestrian facilities within the Project Limits;

G) Locate signs in accordance with the MUTCD and any specific NYS supplement;

H) Provide new overhead sign structures, with walkways where walk-in type VMS signs are provided, designed for fully loaded conditions that meet the minimum vertical clearance requirements over the entire width of the roadway lanes and shoulders;

I) Provide signs with high reflectivity with Type IX sheeting such as to not warrant sign lighting;
J) Provide mainline reference markers consistent with Department practice, spaced every 0.10 mile;

K) Provide signage and striping related to all other facilities and buildings included within the Project or impacted by construction; and

K) Utilize Department standards, which exceed minimum guidance in the MUTCD, to provide system conformity when installing bridge and local street related signage and striping; and

M) Provide temporary signs, signals and pavement markings for vehicular, bicycle and pedestrian traffic.

The Design-Builder shall not place overhead sign structures on the Main Span or in the vicinity of cable stays.

The Design-Builder may present the respective signing and pavement marking elements on separate drawings, but shall demonstrate that the proposed signs and pavement markings work in unison in the manner called for in this Project Requirements and the governing standards.

The Design-Builder shall prepare Design Plans that meet the requirements of Chapter 21 of the HDM related to plan sheet preparation for signs, traffic signals and pavement markings.

The Design-Builder shall prepare Design Plans that shall at a minimum cover the following signing aspects:

A) Position accurate temporary and permanent sign locations;

B) Panel sizes and legends;

C) Permanent and temporary ITS devices, including variable message sign locations, lane-use signals and cameras, as called for by Project Requirement 15 – Intelligent Transportation System;

D) Types of temporary and permanent sign supports; and

E) Sign structure elevations depicting temporary and permanent panel placement and horizontal and vertical clearances.

At minimum, the Design Plans shall cover the following pavement marking aspects:

A) A plan view showing the proposed temporary and permanent pavement markings;

B) Proposed temporary and permanent traffic signalization and intersection design on local streets;

C) Existing pavement markings for a minimum of 500 feet past the Project Limits, with the transitions and tapers appropriate for the design speed. Existing markings shall be
graphically distinguished from proposed markings, for example by using a lighter-weight drawing line than for the proposed markings;

D) Existing pavement markings to be removed and existing pavement markings to remain, identified by material type, color, and width, dimensioned across the roadway;

E) New pavement markings identified by material type, color, line width, dimensioned across the roadway; and

F) Location by station or dimension lines of all proposed pavement arrows, symbols, legends, crosswalks, and other pertinent features.

13.3.2 Software

The Design-Builder shall obtain the Department's consent on the use of software programs and techniques. The use of proven and commonly available software familiar to the Department and to the Department's sign fabrication shop is required.

13.3.3 Meetings and Records

The Department and the Design-Builder shall meet at the request of any of the parties, as necessary, to discuss and resolve matters relating to the signing and pavement marking Work during the design and construction stages.

The Design-Builder shall schedule one or more concept meeting(s) to present to the Department the inventory of existing signing and pavement markings for the Project and the proposed permanent signing and pavement markings. The Design-Builder shall document the resolutions of issues in a correspondence file, including meeting minutes and memoranda for the record. The Design-Builder shall document liaison with other agencies, including any permit requirements and contacts with the permitting agencies.

13.3.4 Construction Requirements

13.3.4.1 Signs

The Design-Builder shall not reuse any existing sign materials as part of the permanent signing installation and shall be responsible for the disposal of all removed signing materials and structures from the Project.

The Design-Builder shall be responsible for submitting to the Department the proposed sign panel layouts for review and comment before the design of the sign support structures is finalized since changes in the panel sizes could affect the design of the support structures.

The Design-Builder shall be responsible for submitting to the Department the finalized signage design data sheets for required sign panels. The format and content of the finalized sign panel data sheets shall be in accordance with standards in NYSDOT Highway Design Manual, Chapter 21. The Design-Builder shall be responsible for the design and provision of all posts, frames and other structural components required for the installation and support of the sign panels.
13.3.4.2 Pavement Markings

Pavement markings shall be uniform in type, color, dimensions, location, and reflectivity.

All linear roadway and SUP permanent pavement markings shall be installed in accordance with Special Specification 685.11010091, the Department’s specification for highly reflectorized triple drop epoxy pavement stripes.

13.3.4.3 Overhead Sign Structures

If the placement of the support post for signage requires non-standard roadway design features, the Design-Builder shall obtain a design exception from the Department.

The Design-Builder shall not attach signs to any overhead bridge unless no other viable alternative exists, nor without the written consent of the Department.

13.3.4.4 Traffic Signals

All local street traffic signalization shall be developed as per the NYCDOT standards for traffic signal and intersection design.

The Design Builder shall coordinate with NYC agencies and prepare traffic signal plans for submission to the NYCDOT in the appropriate format per the NYCDOT policies.

Upon approval (by the NYCDOT) of traffic signal and intersection design, the Design-Builder shall incorporate and provide Traffic signal and intersection design drawings per the NYSDOT policies and most current CADD Standards.

13.4 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 13.4-1 for the Department’s consultation and written comment, except that the finalized signage design sheets shall be for action by the Department.

<table>
<thead>
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<th>Deliverable</th>
<th>Number of Copies</th>
<th>Delivery Schedule</th>
<th>Reference Section</th>
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<td>Meeting minutes and records</td>
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<td>Not more than 5 days after each meeting</td>
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<td>Proposed sign panel layout</td>
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<td>At least 60 days before finalized sign panel design is due</td>
<td>13.3.4.1</td>
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<td>Delivery Schedule</td>
<td>Reference Section</td>
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</tr>
<tr>
<td>Finalized sign panel design data sheets</td>
<td>3</td>
<td>At least 90 days before required shipping date</td>
<td>13.3.4.1</td>
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<tr>
<td>Design Plans</td>
<td>3</td>
<td>At Design Reviews</td>
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<tr>
<td>Traffic Signal and intersection design drawings</td>
<td>3</td>
<td>At Design Reviews</td>
<td>13.3.4.4</td>
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</tbody>
</table>
SECTION 14 LIGHTING

14.1 SCOPE

The Design-Builder shall conduct all Work necessary to provide all lighting located inside the Project Limits. This includes the transportation related permanent and temporary roadway lighting of the bridge, under:-deck lighting, structure, maintenance lighting, navigation and aviation lights, aesthetic lighting and lighting of local streets.

14.2 STANDARDS AND REFERENCES

The Design-Builder shall perform the lighting activities in accordance with the Contract Requirements and the applicable New York City and New York State Standards, Codes and Manuals listed in Section 1.5.Requirements. The lighting design and construction will require review and approval from the New York City Department of Transportation Bureau of Street Lighting.

Additional reference is made to:

- Commission Internationale de l’Eclairage (CIE).

In addition to the documents referenced above, the IESNA has published two technical memorandums that solely address light trespass and sky glow.

- TM-11-00, Light Trespass: Research, Results and Recommendations/Illuminating Engineering Society of North America, 2000 (TM-11-00)
- TM-10-00, Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in conjunction with Roadway Lighting, Illuminating Engineering Society of North America, 2000 (TM-11-00)
- MLO, Model Lighting Ordinance, Illuminating Engineering Society of North America and the International Dark Sky Association

These additional criteria documents provide recommendations for measuring, determining, and identifying light trespass, sky glow and light trespass from roadway lighting. These documents shall be used to determine whether light control apparatus, such as shields, will be required.

The criteria referenced for the design of the aesthetic lighting can be found in:

The particular tables to be used are:

• 4.1 Recommended Illuminance Targets;
• 22.4 Indoor and Nighttime Outdoor Activity Level Definitions
• 26.2 Exterior Illuminance Recommendations
• 26.4 Nighttime Outdoor Lighting Zone Definitions.

14.3 REQUIREMENTS

The Design-Builder shall employ a professional lighting designer(s) who is a professional member (minimum) of the International Association of Lighting Designers at the professional member level, with a minimum of two successful bridge lighting experiences, and a minimum of 10 years of experience in design.

Said individual or firm shall also employ a lighting designer / lighting engineer who is lighting certified (LC) by the National Council on Qualifications for the Lighting Profession, with a minimum of five years of site and roadway lighting design experience.

14.3.1 General

The Design-Builder shall be responsible for design and implementation of lighting for the Project, including new luminaires, controls, traffic signals, poles, mounting, wiring, conduits, containment, installation, programming, focusing, commissioning, and as-built information necessary for delivering a complete and functional system. The Design-Builder shall be responsible for ensuring that the system meets the following requirements:

A) Provides illumination such that the road surface illumination meets or exceeds the uniformity and the illuminance and/or luminance criteria during darkness;

B) Utilizes energy efficient and long-life, low maintenance lighting technologies that have been reviewed and accepted by the Department;

C) Provides aesthetic architectural lighting scheme during darkness;

D) Minimizes avian/bird impacts as outlined in the Kosciuszko Bridge Project Reevaluation Statement, January 2011;

E) Meets U.S. Coast Guard navigational requirements for Newtown Creek including the shipping channel;

F) Provides aviation warning to meet Federal Aviation Administration (FAA) requirements during daylight and darkness;
G) Utilizes a photo-control switch system that automatically activates lighting before dusk and deactivates the system past dawn. In addition, the use of independent light switching shall be included, in order to reduce power consumption and allow manual control of lighting.

H) Provides lighting of all enclosed areas such as pier, towers and box girders;

I) Provides for protection against damage by lightning strikes; and

J) Uses lighting fixtures that are vibration resistant, and light poles that include damping devices as needed to insure that the fixtures are not damaged nor have their life shortened by bridge vibration.

K) Provides fixtures that are water tight and intended for a marine/industrial environment.

L) The roadway and bikeway/walkway lighting shall be readily available luminaries and not proprietary equipment.

The Design-Builder shall coordinate with the Department and NYCDOT to ensure the appropriate design methods, procedures, submittals, plan preparation, analysis methodology, review and comment processes, approval procedures, specifications and construction requirements are met.

14.3.2 Bikeway/Walkway Lighting

The Design-Builder shall ensure that the lighting installation at the bikeway/walkway shall:

A) Provide permanent lighting on the entire length of the bikeway/walkway, both on and off the Bridge;

14.3.3 Power Supply Requirements

Electrical power supply requirements are further defined in Project Requirements 9 – Utilities. For reference, the lighting installation shall:

A) Meet all requirements of NFPA 70 – National Electrical Code (NEC);

B) All outdoor electrical enclosures shall be rated NEMA 4X or a higher degree of protection; and

C) Meet all requirements of applicable IEEE and ANSI power engineering standards.

14.3.4 Interior Inspection Lighting

All enclosed areas subject to inspection and maintenance shall be provided with a low voltage (120 V a.c.) inspection and maintenance lighting system, and electrical outlets. The lighting levels shall be 30 foot candles horizontal. Bulbs for interior lighting system shall be high-endurance bulbs and fixtures shall be impact resistant. The system wiring shall be sized so that voltage drop shall not be more than 5%. Megger test all system conductors before putting them
into service. Test results shall become part of the Operation and Maintenance Manual for reference. Installation shall meet all requirements of the latest edition of the National Electric Code (NEC) and local ordinances.

Electrical receptacles shall be provided and be 120V duplex receptacles, in non-metallic outlet boxes at 50' maximum on centers. Each receptacle shall have a weather-protective gasketed outdoor plate.

Switches shall be mounted at each end of each span and at each access door. Six hour reset timers shall be provided for each circuit to turn off lighting system automatically.

14.3.5 Aesthetic Lighting

Aesthetic lighting fixtures used shall be accessible by way of normal and customary inspection and maintenance access equipment. Aesthetic lighting fixtures shall be water tight, and marine grade.

The aesthetic lighting scheme shall at a minimum illuminate all of the main span and back span stay cables as well as all faces of the main span towers full height, i.e. from the top of the tower footings to the top of the towers, Aesthetic lighting shall also be provided along the length of the main span and back span edge girders. The lighting scheme shall minimize avian/bird impacts in accordance with the Reevaluation Statement and utilize LED fixtures to the maximum extent feasible.

Aesthetic lighting shall pose no veiling luminance to roadway or navigable channel users.

14.3.6 Navigation Lights & Aviation Beacons

The Design-Builder shall design, furnish and install navigation and aviation lighting systems for the Main Span Bridge over Newtown Creek. The system shall be suitable for marine environment.

The installations, equipment, materials and workmanship shall be in accordance with the applicable provisions of the National Electrical Code, the United States Coast Guard and the Federal Aviation Administration.

Marine navigation red and green lanterns shall be provided on each side of the span over the navigable channel in accordance with 33 CFR 118. Two suspended duplex red channel margin marker lights (180 degrees) and one suspended duplex center channel green lantern (360 degrees) shall be displayed below the superstructure on each side of the bridge. A mounting bracket with retrieval chain shall be provided to hold the lantern in proper operating position. The mounting bracket shall be hot-dip galvanized steel with stainless steel hardware complete with all required accessories.

The navigational lights shall be placed so as to mark the navigation channel.

Aviation beacons lights shall be subject to FAA approval and consistent with the Reevaluation Statement with regard to minimizing avian/bird impacts. Housing shall be constructed type 316
stainless steel. The FAA has determined the aviation lighting is to be in accordance with AC 70-7460-1k Chapters 4, 5, and 12.

Temporary navigation lights and other navigation signals shall be installed during construction as required by the United States Coast Guard (USCG).

### 14.3.7 Lightning Protection System

The Design-Builder shall provide a UL master labeled lightning protection system. The installation shall comply with NFPA-780. All connections and components of the system shall be accessible for inspection and maintenance.

Lightning protection of concrete pylons and stay cables of cable-stayed structures shall consist of the following:

A) Installation of collector lines from each stay cable anchorages to the transition line. Installation of a collector line from the reinforcement near the top of the pylon to the transition line. Collector lines should be made of copper and have a cross section of at least 0.08 inches;

B) Installation of a transition line, in direct contact with the reinforcement cage, from the pylon tip down to the foundation. The transition line should have a cross section of at least 0.3 square inches and may consist of specifically designated reinforcing steel bars properly welded together to assure adequate electrical conductivity. The transition line should be connected to the foundation earth which typically consists of a horizontal closed loop of reinforcing steel bars (min 0.3 inches cross section) placed low in the foundation, inside the concrete. The concrete deck does not need any specific protection in general. In case electrically isolated bearings are used, they need to be electrically connected to earth with cables (min. cross section of 0.08 square inches or copper bar Ø ¼ inches). Composite structures are suggested to be protected similarly to concrete structures.

### 14.3.8 Roadway Signage

The requirements for roadway signage are further defined in Project Requirement 13 – Signing Pavement Marking and Signals. No signage installed as part of the Project requires sign lighting.

### 14.3.9 Relocation of Existing Equipment

All existing lighting luminaires and associated equipment on utility poles to be relocated shall be relocated to the proposed utility poles. Any existing equipment damaged by the Design-Builder during the progress of the Work shall be replaced at no additional cost to the Department.

### 14.4 DESIGN REQUIREMENTS
14.4.1 Existing Inventory

The Design-Builder shall be responsible for the production of an inventory including a map and list, of as-built locations of all existing lighting, illuminated signals and related cabling and controls within the Project Limits and such features located beyond the Project Limits that may be impacted by the Project.

14.4.2 Lighting Design Plans

The Design-Builder shall develop a lighting plan for the Project that shall:

A) Provide for all components as called for in this Project Requirement;
B) Meet the Visual Quality Requirements of Section 18; and
C) Provide a complete visual representation of the lighting design.

14.5 CONSTRUCTION REQUIREMENTS

14.5.1 General

The Design-Builder shall use materials listed on the NYSDOT approved list of materials or suitable LED luminaire models if none is included in the NYSDOT list.

The Design-Builder shall provide lighting materials that:

A) Are new at the time of installation;
B) Meet the visual and aesthetics goals for the Project;
C) Are long life, with a minimum rating of 50,000 hours L70, and are energy efficient;
D) Are compatible with the electrical characteristics (including voltage, number of phases, number of wires) of the power supply available at the Project site;
E) Minimize future maintenance and can be readily and inexpensively serviced and replaced by the Department’s in-house personnel; and
F) All permanent LED luminaires shall have a minimum manufacturer's warranty of five years from Final Acceptance.

