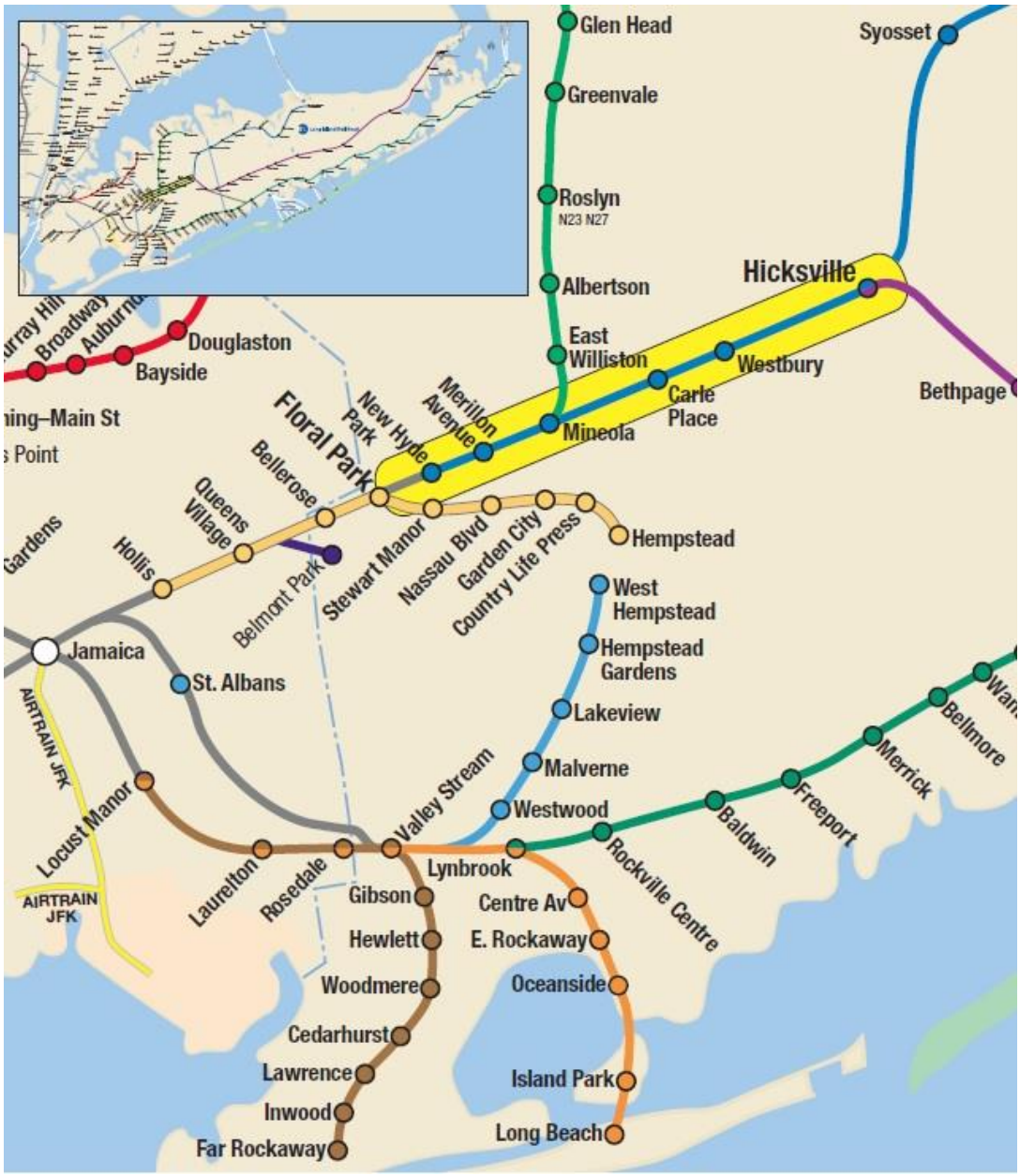
**Technical Statement of Work**
**For**
**Engineering and Environmental Consultant Services**

# LIRR EXPANSION PROJECT
# FROM FLORAL PARK TO HICKSVILLE




MTA Long Island Rail Road

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**LIRR EXPANSION PROJECT FROM FLORAL PARK TO HICKSVILLE**

## FOREWORD

As part of Governor Andrew M. Cuomo's 2016 "Built to Lead" initiatives to "Transform and Expand Vital Infrastructure Downstate," a totally revamped project—to be known as the **LIRR Expansion Project**—will be examined in this study (see reference documents). The LIRR Expansion Project ("the Project") is a key element of the Governor's initiatives and is a strategic component of a comprehensive plan to transform and expand our vital regional transportation infrastructure so that we may strengthen our local economy, create jobs, enhance our environment and protect Long Island's future. The LIRR Expansion Project would construct a third track along a critical 9.8-mile section of LIRR's Main Line, between Floral Park and Hicksville Stations, where five branches converge carrying 41 percent of LIRR's daily ridership. The addition of a third track would increase track capacity through the corridor making it easier to run trains, which would improve service reliability and make transit more attractive, with the further goal of getting travelers out of cars, reducing traffic congestion, and reducing adverse environmental impacts.

The LIRR Expansion Project represents a fresh approach to bringing the third track to fruition. Governor Cuomo has said that this project will set the standard for positive community engagement. Outreach for the Project is being modeled on the successful efforts he ordered as part of the replacement for the Tappan Zee Bridge. Governor Cuomo has announced the Project will be constructed within the existing LIRR Right of Way ("ROW"), eliminating the need for any residential property takings. He has also committed to working with local communities to review all seven street-level train crossings ("grade crossings") along the affected main line corridor. Eliminating grade crossings, through separation or in some cases potentially closure, will reduce noise, traffic congestion, delays, and air pollution, and greatly improve safety for residents, motorists, and pedestrians.

This study will collect new data and conduct new analyses to comply with applicable laws and regulations. Depending on the project funding source, review will comply with the New York State Environmental Quality Review Act (SEQRA). Preliminary design will be initially developed to support the environmental process, program planning and become the basis for design-build construction efforts following an environmental determination.

This scope of work mandates that the work be conducted in a highly efficient and enhanced manner to meet an aggressive completion date while still ensuring a complete and thorough review; this necessitates, at a minimum the assumptions that:

- This project will be conducted on a time is of the essence basis

- All local, state, and federal reviewing agencies as applicable, expedite their reviews in a collaborative partnership manner
- Any and all data collection that is seasonal in nature (e.g. traffic counts in the vicinity of seven grade crossings), must be collected before Memorial Day to ensure representative conditions

## GENERAL INFORMATION

### Introduction

The Long Island Rail Road ("LIRR" or "Railroad") requires a consultant to provide Engineering and Environmental Consultant (EC) services for: 1) Base Work: preparation of an Environmental Impact Statement (EIS), 2) Option 1, the development of a preliminary design and preparation of Design/Build contract documents and 3) Option 2, construction phase services, to support the LIRR Expansion Project including the addition of a third main track, roadway grade crossing separations and/or closures, and infrastructure improvements between the Floral Park station and the Divide Interlocking (Hicksville Station) in Nassau County on the LIRR Main Line. As part of this effort, the EC shall review existing design data and other technical information, and verify current site conditions along LIRR's ROW covering track alignment, grade crossings, stations, bridges, signals, electrical and communication systems, location of private properties and businesses, roadways, roadway traffic patterns, current and planned LIRR train operations to develop third track alignment alternatives within the existing LIRR ROW, update an existing feasibility analysis, update preliminary designs, conduct public outreach, and prepare an Environmental Impact Statement (EIS).

The existing two Main Line tracks presently accommodate more than 220 trains in a 24-hour period. The additional third track, less than 10 miles long, will reduce severe congestion during peak periods, provide operational flexibility to improve reliability, allow reverse and intra-island commuting services through this corridor, and provide additional capacity to accommodate service growth system wide.

Key elements of the work to be performed by the EC while working under the direction of the LIRR will include:

- Verify various potential alignments for the Main Line third track (within the existing ROW)
- Develop schematic designs for the identified alignments
- Perform site screenings and feasibility analysis
- Recommend an alignment
- Prepare and publish a Notice of Intent (NOI) or other required documentation
- Perform surveys of the route of the alignment
- Develop a preliminary design for the recommended alignment including, but not limited to retaining structures, station/platform and bridge and structure modifications
- Assist the LIRR in developing a programmatic approach for planning and implementation of the LIRR Expansion Project
- Assist the LIRR with the formal EIS public outreach process
- Obtain and incorporate public comments into the preliminary design and environmental analysis
- Coordinate with NYSDOT performed traffic and pedestrian circulation studies for the recommended alignment in light of roadway grade crossing separations and/or closings; and

provide conceptual designs for the crossings
- Perform Phase I, and if required, Phase II Environmental Site Assessments
- Complete a Draft Environmental Impact Statement (DES)
- Complete the Final Environmental Impact Statement (FEIS)
- Prepare a Draft Findings of Environmental Determination or other determination document
- Following a final environmental determination (as may be applicable), the consultant shall finalize preliminary designs suitable for a Design-Build Construction Contract for early civil site works, track work, line structure modifications and construction, and other track and railroad utility systems as further outlined in this Technical Statement of Work (TSOW)

Final design and construction of the LIRR Expansion Project will be undertaken by the LIRR under a separate contract.

## Background

The LIRR is expecting a significant increase in its service levels by the year 2040. This increase is a result of a number of factors including:

- Forecast of ridership growth
- Desire to increase reverse peak and intra-island service opportunities
- Desire to further reduce non-revenue (deadhead) car miles
- Planned future service growth to Manhattan terminals

For this project, it is required to study the potential grade separation of seven roadway at-grade crossings as part of the EIS process and the preliminary design for the LIRR Expansion Project. The seven locations for study in this EIS include (from west to east):

1. Covert Avenue, New Hyde Park
2. S. 12th Street, New Hyde Park
3. New Hyde Park Road, New Hyde Park / Garden City
4. Main Street, Mineola
5. Willis Avenue, Mineola
6. School Street, Westbury / Town of North Hempstead
7. Urban Avenue, New Cassel (Town of North Hempstead)

## Description of the Construction Elements of the LIRR Expansion Project

A third track will be installed from Floral Park Station to Divide Interlocking with crossover service to the Oyster Bay Branch east of the Mineola Station. The third track construction will be a link of continuous welded rail with concrete ties, high-speed crossovers, and interlockings. Construction may include modifications or additions of: railroad bridges (over / under grade bridges, viaducts, and culverts), retaining walls, stations (platforms, station buildings, parking, and shelters / waiting rooms), structures (signal bridges, signal huts, etc.), substations, signal towers, road bed, track, interlockings & crossovers, sidings, power, communications and signals, and elimination of roadway grade crossings (see Task 5 for required infrastructure modifications).

## REFERENCE MATERIAL

The EC may utilize the following reference information, as necessary:

- NYS Governor's Presentation Video to the L. I. Association (1/5/16)
- Data from earlier third track studies and other reports

All of the above documents will be available for review during the proposal phase, upon making an appointment with LIRR. The EC will utilize the above information and incorporate all applicable relevant research and investigative information including any preliminary engineering / design information developed for Main Line third track.