The Design-Builder shall:

A) Provide all permanent and temporary lighting and related supports, lamping, controls for operational systems throughout the duration of the Project;
B) Ensure that all temporary lighting used during construction and demolition works shall conform to the glare control requirements of NYSDOT Standard Specification Construction and Materials §619-3.19.
C) Provide all new luminaires, poles, mounting, controls, wiring, grounding and bonding, electrical raceways/conduits, pull boxes, switches, junction boxes, panels, cabinets, enclosures, and related electrical equipment as needed;

D) Ensure that all electrical work is performed by or under the supervision of a licensed electrician;

E) Ensure that all exposed raceways/conduits shall be made of PVC coated rigid galvanized steel (RGS). Short runs of liquid-tight flexible metal conduit may only be used to make a final connection between the main power feeder and a light pole or fixture;

F) Ensure that all outdoor electrical enclosures and attached parts (e.g. breather drain) shall be rated NEMA 4X or a higher degree of protection;

G) Provide all luminaires required for safety markings;

H) Provide As-Built Plans with narratives fully describing the lighting installation.

I) Ensure that all electrical enclosures shall have a key lock;

J) Ensure all lighting shall include breakaway devices, unless protected by concrete barrier. Light poles shall feature a breakaway base, except where located behind bridge rails;

K) Ensure that all lighting installed by the Design-Builder shall be maintained in an operational condition until Final Acceptance.

14.5.2 O&M Manual for Lighting

The Design-Builder shall supply to the Department an Operation and Maintenance (O&M) manual for the Project lighting. The O&M manual shall include:

A) Operational instructions;

B) Trouble shooting instructions and emergency maintenance procedures;

C) Details of inspection intervals and extent of inspection for all components

D) Detailed procedure of inspection, maintenance and replacement operations;

E) Detailed instructions for operation and maintenance of aesthetic lighting applications;

F) Manufacturer’s proprietary literature;

G) Relevant data sheets and electrical diagrams including location, make, type, dimension;

H) Equipment list;

I) Access procedures;
J) Spare parts list;

K) List of suppliers with address, email and telephone numbers;

L) As-Built Plans and records;

M) Procedures shall include details of how the components can be replaced;

N) Test certificates; and

O) Any relevant reference documentation.

14.6 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 14.3-1 for the Department’s consultation and written comment.

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<thead>
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</tr>
<tr>
<td>Manufacturer’s warranties for all new equipment, associated parts and software</td>
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<td>1</td>
<td>At Final Acceptance</td>
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<tr>
<td>O&amp;M manual for lighting</td>
<td>5</td>
<td>1</td>
<td>At Bridge Substantial Completion (for Bridge lighting); and At Physical Completion (for all lighting)</td>
</tr>
</tbody>
</table>
SECTION 15 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

15.1 SCOPE

The Design-Builder shall perform all work necessary to design, furnish, build, and install, a new ITS system including any additional software along the Kosciuszko Bridge corridor from the Long Island Expressway to Metropolitan Avenue. This new system shall replace in its entirety the existing ITS system and shall be installed on the new Eastbound structure. The existing ITS system shall be maintained until the new ITS system is in use and has been accepted by the Department at which time the existing system shall be removed by the Design-Builder. The system shall be designed so that it can be expanded in a future contract to a new Westbound structure.

The Design-Builder shall design, furnish, install and test an operational ITS system including all required electronic devices for the system related to systems communication, traveler information, traffic monitoring and detection systems, all associated mounting hardware, and all associated cabling and integrate those devices into the NYSDOT system that connects to the Region 11 Joint Transportation Management Center (JTMC).

The Design-Builder shall prepare As-Built plans that detail all ITS work completed as part of this ITS system including but not limited to the fiber optic backbone, fiber assignments, test results pull boxes, splicing, ITS cabinets, CCTV installation, and radar detection. Variable Message Signs (VMS), Highway Advisory Radio (HAR), and TRANSMIT related equipment. The design, construction and installation of all the devices and facilities and appurtenances shall address functionality, redundancy, reliability, durability, ease of maintenance, maintenance access, safety and protection against vandalism and shall meet the latest NYSDOT Region 11 specifications and NTCIP standards.

The Design-Builder shall be responsible for continuity of operations of the existing ITS system until the new system has been installed, tested and accepted. None of the current functionality of the existing system may be lost or negatively affected by this ITS system replacement. Any disruptions to the existing system caused by the Design-Builder’s operation shall be repaired within 48 hours at the Design-Builder’s expense at no additional cost to the Department.

The Design-Builder shall be responsible for obtaining from the Department all available existing as-built plans of existing ITS elements and systems that will be affected by the Project that are in the possession of the Department. The Design-Builder shall investigate and survey all relevant areas, including areas one quarter mile beyond the Long Island Expressway interchange and beyond the project to Metropolitan Avenue, to ensure that all existing ITS-related features are identified and accounted for in the design. The Design-Builder is also responsible to verify the existing ITS system operational requirements.

The Design-Builder shall be responsible for ensuring that the following requirements are met:

A) The existing ITS system shall remain operational during the Project.
B) The Design-Builder shall identify the location, size, function and condition of all ITS features within the Project Limits from pre-construction as-built plans and field investigations and prepare an ITS plan describing how the ITS features shall remain operational throughout construction, up to the Final Acceptance and submitted to the Department.

C) All new ITS features shall be clustered when possible and shall be designed to incorporate maintenance access features inclusive of access steps/ladders, walkways, as required for access per Department practice. The Design-Builder shall locate ITS features so that the need for lane closures will be minimized. For safety purposes, no ITS equipment shall be positioned such that the Department’s maintenance personnel would have to climb over barriers to reach equipment being maintained;

D) ITS pull boxes shall be located so that they can be reached from the underside of the bridge by ground based equipment and cannot be located on the Main Span. ITS conduit shall be located so that they are within the fascia beams or girders and not exposed to view in elevation. Placement of any conduit in the concrete traffic barriers shall follow requirements in the NYSDOT Bridge Manual – Section 7.3.

E) All existing ITS elements outside the project limits will continue to be maintained by the Department. Access to these features shall be retained for Department maintenance. Any such elements installed or damaged by the Design-Builder shall be repaired by the Design-Builder and shall be maintained by the Design-Builder until Final Acceptance and any warranty period;

F) The Design-Builder shall be responsible for the design, installation and maintenance services for the duration of the Project for all new ITS elements included in the Project. The Design-Builder shall be responsible for identifying all items necessary to install and operate all required ITS elements;

G) The Design-Builder shall coordinate with the Department to ensure the availability and use by the Design-Builder of the latest version of the Department’s ITS equipment and system specifications.

H) The Design-Builder shall provide the Department access to the construction site for maintenance by the Department of the existing ITS facilities.

I) The Design-Builder shall install all necessary ITS temporary components and shall remove the old ITS components.

Prior to beginning construction the Design-Builder shall submit the Design Plans and Project Specifications of ITS elements and associated supporting documents to the Department for consultation and written comments. This shall include any temporary relocation and all necessary relocation of ITS elements and service lines affected by construction activities, regardless of the ownership of such service lines or of the property served by such service lines. All subsequent changes to the ITS designs shall require similar Department consultation and
written comment. ITS equipment, plans and details shall be provided for all construction stages to the Department’s Regional ITS group.

If the Department chooses to exercise the Option, the Design-Builders shall design and construct the Westbound Main Span to accommodate the expansion of the ITS system along the Westbound structure in a future contract.

15.2 EQUIPMENT

15.2.1 Standards

The Design-Builders shall perform ITS activities in accordance with the Contract Requirements, compliance of applicable Standards, Codes and Manuals unless modified by the associated ITS specifications prepared by the New York State Department of Transportation:

- NFPA National Electric Code (NEC) Standards
- FCC Highway Design Manual
- NYSDOT Design and Construction Requirements for Underground bridge of Mainline Pavement and Shoulders
- SAE Overhead Sign Structures, Dedicated Short Range Communications Message Set Dictionary
- AASHTO Roadside Design Guide
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
- AASHTO A Guide for Accommodating Utilities within Highway Right-of-Way
- NYSDOT Design Guide for Fiber Optic Installation on Freeway Right-of-Way
- IEEE 1455-1999 Standards for Message Sets for Vehicle/Roadside Communications
- ASTM E2213-03 Standard Specifications for Telecommunications and Information Exchange ITE TMDD v3 Traffic Management Data Dictionary (TMDD) Requirements
- NTCIP standards.

15.2.2 Fiber Optic Cable System

The Design-Builders shall install new fiber feeds and new interconnect fiber optic cables for all new and relocated equipment. All fiber optic cables shall be installed underground in conduit, or structure attached conduit, or inner-duct placed in conduit. The Design-Builders shall design the pull boxes and manholes on the fiber cable optic routes per Department specifications and overall Department requirements.
The fiber optic network in the construction area includes mainlines, trunk lines, feeder lines and interconnect cables. These include the following components:

- Two(2) 144 fiber optic cables installed along the corridor
- One(1) 216 fiber optic cable installed along the corridor
- One (1) 216 NYCDOT owned fiber optic cable that is aerial in some sections
- One (1) 72 fiber optic backbone cable
- SONET ring
- Various fiber feeds to HUBs, shelters, radar detectors and traffic cameras, VMS etc.
- Equipment interconnect cables with 12 fiber optic cables between the control cabinets and trunk lines
- All cable shall be labeled indicating the fiber count and the owner (NYSDOT or NYCDOT)

The fiber optic system shall be installed in 4” NPS Galvanized Steel Conduit for the entire length of the backbone. Inside the conduit runs of inner duct shall be installed for the entire length of the backbone conduit system. A fiber optic pull box shall be installed where required and at these locations the Design-Builder shall furnish and install splice enclosures and leave sufficient slack to allow fiber optic cables to be spliced from a vehicle parked in a safe location. A minimum length of 100 feet of slack shall be provided for each cable and shall be coiled neatly in a pull box. Fiber optic pull boxes shall be stainless steel and shall be mounted on structures. Fiber optic pull boxes for NYSDOT and NYCDOT are to be installed separately and labeled accordingly.

The Design-Builder shall also provide fiber optic cable connectors, splices, splice trays, splice cases, and breakout kits. All conduit crossing roads shall be at right angles to the roadway unless approved by the Department.

15.2.3 Closed Circuit Television (CCTV) System

The CCTV deployment shall consist of furnishing and installing CCTV camera assemblies at three locations. The camera assembly location shall be designed and installed such that the line of sight of the camera is in the center line of the desired field of view when the camera is in the mid-point of the desired motion between the limit stops. The desired field of view is the eastbound and westbound Brooklyn Queens Expressway roadways, ½ mile in either direction. The camera mounting arm shall be positioned towards the road and shall provide the desired views. The camera assembly shall be mounted on a standalone CCTV pole so the required views are obtained. The minimum mounting height for the camera assembly on a CCTV pole is 40 ft above the highway. The equipment shall deliver high definition full-motion video during day or night operation. The cameras shall be integrated with the Region 11 system so that it operates seamlessly at the Department’s Traffic Management Center.
The proposed CCTV deployment shall include all equipment, camera assembly, Ethernet switch, hardware, mounting arm, pole and foundation, mountings, cabling, power, software modifications and labor necessary to install, and integrate a fully operational system. Connections between the equipment shall be through weather proof connectors to provide easy replacement. CCTV video, fiber optic video and data transceivers shall be supplied. The camera assembly shall include but not be limited to the camera assembly, the mounting arm, cabling, mounting hardware and miscellaneous fittings. The Design-Builder shall furnish and install all equipment mounts for all aspects of the CCTV system including the CCTV assemblies, enclosure, cabinets, stand alone equipment modules and rack mounted components. Shop drawings and cut sheets of all portions of the camera system shall be submitted for review by the Department.

All proposed CCTV control cabinets shall be installed at such locations that accessibility for future maintenance can be performed without any lane closures. The CCTV installed at 54 Ave shall have a lowering device for the future maintenance.

The Design-Builder shall provide the Department with one day class training by the CCTV manufacturer that shall consist of a half day training held in the field and a half day training held in a classroom format.

15.2.4 Variable Message Signs

The Design-Builder shall be responsible for the design and implementation of a new variable message signs (VMS) for the project. The installation of VMS shall be such as to provide one sign on the eastbound approach to the Bridge. The Design-Builder shall design the VMS and the associated assemblies on an overhead structure as per Department specifications and requirements for a VMS on a structure.

A two day class training shall be provided for the ITS maintenance group by the VMS manufacturer. One day shall be held in the field and a second day shall be held in a classroom format.

15.2.5 Travel Time TRANSMIT System

TRANSMIT is the system developed by the Transportation Operations Coordinating Committee (TRANSCOM; which comprises various transportation and public safety agencies in the New York, New Jersey and Connecticut) for managing incidents and traffic using electronic toll tags, including the E-Z Pass system, and traffic management toll tags as anonymous probes for traffic surveillance and incident detection purposes. The Design-Builder shall submit to the Department the design plans and supporting documents for the installation of one traffic monitoring TRANSMIT site per the Department’s standards, in order to provide for travel times and speeds across the Bridge in both directions. The Design-Builder shall be responsible for integrating the project TRANSMIT site into the existing TRANSMIT system and shall comply with Department specifications.
15.2.6 Highway Advisory Radio (HAR)

If the existing HAR is relocated by the Design-Builder, the Design-Builder shall design a new HAR station per NYSDOT specifications and requirements and FCC rules and regulations for installation and operation. The new station shall broadcast advisory messages to motorists over the current allocated radio band that services the Kosciuszko Bridge corridor and New York City. The Design-Builder shall submit to the Department a radio communications system design with Design Plans and manufacturer’s special provisions for consultation and written comment. The Design-Builder shall be responsible for familiarizing itself the existing pre-construction HAR components at its present location.

The HAR station shall consist of the following major components:

- AM simulcast transmitter;
- Antenna, antenna groundplane and support structure;
- Antenna tuning unit; and
- Ground plane.

A two day class training shall be provided for the ITS maintenance group by the HAR manufacturer. One day shall be held in the field and a second day shall be held in a classroom format.

15.2.7 Electrical Work

The Design-Builder shall provide all 120/240VAC power necessary for the construction and system installation and shall include the furnishing and installation of all labor and equipment. Surge protection for all power, video and data circuits entering or exiting the cabinets shall be furnished with surge lightning protection. The Design-Builder shall maintain the integrity of all circuits in service that may be affected by the work.

The Design-Builder shall furnish and install cabling and conduit between the controller cabinet and the ITS equipment cabinet, the ITS cabinet and the fiber optic pull box, the camera and the ITS equipment cabinet, the fiber and communication manholes and the power source. It shall be the responsibility of the Design-Builder to verify that the cabling and its routing are sufficient for their needs.

Points of electrical service are meter cabinets with following locations:

- BQE WB at Leonard Street, MC#8.
- BQE EB at Scott Avenue, MC#9.
- BQE WB at North Service Road and 45th Street, MC#10.

The minimum size cable used for power circuits and ground wires shall be #12 AWG. Alternate cable sizes that can be utilized for power and ground are #6AWG and #2AWG. Voltage Drop
calculations for the electrical service drop to the ITS cabinet shall be provided. Power cabling and wires installed outdoors and underground shall be rated for 600V, rated for wet locations and gasoline and oil resistant. All cables provided shall be provided with terminations, connectors and splices as needed and shall be installed within the existing or proposed conduits. All termination cables provided shall be provided with terminations, connectors and splices as needed.

Video cable furnished for connections shall be rated outdoor use.

All cables shall be clearly labeled with identifying label or tags clearly indicating the circuit # and or camera #.

All electrical cables shall be installed in 2” conduit. All conduits shall be hot-dipped Rigid Galvanized Steel (RGS). All fittings and conduit bodies shall be hot-dipped galvanized. All conduits in the ground shall have a minimum cover of 2.5 feet.

15.3 SYSTEM TEST PROCEDURES

The Design-Builder shall be responsible for testing the installed equipment to verify that it has been installed correctly, is performing as specified, and supports overall system operations. This testing will be accomplished in a sequence of procedures that begin with basic components and culminate in exercising the total system in its operational configuration.