## SCOPE OF SERVICES – ENGINEERING AND ENVIRONMENTAL CONSULTANT (EC)

The Scope of Services comprises the following Tasks:

Task 1: Track Alignment Identification – Base Work
Task 2: Feasibility Analysis of Alternative Alignments – Base Work
Task 3: Initial EIS Scoping and Public Outreach – Base Work
Task 4: Topographic, Planimetric and Property Boundary Surveys – Base Work and Option 1
Task 5: Develop Preliminary Design and Preliminary Cost Estimates and Program Schedules – Option 1
Task 6: Line of Sight Survey/Renderings – Base Work
Task 7: Phase I - Environmental Site Assessment – Base Work
Task 8: Phase II - Environmental Site Assessment – Base Work
Task 9: Final EIS Scoping and Documentation – Base Work
Task 10: Design Objectives and Criteria -- Option 1:
Civil / Site work / Track – Retaining Structures, Earthwork, Track work and Drainage
Line Structures – Bridges, Stations and Ancillary Structures / Systems
Grade Separation – Alignments, Profiles, Roadway, Signal Systems
LIRR and Public Utility – Coordination, Agreements, Construction and Relocation Designs
Traction & Signal Power Systems – Load Studies, Substations, MG Power, 3rd Rail Systems
Signal Systems – Signal and Interlocking, Supervisory Control, and Early Construction
Task 11: Bid Assistance – Option 2
Task 12: Public Agency Coordination – Base Work and Option 1
Task 13: Project Administration – Base Work and Option 1

The EC shall support, and perform, all activities necessary to satisfy existing and future requirements for the new LIRR Expansion Project, and its associated environmental impacts, and identify measures to avoid, minimize or mitigate any potential adverse impacts. The EC shall document these activities, at a minimum, in the DEIS, as detailed later in the Scope of Services.

The Preliminary Designs shall include but not be limited to the following information:

- Design Drawings: Cover Sheet (with project location map), Index of Drawings, Legends and Abbreviations; General Notes, Aerial Site Plans, Proposed Site Plans, Existing Conditions Plans, Demolition Plans, Grading and Drainage Plans and Catch Basin Plans, Composite Utility Plans, Hazardous Materials Notes, Survey Plans (Property Boundary, Planimetric, Topographic), Maintenance and Protection of Traffic (Traffic Re-routing and Detour Plans, Traffic Control Details), Civil Notes, Boring Location Plans, Boring Logs, Retaining Wall Locations and Sections, Temporary Supports, Bridge Storm Leader Plans and Profiles, Bridge Plans, Bridge Elevations and Sections, Bridge Abutment Modification Plans, Bridge Concrete Repair Locations and Repair Procedures, Track Notes, Track Alignment Pans and Profiles, Track Cross Sections, Electrical Site Plans, Proposed Manhole Site Plans, Electrical Single Line Diagram, Signal Plan, Signal Line Plan, Communications Plan and Communications Line Plan, and Construction Staging Plans.

- Technical Specifications: Index of Technical Specifications

The designs and engineering shall be prepared in a manner to support the program implementation as developed during the programmatic planning efforts under this TSOW. Work shall include but not be limited to the following:

- Preliminary Drawings, Performance Specifications, Project Requirements and Bridging Documents, and Technical Data suitable for the issuance of an RFP for Design-Build Construction including Civil / Site / Track work / Utilities / Signal
- Line Structures (Stations)
- Line Structures (New and Bridge Modifications)
- Grade Separations (supporting design for traffic signal modifications shall be provided as part of the final design by NYSDOT)
- Power Systems (Traction Power Substation and associated Distribution Systems)
- Long Lead drawings and specifications suitable to procure long lead elements such as Turnouts, Power and Signal Components
- Utility Relocations to support construction and other elements as determined during the Preliminary Engineering and Environmental review process.

The EIS shall include, but not be limited to, the following:

- Development of a project purpose and need
- Identification and discussion of project alternatives
- Clear description of the project's environmental setting
- Discussion of the scoping and public outreach process
- Discussion of the scope and basis for the LIRR Expansion Project
- Detailed evaluation of reasonable alternatives to this project
- Detailed evaluation of ridership and traffic effects to be generated by the project
- Detailed discussion of the project's effect on the human and natural environment, including both beneficial and adverse impacts

- Detailed discussion of the project's effects on the local and regional transportation network and Railroad operations
- Identification of the required mitigation measures of significant adverse impacts
- Bibliography and list of supporting documents
- Complete summary of comments received on the DEIS, and responses to the comments, or actual copies thereof
- Complete list of preparers

## TASK 1: Track Alignment Identification

### 1.1 Alignment Review and Verification of Alignments

The EC shall review potential alignments for the third track within the existing ROW from Floral Park to Divide Interlocking. This may include reviewing design criteria and assumptions in this TSOW.

In association with locating the Alignment Concept for new third track, the EC shall also review potential sites along the Main Line from Floral Park Station to Hicksville to maintain a clear ROW, including the potential to upgrade stations, structures and bridges, relocate LIRR utilities, and upgrade substations.

Please note, in particular there is limited space along the ROW from Floral Park Station to Hicksville for construction of an additional electrical substation. See also Task 5.10.

At a minimum, each track alignment will be analyzed based on the following pre-established criteria:

- Rail operations
- Traffic impacts (vehicular/pedestrian)
- Impacts on the community
- Construction costs

The feasibility will be determined for each alignment and a recommendation made for an Alignment Concept. As part of the evaluation process, the EC shall prepare schematic and preliminary designs of the proposed track and all associated infrastructure work, determine environmental impacts and costs, and identify/recommend measures to avoid, minimize or mitigate any significant adverse effects, including but not limited to a final product resulting in no residential property acquisitions.

### 1.2 Identification of Existing Land Uses Adjacent to Railroad ROW

The EC shall identify and review the status of existing land uses adjacent to the railroad ROW

### 1.3 Impact on Railroad Infrastructure and Railroad Operations

Track Installation and Modification Constraints - The EC shall consider but not limit itself to the following:

- Track alignments, profiles and clearances (horizontal and vertical)
- Operating Speeds and Reverse Moves
- Elevation of the track bed
- Stations and platforms
- Bridges and structures

- Signals
- Interlockings, Turnouts and Sidings
- Substations and Third Rail Collection System
- Utility poles, ductbanks, manholes and storm sewer systems

The EC shall prepare a plan view graphic analysis of the entire study area identifying those track alignments where operational constraints exist.

Right of Way (ROW) Constraints – With the objective to minimize property impacts, the EC shall review modifications to the alignment of the Main Line Tracks and installation of retaining walls in the project area necessary to construct a third track and to maintain railroad operations.

The EC shall assess whether or not operational constraints can be overcome with reasonable efforts.

## TASK 2: Feasibility Analysis of Alternative Alignments

### 2.1 General

The alternative alignments or modified alignments for the Main Line third track identified in **Task 1** shall be investigated by Geographic Information Systems (GIS) and ground reconnaissance, and by review of available records. For the purpose of establishing a budget, the Feasibility Analysis should consider alignment alternatives with their associated operational, constructability, and opportunities to further prevent or mitigate community impacts. An inventory of all alignment characteristics shall be developed and utilized in the analysis of and in the concept planning for each alignment. The EC shall consider environmental, regulatory, locational, market demand and regional access in determining any **"fatal flaws"** which would preclude a specific alignment from further study. It should be noted any alternative alignment that results in a residential property taking would be deemed to be "fatally flawed."

The EC shall include consideration of zoning, surrounding land uses, natural resources, sensitive uses along routes to site (e.g. schools, parks, wetlands), and potential off-site impacts on adjacent properties

After a thorough investigation of existing natural resource documentation and other resources along the corridor, a visual inspection by experienced environmental staff and review of available mapping from NYSDEC will be completed to determine the presence or absence of wetlands, wetland vegetation, floodplains, protected plants and wildlife, stream encroachment issues, hazardous substances, poor soils or other environmental constraints will be performed. The EC shall assess all potential environmental constraints for each alternative and its associated additions or modifications to structures. The EC shall determine the permits required, likelihood of approvals and mitigation measures which may be required.

The EC should comment on the visibility of the alignment from adjacent properties and roadways to the extent that it adds or detracts from the existing neighborhoods appearance.

## 2.2 Ease of Construction

The EC shall consider the potential limitations to the development of each alternative. Consideration should be given to physical, environmental and regulatory obstacles to construction.

The following represents a sample of potential limitations to construction:

- Spatial limitations (e.g. ROW's too narrow, too steep, irregularly shaped)
- Major access improvements required
- Extensive earthmoving required
- Relocation of underground or overhead utilities (including consultation with affected utilities)
- Rail operations.

## 2.3 Construction Assessment and Cost Estimates

The EC shall assess construction of each alternative and identify the spatial limitations of the alignment, constraints to development (physical, environmental & regulatory), alternative track and ancillary equipment arrangements, areas best reserved for storm water detention, identification of potential earthmoving requirements, etc. Construction cost estimates and supporting schedules of sufficient detail shall be prepared to allow for the credible comparison of each alternative, including retaining walls and modifications and additions to structures. The estimates should provide order of magnitude costs for each element of the design (i.e. retaining wall $/LF, etc.) Any unusual construction expenses related to individual sites shall be identified.

The EC shall provide the following for each alternative (including but not limited to bridges, roadway grade crossing separations and/or closures, third rail power, substation(s), communications and signals, retaining walls, station and platform modifications):

- Alternative construction schemes
- Construction cost estimates suitable for comparison amongst proposed alternatives

## 2.4 Off-Site Impacts

The EC shall assess the potential for off-site impacts related to each of the potential alignment alternatives. Consideration should be given to Railroad operations, environmental issues, roadway grade crossing separations and/or closures, traffic, economic and aesthetic impacts, and any community concerns for each potential alignment.

## 2.5 Deliverables

Twenty (20) draft and twenty (20) final copies of a Technical Memorandum which will include the inventory of site characteristics for each potential alignment and the analysis undertaken to develop the prioritized recommendations for which alignment(s) to advance to further study.

## TASK 3: Initial EIS Scoping and Public Outreach

### 3.1 Scoping Document

The EC shall prepare a scoping document and related environmental review documents which build upon the problem statement, purpose and need for the project, clearly define the goals and objectives of the LIRR Expansion Project, outline a scope of work for the DEIS, and present the alternatives being considered.

### 3.2 Public Outreach Program

An important part of the initial EIS scoping process will be to conduct a public outreach program. This program will complement any existing outreach efforts and be managed by the LIRR Public Affairs Department with technical assistance from the EC. The EC shall prepare and develop print and digital material required for the Public Outreach program, including social media, infographics, video, animation, and other formats utilizing the latest technology. In addition to the print and digital materials, the EC shall also coordinate and arrange for meetings; contract for meeting rooms, required transportation, advertisements in local newspapers, and with radio and television stations, etc. The goal of the program will be twofold: 1) to communicate the benefits and potential significant adverse impacts of the LIRR Expansion Project to our customers and the surrounding communities; and 2) while at the same time soliciting input from those same stakeholders. The program shall highlight the EIS process as it progresses though its various phases, from initial EIS scoping, through to the final EIS scoping and development and finalization of regulatory documentation.

The EC will participate in the Public Outreach Program through the Findings of Environmental Determination. The LIRR may request the EC to continue this effort during the periods in Option 1 and Option 2.

Public Outreach Elements

Planning

- Program Overview :
  EC shall prepare a Public Outreach Overview which shall provide an up-front "visual look" at the program, its proposed strategy and each planned activity and its intended purpose. The Public Outreach Overview will be reviewed and approved by the Railroad. Continual review, feedback, and assessment shall be part of the program.

- Public Outreach Schedule:
  EC shall develop a plan and schedule for the various public outreach elements as they relate to the overall EIS schedule. Sufficient lead time needs to be provided for the Public Outreach Schedule to ensure that the intended results of each planned outreach effort are achieved. The Public Outreach Schedule shall be developed early in the project, provided to the Railroad for review and comments, and modified as required by the EC. The public outreach schedule is expected to be a dynamic document which will need to be updated and adjusted as conditions dictate. The Railroad will provide the EC with formal notification to proceed with each Public Outreach activity and/or element.

- Tour of the Proposed Alignment Site:
  LIRR shall arrange for tours with elected officials and interested parties, as necessary. Site visits should commence right after scoping meeting dates are secured. For project estimating purposes, the EC shall assume that at least two (2) tours will be needed and shall contract for transportation, as necessary, for each tour.