For all tests, the Design-Builder shall be responsible for providing detailed, step-by-step procedures for the testing. These procedures shall follow the requirements of the latest NYSDOT specifications for ITS equipment and communications and specifically identify:

- The equipment configuration,
- The sequence of operations for the test,
- The test setup including environmental conditioning
- The required test equipment and its configuration
- The expected results and pass/fail criteria

A copy of the test procedures shall be furnished to the Department for review and approval prior to the commencement of the tests.

For off-the-shelf equipment and components, the Design-Builder will be allowed to establish compliance through third party verification and a manufacturer’s quality assurance plan. The manufacturer shall supply documentation to verify that the performance of the equipment has been measured against the manufacturer’s equipment specification over the entire environmental range.
For equipment and components that are unique to and specifically manufactured for the project, the Design-Builder shall schedule an acceptance test at the factory to demonstrate compliance with the specifications.

**Operational standalone testing** demonstrates that the equipment has been installed correctly and is operational. These tests involve only single items of equipment or equipment assemblies. Portable laptop computers and test equipment supplied by the Design-Builder can simulate control of the standalone equipment. Typical tests would include but are not limited to:

- Physical inspection of the installation;
- Continuity tests;
- Power-on tests;
- Voltage measurements;
- Cable performance tests (twisted-pair, video and fiber optic). For optical fibers, this would include OTDR and attenuation measurements. For video cable, this would include frequency attenuation measurements. For twisted-pair cable, this would include checks for grounds, splits, crosses, and opens.
- Cabinet assembly-performance tests (e.g., Cabinet to CCTV camera functionality or cabinet to radar detector);
- Verification of radar detector measurements;
- Functional performance of Camera and communications;
- Wireless radio measurements (output power, signal levels, etc.);

Operational standalone testing should also include equipment setup. This would include configuring the equipment’s options and setting the equipment’s system identification, including its network address.

**Group site verification testing** measures or demonstrates that “linked” equipment and components are totally functional and are integrated in the field and with the JTMC. The following tests shall be required:

- Communications links with modems connect to optical fibers
- Multiplex connections and performance between nodes such as minihubs or shelters and the JTMC operations center.
- Modem circuits
- Data circuits
Subsystem integration testing shall include all components in the subsystem that demonstrates that the subsystem is totally functional and capable of supporting operations. Each typical subsystem shall be tested in its operational configuration, demonstrating complete compliance with all components between and including the operations center and the field elements.

System acceptance testing shall demonstrate that the installed equipment shall operate as specified and support operations for an extended period of time, not less than 30 days. The system acceptance test shall include a controlled burn-in period for the installed equipment. Procedures shall be provided to exercise the equipment and associated functions throughout the course of the test.

If any equipment should fail during the 30-day period, those subsystems affected by the failed equipment shall be subject to an additional 30-day test period. The Department will determine which equipment has been affected by the failure and subject to an additional 30-day period of testing.

15.4 DOCUMENTATION REQUIREMENTS

The Design-Builder shall prepare all documentation, as required, and submit to the Department for review. The Department’s review of system documentation does not waive the Design-Builder’s responsibility in furnishing and installing a fully operational and functional system meeting the specifications herein.

Test plan submittals shall be furnished by the Design-Builder to the Department to demonstrate that the System and associated products he intends to supply for this Contract have the capability to meet the functional objectives required by the Technical Parameters. System documentation submittals required shall consist of:

- Factory Acceptance Test Plan and Report.
- Field Acceptance Test Plan and Report.
- Operational Acceptance Test Plan and Report.
- Operating Documentation.

The Design-Builder shall provide the Department with the following documentation at the conclusion of the project:

- A minimum of five copies of all manufacturers’ documentation for all equipment to be supplied as part of this project. This documentation shall include all operations, maintenance, software support, and protocol descriptions available from the manufacturer of each component.
- All documentation specifically requested in the individual item specifications.
• A minimum of three copies of written documentation that contains the correct hardware (dip switch settings) and software adjustable configurations for all equipment used in the project.

• A chart that details the pin-outs of all cable assemblies and actual interconnection of all system components.

• All warranties associated with the ITS equipment with proper dates.

15.5 TEMPORARY ITS SYSTEM

All ITS elements and services that may be affected during construction require that maintenance, protection or mitigation measures shall be provided by the Design-Builder in order to keep the systems operational during all phases of construction. The operation of ITS field devices shall be maintained during construction. The transition time for relocating ITS equipment shall be approved by the Department. The Design Builder shall maintain all communications services and if necessary install a temporary ITS fiber optic system. Downtime for existing fibers requiring cut-over shall not exceed 48 hours. NYCDOT fibers shall be spliced first. After installing the temporary communication ITS services, the Design Builder shall install new fiber optic cable system without interrupting the operation of the ITS system. Multiple cutting of the existing fiber optic cable at the same time shall not be allowed. All plans for removal of the temporary system shall be approved by the Department. A 72 hour lead time shall be provided to the Regional ITS group and JTMC before any disconnects to the existing system can be made.

15.6 ITS EQUIPMENT PLAN

The following ITS equipment shall be installed:

• CCTV & two (2) radar detectors with supporting camera pole in the vicinity of the BQE WB and Morgan Avenue

• CCTV & one (1) radar detector with supporting camera pole along the BQE EB between Varick and Stewart

• A new VMS sign with supporting sign structure should be relocated west of the existing location along the BQE EB.

• CCTV & two (2) radar detectors with supporting camera pole in the vicinity of the BQE EB and 54th Avenue

• HAR at the BQE/LIE Interchange

• Travel Time Reader and antennas with supporting sign structure at the BQE and 54th Avenue

• Control equipment cabinets, respective communications and electrical equipment to be installed at each ITS equipment location.
• New communications system including One (1) 72, two (2) 144 and two (2) 216 fiber optic cables installed in conduit. All cables shall be spliced on both ends respectively with the existing fiber optic cables.

• New meter cabinet for the VMS and electrical conductors to support ITS equipment to be installed.

• New distribution 12 fiber optic cables between control cabinets and trunk cable for all new equipment installations with respective splices.

• Metal, steel zinc coated conduits communications and electrical to be installed with pull boxes respectively.

• All fiber optic pull boxes mounted on structures shall be type 316 stainless steel.

15.7 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 15.7-1 for the Department’s consultation and written comment.

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<td>As-Built Plans</td>
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SECTION 16  WORK ZONE TRAFFIC CONTROL AND ACCESS

16.1  SCOPE

The Design-Builder shall be responsible for the planning and provision of Work Zone Traffic Control (WZTC) meeting the requirements of Chapter 16 of the HDM, Section 619 of the Specifications, and 23 CFR 630 Subpart J, MUTCD Part VI Section 16.3.1 (J) – Public information and outreach considerations until Project Completion. This Project Requirement applies to all roads, including the mainline, ramps, cross roads, local streets, maintenance roads, driveways, and active paths within and/or affected by the Project.

The Design-Builder shall provide WZTC for the safe and efficient movement of people, goods, and services through the Project while maintaining access and minimizing negative impacts to residents, commuters, businesses, and NYSDOT maintenance operations.

Note that, as used in this section, “Work Zone Traffic Control plan” or “WZTC plan” is the equivalent of “Maintenance and Protection of Traffic plan” or “MPT plan” as described in Chapter 16 of the Highway Design Manual.

16.2  STANDARDS

The Design-Builder shall perform the work zone traffic control activities in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5, unless otherwise stipulated in this Project Requirement.

16.3  REQUIREMENTS

16.3.1  Work Zone Traffic Control Plan

The Design-Builder shall prepare and submit a WZTC plan for managing traffic operations and controlling access until Physical Completion meeting the requirements of Chapter 21 of the HDM for final WZTC Plans. In addition, the plan shall include contingency plans for weather, utility issues, and other unforeseen interruptions.

The Department will retain responsibility of maintenance of the existing bridge (including snow removal) for as long as it remains in service for general public use. The Design-Builder shall be responsible for maintenance of all new Construction in accordance with DB §105-12 until Final Acceptance. Where the existing bridge and the new bridge are both in operation, the Design-Builder shall be responsible for the new Crossing structure, until Final Acceptance, and shall be responsible for liaising with the Department in relation to operational arrangements.

The plans shall be submitted to the Department’s Design Quality Assurance Engineer prior to initiation of any work in proximity to traffic or the implementation of any change in traffic patterns.
The construction staging plan shall indicate the location and treatment of all traffic streams (motorized vehicles, bicycles, pedestrians) and shall include details of:

A) Contingency plans for weather, utility issues, and other unforeseen interruptions.

B) Duration of construction, sequencing of construction and detouring/alternate routing required for each construction stage;

C) Identification of lane(s) to be closed and duration of closure(s), if any;

D) Location and scheduled dates of use for all traffic control and safety devices, including but not limited to traffic channelization devices, barriers, impact attenuators, signs, pavement markings and variable message signs;

E) Location and schedule of flaggers (where such use is permitted);

F) Location and type of regulatory, guidance and warning devices;

G) The anticipated impact on local businesses;

H) The means of delivery and deployment of construction equipment, trailers, supplies, materials and other items for the Project;

I) Time of construction; and

J) Public information considerations

The WZTC plan shall be coordinated with affected police jurisdictions to facilitate safe and effective enforcement. The plan shall recognize the need for local approval of the use of public roads.

Six lanes of mainline traffic, three in each direction must be maintained on the BQE throughout construction unless otherwise permitted below. **The desirable lane width during construction is 12'-0". In areas where 12 feet cannot be provided, the minimum lane width shall not be less than 11'-0". All entrance and exit ramps shall be maintained, and consist of the number of travel lanes as in the present condition, as shall All local streets and access to buildings must be maintained unless otherwise noted below in the permit.**

The Department has met with the New York City Department of Transportation Office of Construction Mitigation and Coordination (OCMC) and the closures indicated in Section 16.3.2 are currently under review by OCMC and approval is subject to the submittal of permit applications by the Design Builder to the OCMC. Coordination with emergency services such as the New York City Fire Department will also be required. This coordination will require that traffic data be collected, a traffic study and analysis be performed and that the Design-Builder demonstrate that proposed lane closures will not have an adverse effect on traffic.
The Design-Builder shall produce a clear graphical representation of the staging with each stage, with associated traffic clearly delineated, in linear chronological order. Each significant change in traffic patterns shall be presented separately.

The Design-Builder shall be responsible for updating the construction staging plan as necessary throughout the Contract, so that at all times the current version reflects the planned current and future construction staging activities.

The Design-Builder shall provide portable variable message signs for the posting of appropriate warnings and advisories at strategic locations where opportunities are available for directing traffic to alternative routes in response to prevailing circumstances. It is anticipated that portable variable message signs will be required at major highway interchanges, local streets and any detour routes.

The Design-Builder shall be responsible for maintaining access to all businesses, residences, and properties within and abutting the Project, including essential services such as trash pickup and mail delivery.

NYSDOT’s Construction Quality Assurance Engineer (CQAE) and the Design-Builder shall coordinate with any municipality or agency affected by any detours or road closures that are part of the WZTC. Comments from those municipalities or agencies shall be incorporated by the Design-Builder into the site’s WZTC plan as directed by the CQCE.

NYSDOT’s CQAE shall be contacted by the Design Builder 2 weeks in advance of any proposed closure or staging.

16.3.2 Draft Lane Closure Stipulations

The lane closure stipulations below are currently under review by the OCMC. The current Draft stipulations are located on the Project website as well as the draft Detour Plans. Approval is subject to the submittal of permit applications by the Design Builder to the OCMC. The Design-Builder is required to submit WZTC proposals including final detour plans for approval before closures.

Liquidated Damages will be assessed for lane closures that extend beyond the hours permitted by OCMC per the Part 5 Special Provisions – Liquidated Damages.

**BQE – Eastbound (Queens-bound) between Kingsland Avenue and LIE Interchange**

A. Close one (1) eastbound lane on the BQE while maintaining eastbound traffic on the remaining two (2) eastbound lanes, as follows:

- 10:30 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
- 11:00 PM to 8:00 AM – Friday night to Saturday morning
- 11:30 PM to 9:00 AM – Saturday night to Sunday morning

B. Close two (2) adjacent eastbound lanes on the BQE while maintaining eastbound traffic on the remaining eastbound lane, as follows:

- 12:00 AM to 5:00 AM – Weekdays (Monday to Friday)
- 12:00 AM to 6:00 AM – Saturday
C. Full closure of all three (3) eastbound lanes on the BQE to facilitate transfer of eastbound BQE traffic onto the new eastbound structure and the demolition of existing bridge elements for a maximum of fifteen (15) minutes, as follows:

- 12:00 AM to 5:00 AM – Weekdays (Monday to Friday)

Should these operations require more than one fifteen (15) minute period to complete, then the initial fifteen (15) minute closure must be followed by a period sufficient in length for the queue of traffic to be dissipated or one (1) hour, whichever is less, prior to another fifteen (15) minute closure.

**BQE – Westbound (Brooklyn-bound) between Kingsland Avenue and LIE Interchange**

D. Close one (1) westbound lane on the BQE while maintaining westbound traffic on the remaining two (2) westbound lanes, as follows:

- 10:30 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
- 11:00 PM to 8:00 AM – Friday night to Saturday morning
- 11:30 PM to 9:00 AM – Saturday night to Sunday morning

E. Close two (2) adjacent westbound lanes on the BQE while maintaining westbound traffic on the remaining westbound lane as follows:

- 12:00 AM to 5:00 AM – Weekdays (Monday to Friday)
- 12:00 AM to 6:00 AM – Saturday
- 12:00 AM to 8:00 AM – Sunday

F. Full closure of all three (3) westbound lanes on the BQE to facilitate transfer of westbound BQE traffic onto the new eastbound structure and the demolition of existing bridge elements for a maximum of fifteen (15) minutes, as follows:

- 12:00 AM to 5:00 AM – Weekdays (Monday to Friday)

Should these operations require more than one fifteen (15) minute period to complete, then the initial fifteen (15) minute closure must be followed by a period sufficient in length for the queue of traffic to be dissipated or one (1) hour, whichever is less, prior to another fifteen (15) minute closure.

**Entrance Ramp from Cherry Street Eastbound to BQE Eastbound (Queens-bound)**

**Exit Ramp from BQE Westbound (Brooklyn-bound) to Meeker Avenue Westbound**

**Entrance Ramp from LIE Eastbound Service Road to BQE Westbound (Brooklyn-bound)**

**Entrance Ramp from 43rd Street to BQE Westbound (Brooklyn-bound)**

G. Full closure of the ramp as follows (see detour plans D-4, D-5, D-7, D-8 and D-9):

- 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)

**Exit Ramp from BQE Eastbound (Queens-bound) to LIE**

**Entrance Ramp from LIE Westbound Service Road to BQE Westbound (Brooklyn-bound)**

H. Partial closure of the ramp with traffic shifted to maintain one (1) lane of traffic as follows:

- 10:00 A.M. to 3:00 P.M. – Weekdays (Monday to Friday)
- 10:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
I. Full closure of the ramp as follows (see detour plans D-3 and D-6):
   • 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)

Meeker Avenue – Eastbound between Kingsland and Vandervoort Avenues

Meeker Avenue – Westbound between Kingsland Avenue and Van Dam Street

Laurel Hill Boulevard between 56th Road and 54th Avenue

Morgan Avenue between Meeker Avenue (WB) and Anthony Street

J. Partial closure with traffic shifted to maintain one (1) lane of traffic as follows (see detour plans D-16 and D-16A):
   • 10:00 AM to 3:00 PM – Weekdays (Monday to Friday)
   • 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
   • 11:00 PM to 7:00 AM – Friday night to Saturday morning
   • 11:00 PM to 9:00 AM – Saturday night to Sunday morning

K. Full closure as follows (see detour plans D-10, D-11, D-15 and D-16B):
   • 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)

Vandervoort Avenue between Meeker Avenue (WB) and Anthony Street

L. Partial closure of Vandervoort Avenue with traffic shifted to maintain one (1) lane of southbound traffic and two (2) lanes of northbound traffic as follows (see detour plan D-17 and D-17A):
   • 10:00 AM to 3:00 PM – Weekdays (Monday to Friday)
   • 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
   • 11:00 PM to 7:00 AM – Friday night to Saturday morning
   • 11:00 PM to 9:00 AM – Saturday night to Sunday morning

M. Full closure of Vandervoort Avenue with traffic detoured to adjacent local streets as follows (see detour plan D-12):
   • 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)

Local Cross Streets under/adjacent to BQE

N. Partial closure of local cross streets including:
   • Porter Avenue – between Anthony and Cherry Streets
   • Varick Avenue – between Anthony and Thomas Streets
   • Stewart Avenue – between Anthony and Thomas Streets
   • Gardner Avenue – between Anthony and Thomas Streets
   • Scott Avenue – between Cherry and Thomas Streets
   • Hausman Street at Meeker Avenue (WB)
   • Apollo Street at Meeker Avenue (WB) and Vandervoort Avenue
   • Van Dam Street at Meeker Avenue (WB)
   • 56th Road – between Laurel Hill Boulevard and 43rd Street
   • 54th Road – between Laurel Hill Boulevard and 43rd Street
   • 54th Avenue – between Laurel Hill Boulevard and 43rd Street
with traffic shifted to maintain one (1) lane of traffic as follows:

- 10:00 AM to 3:00 PM – Weekdays (Monday to Friday)
- 11:00 PM to 5:00 AM – Weekdays (Monday night to Friday morning)
- 11:00 PM to 7:00 AM – Friday night to Saturday morning
- 11:00 PM to 9:00 AM – Saturday night to Sunday morning

0. Full closure of local streets for durations of up to one (1) week with only one (1) of these local streets closed at any one time including:

- Porter Avenue with traffic detoured to Varick Avenue
- Varick Avenue with traffic detoured to Stewart Avenue
- Gardner Avenue with traffic detoured to Stewart Avenue
- Scott Avenue with traffic detoured to Gardner Avenue
- 56th Road with traffic detoured to 54th Road
- 54th Road with traffic detoured to 54th Avenue
- 54th Avenue with traffic detoured to 54th Road
- Stewart Avenue with traffic detoured to Gardner Avenue

Only one ramp may be closed at any one time.