- Scoping Meetings:
  EC shall arrange for, schedule and pay for the rental of a meeting place, with the necessary audio/visual equipment, and chair rental, if necessary. For estimating purposes, an allowance for up to two (2) public scoping meetings shall be assumed that the EC would attend.

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Tracking of Information

- Project Updates:
  EC shall document and prepare updates for the work being performed for the EIS. Updates may include summaries of current and planned work (i.e studies and alternatives being considered), work performed, meetings planned and held, and progress achieved to date and shall be suitable for incorporation into both digital and print materials.

- Advertising:
  EC shall support the LIRR by providing for outreach in the study area to use local papers to advertise scoping meetings. The EC shall develop advertisements for the MTA to contract for advertisement space, to be determined by LIRR Public Affairs, at least three (3) times during the scoping process.

Outreach Media

- Invitation Letters and Scoping Packet Material:
  EC shall prepare invitation letters and scoping packet material for the scoping meetings. The timing for the mailing shall be such that it will provide for a minimum of four (4) weeks notice prior to meetings. The EC shall assume that up to six (6) mailings will be required.

- Mobile Displays:
  EC shall support the LIRR in the development of mobile displays, which may include print material as well as video, animation, social media, and other visual media to discuss, inform, educate, encourage participation and solicit comments from community members, various stakeholders, and commuters. The displays will be utilized by the LIRR at various stations along the Main Line Branch during the AM & PM rush.

- Posters:
  EC shall prepare a poster suitable for mounting at ten (10) stations/terminal(s). The poster shall briefly describe the project with a map and identify the project details.

- Seat Drop Brochures:

EC shall support the LIRR in creating brochures, flyers, and/or cards for LIRR to place on seats. It is anticipated that these materials would inform people of key events, project milestones, and update the project status.

- Website:
  EC shall develop website material for the LIRR to install on the project website. The website shall be updated throughout the life of this project, with new material as the EIS process progresses. Information on meeting dates, times and locations shall be featured.

- Photography:
  EC shall take professional photos of typical new track alignments, roadway grade crossing closures and roadway grade crossing separation projects.

- Variable Message Signs:
  EC shall contact NYSDOT to lend signs to the LIRR, so that information regarding scoping meetings can be placed on major roads, to increase public awareness of the planned project.

Outreach Contacts

- Bulk Mailing:
  LIRR shall develop a mailing list for property owners within one mile of the LIRR Expansion corridor and have appropriate bulk mailings sent out. The mailings shall contain material regarding the scoping phase of the project. This should include a brochure and a fact sheet about the environmental review and the EIS processes.

- Information in Libraries:
  EC shall send all scoping packet and aerial map information to local libraries. EC shall assume that ten (10) local libraries will be involved.

- Meetings with Local Community Groups and Associations:
  EC shall identify and contact local Community Groups and Associations within the study area. EC shall prepare for and attend meetings, as needed. For estimating purposes, EC shall assume that they will be asked to attend ten (10) meetings and shall be prepared to attend additional meetings as needed.

- Project Newsletter:
  EC shall support the LIRR in preparing a project newsletter. It will highlight the benefits and needs of the project, potential significant adverse impacts and mitigation identified in the EIS, critical milestones, and it will contain specific information regarding upcoming scoping meetings. The newsletter is to be produced quarterly and should be in a format suitable for digital and print media, to be distributed by the LIRR.

- Ongoing Outreach to Elected Officials:
  EC shall prepare for and attend meetings with LIRR project personnel, and briefings with elected officials. For estimating purposes, the EC shall assume that their presence at twenty (20) meetings/briefings will be required.

### 3.3 MTA Coordination

All public outreach activities and meetings or hearings with county and local governmental or citizen groups will be initiated and coordinated through LIRR and MTA, in accordance with MTA Public Outreach Procedures and Requirements.

### 3.4 Completion of Scoping

The EC shall coordinate and complete the scoping process initiated with **Task 3.1**. The process will include the following elements:

- Participation of affected Federal (if any), State, and Local Agencies, and other interested parties
- Determination of the scope of work and significant issues
- Elimination of insignificant issues
- Allocation of assignments in the preparation of the EIS
- Identification of other environmental review and consultation requirements
- Indication of relationship between the timing and the analyses, agency planning, and decision-making schedule

### A. <u>Other Outreach Services</u>

#### A.1 Community Information Center (CIC), as directed by LIRR

- Identify suitable space/potential locations
- Administer and manage the CIC
- Staff the facility
- Maintain the facility (including cleaning services, utilities, security, fire protection and lease payments)
- In coordination with MTA and LIRR Public Affairs staff, develop and manage production of content/programming: displays, exhibits, interactive exhibits, etc.
- Determine and coordinate information center activities and events
- Conduct tours, education events, community meetings, and other programming/activities to be determined
- Create and maintain information center website
- Deliverables: Staff and maintain CIC and all related activities.

#### A.2 Graphics Support

- Provide graphics support for CIC exhibits, promotional materials, signage, public workshop materials, store vacancy reports, and other requests pertaining to the Main Line LIRR Expansion Project public outreach.
- Create and update signage, business cards, construction maps or other print materials as needed.

- Deliverables: Graphics support for CIC exhibits and other project initiatives as needed.

**A.3 Community Visioning**

Develop, update and execute a community outreach plan, which includes the following:

- On a continuing basis, review current outreach strategies and conduct research to identify how to communicate more effectively. Develop content to address community concerns, potential impacts, and discuss the benefits of the project
- Develop content for outreach methods

**TASK 4: Topographic, Planimetric, and Property Boundary Surveys (Base Work and Option 1)**

The EC shall conduct a detailed planimetric, topographic, and LIRR ROW boundary survey to locate the third track and other construction elements in relation to adjacent properties. This task will include enough survey to support the EIS in the Base Work followed by survey for preliminary design to prepare design build documents in Option 1.

See **Attachment "A"** for a description of this work.

**TASK 5: Preliminary Design Plans and Preliminary Cost Estimates (Option 1)**

The EC shall develop three (3) preliminary designs consistent with the alternatives from **Task 2 and Task 4,** incorporating comments received from **Task 3.** The EC shall advance LIRR's preferred sketch plan of the alternative third track alignment and associated modifications/additions to: bridges, structures and to adjacent properties to the Railroad ROW, on both the north and south sides, and for other elements to a maximum preliminary design level permitted by SEQRA. In addition, recommendations for roadway grade eliminations (through separation and/or closure) and traffic mitigation improvements are to be developed as concept designs and have preliminary cost estimates prepared. These plans shall be consistent with **Tasks 2 and 4** and should include, but not be limited to; the following (**subtasks 5.1 through 5.13**):

**5.1 Utility Relocation**

Existing utilities, including third rail power, fiber optics, substation feeders, signal, and communications lines, are either located along the ROW or transverse to it at the street crossing locations. Utilities traversing overhead and underground utilities along the ROW consist of: PSE&G lines, Western Union lines, LIRR power, third Rail power, fiber optics, substation feeders, and signal and communication lines. Utilities traversing the ROW consist primarily of telephone, water, gas, sewer, storm water system, cable TV, and electric lines. The utilities that interfere or would not be accessible due to the expansion of the track bed for the third track installation will have to be relocated to an accessible location.

**5.2 Property Acquisition and Retaining Walls**

To minimize commercial property acquisitions and avoid residential property acquisitions, existing fill slopes may be eliminated and retaining walls installed to increase track bed within the ROW.

## 5.3 Stations

The EC shall analyze the following six (6) stations to identify any modifications needed, including pedestrian overpasses/underpasses, to accommodate the installation of a third track:

- Floral Park Station
- New Hyde Park Station
- Merillon Avenue Station
- Mineola Station
- Carle Place Station
- Westbury Station

## 5.4 Track Work

Track work includes: all rail, ties, ballast, sub-base, mechanical and electrical connections, switches, and crossings. All track work required for Railroad service will be installed and electrified to accommodate the LIRR's standard third rail current collection system for its electric cars. New track shall be continuous welded rails supported by concrete ties. Switches shall also be supported by concrete ties. All track work configuration shall conform to MTA - LIRR M. of W. Standards, MW-1 Drawings, LIRR CE-1 Drawings, and AREMA Specifications.

## 5.5 Bridges

The approximately eighteen bridges along the route from Floral Park Station to Divide Tower (Hicksville Station) will require condition assessment and may require modification to accommodate the third track. The need for potential modifications shall include, but not be limited to, installation of support abutments, bearings, bridge members, cribbing retaining structure, retaining/ wing walls, and installation of catwalk with railings.

## 5.6 Roadway Grade Crossings

The seven roadway grade crossings (as noted in Background section) will be reviewed for elimination with community input and consultation in connection with the project. The EC will coordinate with NYSDOT for grade separation design performed by NYSDOT, or their consultants. It is assumed that the bulk of the design will be performed by NYSDOT or their consultant; however, the EC will incorporate the NYSDOT design into the LIRR Expansion Project documents, as directed by the LIRR.

The development of preliminary design plans and preliminary cost estimates will be based upon a preferred alternative that contemplates the elimination of all roadway grade crossings through grade separations and/or closures. The EC shall also identify the construction impacts of each alternative and possible mitigation measures for various grade crossing approaches. <u>The details of the preferred alternatives shall be determined based on community input and consultation.</u>

In support of the community consultation, the EC shall coordinate traffic studies conducted by NYSDOT, or their consultants, the results of which shall be provided to the affected communities. Since there are three (3) clusters of roadway grade crossings, or three study areas, a combination of short term and long term traffic impact mitigation measures/options need to be evaluated for each.

<u>Conduct Traffic Impact Study and Identify Mitigation Measures (by others)</u>

A vehicular traffic impact study shall be conducted for each of the roadway crossings by NYSDOT or their consultant, to determine the following: a) the vehicular traffic impact to roadways at and nearby

each crossing, b) the impacts to traffic flow in the general area of the roadway crossing where there is a potential for the traffic to be back-up into local communities/business districts etc., and c) the cumulative effect on traffic from one crossing to another, if any.

The traffic impact study described above shall include collection of existing traffic data consisting of 6-9 AM and 4-7 PM peak three-hour counts at each of the intersections, as well as 7-day Automatic Traffic Recorder counts, at locations to be mutually agreed upon with LIRR.

The data from the traffic counts will be used to determine existing base conditions for peak AM and PM hours. Future traffic volumes shall be forecasted under a "Build" scenario (which assume the Project is completed) and a "No Build" scenario (which assumes the Project is not undertaken). The No Build analysis will form the baseline for a comparison to understand the impact of the Project. The EC shall evaluate projected traffic, parking, and pedestrian impacts on the current intersection levels of service in the study area and recommend traffic improvements to both north and south of the Railroad ROW to mitigate any significant adverse impacts identified.

The number of intersections requiring analysis shall be determined in accordance with engineering judgment and accepted practices for traffic impact studies to assess potential closure impacts. The NYSDOT or their consultant, shall request historical-based traffic growth rates on roadway and intersection in the study area from NYSDOT, county and local officials for use in assessing future traffic growth. The future analysis years shall be per SEQRA regulations or accepted practice

The increase in traffic due to other major project(s) committed to being constructed, shall be included as part of the traffic study.

Since multiple roadway grade crossings are being evaluated in close proximity, a combination of mitigation measures/options need to be considered for each crossing during construction and at project completion, including: traffic control improvements, traffic re-routing, roadway grade crossing separations, and roadway grade crossing closures.

The project team will examine new and emerging technologies that might help to reduce noise and vibration associated with railroad operations.

Mitigation measures will all be planned and undertaken as part of a very extensive community engagement effort. The EC will listen to the needs and interests of the surrounding community residents and consider the project mitigation measures that the community identifies.

<u>Detailed requirements for the three (3) study area traffic studies shall be as follows:</u>
NYSDOT or their consultant will conduct data collection and an inventory of existing roadway and railway grade crossing conditions and document these in a report. This data will be the main source of reference for benchmarking, future studies and improvements, as may be warranted.

To create the traffic report of current existing conditions and traffic volumes, the EC will research and/or collect crossing data, at a minimum, in the following categories:

- Geometry and other Physical Conditions
- 24-Hour Roadway Crossing Traffic
- 24-Hour Gate Activation
- Select Turning Movement Counts and Queue Lengths
- Accident Data

NYSDOT or their consultant will also analyze the data and evaluate each crossing using generally accepted traffic engineering and railroad practice. Criteria used will be suitable for rating and ranking each crossing against the others. In its proposal, the EC will explain the methodology and rationale proposed for the rating and ranking.

**5.6.1 - Geometry and other Physical Conditions**
NYSDOT or their consultant will use available media, field measurements, aerial photos and select GIS layers from the LIRR GIS database and other sources to collect basic geometry and physical conditions of all crossings.

**5.6.2 – 24-Hour Roadway Crossing Traffic and Gate Actuation Counts**
NYSDOT or their consultant will place vehicle count machines at all crossings for a period of 7-days during the season of typical traffic flows. Data will be collected by direction and tabulated in accordance with acceptable practice. Peak hours will be identified by direction. The EC will also count, concurrently, the time of day and duration of gate actuations. Note that this data may be extracted for certain crossings from the hardware/software equipment controlling the gates.

**5.6.3 – Select Turning Movement Counts & Queues – High Volume Crossings Only**
Select vehicle turning movement counts will be conducted for two consecutive hours in the AM and in the PM peak periods. Concurrently, the longest lengths and frequency of vehicle queues will be recorded at the intersection approaches and at the crossing gates. Turning movement counts will be made only on the downstream intersections for vehicles that cross the tracks, i.e. the approach away from the crossing. Intersection locations are limited to within 1,000 feet downstream from the crossing, in each direction. To qualify, these intersections must also be downstream from a High Volume crossing, as classified in Task 5.

NYSDOT or their consultant will conduct data collection at High Volume crossings of elements and characteristics also required as field input by VISSIM Traffic Simulations Software. Simulation for one High Volume crossing will be prepared in VISSIM for proof of concept and compared with field data such as length and frequency of traffic queues.

**5.6.4 – Research and Tabulation of Crossing Accident Data**
NYSDOT or their consultant shall research and summarize/tabulate accident data directly related to the crossing operations. Motor Vehicle Accidents (MVAs) not at or not likely affecting the gate operations and train movements are excluded. The research is limited to a 5-year look back period and shall include, but not limited to, LIRR's own safety databases. Development of collision diagrams is not considered part of this TSOW.

### 5.6.5 – Analysis, Rating and Ranking

NYSDOT or their consultant shall evaluate the 24-Hour count data and classify each crossing as a) High Volume or b) Low Volume crossing. The specific criteria and cut-off values will be developed after all 24-Hour data is collected. For the study, the EC will rate and rank key variables at each location. In its proposal, the EC will explain the methodology and rationale proposed for the rating and ranking. It is not the objective of this analysis to identify deficiencies or recommend improvements – However, the data collected shall be sufficient to allow for subsequent evaluation of deficiencies and recommend crossing related improvements in traffic flow across the tracks.

### 5.6.7 – Emergency Vehicle Routing Analysis and Community Response Times

NYSDOT or their consultant shall evaluate qualitatively the preferred Build condition for changes to emergency vehicles routes across the LIRR tracks. The evaluation will include increase or decrease in emergency vehicle response times from the nearest firehouses and hospitals as result of the preferred improvements.

### 5.6.8 – Public Agency Coordination

The NYSDOT's studies of grade crossing traffic analyses and improvements will be coordinated with other local and state agencies in accordance with accepted practice. The EC will assist LIRR in providing the information as provided by NYSDOT in LIRR's Public Agency Coordination effort.

## 5.7 Structures

There are approximately ten (10) signal bridges affected by the installation of the third track. Some of the signal bridges might be eliminated, relocated or require redesign. All signal structures along the route that interfere with the third track installation will have to be relocated. The EC shall assess all structures that may be affected by the third track.

## 5.8 Interlockings, Crossovers, and Sidings

- The interlockings at Nassau (N2) and Divide 1 (D1) will be expanded to include the third track.
- High speed Cross-Overs at existing locations on the Main Line will be expanded to include third track, east of New Hyde Park Station (Nassau 1 Interlocking (N1)) and east of Nassau 3 Interlocking (N3). An additional Cross-Over on the Hempstead Branch will also be included.
- The third track must accommodate a connection with reverse operation capability from the Main Line to the Oyster Bay Branch east of the Mineola Station.
- There are numerous sidings on the Main Line from Floral Park to Hicksville. Coordination with MTA Real Estate on the lease agreements for these sidings will be required.
- The third track tie-in begins at the east end of Floral Park Station.
- Note: Hicksville North Siding Improvements is currently under design.

## 5.9 Power

- Third rail power distribution, overhead and signal power will have to be modified to accommodate the additional requirements of the third track.
- All existing power lines, conduit, and duct banks that interfere with the alignment of the third track will require relocation.
- Evaluate existing and proposed Traction and Signal Power loads during the preliminary design process.

### 5.10 Substations

Eight (8) substations may be affected by the installation of the third track. The EC shall study the following substations to determine if they may require modification.

- G-13, Floral Park
- G-14, New Hyde Park
- G-15, Garden City
- G-16, Mineola
- G-17, Carle Place
- G-18, Westbury
- G-19, New Cassel
- G-20, Hicksville

### 5.11 Communications

- Provide relocation of public address system for station buildings and platforms
- Provide relocation of existing fiber optic and cable feeds during new third track construction
- Install communication cables and equipment for any Ticket Vending Machine (TVM), Passenger Information Display System (PIDS), Closed Circuit TV (CCTV) systems, and Audio-Visual Information System (AVIS) where applicable
- All under platform cables and wire trays to be tested for hazardous materials and abated; then relocation to permanent protective enclosures
- Relocate existing "T" boxes during construction and install in permanent locations where applicable.

### 5.12 Signal System and Signal Block Tower

- Signal system requirements for the third track installation and existing track relocation will include reverse signaling
- Signal modifications are required for design of existing roadway grade crossings to support the third track
- Signal cable requirements will be assessed and determined
- Nassau Tower is to be eliminated and control switched to a facility to be determined. The control functions are scheduled under another project.

### 5.13 Other

Fencing for the ROW, including security fencing for temporary construction locations, will be required.

Preliminary order of magnitude cost estimates (+ or-25 %) shall be developed based upon unit prices with sufficient analysis documented to establish unit and lump sum prices, as necessary. Estimates shall be consistent with FTA requirements for alternative analysis, including indirect engineering and project management costs, with appropriate contingencies. The cost estimates shall assume all roadway grade crossings are either separated or closed.

At a minimum, the following references will form the basis of the design effort; however, other specifications, standards and regulations may also apply, per Task 11.1:

- AREMA and AASHTO Standards
- Federal ADA Guidelines and Standards
- LIRR CE-1 Specifications, and M.W. 1 Drawings and MW 2000 Standards
- Engineering Guidelines - CE1 Drawings and Specifications
- Station Design Guidelines
- Maintenance of Way - 2000
- Signal Engineering Operations Manual (SEOM)
- LIRR Standards and Typicals
- LIRR CADD Standards (LIRR Department Specific)
- Signal RMS-201
- Communications C.S. 223

### 5.14 Deliverables

Twenty (20) draft and fifty (50) final copies of Technical Memoranda which shall include a description of the work of each alternative, cost estimate, and Preliminary Design drawings, including:

- Provide preliminary design layouts for the new LIRR Expansion Project third track with any needed modifications to the following: stations and platforms, switch points, third rail connections, bridges, and structures
- Provide design elevations which reflect a preliminary level of design
- NYS DOT, or their consultant, will develop vehicular traffic plan. The EC shall include this data into the Technical Memoranda.
- Determine the extent of security measures necessary to permit safe usage of the proposed third track
- Develop a site drainage plan including recommendations for the type, approximate size and location of retention and storm water management facilities
- Provide preliminary plans for construction staging and landscaping
- Provide plans for any off-site mitigation
- Provide plans for landscaping/fencing

Deliverables format:

- Drawings shall be submitted at a scale of 1”=30' on 24” x 36", 0.0003" minimum thickness vellum sheet, and matte finish on both sides. Suitable quality ink intended for use on vellum shall be used for all drawings.

- Final drawings shall be submitted on CD ROM disks in the latest version of AutoCAD to be specified by the Railroad.

## TASK 6: Line of Sight Survey/Renderings

### 6.1 General

The work shall consist of the following:

### 6.2 Site Surveys

The EC shall visit the Railroad Main Line from Floral Park to Hicksville along the route of the third track

Alignment Concept and perform line of site surveys, take photographs and other associated tasks to support the generation of the renderings. The purpose of the site surveys is to determine the visibility of the third track and appurtenances with respect to adjacent communities considering the topography, trees and proposed landscaping (trees, berms, etc.) to minimize any adverse visual effects of the proposed project.

### 6.3 AutoCAD Three Dimensional Sketches

The EC shall develop AutoCAD three dimensional (3D) sketches of the third track within the existing ROW, retaining walls, and associated bridge and structure modifications. The 3D sketches shall be submitted to the LIRR for review and approval. Upon LIRR approval of the sketches, the EC shall advance the sketches to renderings.

### 6.4 Site Renderings

The EC shall prepare up to twenty (20) individual color artistic renderings of the proposed alignment and associated bridges and structures modifications/additions in relation to the existing neighborhoods and roadways. The EC may provide artistic renderings, computer aided renderings, enhanced photographs or combination thereof. Renderings will be full size drawings, E size, mounted on boards.

### 6.5 LIRR Expansion Alignment Views

- Provide plan views from Floral Park station to Mineola and Mineola to Hicksville. The purpose of these views is to show entire alignment.
- Provide line of site views looking at the track from a direction approved by the LIRR. Line of Site views should be for critical areas, e.g., grade crossings, station interfaces, interlocking tie-ins, etc.
- Provide cross-sectional views of the track from a direction approved by the LIRR.
- Within the previously mentioned views and as appropriate, including, but not limited to: Provide a Video Simulation of the proposed new track alignment incorporating the third track from Floral Park station to Hicksville.

  *Note*: All alignment views shall take into consideration the following: the entire ROW including Main Line 1, Main Line 2, and Main Line 3 Tracks; cross-over to the Oyster Bay Branch; stations, platforms; pedestrian overpasses; bridges, structures, site utilities, retaining walls, sound walls and parking areas.

## TASK 7: Phase I – Environmental Site Assessment

The EC shall conduct a Phase I - Environmental Site Assessment for selected commercial properties along the ROW or at grade crossings potentially impacted by the LIRR Expansion project, including a primary focus on the goal of minimizing such impacts. Unit costs for all properties shall be included in the EC's cost proposal. The work of this Task will advance only upon approval of LIRR's Project Manager.

See **Attachment "B"** for a description of this work.

**TASK 8: Phase II – Environmental Site Assessment**

Should it be determined from **Task 7**, that additional investigation will be required on a specific piece(s) of property; the EC will conduct a Phase II - Environmental Site Assessment for the selected properties. ***Costs for this work for all sites/properties requiring further investigation shall NOT be included in the EC's cost proposal.*** **The Railroad may request this work to be performed by the EC at a later date.**

See **Attachment "C"** for a description of this work.

**TASK 9: Final EIS Scoping and EIS Documentation**

**9.1 General**

The EC shall prepare and file a final EIS Scope of Work in accordance with applicable regulations. The EC shall incorporate all applicable relevant research and investigative information per the final scoping document into the EIS. The EC will prepare the Draft EIS (DEIS), coordinate and implement the public review and hearing process, document, evaluate and address comments received, complete the Final (FEIS) and provide support through the approval of the FEIS and the issuance of a final decisional document as applicable.