16.3.3 Opening of New Lanes or Shared Use Path

Any new travel lanes, turn lanes, shared use path or other feature shall not be open to traffic prior to complete installation of all associated overhead and ground mounted permanent signs and striping.

16.4 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 16.4-1 for the Department’s consultation and written comment.

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<td>Design Plans</td>
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SECTION 17 SECURITY

17.1 SCOPE

The Design-Builder shall be responsible for securing non-public spaces of the new bridge and providing fire fighting standpipes and access features as detailed in this specification.

The Design-Builder shall design the bridge structures and components to withstand a fire and to withstand various types of explosions. The specific fire and blast loads to be designed for are confidential, and will be made available to the shortlisted firms authorized representative.

17.2 STANDARDS

The Design-Builder shall perform the security design in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5. Requirements

17.3 GENERAL

The Design-Builder shall be responsible for providing, designing and installing secure doorways, gates and hatches at the entrance to all non-public spaces. In locations where a potential intruder may not be clearly visible to the general public and may be able to escape detection, secure doorways, gates and hatches shall be especially robust.

The Design-Builder shall be responsible for designing, providing and installing dry standpipes on both the Eastbound (EB) and Westbound (WB) bridges, along with a temporary standpipe on the Queens temporary bridge.

17.4 FIRE STANDPIPES

17.4.1 Fire Suppression Considerations/Requirements

A standpipe system shall be provided on the Eastbound (EB) and Westbound (WB) Main Spans, Brooklyn Approach and Queens Approach. The EB and WB bridge systems shall be independent but shall have valve controlled cross connections. Each system shall provide 3000 gallon/minute (GPM) with 1500 gpm from Brooklyn and 1500 gpm from Queens.

Crosswalks at the BQE roadway level shall be provided between the EB and WB structures, as per Project Requirement 11 – Structures.

Standpipe hydrants shall be spaced at 150 feet maximum on centers, with an outlet at each crosswalk.

The EB and WB standpipe systems shall have connections at ground level in both Brooklyn and Queens. The ground level connections shall be provided at locations that provide good access
to FDNY pumper trucks, and are located within 100 feet of hydrants fed by looped (not dead end) water mains.

17.4.2 Temporary Bridges

The temporary bridge in Queens will be located above Laurel Hill Blvd and will vary in height up to approximately 55 feet above grade. A temporary standpipe is required on the temporary bridge in Queens due to the height of the structure. A temporary standpipe is not required on the temporary bridge in Brooklyn.

17.5 CONSTRUCTION REQUIREMENTS

17.5.3 Testing Prior To Installation

The fire standpipe system shall be tested per FDNY requirements and approved by the FDNY prior to acceptance.

17.6 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 17.7-1 for the Department’s consultation and written comment.

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<td>Manufacturer’s warranties for all new equipment, associated parts and software</td>
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SECTION 18 VISUAL QUALITY

18.1 SCOPE

The Design-Builder shall be responsible for ensuring the Kosciuszko Bridge Project including all structures and streetscapes is a valued visual and aesthetic component compatible with the environmental, social, and physical characteristics of the region and the neighborhoods in which it is located. The Design Builder shall prepare a Visual Quality and Lighting Plan as indicated below.

The Design-Builder shall be responsible for ensuring that all aesthetic aspects shall comply with the requirements laid out in the Environmental Documentation, including the Final Environmental Impact Statement (FEIS), Record of Decision (ROD) and the Reevaluation Statement as they apply to this Project. The Design-Builder shall prepare a Visual Quality and Lighting Plan that will address the aesthetic aspects of all visually significant elements of the Project work. The Visual Quality and Lighting Plan shall consider both the Project and the Project plus the Option.

18.2 CONTEXT SENSITIVE SOLUTIONS

The Design-Builder shall conduct its visual quality management work consistent with the principles of context-sensitive solutions using inclusive design approaches that integrate and balance community, aesthetic, historic, and environmental values with transportation safety, maintenance, and performance goals. The Design-Builder shall ensure that the Project fits within the unique environmental, social, aesthetic and physical character of the site and neighborhoods within which it is located.

18.3 VISUAL QUALITY AND LIGHTING PLAN

The Design-Builder shall prepare a Visual Quality and Lighting Plan (VQP) that shall include elevation views, plan views, cross sections and details for the main spans, approaches, connectors, retaining walls, local streets and all elements that are included in the visual impact of the project. A Preliminary VQP shall be prepared during the proposal phase and shall be submitted as part of the Technical Proposal. The preliminary plans shall define the configuration and details of the primary structural members, including height, shape, tapers, approximate dimensions, cross sections, orientation, and architectural details.

The Design-Builder shall include a licensed architect, with experience in aesthetics of major long-span signature bridges, who shall be responsible for the development of uniform architectural criteria and standards to be applied for the entire Project.

The development of the design shall be a collaboration of Design-Builder's bridge engineers working along with the architect as an integrated team. In the development of bridge designs and selection of structures every attempt shall be made to integrate the ramps and approaches
with the Main Span Bridge, so that from an aesthetics viewpoint the bridge will be viewed as a
total design concept where all elements are fully coordinated in both structural and visual terms.

The architect shall develop an architectural theme for the bridge including preferred shapes for
superstructure cross-sections, stay-cable arrangements, towers and pier configurations.

All elements of the bridge should have a sense of unity that results from the commonality of
expression, sense of scale, simplification of form and contour and similarity of materials, texture
and color. The relationship of the Main Span Bridge to the approaches and other structures
shall be defined so that the placement of piers, the roadway deck, and the superstructure all
contribute to the overall sense of proportion, scale, rhythm and unity of design.

There should be similarity in the detailing and articulation of all elements and components of the
entire bridge appurtenances, standards for signs, treatment for drainage pipes and scuppers,
architectural finishes and facing, and concrete rustication details. They must be clear, concise,
and visible without being dominant.

All concrete components, either precast or cast-in-place, shall be of uniform color and texture.
All concrete surfaces on the exterior face of the bridge, and those elements visible to the
traveling public, i.e. parapets, barriers and pedestals shall be treated with a Silane/Siloxane
sealer so that it will retain original color and help in removing graffiti.

The final design and construction shall conform to the VQP submitted with the Technical
Proposal.

18.3.1 Substructure

For each substructure type, provide drawings showing the column shape and orientation, details
of architectural shapes, tapers and finishes, approximate dimensions, and any unique aesthetic
details.

18.3.2 Superstructure

Provide drawings from schematic that show overall aesthetic character and visual quality of the
bridge design. Provide accompanying drawings showing the elevations, cross section and
visualizations of each superstructure type or sub-type including locations and dimensions of
lanes, barriers, shoulders, bikeway/walkway, railings, fences, primary structural elements, light
fixtures, etc. Provide drawings showing the elevation and cross-section of primary structural
elements for each superstructure type or sub-type or condition including the deck, stay cables
and stay cable attachments to the towers and superstructure.

18.3.3 Cable Stayed Main Spans

Provide drawings/visualizations showing the configuration and details of the primary structural
members, including height, shape, tapers, approximate dimensions, cross sections, orientation,
and architectural details. These renderings shall be set within the context of the local site, and
shall include views similar to those in the Visual Resource Assessment (VRA) prepared for the
Environmental Impact Statement.
18.3.4 Approaches

Provide drawings/visualizations showing the configuration and details of the primary structural members, including height, shape, tapers, approximate dimensions, cross sections, orientation, and architectural details.

18.3.5 Retaining Walls and Abutments

Provide drawings/renderings for retaining walls and abutments. Include elevation and plan views showing the extent of the Work, conceptual details for connections, transitions, and architectural surface treatments. The drawings/renderings shall be set within the context of the local site, and shall include views similar to those in the VRA.

18.3.6 Underpasses

Provide drawings/renderings for the local street underpasses below the highway.

18.3.7 Bikeway/Walkway

Provide drawings/renderings showing the bikeway/walkway, including treatments at connections to local streets. Include plan and profile drawings, various cross-sections proposed, ornamental railing/barrier/fencing details, transition area layouts, road crossing layout plan, terminations, notification/informational signing concepts, and preliminary surface and structural section designs.

18.3.8 Landscaping

Provide plans or renderings as needed to convey the visual quality design approach related to landscaping and streetscapes within the construction limits. The aesthetic design of these elements shall coordinate and comply with Part 3 Section 12 –Landscape Architecture.

18.3.9 Newtown Creek

Provide plans, sections, and/or renderings as needed to convey the visual quality design approach for the banks of Newtown Creek. The aesthetic design of these elements shall coordinate and comply with Part 3 Section 12 –Landscape Architecture.

18.3.10 Lighting

Provide plans, sections, elevations, details, and renderings of architectural lighting for the bridge, inclusive of Main Span and approach structures, cables, deck, understructure, and piers. The aesthetic design of these elements shall coordinate and comply with Part 3 Section 14 –Lighting. The drawings/renderings shall be set within the context of the local site.

18.4 PUBLIC OUTREACH VISUALIZATION MATERIALS
18.4.11 Visualizations

The Design-Builder shall be responsible for producing and providing all visual simulations for the public involvement process in order to facilitate public understanding, and to communicate design solutions and associated construction. See also Part 3 Section 8 – Public Involvement.

18.4.12 Visual Simulations

The Design-Builder shall be responsible for producing and providing computer-generated geographically and photographically accurate visual simulations. The visual simulations shall be set within the context of the local site, and shall include drive through views on the highway and local streets. All visual simulations shall be prepared by the Design-Builder from accurate three-dimensional models and shall be high resolution TIFF format reproducible to poster size (30 inch x 40 inch minimum) print medium as necessary. Visual simulations shall accurately depict design features such as overall and detailed form, scale, proportion, perspective, lighting, reflectivity, shape, dimensioning, color, materials and textures. The Design-Builder shall be responsible for producing day, evening and nighttime visual simulations, which shall include Project design features necessary for stakeholder and public involvement review and, where appropriate, for decision making requirements. The visual simulations may include but not be limited to bird’s eye perspectives from various locations, drivers’ perspectives from each travel direction and water body perspectives from key upstream and downstream viewer locations.

18.5 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 18.5-1 for the Department’s consultation and written comment.

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<td>Visual Quality and Lighting Plan</td>
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<td>Visualizations</td>
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SECTION 19  PAVEMENT DESIGN AND CONSTRUCTION

19.1  SCOPE

The Design-Builder shall design, furnish all materials, construct and undertake all Work necessary to provide all pavements needed for the on-grade sections of the I-278 Mainline, ramps, and local streets.

19.2  STANDARDS

The Design-Builder shall perform the pavement activities in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5 unless otherwise stipulated in this Project Requirement.

19.3  REQUIREMENTS

All pavement materials and construction methods shall be performed in accordance with the NYSDOT materials and pavement installation methods.

Where installed, the Design-Builder shall provide a pavement system that meets the Type 1 friction aggregate specifications, with the exception that limestone and/or dolomite, regardless of the acid insoluble residue content, shall not be allowed.

Limestone and/or dolomite, regardless of the acid insoluble residue content, shall not be allowed for Type 2 or F1 friction aggregate requirements.

19.3.1  Mainline and Ramp Pavement on Subgrade

The Design-Builder shall provide the mainline and ramp pavement on subgrade in accordance with the following requirements

New/reconstructed mainline and ramp permanent pavement on subgrade shall consist of a plain jointed Portland cement concrete pavement structure with lateral dowel bars and longitudinal joint ties, applied across the entire width of all lanes and shoulders, placed on a properly prepared subgrade, that meets or exceeds the following characteristics:

A)  50 year minimum service life for structural pavement elements and materials performance;

B)  Suitable and properly prepared subgrade;

   1)  Unsuitable material as defined in the NYSDOT Standard Specification shall be removed and replaced;

   2)  Replaced and added material shall meet or exceed the material and placement requirements in NYSDOT Standard Specification for embankment in place;
3) The subgrade shall be proof rolled in accordance with section 203 of the NYSDOT Standard Specification prior to placement of subbase. Any areas that are determined to be unstable shall be excavated and backfilled with select granular subgrade material;

B) If portland cement concrete pavement is used a permeable subbase shall not be used.

C) Edge drain systems consistent with the PCTPB system shall be provided on both sides of directional roadways with a (6 inch minimum pipe diameter) and under drain systems. The edge drain shall be located beneath the outermost edge of installed concrete pavement (shoulder or travel lane).

19.3.2 Mainline and Ramp Resurfacing

The entire roadway width, including travel lanes and shoulders, of retained mainline and ramp structural pavement shall be resurfaced at the conclusion of final reconstruction WZTC stages to the extent necessary to overlap previous WZTC lane shifts, crossovers, and pavement used in staging areas.

Resurfaced composite (i.e. hot mix asphalt [HMA] over concrete) or full depth HMA mainline, ramp, and shoulder pavements in locations outside of new construction/reconstruction limits shall be treated per NYSDOT Comprehensive Pavement Design Manual (CPDM) Chapter 6 and active Engineering Instructions and Engineering Bulletins, at a the minimum, with a 2 inch mill and inlay treatment with full depth repair of pavement faulting areas.

Pavement courses shall minimally be 2.5 inches of hot mix asphalt (HMA) binder with a maximum of 1.5 inches of HMA top.

Retained mainline, ramp, and shoulder pavements with existing concrete wearing surfaces in locations outside of new construction and reconstruction limits shall be rehabilitated through concrete pavement restoration ((CPR) techniques, as outlined in the NYSDOT Comprehensive Pavement Design Manual (CPDM) and active Engineering Instructions and Engineering Bulletins.

Existing profiles and cross slopes shall be maintained, unless a transition to match the new construction profiles and cross slopes is necessary. The inlaid pavement shall be 12.5 mm aggregate top course HMA that, minimum, shall meet the Department’s New York Division Superpave 70 series minimum pavement requirements. Asphalt binder courses in resurfacing areas shall meet or exceed the Department’s requirements for Superpave 70 series HMA pavement.

Local Roadways and Streets

Reconstructed permanent local roads and streets shall be constructed in accordance with the NYSDOT CPDM and NYC Department of Design and Construction Guidelines and Directives. The same pavement treatment shall be applied across the entire width of the roadway and shoulders and shall be placed on properly prepared subgrade. Asphalt and concrete pavement materials and construction methods shall meet the requirements of NYSDOT Standard
Disturbed and damaged curbs, sidewalks, and driveways shall be replaced with corresponding elements having equal to or better characteristics.