**9.2 Purpose and Need/Scoping**

The EC shall develop a clear, concise statement of purpose and need for the project. The purpose and need will form the basis of the Scoping documents and assist in the evaluation of alternative alignments.

The statement of purpose and need shall be finalized in advance of the commencement of Public Outreach activities (Task 3).

**9.3 Draft EIS**

The EC shall prepare a Draft EIS (DEIS) that conforms to all government regulations, criteria, standards, and guidelines applicable to the performance of an environmental review under SEQRA.

The EC shall define the proposed action impacts, analyze the identified impacts (utilizing appropriate methodologies), identify alternatives and any additional impacts and develop mitigation measures for the alternative impacts consistent with the final scoping document.

The EC shall describe the probable beneficial and adverse consequences of the action and preferred alternative and discuss measures that could be taken to avoid, minimize or mitigate any significant adverse effects. The analysis shall cover all aspects of the natural and human environment to be affected by the preferred alternative.

Technical areas to be evaluated and analyzed in the EIS shall include but is not limited to the following:

- Purpose and need for the proposed action
- Ridership study data will be provided to the EC. The EC shall not develop a ridership forecasting model as part of this project
- Project alternatives

- Land use, zoning and public policy/social conditions/neighborhood character/community facilities
- Socioeconomic effects
- Visual character
- Historic and archaeological resources
- Natural and water resources
- Parks and recreation
- Contaminated materials
- Infrastructure and utilities
- Energy and greenhouse gas
- Vehicular traffic, parking and pedestrian impacts
- Air quality
- Noise and vibration
- Construction impacts
- Other issues, as may be appropriate, for environmental review under SEQRA regulations and guidelines.

The DEIS chapters and technical memoranda shall be submitted to the LIRR, MTA and NYSDOT for evaluation and review. The EC shall incorporate LIRR, MTA and NYSDOT comments following a review with LIRR.

**9.4 DEIS Public Notification and Hearing Process**

The EC shall prepare and distribute a public outreach letter, if required, explaining the purpose and need of the LIRR Expansion project and the criteria to be used and process to be followed to assess potential significant adverse impacts of the project. The EC shall arrange for, schedule and pay for the rental of a meeting place, with the necessary audio/visual equipment for up to ten (10) public outreach meetings, of which the EC shall budget for up to 2 public hearings. The process will comply with MTA procedures and SEQRA requirements.

Upon completion of the DEIS, the EC will support the public notification and hearing process as required. The EC shall perform all activities required which will include but may not be limited to:

- Publish hearing notices and statements in appropriate newspapers
- Coordinate and attendance at public hearings and meetings
- Preparation and distribution of mailings
- Stenographer's services
- Securing meeting space
- Compilation of questions and comments
- Responses to questions and comments
- Preparation of presentation material
- Technical presentation support
- Develop and maintain project website to assist in public outreach and document distribution

### 9.5 Final EIS and SEQRA Findings

The DEIS shall be revised based on the comments received during the Public Hearing Process and progressed to the FEIS. The responses to questions and comments shall be included in the FEIS document. The draft or preliminary FEIS shall then be submitted to the LIRR, MTA and NYSDOT for evaluation and review. The EC shall incorporate LIRR, MTA and NYSDOT comments following a review with LIRR. The FEIS shall be prepared for public review process and any additional comments received shall be incorporated.

If requested, the EC shall assist in the preparation of draft SEQRA findings after issuance of the FEIS. The draft SEQRA findings shall be submitted to the LIRR for evaluation and review. LIRR will coordinate with MTA and NYSDOT.

## TASK 10: Design Objectives and Criteria (Option 1)

### 10.1 Design Objective

A primary objective of this contract is to perform preliminary engineering and design for the construction elements of a third track and associated infrastructure modifications that will improve the function and operations of the Main Line Branch between Floral Park and Hicksvillle. The preliminary designs and engineering shall be prepared in a manner to support the program implementation as developed during the programmatic planning efforts under this TSOW. Preliminary Drawings, Performance Specifications, Project Requirements and Bridging Documents, and Technical Data suitable for the issuance of an RFP for Design-Build Construction including:

- Civil / Site / Track work / Utilities
- Modifications, if any, to line Structures (Stations)
- Modifications, if any, to line Structures (New and Bridge Modifications)
- Grade Separations (Supporting design for signal modifications shall be provided as part of the final design)
- Power Systems (Traction Power Substation and associated Distribution Systems)
- Long Lead drawings and specifications suitable to support the procurement of long lead elements such as Turnouts, Power and Signal Components
- Utility Relocations to support construction and other elements as determined during the Preliminary Engineering and Environmental process

## OPTION 1 SCOPE FOR ALL DESIGN EFFORTS:

1. Preliminary Tasks for the entire alignment, including:
    a. Abbreviated Survey and Track Alignment Plan
    b. Geotechnical Investigation
    c. Preliminary Design Report
    d. Best Value Report
    e. Constructability Review
2. Design services for Preliminary designs including: track subgrade, retaining walls, culverts, empty conduits and ductbanks, drainage, signal hut foundations, track sub-base preparation, signal system, communications work, track work (including ballast), grade

crossings, electric traction, and electric power; for construction by LIRR F/A, complete with equipment procurement packages for: substation equipment; track switches; signal system design/furnish vendor; signal software developer; signal system PTC developer, and all associated long-lead material.

The Consultant shall perform an adequate amount of investigation and properly study the work required, obtain LIRR approval through the design submittals, and prepare a clear and understandable set of biddable documents (drawings and specifications) that are workable, code compliant, and meet all the requirements of the project as intended by the standards and guidelines established by the Railroad.

The Consultant shall be cognizant that the construction of the Project is to be performed in such a manner as to allow continued railroad operations during weekday peak hours, and summertime weekends, while minimizing disruption and impacts to adjacent roadways and communities. The construction approach must allow for uninterrupted use of the stations and facilities by LIRR passengers during the above periods. In addition, the proposed improvements shall utilize equipment and materials which have been approved and accepted by the LIRR, are of high quality, cost effective, and require low maintenance.

The engineering and design for the proposed work shall consist of the preparation of: design drawings, technical specifications, identification of long-lead items, procurement and bid packages, recommended construction staging and sequencing, construction estimates, and coordination with outside Public Agencies and Utilities. The design shall incorporate construction staging/constructability concerns, input from the community, and LIRR operational requirements.

The design shall evaluate potential safety improvements along the ROW including fencing, drainage, clearance, retaining structures and encroachments.

The Consultant's design shall address the staging of demolition and construction activities in a comprehensive fashion to allow uninterrupted railroad operations as well as passenger use of the station and parking facilities during construction.

**A. <u>References Documents To Be Made Available By The Railroad (following award of contract)</u>**

***(It should be noted that existing drawings may not be all inclusive. Field Surveys shall be conducted by the Consultant as necessary to verify existing conditions and infrastructure.)***

- LIRR Power Study for Main Line
- LIRR Signal Existing Infrastructure Drawings
- LIRR Track Existing Infrastructure Drawings
- LIRR Traction Power Third Rail Existing Infrastructure Drawings
- LIRR Civil/Structural Existing Infrastructure Drawings
- LIRR Design Standards as listed in Section B below

## B. Design Standards

The Consultant shall prepare the design in accordance with the following current standards/guidelines:

- MTA Long Island Rail Road Design Guidelines
  - Station Design Guidelines
  - Maintenance of Way – 2000
  - Engineering Guidelines – CE1
  - Signal Engineering Operations Manual (SEOM)
  - LIRR Standards and Typicals
  - LIRR CADD Standards (LIRR Department Specific)
  - Signal RMS-201
- Guidelines for Preparation of Technical Requirements
- New York State Fire Prevention and Building Code
- New York State Energy Conservation and Construction Code
- National Electrical Safety Code (NESC)
- National Electric Code (NFPA-70)
- National Fire Protection Association (NFPA-130)
- New York State Executive Order 111
- Applicable requirements of the Americans with Disabilities Act (ADA)
- Other applicable Local, State and Federal (most stringent) requirements.
- AREMA – American Railway Engineering and Maintenance-of-Way Association
- SIGNAL CFR TITLE 49 (Code of Federal Regulations)
- APTA – American Public Transportation Association
- CPTED – Crime Prevention Through Environmental Design
- ACI - American Concrete Institute
- PCI – Precast/Pre-stress Design Handbook
- AISC – American Institute of Steel Construction
- AWS – American Welding Society
- CSI - Construction Specifications Institute
- Federal & state with Disability Act (ADA) and other applicable local, state, and Federal requirements
- ASTM – American Society of Testing materials

## C. Other Design Requirements

- Attachment A - TSOW for Surveys
- Attachment B - TSOW for Phase I Environmental Site Assessment
- Attachment C - TSOW for Phase II Environmental Site Assessment
- Attachment D - Geotechnical Investigation
- Attachment E - Project Controls System
- Attachment F - Commissioning, Acceptance, and Maintenance Plan Requirements
- Attachment G - Best Value Analysis
- Attachment H - Special Requirements for Developing an Estimate
- Attachment I - Special Requirements for Consultants Performance Reporting System
- Attachment J - Guidelines for Planning Scheduling and Requesting Track Access

- Attachment K - TSOW for Construction Phase Services (CPS)

**D. Division of Labor**

The Consultant shall identify the construction work to be performed by a 3rd Party Contractor and by LIRR Force Account personnel through the preparation of clear and concise construction documents. The determination of the Division of Labor will be accomplished early on in the Design through the LIRR Project Team's direct interaction with the Consultant, considering items such as the scope/scale of work to be accomplished, relative to the timing and staging of construction, and availability of LIRR forces to perform the work.

All design documents associated with 3rd Party Construction shall be separately packaged from LIRR F/A construction elements.

## 10.2 Design Elements

The following design elements have been outlined to define the project scoping intent and assist in identifying the level of design required by this TSOW.

### 1) Track Work (including Interlockings, Crossovers, & Sidings)

This project will require the construction of new track, either to the south or the north, parallel to the existing double track, between Floral Park and Hicksville. Track work includes all rail, ties, ballast, sub-base, mechanical and electrical signal connections, third rail, substation feeder cables, and switches, as well as, tie-ins to the existing tracks, and grade crossing upgrades. All track work required for LIRR service shall be installed and electrified to accommodate LIRR's standard third rail for its electric trains.

As part of the track alignment and profile design, the Consultant shall connect main track to existing or new interlockings and specify the geometry, size, and locations of switches, turnouts, crossovers, and interlockings. New track shall be 136lb continuous welded rails supported by concrete ties. New Main Line Interlocking switches shall be electrically operated high speed turnouts with moveable point frog (MPF) supported by concrete ties. New Freight and Siding switches connecting to the Main Line shall be size 10 hand thrown T20 electrically-locked spring frog switches, supported by concrete ties; or electrically operated size 10 M23 switches for interlocked controlled sidings. All track work shall conform to LIRR MW-2000, LIRR CE-1, and AREMA standards.

The track design shall include but not be limited to:

1. Assessment of the existing track structure conditions.
2. General plans identifying the track centerlines of Main Line tracks and connecting sidings, top of rail elevations, track layout plan and configuration (showing location and details of switches: point of switch, length of frogs (including heel and toe lengths), frog number/angle, degree of curve and radius, point of switch/frog, cross sections (every 100 feet) with profile elevations of the new track and existing tracks, identification of existing and proposed horizontal and vertical track alignment, critical information, and utility subsurface facilities. Track plans shall contain all pertinent survey data and be tied into

survey controls that will be used for the Final Design and subsequent construction. The plan and profiles shall be identified on the same drawing.

3. The track design layout for all tracks shall be a continuous stationing starting with the lower valuation station as the beginning section starting west and moving east. The profile grade and horizontal alignment of the new track configuration shall be "best fitted' with the existing profile when considering other structure elevations and overhead clearances.
4. The track profile design shall take into account existing platform heights, adjacent platforms, overhead and wayside clearances, and horizontal lateral clearances from the centerline of adjacent tracks. The consultant shall prepare and obtain all required track waivers in accordance with LIRR and NYSDOT requirements.
5. Track centers shall be a minimum of 14 feet on centers and will take into consideration existing and proposed overhead and wayside clearances, and horizontal lateral clearances from the centerline of the existing track or revised configuration. The consultant shall prepare and obtain all required track waivers in accordance with LIRR and NYSDOT requirements.

## 2) Site and Civil Work

The design services for the Site and Civil work shall include the following items: demolition, relocation and construction of retaining walls, embankments, landscaping, fencing, drainage structures, sidewalks, roadways, etc. In addition, location of potential off-site construction staging and lay down areas (which shall be on LIRR land to the maximum extent feasible), access points, on site LIRR F/A HQ's, road closures, and detours shall be identified.

Key activities in this section include:

- **Land Surveying**

  Perform Planimetric, Topographic and property surveys. Survey plans shall be developed by the Consultant locating all physical characteristics of the site including: track centers, switch points, existing structures (bridges, buildings, platforms, retaining walls, etc.), underground and above ground utilities, roadways, etc., and all mapped information such as property boundaries, edge of ROW, easements, etc.

- **Geotechnical Investigation**

  The design shall require a comprehensive geotechnical investigation including soil and other testing to determine proper designs for track, foundations, new structures e.g., new platforms, retaining structures, LIRR equipment and utilities, and appropriate support for existing structures.

- **Existing Conditions**

  Plans, elevations and cross sections shall be developed locating existing infrastructure elements including, but not limited to: track, retaining walls, embankments, fencing, drainage structures and lines, sidewalks and roadways.

- **Drainage**

  Existing and proposed drainage shall be identified on the drawings. Drainage system configuration changes due to the new construction shall be identified on the drawings with all interconnects clearly defined by stations. Drainage details shall identify inverts, gradients, and standard cross sections of ditches and other structures. Surface drainage to and from railroad tracks, including existing patterns, high water marks, and percolation, shall be identified. The Consultant shall recommend and design for the best scenario to remove water from the LIRR ROW, identifying any existing drainage deficiencies, and providing a design for their elimination.

- **Proposed Construction**

  Plans, elevations and cross sections, details and specifications shall be developed which identify the relocation of existing work elements and the construction of new work elements.

- **Retaining Walls**

  Retaining walls may be required along the outside of the new track area to eliminate additional land area acquisitions needed for sloped embankments; for new signal huts/cases and cable troughs; to meet the surrounding grade; and in locations where the tracks are either elevated or depressed compared to the surrounding land. Architectural treatment on retaining wall exteriors (facing the community) for aesthetics shall be considered.

- **Fencing**

  Fencing for portions of the ROW, as well as, temporary security fencing for construction locations, may be required, and shall be addressed accordingly.

**3) <u>Utility Relocation</u>**

Existing overhead and underground LIRR and non-railroad utilities, including third rail power, signal power, fiber optics, substation feeders, signal, and communications lines, are either located along the ROW or traverse to it at grade crossing locations. Utilities traversing overhead and underground along the ROW consist of: PSE&G lines, LIRR power, third rail power, signal power fiber optics, substation feeders, and signal and communication lines. Utilities traversing the ROW consist primarily of telephone, water, gas, sewer, storm water system, cable TV, and electric lines. The Consultant shall identify all utilities that interfere with or would not be accessible due to the expansion of the track bed for the third Track installation; and shall determine new locations for such utilities that are suitable to both the Railroad and the specific utility company involved, so as to maintain existing easements. As part of this design, the Consultant shall coordinate with non-railroad utilities and develop a conflict table identifying which utilities will require relocation, and which utilities will require support and protection. The Consultant shall support the LIRR in developing Utility Agreements as required.

**4) Stations & Structures**

The stations within the project area may require various modifications to accommodate the installation of a third track. The EC shall study all station components.

At all stations where improvements will be made, accessibility shall be preserved or improved, including new or relocated stairs, ramps and sidewalks between platforms and existing street-level pedestrian facilities.

The following structural items may require modification/relocation/re-construction to accommodate the installation of a third track:

- Signal bridges, some of which may need to be eliminated, relocated and/or require redesign.
- Signal structures along the route that interfere with the third track installation will have to be relocated or reconstructed.
- Under grade and over grade bridges, retaining walls, general site appurtenances, railings, etc.

The Consultant shall coordinate with PSE&G regarding power needs and service drop locations.

**5) Bridges, Viaducts, Underpasses, and Culverts**

The Consultant shall review the LIRR existing condition assessment documentation of all bridges, viaducts, underpasses, and culverts along the route; and shall identify and design any required modifications to this infrastructure to accommodate the Third Track.

**6) Mechanical and Electrical**

Within the project limits, work may be required at station buildings, platforms, overpasses, structures, signal locations, and grade crossings which will involve mechanical and electrical work. The Consultant shall identify the work required, and the location of all interface points for connection to LIRR equipment and facilities. The Consultant shall coordinate with PSE&G, Verizon, and other applicable non-railroad utilities to identify all interface points within their facilities.

**7) Substations, Traction Power, and High Tension Work**

The new Third Track is within existing electrified territory. Modifications to the existing electric substations, third rail distribution (underground and overhead), and signal power will be required to accommodate the additional load requirements placed by the Third Track. Modifications may include upgrades to breakers, additional DC traction breakers, additional duct lines, third rail upgrades, etc.

All design services shall be consistent with the LIRR's most recent Power Study.

All existing power lines, conduit, and duct banks that interfere with the alignment of the third track will require relocation.

All plans and specifications shall be prepared in accordance with AREMA, NESC, NEC and LIRR CE-1 standards.

The Consultant shall identify the locations/interface points from which primary/secondary power will be delivered to LIRR Signal Power System and traction power third rail. The third rail conductor uses a 750 V DC traction power supply and negative return system. The power supply shall be integrated with the new track configuration and signal huts. Power service for the new CIH's shall be coordinated with PSE&G.

Substations and existing traction power duct banks must be investigated to assess if any relocation, repair, or addition is required.

The Consultant shall provide engineering and design services to support, but not limited to the following, though only to the extent necessary for a design-build procurement:

1. Provide Site and Cable Plans which identify routes and cover, develop design drawings identifying existing duct banks and new duct banks with cables or modifications of existing ducts and cables as necessary.
2. Design details for all construction materials and related site work. Details shall include staging plans, elevations, foundation plans, excavation plans, new duct banks and/or modifications to the existing duct bank details, and other work as necessary.
3. Design details for the outgoing DC positive traction power feeder cables and associated third rail connections, negative return cables, and dead rail indication (DRI) cables.
4. The Consultant shall identify all the necessary materials including transformers, cable, additional DC breakers and protection relays that require procurement. LIRR will determine, during the design development, if LIRR will procure the necessary materials.
5. Design details for additional impedance bonds and negative return reactors as necessary, to maintain the integrity of the traction power and signal systems. Specifications for LIRRs negative return reactor will be provided to the Consultant, if necessary.
6. Design details for all associated Remote Terminal Unit (RTU/SCADA) equipment and interconnections within the substations. Details on interconnections to the existing copper based plant shall be included.
7. Location of and design details for new Sectionalizing Switches for the Traction Power Feeders in the new interlockings and existing sectionalizing switches. Identify and specify new controls to be incorporated for the new interlockings and new electrically operated third rail sectionalizing switches from substations.
8. Design details for negative drainage and the cathodic protection of any critical metal pipelines in the area of the substations.
9. Engineer and design signal power transformers to feed the new CIH's. The existing signal power system shall be evaluated to ensure whether it can handle the additional signal loads.
10. Design of all control wiring and protective relays for the existing DC switchgear spare cubicles at all associated Substations.

11. Design of a DC breaker transfer-trip system as required to include the necessary communication infrastructure.
12. The Traction Power negative return system shall be evaluated with an in-depth engineering analysis on rail to ground (touch) potential. The Study shall include consideration of Substation outages.

**8) Communications**

Existing communication systems will need to be modified which include the following work:

- Provide capability for new public address system for the future station building and platforms.
- Provide relocation of existing fiber optic and cable feeds during project construction.
- Install communication cables and equipment for any Ticket Vending Machine (TVM), Closed Circuit TV (CCTV) systems, and Audio-Visual Paging System (AVPS) where applicable.
- All under platform cables and wire trays shall be tested for hazardous materials and abated, then relocated to permanent protective enclosures.
- Relocate existing "T" boxes during construction and install in permanent locations where applicable.
- Identify all communications system related interferences and potential relocations (i.e., troughs, conduit systems, poles)

The Consultant shall incorporate as part of the Preliminary Engineering and Design for this project, all LIRR Standards relative to Communication Systems.

The Consultant shall provide engineering and design services to support, but not limited to the following:

1. Evaluation of the existing LIRR communication system and standards.
2. Incorporate signal, communications, and circuit cable systems into the design drawings identifying the existing and new work. The new signal communication network shall interface with the existing communication network using new dedicated fiber.
3. Necessary communications infrastructure for Traction Power Substations DC Breaker transfer-trip system.
4. The Consultant shall design a fully integrated communication system guaranteeing seamless system performance for the new track configuration, including all necessary materials, interface for each version and/or system, addition, modification, and testing requirements.

**9) Signal Systems**

Modification, replacement or rehabilitation of the existing signal system to support the Third Track installation will be required. This shall include: signals, signal bridges, switches, switch heaters & cases, signal cables, impedance bonds, poles, signal/communication lines, duct banks, signal huts, cases, and signal tower components.

The signal system requirements for the Third Track and existing track shall incorporate LIRR

Block Signal System Rules 261 & 410 which includes signaling for trains in either direction and Automatic Speed Control (ASC).
The existing relay based signal system shall remain in operation during construction, with temporary modifications, as required, to support construction staging. The design shall include necessary modifications to the proprietary software and display of the signal supervisory system in the Towers, associated with completion and cut over of each major field side segment. When an entire construction stage of the Project is completed, the modified/added signal system shall be tested prior to cut over, and replace the existing signal system.

The signal design shall be developed in a manner such that installation causes minimal impact on train operations. The Consultant shall develop staging plans that will allow the new interlocking/track construction to be phased-in with minimum impact to the LIRR operations.

The signal design shall include detailed signal circuit plans incorporating the track and signal layout (TSR's) – which includes the routes, ASC codes and aspects for the new signal system, vital and non-vital hardware plans, vital and non-vital software logic, vital and non-vital revisions to the current system, detailed track plans, cable plans, processor layout and architecture, rack layouts, terminal board layouts, staging plans, tie-in plans, an "Order of Magnitude" of the type and number of FRA/LIRR required pre-tests and cutover tests as per design and the necessary plans and specifications for huts and cases for the procurement of equipment by LIRR or others. The designs plans and specifications shall be ready for independent check by LIRR or another Consultant, according to Signal standard operating procedures. The new signal system shall interface with the signal supervisory at the Tower.

The Consultant will be provided with current LIRR specifications of huts, cases, switch heater cases, and local control panels in Construction Specifications Institute (CSI) format on CD ROM. The Consultant shall update them to reflect the recommended correct sizes of the huts/cases, name of interlockings, and any additional features in the new designs. After checker review and comments are incorporated, the intent is for the specifications to be forwarded to procurement with no additional engineering required.

The design shall include necessary modifications to the proprietary software and display of the signal supervisory system in the Tower, associated with completion and cut over of each major field side segment. The design shall include software logic, drawings, specifications, calculations, bills of materials, code and aspect plans, point assignments, routing plans, and procurement documents.