**19.3.3 Ride Quality and Noise Mitigation**

The Design-Builder shall evaluate ride quality in all lanes in accordance with NYSDOT standards and requirements. A profilograph, inertial profiler or reference profiler may be used for testing PCC pavement. An inertial profiler or reference profiler may be used for testing HMA surfaced pavements. Ride quality testing shall be performed by a NYSDOT certified operator using calibrated equipment verified by NYSDOT.

At least 10 days before the proposed opening of any lane to public traffic, the Design-Builder shall supply the operator’s certified results, including unfiltered data, to the Department. The Department shall use the certified results to determine the acceptability of the ride quality in the relevant lane prior to placing the permanent pavement into service for use by the public. A verification of the ride quality may be conducted.

The Design-Builder shall be responsible for rectifying any ride quality and friction aggregate deficiencies prior to the opening of new pavements to traffic, and prior to placing existing pavement into either permanent use or temporary use.

The Design-Builder shall ensure that the design and implementation of the surface of all pavements shall mitigate tire pavement noise through use of appropriate pavement surface materials, ensuring that the mitigation is commensurate with the climatic conditions at the Project Site plus all relevant Project Requirements, including those related to service life and cross section.

The Design-Builder shall evaluate ride quality in all lanes and shoulders using a profilograph as indicated in NYSDOT Standards as supplemented by the NYSDOT requirements, and shall prepare profilograph data accordingly.

At least 10 days before the proposed opening of any lane or shoulder to public traffic, the Design-Builder shall supply the profilograph and the certified qualified operator’s (CQO) certified results to the Department, in order to demonstrate that the ride quality in the relevant lane or shoulder is satisfactory. The Department shall use the CQO certified results to assess the pavement work prior to placing the permanent pavement into service for use by the public. A verification of the ride quality may be conducted.

The Design-Builder shall be responsible for rectifying any ride quality and skid resistance deficiencies prior to the opening of new pavements to traffic, and prior to placing existing pavement into either permanent use or temporary use.

The Design-Builder shall ensure that the design and implementation of the running surface of all pavements shall mitigate tire pavement noise through use of appropriate pavement surface materials.
materials, ensuring that the mitigation is commensurate with the climatic conditions at the Project Site plus all relevant Project Requirements, including those related to service life and cross section.

### 19.3.4 Temporary Pavement

The Design-Builder shall design, construct, and maintain all temporary pavements within the Project Limits in compliance with the following requirements:

A) Provide documentation describing the assumptions used to design the temporary pavement. At a minimum the documentation shall include design life and anticipated equivalent single axle loads (ESALs) for each temporary pavement location within the Project;

B) Provide a pavement system that meets the same Type 1 friction aggregate specifications as the permanent pavement, including the exception that limestone and/or dolomite, regardless of the acid insoluble residue content, will not be allowed;

C) Provide a durable, maintainable pavement system that meets the following requirements during service life;

1) International roughness index (IRI) of less than 120 inches/mile;
2) Free of potholes;
3) Rutting to not exceed 0.25 inch depth;

D) Include pavement-to-structure transition areas as a part of ride quality;

E) Minimize pavement-to-structure transition deviations;

F) Minimize pavement type-to-pavement type transition deviations;

G) Provide bridge pavement approach slabs;

H) Provide adequate cross slope to drain water from pavement surface, consistent with maximum grade breaks between lanes and between lanes and shoulders;

I) Provide a free-draining subgrade section beneath the pavement section for pavement constructed on this Project. Identify subgrade issues and do not exacerbate subgrade moisture below existing pavement left in place.

### 19.3.5 Subsurface Drainage System

The Design-Builder shall design and construct edge drains, where stipulated within this Project Requirement, in accordance with the applicable Standards. Subsurface drainage outlets shall not cross roadways. Left- and right-side subsurface drainage systems shall not use a common outlet pipe.
19.4 DELIVERABLES

At a minimum, the deliverables in Table 19.4-1 shall be submitted to the Department for consultation and written comments.

The Design Plans for pavements shall include:

A) Plans depicting existing pavement and the limits and means of pavement removal;

B) The limits of proposed permanent pavements, by composition, in plan and cross section

C) Details for matching into existing pavements;

D) Maintenance and protection of traffic plans showing limits and composition of temporary pavements to be adopted during the various phases of construction (consistent with plans developed under Project Requirement 16 – Work Zone Traffic Control and Access);

E) The proposed means of providing appropriate surface and subsurface drainage.

Table 19.4-1 – Deliverables

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SECTION 20 DRAINAGE AND STORMWATER

20.1 SCOPE

The Design-Builder shall provide a bridge drainage system that is compliant with the NYSDOT Highway Design Manual Chapter 8 and NYCDEP requirements. Where realignment and reconstruction of local streets impact the existing local street drainage system, the Design-Builder shall provide a new drainage system compliant with NYCDEP requirements. The Draft Drainage Design Report provided on the Department’s Project website has been coordinated with NYCDEP. The Design-Builder shall revise the Draft Drainage Design Report as necessary and obtain NYCDEP and Department approval for the proposed drainage plans.

Prior to Physical Completion, the Design-Builder shall be responsible for video inspection and cleaning of all new and existing drainage facilities within the Limits of Construction.

20.2 STANDARDS AND REFERENCES

The Design-Builder shall perform the drainage and stormwater activities, including highway, bridge and site systems, in accordance with the applicable standards in Section 1.5, unless otherwise stipulated in this Project Requirement.

20.3 REQUIREMENTS

20.3.1 General

The Design-Builder shall design and construct the drainage and stormwater systems to meet the following requirements:

A) Provide a 75-year minimum service life on all drainage and stormwater management facilities for the bridge drainage within the Limits of Construction that is consistent with the Draft Drainage Design Report;

B) Provide all new drainage and stormwater management elements for the Brooklyn Connector, the Brooklyn Approach, the Main Span, the Queens Approach, the Queens Connector and the portions of the LIE Interchange within the Limits of Construction;

C) Provide new outfall pipes at the Brooklyn and Queens banks of Newtown Creek; stormwater runoff from the Brooklyn Approach, Main Span, Queens Approach and Queens Connector to be directed to new outfall pipes; runoff from the Brooklyn Connector and LIE interchange to be split between existing NYCDEP sewer systems and the new outfall pipes;

D) Provide new pre-treatment system prior to creek outfalls;
E) Remove, replace and/or reset existing catch basins along reconstructed, resurfaced and/or realigned local streets; discharge to be directed to existing NYCDEP sewer systems;

F) Comply with EIS commitments and mitigation strategies.

20.3.2 Coordination with Other Entities

The Design-Builder shall coordinate with the NYCDEP regarding all drainage into the New York City sewer system, and the NYSDEC regarding all stormwater to be discharged into Newtown Creek. The Design-Builder shall comply with and document the permit requirements, modifications, and contacts with these agencies.

20.3.3 Design Deliverables

All design deliverables shall be submitted for review and approval. Design deliverables subject to Drainage Design Review and Approval, and Plan Review and Approval by the NYCDEP and NYSDEC.

20.3.3.1 Construction Documents

The Design-Builder shall prepare Construction Documents that shall include the following items:

A) Drainage plans and specifications;

B) Temporary and permanent erosion control plans.

20.3.3.2 Drainage Report

The Design-Builder shall review, verify and modify as necessary the Draft Drainage Design Report. The Design-Builder shall submit the Drainage Design Report to the Department, NYCDEP and NYSDEC. The drainage report shall be submitted to the Department 15 days in advance of submission to any other entity. The drainage report shall document the design criteria used, alternatives considered, design decisions made, final design basis, and all supporting calculations and computer model output.

20.3.3.3 Hydraulic Infrastructure Inventory

The Design-Builder shall deliver to the Department an inventory of the hydraulic infrastructure of the as-built Project by providing an InRoads® Storm and Sanitary “swf” format file (or equivalent) of all installed pipes and drainage structures.

20.3.3.4 Stormwater Pollution Prevention Plan (SWPPP)

The Design-Builder shall review, verify and modify as necessary the Draft SWPPP provided by the Department and submit the revised SWPPP to the Department and the NYSDEC for approval.
20.3.3.5 Final Inspection Report

The Design-Builder shall prepare a final inspection report that demonstrates that all new and existing drainage facilities within the Project Limits are free of obstructions prior to Physical Completion. The report shall include video inspection footage.

20.3.4 Hydrology

Hydraulic analysis shall be consistent with the HDM and NYCDEP requirements for construction on a new alignment and shall allow for a 10% increase in precipitation due to future climate change. Design for local street drainage systems shall be in accordance with NYCDEP requirements; design of this system shall be based on average 5 year rainfall event. The pipe capacities in the Draft Drainage Design Report were designed to also allow for a 10% increase in precipitation due to any future climate change.

20.3.5 Highway Drainage

Roadway drainage system shall be designed and constructed to minimize maintenance needs, and cleanouts shall be provided at appropriate locations.

The Bridge Drainage System shall conform to the requirements of NYSDOT including the Standard Specifications including Section 576 Bridge Drainage Systems.

A) The system shall be designed for a 10% increase in rainfall rates.
B) Scuppers shall be provided on the uphill side of all expansion joints.
C) Scuppers shall be Cast Iron in accordance with Section 576 and shall not require bolts to remain in place
D) Downspout pipes and fittings shall be Ductile Iron in accordance with Section 576.
E) Pipe couplings shall be Ductile or Malleable Iron in accordance with Section 576
F) Pipe Brackets and supports shall be in accordance with Section 576
G) Each pretreatment system shall be a Vortex system as indicated in the Drainage Report or equal and shall have the capacity to retain a 500 gallon fuel spill.

20.3.5.2 Bikeway/Walkway Drainage

The Bikeway/Walkway drainage system shall be designed in accordance with the requirements of the Highway Drainage system. Scuppers in the bikeway/walkway shall be grated with removable bicycle-safe grates.

20.3.5.3 Performance of Stormwater Management System

Stormwater performance strategies shall provide an acceptable longevity in the field and shall avoid onerous cost and maintenance requirements. These strategies shall be coordinated with
Project Requirement 3 – Environmental Compliance and with the Environmental Impact Statement and Record of Decision.

20.3.5.4 Retained Earth and Lightweight Fill Drainage

The Design-Builder shall provide effective drainage conveyance within retained or mechanically stabilized earth areas and lightweight fill areas to avoid hydrostatic pressure buildup. In addition to toe drains, the Design-Builder shall provide intermediate drains if required.

20.3.5.5 Maintenance Plan

The Design-builder shall provide a Maintenance Manual for the pretreatment system. The manual shall include instructions regarding the removal of a fuel spill.

20.4 DELIVERABLES

At a minimum, the deliverables in Table 20.4-1 shall be provided to the Department for consultation and written comment.

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SECTION 21 RAILROAD

21.1 SCOPE

The Main Span of the bridge crosses over the Long Island Rail Road (LIRR) tracks on the Queens side of Newtown Creek. At this location the railroad consists of two operational tracks and a track siding. The tracks are owned by LIRR, New York and Atlantic Railway also operates on these tracks.

This Project Requirement provides requirements for Works affecting the railroad, in addition to requirements in Part 2 – DB § 102.6. The Design-Builder shall be responsible for the design and implementation of any and all works affecting the railroad. Anticipated work affecting the railroad includes but is not limited to:

A) Demolition of existing bridge above and adjacent to the railroad;
B) Installation of the new drainage system under the railroad;
C) Construction of new bridge piers adjacent to the railroad; and
D) Construction of new bridge superstructure above the railroad.

21.2 STANDARDS

The Design-Builder shall perform all activities in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5 unless otherwise stipulated in this Project Requirement.

21.3 SPECIFICATIONS AND PROTOCOLS

The Design-Builder shall note that this project requires close coordination with the LIRR and the New York and Atlantic Railway Company. It is anticipated that the railroad(s) will provide their own personnel to perform flagging services while certain project operations take place adjacent to, over or under the railroads’ tracks, facilities, rights-of-way and property. The flag person(s) must be present, as determined prior to the start of construction, to insure the safe operation of trains, prevent the delay of trains and insure the safety of all property and personnel on the project site.

The Design Builder shall coordinate and schedule his construction activities with the railroads’ project engineer(s) no later than 60 days prior to the start of the work, in consultation with the Design Builder and the Department, so that a workable schedule can be formulated and agreed upon.

The Design-Builder’s attention is directed to Section 105-09, Work Affecting Railroads, in the Department’s Standard Specifications.
The Design-Builder shall perform the railroad activities in accordance with AREMA Manual for Railway Engineering.

21.4 REQUIREMENTS

The Design-Builder shall be responsible for coordinating design and construction activities in relation to LIRR facilities that may be affected by the Works. This shall include but not be limited to addressing the following issues where applicable:

A) Design criteria and requirements relating to construction on railroad property and for facilities affecting railroad operations;

B) Investigations to be conducted on railroad property;

C) Treatment of railroad-related or owned utilities;

D) Railroad procedures and schedule for design and construction approval;

E) Conditions under which construction on railroad property may start prior to completion of design;

F) Railroad design reviews and construction inspections;

G) Time periods during which field and construction activities can occur, including designated construction windows;

H) Operational constraints and requirements for field and construction activities, including flagging responsibility and costs; and

I) Payments to railroad.

21.4.1 Design

The Design-Builder shall design all permanent and temporary works to be outside the kinetic envelopes of the LIRR tracks based on NYSDOT, AREMA and the LIRR and New York and Atlantic Railway requirements, including a minimum vertical clearance of 23 feet above track level. The Design-Builder shall be responsible for obtaining railroad-specific design information, along with schedule information, through liaison and discussion with the LIRR and New York and Atlantic Railway as necessary.

21.4.2 Construction

All permanent and temporary works shall be constructed outside the kinetic envelopes of the LIRR tracks with a minimum vertical clearance of 23 feet above track level based on NYSDOT, AREMA and the LIRR and New York and Atlantic Railway requirements.
SECTION 22 DEMOLITION OF BRIDGE

22.1 SCOPE

The Design-Builder shall demolish and remove the existing bridge, ramps, abutments, retaining walls, and pavement within the Project Limits and established ROW that are not to be incorporated into the completed permanent Project or designated to be retained by the Department in a safe and environmentally acceptable manner. Building demolition is addressed separately in Project Requirements 23 – Demolition of Buildings.

22.1.1 Standards

The Design-Builder shall perform the demolition activities in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5 unless otherwise stipulated in this Project Requirement.

22.2 DEMOLITION REQUIREMENTS

All requirements specified under this section and Project Requirement 4 – General Project Scope of Work, shall apply to all necessary demolition, removal, and reconstruction required for the Project including elements not explicitly cited.

22.2.2 Extent of Demolition

The following bridge and roadway structures are to be demolished:

A) BIN 1-07569-9: Brooklyn Queens Expressway, Queens and Brooklyn;

B) BIN 1-06589-0: Pedestrian Bridge (at Laurel Hill Boulevard), Queens;

C) BIN 1-07569-A: Meeker Avenue/Morgan Avenue Exit Ramp, Brooklyn;

D) BIN 1-07569-B: Vandervoort Avenue Entrance Ramp, Brooklyn;

E) Portion of BIN 1-06560-9: Portion of Meeker Avenue Viaduct

F) Associated approaches and ramps, Queens.

The demolition of the existing Kosciuszko Bridge shall include all existing superstructure elements and all substructure elements to two feet below final grade elevation. Where new foundations are placed at the locations of existing foundations the existing foundations shall be removed to the extent needed to construct the new foundation.

The existing main span piers shall be removed to two feet below the Newtown Creek bed and the void created by the pier demolition shall be backfilled with clean fill and rip rap. The rip rap shall be sloped back to restore a natural shoreline. The size of the rip rap shall be in accordance with the Hydraulic Report.
There is an abandoned underground stormwater drainage pipe under the Brooklyn and Queens Approaches that discharges into Newtown Creek after passing through the Main Span Piers. Once the new drainage system has been installed, the abandoned pipes shall be filled with lean concrete for a minimum length of 300 feet from the creek to prevent contaminated water from being conveyed to the creek.

22.2.3 Hazardous Materials

The Design-Builder shall test for the presence of Hazardous Materials in all structures, soil and groundwater to be disturbed to ensure the handling, removal and disposal is done in accordance with all applicable laws and standards. See the Kosciusko Bridge Contaminated Material Investigation Findings Report, the Bridge Asbestos Assessment and Design Report and the Contaminant Management Plan for the information on the hazardous materials that have been documented previously for this project.

Suspect, questionable or potentially Hazardous Materials shall be evaluated, sampled and tested, as part of the Design-Build Contract. The following information and documentation shall be submitted as part of any Hazardous Materials evaluation and removal processes.

A) Licenses and certifications of abatement contractors;
B) Testing and sampling reports;
C) Chains of custody of abated materials;
D) Written logs and manifests for transportation of materials and related; and
E) Landfill documentation and receipts.

The abatement of all Hazardous Materials shall be completed to the greatest extent possible prior to any demolition taking place unless a legal variation from related laws, rules and regulations can be obtained.

22.2.4 Protection of Materials and Structures

The Design-Builder shall perform all Work with care so that any materials that are to remain in place, or that are to remain the property of the State shall not be damaged. If the Design-Builder damages any materials that are to remain in place or which are to become or to remain the property of the State, the damaged materials shall be repaired or replaced in a manner satisfactory to the Department at no cost to the Department.

The items to be protected include but are not limited to:

A) Phelps Dodge Property:
B) Wells in both Queens and Brooklyn;
C) Existing plaques on Main Span;
D) ITS signs;

E) NYPD call boxes;

F) Buildings that are adjacent to the ROW.

22.2.5 Environmental Protection

It is noted that the main span superstructure was erected over Newtown Creek using a tie back system that avoided any falsework in the creek, see *New York’s Latest Interborough Bridge, Nathan Deutschman, p 66-69, Engineering News-Record*, November 23, 1939. It is anticipated in the permits that the main span superstructure over Newtown Creek will be removed without the use of falsework in the creek. If falsework is proposed the Design-Builder shall obtain all required permits.

For requirements pertaining to work in Newtown Creek, see Project Requirement 3 – Environmental Compliance and the relevant permits.

The Design-Builder shall prevent any debris from falling into or otherwise being deposited into the creek during construction and demolition. Side-scan sonar surveys shall be performed before the beginning of construction and at substantial completion of construction to determine if any debris have fallen or been deposited in the creek. The Design-Builder shall remove from Newtown Creek all debris created by demolition or construction activities.

A soil erosion and sediment control plan has been submitted as part of the project Stormwater Pollution Protection Plan (SWPPP). Any required modifications to this plan must be submitted, approved and implemented prior to demolition activities.

22.2.6 Public Safety

The Design-Builder shall ensure that no aspects of the Works have a detrimental effect on public safety. Refer to Project Requirement 8 - Public Involvement.

22.2.7 Demolition Staging

The Design-Builder shall assume responsibility for safety and maintenance of all existing structures within the Project Limits, identified for removal in accordance with DB §105-12.

22.2.8 Utilities

Utility connections: service utility connections shall be discontinued and capped in accordance with the requirements of the utilities companies or the Department.

22.3 DELIVERABLES

A demolition and removal plan, signed by a Professional Engineer registered in the State of New York, shall be submitted to the Department for review and written comment.
The demolition and removal plan shall include design documents and shall show the location(s) of equipment used for demolition, sequence of removal, loading limits, allowable location of loads, equipment specifications including their weight, and any other material, which will be placed on the structure during or prior to demolition for all structures.

Details of the submission requirement are summarized in Table 22.3-1.

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<td>At Release for Construction Review or 60 days prior to start of first demolition, whichever is sooner</td>
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SECTION 23 DEMOLITION OF BUILDINGS

23.1 SCOPE

The Design-Builder shall demolish and remove the existing buildings, ancillary structures, and temporary structures and facilities within the Project Limits and established ROW as indicated on the Directive Plans in Part 6 – RFP Plans, in a safe and environmentally acceptable manner. Where partial removal of a building is indicated, the portion of the existing building within the FEE limits shall be demolished and a new building fascia wall shall be constructed along the FEE line to enclose the remaining building space. See the Acquisition Maps 42 and 72 in Part 7 – Engineering Data for location of FEE lines. Below grade areas that are not filled with new bridge foundations shall be backfilled with suitable material. Construction, demolition and/or asbestos abatement operations shall comply with all of the applicable codes, rules and regulations governing those activities in New York City, including, but not limited to, all relevant provisions of the New York City Fire Code and FDNY Rules; the New York City Construction Codes and DOB rules; and the New York City Air Code and the DEP Asbestos Rules and Regulations/Asbestos Control Program.

23.1.1 Standards

The Design-Builder shall perform the demolition activities in accordance with the Contract Requirements and the applicable Standards, Codes and Manuals listed in Section 1.5 unless otherwise stipulated in this Project Requirement.

23.2 DEMOLITION REQUIREMENTS

All requirements specified under this section and Project Requirement – General Project Scope of Work, shall apply to all necessary demolition, removal, and reconstruction required for the Project including elements not explicitly cited. The Design-Builder shall obtain the appropriate demolition permit and consent in advance of all demolition Work.

23.2.2 Extent of Demolition

Buildings shall be demolished to 2 feet below final grade and all slabs including basement slabs that are below 2 feet shall be broken. Additional demolition shall be required for construction of new substructure at the location of an existing building. The Design-Builder shall remove an existing abandoned cesspool that is located underground within the area acquired by NYSDOT on Block 2814 Lot 18 (Map 74).

23.2.3 Hazardous Materials

The Design-Builder shall test for the presence of Hazardous Materials in all structures to be removed to ensure the removal and disposal is done in accordance with all applicable laws and standards. See the Kosciusko Bridge Contaminated Material Investigation Findings Report, the Building Asbestos Assessment and Design Report and the Contaminant Management Plan for information on the hazardous materials that have been documented previously for this project.
Suspect, questionable or potentially Hazardous Materials shall be evaluated, sampled and tested, as part of the Design-Build Contract. The following information and documentation shall be submitted as part of any Hazardous Materials evaluation and removal processes.

A) Licenses and certifications of abatement contractors;
B) Testing and sampling reports;
C) Chains of custody of abated materials;
D) Written logs and manifests for transportation of materials and related; and
E) Landfill documentation and receipts.

The abatement of all Hazardous Materials shall be completed to the greatest extent possible prior to any demolition taking place unless a legal variation from related laws, rules and regulations can be obtained.

23.2.4 Protection of Materials and Structures

The Design-Builder shall perform all Work with care so that any materials that are to remain in place, or that are to remain the property of the State shall not be damaged. If the Design-Builder damages any materials that are to remain in place or which are to become or to remain the property of the State, the damaged materials shall be repaired or replaced in a manner satisfactory to the Department at no cost to the Department.

23.2.5 Environmental Protection

A soil erosion and sediment control plan has been submitted as part of the project Stormwater Pollution Protection Plan (SWPPP). Any required modifications to this plan must be submitted, approved and implemented prior to demolition activities.

23.2.6 Public Safety

Thirty days after award, the Design-Builder shall be responsible for all buildings and shall ensure that no aspects of the Works have a detrimental effect on public safety.

See Project Requirements Section 17 – Security for requirements for securing the project site with fencing.

23.2.7 Demolition Staging

The Design-Builder shall assume responsibility for safety and maintenance of all existing structures within the Project Limits, identified for removal in accordance with DB §105-12.

23.2.8 Utilities

Utility connections: any service utility connections that have not yet been capped shall be discontinued and capped in accordance with the requirements of the utilities companies or the Department.
23.3 DELIVERABLES

A demolition and removal plan, signed by a Professional Engineer registered in the State of New York, shall be submitted to the Department for review and written comment.

Details of the submission requirement are summarized in Table 22.3-1.

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SECTION 24   HIGHWAY DESIGN

24.1   SCOPE

The Design-Builder shall be responsible for the design, construction and reconstruction of the temporary and permanent travel ways within the Project Limits, including the I-278 highway mainline, highway ramps, local streets and bikeway/walkway all in accordance with the requirements stated herein. Highway design construction and reconstruction shall be understood to include the design, furnishing, and construction of all road appurtenances, protections, and safety devices not specifically cited in other Project Requirements.

24.2   STANDARDS AND REFERENCES

The Design-Builder shall perform the Work in accordance with the applicable Standards, Codes and Manuals cited in Section 1.5, unless otherwise stipulated in this Project Requirement.

24.3   REQUIREMENTS

24.3.1   General

The Design-Builder shall be responsible for performing the detailed highway design, construction and reconstruction within the Project Limits in accordance with the Project Requirements set forth herein.

24.3.2   Design Requirements

Design requirements for the reconstruction of the I-278 highway mainline, highway ramps, local streets and bikeway/walkway is contained in Tables 24.3-1 to 24.3-4 inclusive.

The eastbound Brooklyn and Queens Approaches shall consist of 2 travel lanes on the mainline and 2 travel lanes with 1 auxiliary lane on the eastbound Collector Distributor (CD) road. The eastbound mainline and CD road shall be barrier separated as shown on the indicative plans. The eastbound mainline diverge to the eastbound CD road shall be designed as a major fork diverge. The westbound Brooklyn and Queens Approaches shall consist of 3 travel lanes with one auxiliary lane. The auxiliary lanes for both the eastbound and westbound directions shall be full width and continuous terminating at the locations shown on the indicative plans.

The eastbound entrance ramp from Meeker Avenue shall consist of 2 travel lanes.

The eastbound exit ramp to eastbound LIE shall consist of 2 travel lanes, and shall continue as 2 lanes on the ramp proper.

The westbound LIE semi direct connection ramp to westbound BQE shall consist of 2 travel lanes.
All existing ramp connections to the mainline and local streets shall be maintained until the new connecting ramp is opened to traffic.

The Design-Builder shall resurface and reconstruct as required all local streets within the Project Limits. The Design-Builder shall re-open and reconstruct Stewart Avenue between Thomas Street and Anthony Street and shall realign and reconstruct Cherry Street between Vandervoort Avenue and Stewart Avenue. A 20’ wide emergency access route shall be provided on Cherry Street between Stewart Avenue and Scott Avenue and on Scott Avenue from Cherry Street to Thomas Avenue.
Table 24.3-1 – Design Criteria for Highway Segments

<table>
<thead>
<tr>
<th>Critical Design Element</th>
<th>Standard</th>
<th>HDM Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed</td>
<td>60 mph</td>
<td>2.7.1.1 A</td>
</tr>
<tr>
<td>2 Lane Width</td>
<td>12 ft</td>
<td>2.7.1.1 B</td>
</tr>
<tr>
<td>3 Shoulder Width</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>4’-0”</td>
<td>2.7.1.1 C</td>
</tr>
<tr>
<td>Right</td>
<td>10’-0”</td>
<td></td>
</tr>
<tr>
<td>4 Bridge Roadway Width</td>
<td>Full highway approach section</td>
<td>2.3.1</td>
</tr>
<tr>
<td>5 Grade</td>
<td>3% max.²</td>
<td>2.7.1.1 E</td>
</tr>
<tr>
<td>6 Horizontal Curvature @ e=6%</td>
<td>1330 ft min.</td>
<td>2.7.1.1 F</td>
</tr>
<tr>
<td>7 Superelevation</td>
<td>6% max.</td>
<td>2.7.1.1 G</td>
</tr>
<tr>
<td>8 Stopping Sight Distance</td>
<td>570 ft min.</td>
<td>2.7.1.1 H</td>
</tr>
<tr>
<td>9 Horizontal Clearance</td>
<td>The greater of shoulder width or 4 feet</td>
<td>2.7.1.1 I</td>
</tr>
<tr>
<td>10 Vertical Clearance</td>
<td>16 ft min.</td>
<td>BM 2.4.1 &amp; 2.4.2</td>
</tr>
<tr>
<td>Over National Highway System (NHS) Roadways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over NHS “Exempt” Roadways</td>
<td>14 ft min.</td>
<td></td>
</tr>
<tr>
<td>11 Travel Lane Cross Slope</td>
<td>1.5% min.</td>
<td>2.7.1.1 K</td>
</tr>
<tr>
<td></td>
<td>2.0% max.</td>
<td></td>
</tr>
<tr>
<td>12 Rollover</td>
<td>4% max.</td>
<td>2.7.1.1 L</td>
</tr>
<tr>
<td>Between Lanes</td>
<td>8% max.</td>
<td></td>
</tr>
<tr>
<td>At edge of traveled way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Control of Access</td>
<td>Full</td>
<td>2.7.1.1 O</td>
</tr>
<tr>
<td>14 Median Width</td>
<td>10 ft min.</td>
<td>2.7.1.1 P</td>
</tr>
</tbody>
</table>

Notes:
1: BM: NYSDOT Bridge Manual
2: Vertical grades equal to or less than 2% are preferable in order to achieve the operational improvements committed to in the EIS. Grades between 2% and 3% shall not be utilized for distances equal to or greater than 3/4 mile to avoid impact to operations per the current HDM.
### Table 24.3-2 –Design Criteria for Highway Ramps

<table>
<thead>
<tr>
<th>Critical Design Element</th>
<th>Standard</th>
<th>HDM Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed</td>
<td>30 mph</td>
<td>2.7.5.2 A</td>
</tr>
<tr>
<td>2 Traveled Way Width</td>
<td>HDM: Exhibit 2-9</td>
<td>2.7.5.2 B</td>
</tr>
<tr>
<td>One Lane</td>
<td>Case II</td>
<td></td>
</tr>
<tr>
<td>Two Lane</td>
<td>Case III</td>
<td></td>
</tr>
<tr>
<td>3 Shoulder Width</td>
<td>Left</td>
<td>2.7.5.2 C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3' min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6' min.</td>
<td></td>
</tr>
<tr>
<td>4 Ramp Roadway Width</td>
<td>Full ramp approach section</td>
<td>BM² 2.3.1</td>
</tr>
<tr>
<td>5 Grade</td>
<td>7% max.</td>
<td>2.7.5.2 E</td>
</tr>
<tr>
<td>6 Horizontal Curvature @ e=6%</td>
<td>231 ft min.</td>
<td>2.7.5.2 F</td>
</tr>
<tr>
<td>7 Superelevation</td>
<td>6% max.</td>
<td>2.7.5.2 G</td>
</tr>
<tr>
<td>8 Stopping Sight Distance</td>
<td>200 ft min.</td>
<td>2.7.5.2 H</td>
</tr>
<tr>
<td>9 Horizontal Clearance</td>
<td>Left</td>
<td>2.7.5.2 I</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoulder width or 3 ft min. 7 ft if</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pass under structure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoulder width or 6 ft min. 10 ft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if pass under structure</td>
<td></td>
</tr>
<tr>
<td>10 Vertical Clearance</td>
<td>Over National Highway System (NHS)</td>
<td>BM 2.4.1 &amp; 2.4.2</td>
</tr>
<tr>
<td></td>
<td>Roadways</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Over NHS “Exempt”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Roadways</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 ft min.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 ft min.</td>
<td></td>
</tr>
<tr>
<td>11 Travel Lane Cross Slope</td>
<td>1.5% min.</td>
<td>2.7.5.2 K</td>
</tr>
<tr>
<td></td>
<td>2.0% max.</td>
<td></td>
</tr>
<tr>
<td>12 Rollover</td>
<td>Between Lanes</td>
<td>2.7.5.2 L</td>
</tr>
<tr>
<td></td>
<td>At edge of traveled way</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4% max.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8% max.</td>
<td></td>
</tr>
<tr>
<td>13 Control of Access</td>
<td>Full</td>
<td>2.7.5.2 O</td>
</tr>
</tbody>
</table>

**Notes:**

1: Ramps are designed to accommodate WB-15 trucks and for traffic condition "C".
2: BM: NYSDOT Bridge Manual
Table 24.3-3 – Design Criteria for Local Streets