Signal system requirements include but are not limited to the following:

1. The design shall be equipped to support the LIRR's planned PTC system.
2. The signal design shall incorporate LIRR RAS Color Light system.
3. The signal design shall consist of 100 Hz track circuits and ASC.
4. Designs shall include express cables as required for traffic circuits. Express cables will be direct buried or aerial by LIRR.
5. Interlocking CIH's shall include hardwired local control panels. Local control shall be limited to the interlocking area where the CIH is located.

6. The new signal communication network shall interface with the existing communication network using new dedicated fiber.
7. The design shall consist of the LIRR's typical traffic system between interlockings. In addition, the design shall allow traffic to be reversed manually during perturbed situations, from either end interlocking (allowing for one individual to manually reverse traffic for the block from one end only).
8. Interlocking CIH's shall be equipped with standalone event recorders or shall provide event recording/monitoring from the interlocking processor. .
9. Power for the new Interlocking CIH's will be from localized commercial utility drops for 60Hz hotel power, and provided by LIRR utility drops for 100Hz Signal Power. Design shall include a complete signal power layout specifying what locations require both power feeds, including master or outlying locations Interlocking power design shall include battery backup power. Available battery time shall be based on the maximum number of operations performed at the peak time of the week, and shall provide at least 6 hours battery back-up at peak time.
10. The design shall include Automatic Speed Control (ASC) circuitry.
11. Interlocking CIH's are to be fully designed utilizing the PTC hardware and the ACESS II system or latest version installed on the LIRR system. PTC design should incorporate Transponder lay-out throughout the segment. Nested Interlocking CIH's will be required to have updated programs.
12. The design shall incorporate the separation of the three (3) Main Line tracks to allow the operation of train movement during a single track outage for the pre-testing and cutover testing of each track separately.
13. Cable terminations shall be fully detailed.
14. Houses and cases for any new intermediate, master, or outlying locations.
15. Interlocking shall include a separate battery hut to house all backup power systems.
16. The design shall include plans and circuitry for all switch heater cases (DC or AC to be determined later).
17. The design shall incorporate the latest LIRR Signal Department standards for lightning protection and grounding. In absence of a LIRR standard for lightning protection, the latest AREMA standard shall be utilized. The Consultant shall submit for approval any additional recommended lightning protection systems or devices or for any deviation from the latest standards.

Interlocking controls shall be designed using redundant vital microprocessors configured to provide hot seamless transfers between systems.

1. Systems shall be controlled from the existing Supervisory Control System at the Tower.
2. The Consultant shall specify an "A and B" Redundant vital microprocessor system so that in the event of a failure of the Main system "A", the "B" system shall seamlessly come on line.
3. The software design shall follow the "Nodal Equation method" for the structuring of the software.
4. Both "A" and "B" systems shall be galvanic isolated, with separate power supplies for powering the processors and serial isolators on all communication circuits. The system

shall include separate isolation for all I/O (this is in addition to any I/O isolation provided internally by the processor).

5. External lamp drivers units driven by output OR gates shall be used to power all signals.

The cab signal system shall be designed using standard code rate 0, 75, 120, 180, and 270 pulses per minute @100 Hertz (PPS). Cab signals should be turned on only when the track circuit is occupied. The code rates shall correspond to the following speeds:

a) 180 PPM Maximum authorized speed.
b) 270 PPM 70 MPH
c) 120 PPM 40 MPH
d) 75 PPM 30 MPH
e) 0 PPM 15 MPH

The Design shall include any vital relay master locations or cut sections needed to interface with the new signal system. The design shall include, but not limited to the following:

a) Block Plan with survey data,
b) FRA approved plan (if applicable),
c) Site and cable plan (showing elevations),
d) Code and aspect charts with equated distances, including a CASCOL or equivalent report, verifying the equated distances
e) Typical circuit plans for the interlockings plus any required master locations or cut sections.

Typical circuit plans shall include circuits for CIH's based on a redundant vital microprocessor system with track circuits, network equations using Node-Equation Boolean algebra, all vital and non-vital circuits, switch control and indication circuits, power distribution, power calculations, house and case layouts, cable plans, code charts and surge suppression.

The Consultant shall make design accommodations and cable provisions for communication as required.

CIH's shall contain a Dry Agent Fire Suppression System in accordance with NFPA 2001. The Fire Suppression system shall operate on Hotel prime power with battery backup sufficient for up to 14 hours of off-line operation. The Consultant shall provide details of the Fire Suppression to the LIRR for approval.

The Consultant shall prepare the FRA application and documentation for the new signal system (if applicable) as defined by the Code of Federal Regulations (CFR) subject to approval by LIRR

Signal FRA Group. The Consultant shall work with the LIRR to develop FRA testing requirements required for the cutovers of new signal equipment installation.

The Consultant shall develop non-vital and vital software in relay equivalents circuits. The Consultant shall perform all necessary checking to ensure the design of the system meets all LIRR and FRA regulations. The final vital and non-vital application software shall be converted to 11" x 17" relay equivalent drawings as per LIRR standards. The software shall be developed for a Seamless Redundant processor configuration.

The Consultant shall provide the performance specifications for the Vital Logic Program Controller and Integration with existing supervisory system. Consultant shall investigate the requirements for integrating and necessary modifications to the existing supervisory system to ensure display boards/monitors are accurate.

**10) Project Staging**

The Consultant shall provide all interface drawings for construction staging, cut-over, and operational use for each stage of the Project.

## 10.3 Personnel Requirements

1. The Consultant shall provide a qualified and dedicated Team to perform the key functions, including, at a minimum, a Project Manager, Environmental Engineer, Track Engineer, Surveyor, Structural/Civil Engineer, Traction Power 3rd Rail Engineer, Signal Engineer, Quality Assurance Manager, and Scheduler. Lead Engineers shall have had similar and previous experience in their respective disciplines, on at least three other railroad projects that are similar in scope and magnitude to this project.

2. Project Manager: Shall have the equivalent of 15 years of experience in managing the design of railroad and track infrastructure. The emphasis of the project experience shall involve track, power, signal, and civil/structural construction. The PM shall have had experience in coordinating the design of track, signal, communication, structural, and power disciplines and an understanding of developing a design which will allow the Railroad to minimize operating impacts on a mainline commuter railroad.

3. Environmental Engineer: Shall have the equivalent of 10 years of experience managing the environmental review process of high-profile, complex, transit infrastructure projects. Emphasis of the project experience shall involve writing technical memoranda, SEQRA knowledge and experience, and the environmental protection process.

4. Track Engineer: Shall have the equivalent of 15 years in designing for construction of railroad infrastructure. The emphasis of project experience shall involve track construction and a good understanding of the design interfaces with the signal design, and LIRR and AREMA track design standards.

5. Surveyor: Licensed Land Surveyor shall be used with the equivalent of 15 years of experience surveying for construction of railroad infrastructure. The project experience shall involve track layout and new construction.

6. Structural/Civil Engineer: Shall have the equivalent of 15 years in designing for construction of railroad infrastructure. The emphasis of project experience shall involve track construction, bridge rehabilitations, and retaining systems.

7. Traction Power 3rd Rail Engineer: Shall have the equivalent of 15 years in designing for construction of railroad infrastructure. The emphasis of project experience shall involve DC traction power distribution and third-rail layout. The power engineer shall have a good understanding of the track/signal interface for the new track /interlocking construction.

8. Signal Engineer: A Licensed Professional Engineer, registered in the State of New York, with a minimum of 15 years of experience designing for construction of railroad signaling systems which are similar in complexity and comparable in size with this project. The emphasis of project experience shall involve AC track circuits, Vital Processor Logic Controller (VPLC), Color Light Signaling, Grade Crossings, Automatic Speed Control Testing, and switch machines and controls and PTC implementation. The Signal Engineer shall also have a full understanding of vital and non-vital hardware/software of railroad projects of comparable size and complexity and an understanding of LIRR railroad operations, block and aspect designs, software/hardware integration in testing, experience in cab signal design, and developing cutover schemes to allow the railroad to maintain its operations during construction of the new track. The emphasis of project experience shall involve AC track circuits, Vital Processor Logic Controller (VPLC), Color Light Signaling, Grade Crossings, Automatic Speed Control Testing, and switch machines and controls.

9. Scheduler: Shall have the equivalent of 15 years of experience scheduling for construction of railroad projects. The emphasis of project experience shall involve detailed schedules and phasing plans for construction, in support of maintaining operations within the construction zone.

10. Quality Representative: with equivalent of 10 years of experience implementing and monitoring quality systems for design, engineering and construction projects. The quality representative shall be independent from project activities and shall report to senior management.

11. Cost Estimator: Shall have the equivalent of 15 years of experience and knowledge of railroad projects. Key project components include: Track, Structural, Electrical, Mechanical, Signal, and Communications.

12. Public Outreach Lead: Shall have the equivalent of 15 years of experience and knowledge developing, managing and implementing comprehensive Public Outreach Programs. Emphasis of the experience shall involve Outreach processes of high-profile, complex, transit infrastructure projects requiring environmental review and determinations.

## 10.4 Project Assignments

The project assignment shall consist of the following tasks:

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**Survey and Track Alignment Plan for the Third Track**

The Consultant shall prepare a GIS Base Map survey and track alignment plan for the Third Track between Floral Park and Hicksville, using ground based LiDAR (or equivalent) and utilizing field and office data as needed.

The Consultant's survey work shall be performed in such a manner as to minimize impacts to LIRR operations. As part of their proposal, the Consultant shall identify the following:

- Intended means and methods for performing survey work
- Anticipated number of track outages to perform survey work
- Anticipated number of flag-days to perform survey work

The intent of the data collection task is to obtain an understanding of the existing signal, communication, power systems, and track configuration currently used by the LIRR. During design development the Consultant shall collect existing field data, previous information made available by the LIRR, and perform a review of the existing track alignment/profile, signal, communication, and power system infrastructure for the design of the new Third Track. The survey boundaries shall extend the complete length of the LIRR ROW.

The consultant shall review the existing track chart, existing track configuration, other structures, other equipment, and existing underground and overhead signal and power cable runs for accuracy (identify grade and curvature/tangent track) for incorporation into the new track layout design.

All survey work shall be conducted under the general supervision of a Professional Land Surveyor licensed in the State of New York. All survey documents shall include the original seal and signature of the NYS Professional Land Surveyor. The Consultant shall submit copies of the respective resumes and licenses as part of the Consultant's proposal. The survey shall, at a minimum, include the following:

a) Conformance to the requirements shown in Appendix "A" entitled "Technical Statement of Work Surveys,"
b) Centerline of existing tracks, profile elevation of top of rail (on curves) and both rails, location of switch points and frogs, insulated joints, any communication and signal facilities within the ROW, any spiral or circular curve points that may be present, establish lateral clearances from centerline of the new track,
c) Identification of existing overhead and subsurface LIRR facilities and foreign utilities impacted by the new track structure such as manholes, duct bank, any cable crossings, etc. This survey plan shall be used as a basis for locating new appliances and shall assist in performing the track, communications, signal, and power work,
d) Prepare and submit all calculations/data in deriving geometry of the new track and interlocking construction.

**Geotechnical Investigation (Option 1)**

The Consultant shall perform a comprehensive geotechnical investigation including soil borings, as needed, and other testing to determine proper foundation designs for new structures and appropriate support for existing structures; and shall provide and incorporate the results of the geotechnical investigation program, as part of the Preliminary design submittals.

As part of their proposal, the Consultant shall identify the anticipated geotechnical investigations to be conducted including:

- Estimated number and depth of borings.
- Anticipated soil analysis to be performed.
- Proposed means and methods to perform the work.
- Location and number of track outages and track fouling days required.