<table>
<thead>
<tr>
<th>Critical Design Element</th>
<th>Standard</th>
<th>HDM Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed</td>
<td>30 mph</td>
<td>2.7.4.2 A</td>
</tr>
<tr>
<td>2 Lane Width</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel Lane</td>
<td>10 ft min. – 11 ft desirable</td>
<td>2.7.4.2 B</td>
</tr>
<tr>
<td>Turning Lane</td>
<td>9 ft min.</td>
<td></td>
</tr>
<tr>
<td>Parking Lane</td>
<td>8 ft min.</td>
<td></td>
</tr>
<tr>
<td>3 Shoulder Width</td>
<td>Not Required</td>
<td>2.7.4.2 C</td>
</tr>
<tr>
<td>4 Bridge Roadway Width</td>
<td>Full curb to curb, or Full roadway approach width</td>
<td>BM¹ 2.3.1</td>
</tr>
<tr>
<td>5 Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>15% max.</td>
<td>2.7.4.2 E</td>
</tr>
<tr>
<td>Commercial/Industrial</td>
<td>8% max.</td>
<td></td>
</tr>
<tr>
<td>6 Horizontal Curvature @ e=4%</td>
<td>250 ft min.</td>
<td>AASHTO²</td>
</tr>
<tr>
<td>7 Superelevation</td>
<td>4% max.</td>
<td>2.7.4.2 G</td>
</tr>
<tr>
<td>8 Stopping Sight Distance</td>
<td>200 ft min.</td>
<td>2.7.4.2 H</td>
</tr>
<tr>
<td>9 Horizontal Clearance</td>
<td>1’-6” ft min.</td>
<td>2.7.4.2 I</td>
</tr>
<tr>
<td></td>
<td>3'-0” at intersections</td>
<td></td>
</tr>
<tr>
<td>10 Vertical Clearance over Local Streets</td>
<td>14 ft min.</td>
<td>BM 2.4.1 &amp; BM 2.4.2</td>
</tr>
<tr>
<td></td>
<td>16 ft desirable</td>
<td></td>
</tr>
<tr>
<td>11 Travel Lane Cross Slope</td>
<td></td>
<td>2.7.4.2 K</td>
</tr>
<tr>
<td>Travel Lanes</td>
<td>1.5% min. / 2.0% max.</td>
<td></td>
</tr>
<tr>
<td>Parking Lanes</td>
<td>1.5% min. / 5.0% max</td>
<td></td>
</tr>
<tr>
<td>12 Rollover</td>
<td></td>
<td>2.7.4.2 L</td>
</tr>
<tr>
<td>Travel Lanes</td>
<td>4% max.</td>
<td></td>
</tr>
<tr>
<td>Pavement Edge</td>
<td>8% max.</td>
<td></td>
</tr>
<tr>
<td>13 Pedestrian Accommodations</td>
<td>5 ft min.</td>
<td>18.6.5 ADAAG³</td>
</tr>
</tbody>
</table>

Notes:
1: BM: NYSDOT Bridge Manual
2: AASHTO: American Association of State Highway and Transportation Officials
3: ADAAG: Americans with Disabilities Act Accessibility Guidelines
Table 24.3-4 – Design Criteria for Bikeway/Walkway

<table>
<thead>
<tr>
<th>Critical Design Element</th>
<th>Standard</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed</td>
<td>20 mph min.</td>
<td>HDM 17 &amp; 18, AASHTO</td>
</tr>
<tr>
<td>2 Shared Use Width</td>
<td>20’-0”</td>
<td>Project Specific</td>
</tr>
<tr>
<td>3 Grade</td>
<td>5% max.</td>
<td>HDM 17 &amp; 18, AASHTO, ADAAG</td>
</tr>
<tr>
<td>4 Cross Slope</td>
<td>2% max, 1% desirable</td>
<td>HDM 18, ADAAG</td>
</tr>
<tr>
<td>5 Horizontal Clearance</td>
<td>2 ft min., 3 ft recommended</td>
<td>HDM 17, AASHTO</td>
</tr>
<tr>
<td>6 Vertical Clearance</td>
<td>8 ft</td>
<td>HDM 17, AASHTO</td>
</tr>
<tr>
<td>7 Sight Distance for bicyclists.</td>
<td>15 mph</td>
<td>AASHTO Guide</td>
</tr>
</tbody>
</table>

1 NYSDOT Highway Design Manual (HDM) Chapters 17 and 18, the AASHTO Guide for the Development of Bicycle Facilities (AASHTO), and the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) were used as references. The proposed bikeway/walkway facility shall be ADA-accessible.
24.3.3 Roadway Appurtenances

Permanent road appurtenances, protections, and safety devices shall be provided in accordance with the Standards in Section 24.2.

All mainline median and fascia barrier systems shall be concrete barrier. Attenuators on the concrete barrier shall be reusable type with concrete anchor, and at a minimum meet TL -3 standards as defined in Chapter 10 of the HDM.

24.3.4 Design Exceptions and Non-Standard Features

All design elements listed within Section 24.3.2 (Design Requirements) herein are critical design elements. The new bridge shall eliminate the non-standard features associated with the existing bridge except as specifically presented in the Environmental Impact Statement and the Reevaluation Statement and as noted below. All of the non-standard features cannot be eliminated primarily due to cost, adverse community disruption, and environmental considerations.

The Brooklyn Connector will essentially be replaced in-kind, therefore, non-standard lane and shoulder widths and horizontal stopping sight distance will be retained at the tie-in. Similarly, in Queens, the ramps to and from the LIE and local streets will retain many of their non-standard features due to the adverse impacts to either private property or Old Calvary Cemetery that would be required to eliminate them.

Because of the need to retain the general alignment of the bridge to minimize property impacts, horizontal stopping sight distance will be improved, but remain non-standard on both the Brooklyn Approach and the Queens Approach. Additionally, in order to maintain traffic on the existing bridge throughout the construction period, a short section of the Brooklyn Approach will contain roadway profile grades that exceed the design criteria of 3%.

24.4 DELIVERABLES

The Design-Builder shall provide to the Department documentation including that listed in Table 24.4-1 for submittal to and approval by the FHWA relating to the Project’s Final Design in the areas of non-standard and non-conforming features and changes to interstate highway access/egress design or location:

A) Tabulations comparing the highway design parameters of the Basic Project Configuration with the Project Requirements listed herein;

B) Tabulations comparing the highway design parameters of the Definitive Design with the Project Requirements listed herein;

C) Itemization and location of appurtenances, protections, and safety devices to be included in the Project;

D) Itemization of non-standard features and tabulation comparing them with those identified in the Environmental Documentation;
Where applicable, electronic copies of deliverables listed in Table 24.4-1 shall be supplied as per the specifications given in the NYSDOT CADD Standards and Procedure Manual. All relevant Bentley MicroStation® files (including .DGN files) and Bentley InRoads® files (including DTM, ALG files) shall be compatible with the current version of MicroStation and InRoads software versions.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Number of Copies</th>
<th>Delivery Schedule</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabulated comparison of Basic Project Configuration and Project Requirements for all elements</td>
<td>5 1</td>
<td>At Design Review</td>
<td>24.4</td>
</tr>
<tr>
<td>Tabulated comparison of Final Design and Project Requirements for all elements</td>
<td>5 1</td>
<td>At Design Review</td>
<td>24.4</td>
</tr>
<tr>
<td>Itemization and locations of appurtenances, protections and safety devices</td>
<td>5 1</td>
<td>At Design Review</td>
<td>24.4</td>
</tr>
<tr>
<td>Itemization of non-standard features and comparison with Environmental Documentation</td>
<td>5 1</td>
<td>At Design Review</td>
<td>24.4</td>
</tr>
</tbody>
</table>
SECTION 25 STANDARDS SCOPE

25.1 GENERAL REQUIREMENTS

The Design-Builder shall use the version of Standards in force on the date of issue of the RFP. The Design-Builder shall identify the specific version of each Standard it uses. If the Standard is a NYSDOT manual, the Design-Builder shall use the design-build modified version, to the extent available.

Should the requirements in any Standard conflict with those in another, the more stringent Standard shall govern. It is the Design-Builder’s responsibility to obtain clarification of any apparent error, omission, ambiguity or conflict regarding any Standard in accordance with DB §102-2.

For Work not specifically covered by the individual sections of the Project Requirements, the Design-Builder shall, at a minimum, apply the Standards normally applied by NYSDOT for such Work, to the extent they do not conflict with express requirements in the Contract Documents. The Design-Builder shall be solely responsible for ensuring that it identifies and applies all correct Standards.

Access to and document ordering information for most Department Standards are available from the Department website:


This website address has been supplied to the Design-Builder for convenience only, in an effort to help the Design-Builder locate the required Standards. The website is not guaranteed to be correct. It is the Design-Builder’s responsibility to locate the required Standard and to determine if the Standard has been modified pursuant to the Contract Documents.

25.2 SPECIFIC REQUIREMENTS

The Design-Builder shall assume that all provisions of the Standards, including the figures and tables, are mandatory and guidelines contained therein shall be assumed to be requirements. All words such as “should,” “may,” “must,” “might,” “could,” and “can” shall mean “shall” unless the context requires otherwise, as determined in the sole discretion of the Department. It shall be in the Department’s sole discretion to determine when the context does not require a provision to be mandatory;

Except as expressly otherwise provided in the Contract Documents, as between the Design-Builder and the Department, any reference to NYSDOT under a Standard shall mean the Department;

When a Standard refers to an action being necessary, needed, or recommended, the Design-Builder shall construe the action as required unless the context requires otherwise, as determined in the sole discretion of the Department;
Except with respect to any Work for which Design Builder is to be paid on a unit price or force account basis, any references in the Standards related to payment, pay items or quantities, measurement for payment, method of measurement, basis of payment, extra work, adjustment of unit prices, or similar phrases, shall be disregarded by the Design-Builder, since the Contract Price is full compensation for the Work;

Where reference is made in the Standards to items that are indicated in the plans or special provisions or required in the plans or special provisions, the plans or special provisions shall mean the Design-Builder’s Plans or the Special Provisions;

References in the Standards to approved products or materials shall mean approved by the Department;

All references in the Standards to the inspector, the field inspector, the project engineer, the engineer, the materials engineer, the district materials engineer, the survey crew, the project supervisor, the agency certified technician, the certified plant technician, and the representative of the Office of Materials shall mean the Design-Builder, except as otherwise expressly provided in the Contract Documents or otherwise directed by the Department;

When a Standard uses the term “engineer” relating to activation or de-activation of railroad or highway signals, or the approval of any activities involving the use of explosives, such term shall mean the Department’s Project Manager;

When approval or authorization by the “engineer”, “NYSDOT” or “the Department” is required in a Standard for the use of alternative or substituted processes or components, this shall mean the Department’s Project Manager;

When a Standard requires actions, dimensions, spacing, design information, materials as designed, means, or methods that are “either as indicated in the Plans or as designated by the engineer,” the Design-Builder shall disregard the phrase “or as designated by the engineer”;

When a Standard refers to the “engineer” ordering work beyond the scope of work in the Contract, “engineer” shall mean the Department’s Project Manager;

Wherever references to “engineer” result in testing or acceptance procedures being assigned to the engineer, acceptance will be on behalf of the Department. The Department reserves the right to perform additional tests and inspections as necessary to confirm that the work is in conformance with Contract requirements and will be the only party authorized to accept or approve the Work on behalf of the Department;

When a Standard refers to unauthorized work or to acceptance of non-conforming work by the “engineer,” the “engineer” shall mean the Department’s Project Manager;

When a Standard refers to “Department,” “departments” or “divisions” within NYSDOT, or to specific job titles within NYSDOT, such reference shall mean the Department;

Any acceptances on behalf of NYSDOT, the Department or the State shall be performed by the Department’s Project Manager;
When any references occur in a Standard to the “engineer” that refers to the time period after Final Acceptance, the term “engineer” shall mean the Department’s Project Manager;

When a Standard requires notifications to the “engineer”, the “engineer” shall mean the Department’s Project Manager;

When a Standard refers to an approval of any correction or repair that deviates from the Contract requirements, the Approval must be by the Department’s Project Manager;

When a Standard refers to items that will be performed or provided by NYSDOT or by a division or employee of NYSDOT, the Design-Builder shall construe the requirements as applying to the Design-Builder unless otherwise specified in the Contract Documents, or unless the context requires otherwise. It shall be in the Department’s sole discretion to determine when the context requires otherwise;

When a Standard refers to the “project manager” as it relates to plan processes, sending information or requesting information from NYSDOT entities, the term “project manager” shall mean the Department. The Design-Builder shall submit all requests directly to the Department’ Project Manager.

The Design-Builder shall perform Work relevant to each Project Requirement in Part 3 – Project Requirements in accordance with the Standard(s), if any, that are listed in that Project Requirement, unless otherwise stipulated in the Project Requirement.

The Design-Builder shall follow all standards, laws and rules necessary to perform its Work regardless of whether an applicable standard, regulation, law or rule is specified in Part 3 – Project Requirements.
SECTION 26  CADD AND 4D/5D MODELS

26.1  SCOPE

The Design-Builder shall develop, maintain and provide all CADD files necessary to produce contract plans for all disciplines in accordance with Department requirements.

In addition to the CADD files used for the preparation of contract plans, the Design-Builder shall perform all tasks necessary to prepare and maintain 3D and 4D Model(s), 5D Model(s), 3D animations, and 3D schedule simulations that:

- Provide a visualization to be included in the Design Builder’s Technical Proposal to communicate the intended design, construction sequence and provisions for MPT.
- Provide a method of evaluating and monitoring the planned construction sequence after award.
- Provide a method of tracking progress and payments after award based on a selected number of Lump Sum payment items.

As part of their Technical Proposal the Design-Builder shall submit a 3D animation and a 4D schedule simulation that presents the key elements of their design concept and approach. The Department shall use the 3D animation and 4D schedule simulation as part of the proposal evaluation process.

After award, the Design-Builder shall further develop, and update the 3D Models, 4D/5D Models, 3D animations and 4D schedule simulations to reflect planned and completed construction activities and costs. The 4D/5D models, 3D animations and 4D schedule simulations will be used by the Department to track progress and costs during construction.

26.2  STANDARDS AND REFERENCES

The Design-Builder shall perform CADD production of contract plans and 4D/5D modeling and simulation activities in accordance with the applicable Department Standards and Manuals cited unless otherwise stipulated in this Project Requirement.

26.2.1  CADD

All work shall conform to the CADD requirements stated in Consultant Instruction 03-02. In general, this requires that all CADD graphics be generated and provided in the required version of MicroStation (.DGN) format currently supported by the Department; and, all electronic engineering data be generated and provided in the applicable InRoads (DTM, ALG, SDB) format currently supported by the Department. The Design-Builder shall submit files adhering to the naming convention, format requirements and procedures defined in the Project Development Manual (Appendix 14) and the Highway Design Manual (Chapters 20, 21 and 22). The Design-Builder shall assume that version upgrades of CADD and related software will occur on a routine basis in order to remain current with the most productive software changes and
The Design-Builder shall update file formats to newer versions of CADD and related software as the Department adopts these versions. The Design-Builder shall assure that the data contained in these files adheres to current standards and procedures for the duration of the project.

All Right of Way (ROW) mapping and survey work completed by the Design-Builder shall conform to the Land Surveying & Procedures Manual. All project base mapping, survey data, coordinate geometry information, parcel maps, terrain data, boundary lines and horizontal control that is collected and/or prepared by the Design-Builder for the duration of the project shall be supplied to the Department in electronic format, whenever available. The electronic format shall supplement, and shall not replace, any other format requirements for these types of project deliverables.

All CADD Resources and Settings files developed by the Department are available on the Department's website for download and use. The Design-Builder shall establish the configuration and operation of these settings/resource files for their site. The Design-Builder shall periodically check the Department's website for updates to the CADD Resources and Settings and information pertaining to the most current software and versions.

26.2.2 4D/5D Modeling

The Design-Builder is not required to generate or extract construction documents (plans) from the 3D Models developed to support 4D/5D modeling and schedule simulation activities. However, the Design-Builder is required to keep the 3D models current with latest plan milestone submittal and subsequent contract plan revisions during construction phase.

3D Models developed to support the 4D/5D model shall be in Bentley Microstation dgn format.

Design-Builder’s cost loaded progress schedule shall be in Oracle Primavera P6 format maintained on a Third Party Hosting Service P6 database designated by the Department.

The Design-Builder shall use Synchro Professional or Bentley Navigator or approved equal to develop 4D/5D models and 4D Schedule Simulations. The Design-Builder shall make this software available to the Department for the contract duration with concurrent access to the current 4D/5D model.

26.3 REQUIREMENTS

26.3.1 CADD/Model Manager

The Design-Builder shall designate a CADD/Model Manager for the Project. The CADD/Model Manager shall manage all CADD production, modeling, animation and schedule simulation activities, CADD files and models associated with the Project, shall be responsible for directing and reviewing all Project CADD production, modeling, animation and simulation work, and serve as the point of contact for all CADD, modeling, animation and simulation activities. The model manager shall have thorough knowledge and understanding of all aspects of required CADD, 3D modeling, 4D modeling, 3D animation and 4D schedule simulation.
26.3.2 Model Management Plan

The Design-Builder shall prepare and maintain a model management plan that contains:

- Strategy for model creation and maintenance;
- Software, including CADD, 3D modeling, 4D modeling, and CPM scheduling;
- Change management plan for keeping models current with design document milestone submittals and subsequent revisions;
- Quality control and Quality Assurance process for auditing change management of 3D models; and
- Roles and responsibilities of modeling team.

The model management plan shall be submitted to the Department for review and approval prior to the start of any CADD production or 3D modeling.

26.3.3 Department-supplied Data

The Department will make available the data listed in Table 26.3-1. The Design-Builder shall be responsible for verifying any data used for the Project.

<table>
<thead>
<tr>
<th>Information Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photogrammetric mapping</td>
</tr>
<tr>
<td>Records Plans</td>
</tr>
<tr>
<td>Preliminary Design CADD Files</td>
</tr>
<tr>
<td>USACE Bathymetric Survey (2009)</td>
</tr>
</tbody>
</table>

26.4 4D/5D MODELING DELIVERABLES

At a minimum, the Design-Builder shall submit the items listed in Table 5.4-1 –Survey and GIS Deliverables.

Where applicable, electronic copies of deliverables listed in Table 5.4-1 –Survey and GIS Deliverables shall be supplied as per the specifications given in Chapter 2 of the Department’s CADD Standards and Procedure Manual. All relevant Bentley MicroStation® files (including .DGN files) and Bentley InRoads® files (including DTM, ALG files) shall be compatible with the MicroStation 8i and InRoads 8i software versions.
26.4.1 Definitions

**Visualization** – A simulated visual representation of proposed transportation improvements and their associated affects on the project area.

**3D Model** – A virtual model that contains representations of physical objects in 3D (x, y, and z) as surfaces or solids. 3D models may or may not be parametric depending on the software used to create (author) them. Common types of 3D models include but are not limited to: Existing Conditions Model(s), Design Model(s), and Construction Model(s). Construction Model(s) typically contain temporary site features and equipment.

**Model Element (or Object)** – Is a piece or portion of a virtual model that represents a component, system or assembly within the facility. Model Elements are often assigned a reference to a specification classification system.

**Level of Development (LOD)** – LOD describes the level of completeness and accuracy to which a Model Element is developed. Article 3 of AIA Document E202 contains a complete description of Levels of Development and corresponding authorized uses.

**3D Animation** – A walkthrough of a virtual model that also supports movement and display of 3D objects. Viewer and 3D object motion and 3D object display are typically defined through the use of key frames. 3D animation software interpolates position and number of frames between key frames to render a series of images that are composited (combined) to create a digital video.

**4D Model** – An aggregation of virtual models that are linked to the current CPM Progress Schedule. The CPM Progress Schedule that is integrated to the 3D model (4D model) shall be kept current (all revisions and updates) through an API interface with Progress Schedule on the Third Party Hosting Service P6 database. A 4D model must contain one or more virtual models and at least one link to a CPM schedule. Specific activities within the linked CPM schedule are then related to a specific object or grouping of objects within the virtual model(s).

**5D Model** – The 4D Model with the CPM schedule cost loaded.

**4D Schedule Simulation** – A unique type of 3D animation that is tied to a CPM schedule that shows an ordered, time scaled appearance of model elements/objects. Viewer/object motion and display are controlled by parameters of the associated schedule activities at a specific point in the schedule time line. 4D schedule simulations are produced from 4D models using specialized schedule simulation software.

**4D Construction Planning and Scheduling Simulation** - Consists of multidimensional 3D models + CPM Progress Schedule + Resources + Contract Costs in which a virtually unlimited range of visual and non-visual project and project related information is allocated, tagged or attached to each 3D model element at an object level visualized as a collection of attributes dynamically rendered by the software controlled at the Activity level data as determined by the CPM Progress Schedule. As the project is developed, increasing amounts of data is added increasing the data and information intelligence to overall project model. This information intelligence is captured in a single project data set and or separately in separate fragmented
networks in isolated detail as may be required to determine typical repeatable project specific operations.

**Progress Schedule** – Design-Builder’s Primavera P6 CPM PROGRESS SCHEDULE as required by the Department in accordance with the contract Section 108 CPM PROGRESS SCHEDULE provisions.

**Resource Dictionary** – A list of major construction Equipment resources, Labor resources - crew level information, Material resources from project design models, and Location resources for work zone areas essential for site area allocation and coordination. These resources are assigned to Activities in the Progress Schedule as well as required 3D graphical representations associated with the 3D Design and 3D Construction Model elements required to visualize the dynamic 3D design and site conditions throughout the project from start to finish for clear and accurate visual simulation.

**Payment Breakdown Structure** – A breakdown of the entire contract value in a level of detail necessary to allocate costs to the CPM Progress Schedule and that accurately correlates to both the 3D Model elements and the ACTIVITIES of the authorized PROGRESS SCHEDULE; and is CONSISTENT WITH THE PBS STRUCTURE PROVIDED FOR WITHIN THE RFP.

**Links** – The data tags associating the 3D model objects to the resource data objects to the activity or task data objects formed in the 4D Construction Planning and Scheduling Simulation software. Links between activities are also known as dependencies for activity predecessors and successors.

**Reference Date** – The moment in time viewed in the 4D Construction Planning and Scheduling Simulation on the Initial or Baseline Progress Schedule, the current Progress Schedule, or As-Built Schedule. The moment will be the same regardless of the amount of Progress Schedules views shown in the 4D Construction Planning and Scheduling Simulation at the time of review and analysis.

### 26.4.2 Visualizations and Computer Generated 3D Animations

The Design-Builder shall be responsible for producing and providing all visual simulations such as photo-simulations, animations and technical media as determined necessary by NYSDOT for the public involvement process in order to facilitate public understanding, to communicate design solutions and associated construction phasing. See also *Public Involvement*.

#### 26.4.2.1 Visual Simulations

The Design-Builder shall be responsible for producing and providing computer-generated geographically and photographically accurate photo-simulations from a minimum of 10 significant point-of-view locations. These locations shall be identified by the Design-Builder and approved by NYSDOT during the course of design development, visual impact assessment, aesthetics analysis and construction build-out. All visual simulations shall be prepared by the Design-Builder from accurate three-dimensional models and shall be high resolution TIFF format reproducible to poster size (30 inches x 40 inches minimum) print medium as necessary. Visual simulations shall accurately depict design features such as overall and detailed form,
scale, proportion, perspective, lighting, reflectivity, shape, dimensioning, color, materials and textures. The Design-Builder shall be responsible for producing day, evening and nighttime visual simulations, which shall include Project design features necessary for stakeholder and public involvement review and, where appropriate, for decision making requirements. The visual simulations may include but not be limited to bird’s eye perspectives from various locations, drivers’ perspectives from each travel direction and water body perspectives from key upstream and downstream viewer locations.

Photo-simulations shall include the following formats, consistent with all specifications and terminology identified in the AASHTO Visualization in Transportation: A Guide for Transportation Agencies

A) Uncompressed TIFF file format;
B) JPEG files will not be acceptable other than for use in PowerPoint® presentations;
C) Searchable PDF files;
D) Hard copy prints in sizes between 11 inch x 17 inch to 30 inch x 40 inch as appropriate; and
E) Mounted foam-boards (22 inch x 34 inch) with one printed and mounted copy per board of each identified view, on photo-quality paper.

Visual simulations may include any of the following;

A) Aerial photographs;
B) Composite image photo-simulation;
C) Computer generated images from three dimensional modeling of synthetic or virtual environments; and

26.4.2.2 Computer-generated Animated Simulations

The Design-Builder shall provide computer-generated animated simulations to accurately depict both overall and detailed form, scale, proportion, perspective, lighting, reflectivity, shape, dimensioning, color, materials and textures of all design features as well as the motion and operation of transportation modes and traffic volumes at peak hour usage at design speeds. Day, evening and nighttime animated simulations shall include project design features necessary for stakeholder and public involvement review and, where appropriate, decision making requirements. The simulations shall include but not be limited to bird’s eye perspectives from various identified locations, driver perspectives from each travel direction and water body perspectives from key upstream and downstream viewer locations. Animated simulations shall include: pedestrian walk-throughs; drive-throughs from drivers’ perspectives in each travel direction; fly-throughs from various bird’s-eye perspectives as necessary to address design, construction phasing, transportation operation, public involvement or stakeholder issues. The Design-Builder shall provide to NYSDOT sample animated simulations to illustrate the quality
and visual fidelity of the deliverables for review and written comment, prior to developing finalized simulations.

The Design-Builder shall be responsible for close liaison with NYSDOT in the development of any scripts to accompany computer-generated animated simulations.

**26.4.2.3 Computer-generated Animated Simulations Deliverables**

The Design-Builder shall provide computer-generated animated simulations for various digital medium formats such as DVD, video and webcast video streaming over the internet. All versions shall be formatted appropriately to operate most effectively and efficiently while maintaining best image fidelity to accurately depict overall and detailed form, scale, proportion, perspective, lighting, reflectivity, shape dimensioning, color, materials and textures, of all design features as well as the motion and operation of transportation modes and traffic volumes at peak hour usage at design speeds. See also *Public Involvement*.

The Department shall use the 3D animation/4D schedule simulation as part of the proposal evaluation process. The 3D animation or 4D schedule simulation shall be submitted with the Design-Builder’s proposal as a wmv file.

**26.4.2.4 4D/5D Models and 4D Schedule Simulations at Post-award**

The Design-Builder shall provide detailed 4D/5D models and 4D schedule simulations of the Project work suitable for Department’s use in evaluating and monitoring progress of the Design-Builder’s schedule and tracking of key Lump Sum pay items.

The 4D/5D Models and 4D Schedule simulation shall be submitted along with the Progress Schedule submission as required by the Department for review and approval. The 4D/5D Model and 4D Schedule Simulation shall be at a level of detail that is consistent with the level of detail available from the ongoing design process and Baseline and Weekly Progress Schedule submission requirements. The 4D/5D Model and 4D Schedule Simulation will be kept up-to-date within 5 days following all design submissions and design iterations for progress review, comment and approval as required by the Department.

The Department intends to use 4D Schedule simulations for evaluating Design-Builder’s schedule and monitoring progress of the work. The Design-Builder shall work closely with the Department to refine the requirements for 4D Schedule Simulation submissions to ensure the end product meets the needs of the Department as work progresses. This effort may require several iterations before the end product satisfies Department requirements. Initial 4D Schedule Simulation submission requirements identified by the Department are as follows.

A) The 4D schedule simulation file shall contain the 4D/5D model viewpoints and 4D data filters for tasks, resources and 3D objects that support the schedule narrative and pay item queries.

B) The simulation will accurately show and match the primavera progress schedule of the overall plan to complete the project; including where the work will begin and the how the work and crews will flow through the project.
C) The simulation will accurately label all calendars used per task or per resource that controls the work hours per day, days per week, number of shifts per day, number of hours per shift, and holidays observed.

D) The simulation will show how the Progress Schedule accommodates adverse weather days for each month or activity.

E) For multi-year projects, identify the work to be completed in each construction season.

F) A description in text annotation in the simulation linked to the task to be rendered in the simulation coordinated in the simulation view.

The Department intends to use 4D/5D models to track the 20-30 key Lump Sum pay items established with the Design-Builder. This functionality requires that the Design-Builder’s CPM Progress Schedule has material (Pay Item) resources assigned to activities, and these activity resource assignments contain the correct costs, units, and Cost Accounts entries. The Design-Builder shall work closely with the Department to develop the detail of defining the WBS, Resources, Cost Accounts, and their activity assignments with Units and Costs, activity physical percent complete, and a project Report from the 4D model that can be generated on a regular basis as a way to verify contract pay estimates.

4D Models are created by importing of 3D model(s) and establishing links to a copy of the CPM Progress Schedule. The CPM Progress Schedule is updated through Primavera API integration with the current CPM Progress Schedule on the Third Party Hosting Service P6 database. Each 3D schedule simulation shall have a unique 4D model associated with it.

4D model(s) shall contain a link to the Design-Builder’s CPM schedule and contain a task list based on schedule activities from the lowest level of the WBS.

The following table contains the recommended 3D models, model content and model LOD necessary to support detailed 3D Schedule Simulations.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Model</th>
<th>LOD</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exist Conditions</td>
<td>Surface Terrain DTM</td>
<td>300</td>
<td>Per Department Stds</td>
</tr>
<tr>
<td>Exist Conditions</td>
<td>Bathymetry DTM</td>
<td>300</td>
<td>Per Department Stds</td>
</tr>
<tr>
<td>Exist Conditions</td>
<td>Elevated Structure including foundations, piers, abutments, main truss, approach framing and decking.</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Exist Conditions</td>
<td>Buildings to be demolished</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Existing Conditions</td>
<td>Buildings – Context</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Existing Conditions</td>
<td>Local Streets, other topographic features required for context</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Civil</td>
<td>Local Streets – Paving</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Civil</td>
<td>Local Streets – Relocated</td>
<td>300</td>
<td>Per Department Stds</td>
</tr>
</tbody>
</table>
## Table 26.4-1 – 4D/5D Modeling Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Number of Copies</th>
<th>Delivery Schedule</th>
<th>Reference Section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hardcopy</td>
<td>Electronic</td>
<td></td>
</tr>
<tr>
<td>Visualization at Pre-award</td>
<td>-</td>
<td>1</td>
<td>With Proposal</td>
</tr>
<tr>
<td>Model Management Plan</td>
<td>1</td>
<td>1</td>
<td>Within 30 days of NTP</td>
</tr>
<tr>
<td>4D Simulation Report – Initial</td>
<td></td>
<td>1</td>
<td>With Initial Schedule</td>
</tr>
<tr>
<td>Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4D Simulation Report – Baseline</td>
<td></td>
<td>1</td>
<td>With Baseline Progress Schedule</td>
</tr>
<tr>
<td>Progress Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4D Simulation Report – Weekly</td>
<td></td>
<td>1</td>
<td>With Weekly Baseline Progress</td>
</tr>
<tr>
<td>Progress Schedule Updates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4D Simulation Report – As-built</td>
<td></td>
<td>1</td>
<td>With As-Built Schedule</td>
</tr>
<tr>
<td>Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4D Schedule Simulation Report Contains the following items:
A) Transmittal letter to the owner identifying which P6 schedule in the database is being submitted for review.

B) Animations of submitted 4D schedule simulations, in wmv file format that support schedule narrative.

C) The 4D schedule simulation file used by the simulation software or 4D/5D modeling software that supports independent editing of complete data set, was used to produce the wmv file(s) and contains submitted 4D schedule simulations.

D) A statement explaining why the schedule completion date is forecast to occur before or after the contract completion date.

E) An explanation stating why any of the contract milestone dates are forecast to occur late and if there is a potential recovery plan for late schedules.

F) When a recovery plan is required the simulation will show the actual schedule and the recovery schedule in a side-by-side schedule analysis view in the simulation using the same reference date in a single simulation file. It is not acceptable to submit two separate simulations in two files to analyze the proposed or planned recovery schedule.

G) Identify and document the reason and purpose of each constraint, including spatial and location resource, using a combination of narrative and simulation viewpoints.

H) A comparative 4D simulation that identifies in side-by-side views with simultaneous reference date control the changes made between the previous schedule submission and the current proposed schedule, including, but not limited to: data date, completion date, activity code assignments, scheduling options, activity descriptions, added activities, deleted activities, added activity relationships, deleted activity relationships, activity original durations, activity remaining durations, activity actual start and finishes, percent complete, constraints, activity resources, activity costs, and activity coding.