**Preliminary Design Report (Option 1)**

The report shall include, but not necessarily be limited to the following:

1. Data collection of existing conditions (i.e. understanding of the existing signal system, site investigations with complete existing drainage system),
   a) Complete Topographic survey including existing track profile and alignment within the project limits.
   b) Identification and location of all LIRR subsurface utilities within the project limits,
   c) Basis of design assumptions and standard references to be utilized,
   d) Identification of necessary permits, including those required by the Nassau/Suffolk County/NYSDEC,
   e) Findings and recommendations,
   f) Identify track outages for construction,
   g) Provide subsurface and soil investigation for the Project, conforming to the geotechnical requirements in Attachment "D",
   h) Preliminary layout of track, crossings, signals, switches, huts, and cases. Preliminary layouts shall also show the location of future track, signals, and switches,
   i) Preliminary layout of Station platforms, overpasses, and facilities etc
   j) Include a brief description of potential BV opportunities identified by the Consultant for LIRR consideration and comment. This submission shall include any proposed alternatives that may adversely impact the major physical or operational characteristics of the Project including elements that may affect size, location of facilities, legal ramifications, need for a waiver from LIRR Standards, requirement for special technology, or could have a significant impact on maintenance and/or operational use of the end-products(s). At this point, the Consultant may propose changes to the conceptual design, design criteria, or element of the configuration that might yield significant benefits or cost savings.
   k) Scope of work for any proposed modifications to bridges, viaducts, underpasses, and culverts.
   l) Scope of work for substations, traction power, and electric power

**Best Value Design Review (BVDR) (Option 1)**

The Consultant shall refer to the attached Best Value Engineering requirements (Attachment G) in determining the design alternatives related to the scope of this project

Best Value analysis of the Project shall include review of, but not be limited to, alternatives to the following elements:

- Track configuration alternative(s) to meet the operational needs,
- Structural systems for drainage, foundations, retaining walls (i.e. cast in-place, pre-cast, and others), etc.
- Types of drainage systems.
- Recommended means/methods/materials to construct retaining walls, and track substructure.
- Signal hut configuration, location, and foundations.
- Signal/Segment cutover staging.
- Trough vs Aerial routing for Signal, Communication, and Power cables.

It should be emphasized that all alternatives and/or recommendations shall be fully compatible with the existing signal system in the Towers.

**Constructability Review (Option 1)**

The Consultant shall perform a constructability review which will include, but not be limited to the following:

1) The proposed means and methods of construction including overall construction schedule, demolition/erection procedures and preparatory work (manner of prosecution, installation sequencing, etc.), environmental concerns; shoring and temporary supports, point of contacts (i.e. load transfer, finished edge, interface with existing roadways, etc.), water issues (i.e. waterproofing, drainage, dewatering, etc.), operability and maintainability, MPT, required track outages & foul time, utility temporary/permanent relocations/staging, Railroad/temporary/permanent relocations, construction staging and phasing plans, roadway closures, community impacts, and crane and equipment staging; safety; required LIRR Force Account support; testing requirements, and recommended contract packaging. The constructability effort shall assure that:

   a) The Project, as detailed in the preliminary plans and specifications, can be constructed using standard construction methods, materials and techniques.

   b) The plans and specifications provide the LIRR with clear, concise information that can be utilized to progress the design and perform the work including maintaining and protecting the existing structures and utilities.

   c) The work when designed and constructed in accordance with the plans and specifications shall result in a project that can be maintained in a cost-effective manner by the LIRR over the life of the project.

2) The reviewshall be performed by an independent team which shall consist of qualified individuals with a construction/operating background that have been involved with projects of a similar nature; who have not worked on the design effort, and are independent from the project team.

   a) The Consultant shall provide a declaration stating that the proposed Constructability Review team members have not worked on the design effort.

   b) The Consultant shall provide, for approval by the LIRR prior to the performance of the work , a list of Constructability Review team members with their respective resumes and the team leader's qualifications. The team shall be composed of members of a diverse background which is suited for the scope and complexity of the project and also have at least one individual who is knowledgeable of Constructability Review techniques. Subsequent changes or substitutions of the CR team members shall be submitted in writing to the LIRR for approval.

3) Submission of final constructability rereview with engineering calculations checked and signed by a PE Registered in NY State (citing all referenced, assumptions, and codes), permits, test results, surveys signed by a Registered Surveyor in NY State.

**Preliminary Design (Option 1)**

The Consultant is advised that the Preliminary design drawings and specifications shall contain all necessary information for solicitation of a Design/Build contract under this project as follows:

1) Address and incorporate comments resulting from the LIRR's review of the study/conceptual design reports. The consultant shall maintain a LIRR format comment-tracking document.
2) Submission of the Preliminary design package, drawings, specifications, engineering calculations, and reference standards and assumptions shall represent the overall size, character, and features of the project and serve to thoroughly convey the designer's intentions, define options for drainage systems, and track alignment/profile and locations of the existing track and new track, existing crossings, and new crossing configurations.
3) Preparation of general arrangement drawings and specifications required to support the work effort for all disciplines.
4) Progression of recommended integrated design identified in the conceptual report to the Preliminary level for all signal, power, communication and track designs.
5) General plans identifying the track centerlines of Main Line tracks and connecting sidings, top of rail elevations, track layout plan and configuration (showing location and details of switches: point of switch, length of frogs (including heel and toe lengths), frog number/angle, degree of curve and radius, point of switch/frog, cross sections (every 100 feet) with profile elevations of the new track and existing tracks, identification of existing and proposed horizontal and vertical track alignment, critical information, and utility subsurface facilities. Track plans shall contain all pertinent survey data and be tied into survey controls that will be used for the Final Design and subsequent construction. The plan and profiles shall be identified on the same drawing.
6) Layout of the proposed interlocking plans showing signals, switches, recommended routing plans for power/signal/track circuits, tentative location of all signal and battery huts, completed track survey within the limits of the project work limits. The plan shall include

the proposed track alignment and profiles, and interconnection between the proposed and existing track alignment/profile. Drawings should include, but not limited to, the followings:

a) Hut and Battery Case size and layout,
b) Rack and wallboard layout,
c) Cable Layout/Termination,
d) Comprehensive list of materials with long lead times, CIH's, switches, transformers, cables, signals, switch machines etc.,
e) Interlocking plans showing signals, switches, track circuits, and limits of project area in accordance with LIRR standard,
f) Tentative location of CIH's, battery huts, grade crossing cases, etc. based on field visit with LIRR,
g) Power Calculations.

7) Identification of any issues resulting from the review of the existing signal infrastructure/circuit plans.
8) Comprehensive list of materials (i.e. cable, signals apparatus, switch machines, etc.) Also develop a candidate list of long lead item times. The list shall include,
   a) Technical specifications, and design details to enable placing the order,
   b) Quantity required,
   c) Time needed for fabrication and delivery,
   d) The basis for determination.
9) Submission of proposed drainage improvements, calculations and connections into existing systems. Identify and procure any permits necessary for this drainage work.
10) Identification of Public Agencies and Utilities involved with the project, including initiation of necessary permit applications.
11) Submission of report to determine if additional reactors are needed for broken rail protection. If a reactor is needed, the Consultant shall prepare a complete design.
12) Layout of modifications, if any, to Platforms, Stairways, and Pedestrian Overpasses.
13) All modifications to bridges, viaducts, underpasses, and culverts.
14) Submission of draft BVDR Report.
15) Incorporate LIRR comments to the draft BVDR Report.
16) Submission of final BVDR Report.
17) Submission of Constructability Review.
18) Cost Estimates and preliminary schedules for all elements of the project.

THE CONSULTANT SHALL NOT PROGRESS THE WORK OF THIS PROJECT BEYOND THE PRELIMINARY DESIGN STAGE, WITHOUT THE WRITTEN AUTHORIZATION OF THE LIRR

**Design/Build Contract Packages Submittal (Option 1)**

1) Address and incorporate comments resulting from the LIRR's review of the Preliminary design submittal.
2) Submission of the Design/Build contract package outlined in section 10.1 for approval.
3) The work shall include a detailed work scope for the project work in accordance with the Division of Labor determined by the LIRR.

4) Drawing, specification, and report packages shall fully define the project scope for LIRR procurement of a Design/Build contract, and shall include but not be limited to: depiction of all required plans, sections, and controlling details; material specifications; and all relevant geotechnical and topographic survey information.

5) All packages/designs shall also include electronic files on CD ROM and shall be fully compatible with the LIRR CADD system.

**Bid Documents (Option 1)**

Incorporate the comments resulting from LIRR review of the Final Submittal.

## TASK 11: Bid Assistance (Option 2)

The Consultant shall provide a cost option for Bid Phase Support Services for those elements in the project that will progress into construction via a design/build contract. The work shall include:

- Attend the Pre-Bid Conference and Site Tour
- Assist in preparation of the Railroad's response to bidders' technical questions (assume 30-50 technical questions)
- Incorporate all addenda changes and prepare a total of twenty (20) conformed sets:
  - Twenty (20) sets of drawings at 11" x 17".
  - Twenty (20) sets of specifications.
  - Twenty (20) sets of all project Request for Proposal contract and supporting documents on CD ROM(s)

## TASK 12: Public Agency Coordination

In addition to the requirements of Task 5.6.9 (coordination for traffic studies), the EC shall meet with all necessary agencies as required to complete the Project. All contacts with the agencies will be made through the Railroad, with all meetings having a Railroad representative.

The EC shall perform work in concurrence of with all Federal, State, City and Local agencies and will obtain all permits required for the Project.

## TASK 13: Project Administration (Base Work and Option 1)

### Task 13.1: Project Management

The Consultant shall develop a Project Management/Work Plan as part of the technical proposal. The Project Management Plan shall describe the organizational management structure and how the work will be scheduled, directed and reported. As part of this plan, all sub-consultants shall be identified along with the tasks they will be performing on the project. The overall project effort shall be segregated into tasks (manageable work items) via a work breakdown structure approach, each having a measurable end product. The Consultant shall also provide a project schedule depicting the relationships of the work items (Tasks and Subtasks) and the point in the project where they become part of the critical path(s). These documents will be used to track the Consultant's progress throughout the course of the project.

**Work Plan**

The Consultant shall maintain a current, complete and specific plan to accomplish the individual work efforts within the established limits, parameters, guidelines, schedule and budget. The Work Plan shall consist of two (2) complementary and mutually consistent efforts, which shall be referred to as the "Written Work Plan" (WWP) and the "Work Plan" (WP).

A. The Written Work Plan shall contain specific details of each task and subtask included in the scope of the work. The plan shall address each task and subtask in terms of commencement and completion dates, methods of accomplishment, Consultant and LIRR responsibilities, concerns, problems and a full list of activities required to complete the effort and the responsible personnel.

B. The Work Plan shall parallel the Written Work Plan and represent the incurred and anticipated expenditure of hours and all associated costs necessary to perform the Work in accordance with the Written Work Plan. The Work Plan forecast shall have sufficient detail to monitor the progress and cost performance ratios and meet with the LIRR's approval. In no event shall the distribution of the forecast be of less detail than by firm, by task, by month, by discipline. The Work Plan shall emphasize all tasks, subtasks and activities anticipated during the upcoming calendar month, and shall detail the Work, sufficient for positive control and management of all aspects of the Work.

The Written Work Plan and Work Plan shall be revised as required to reflect changes in the specified Work and the Work progress; the impact of changed conditions shall be updated on a regular monthly basis. Each monthly submittal of the plan must be sent to the LIRR for review and comment and approval. The following is required for the work plan:

The WP shall address each task and subtask in terms of commencement and completion dates, methods of accomplishment, consultant and LIRR responsibilities, concerns, problems and a full list of tasks and subtasks required to complete the effort and the responsible personal associated with each task.

The list of tasks and subtasks shall be the same level of detail as shown on the design schedule identifying each discipline required. Once the tasks are established, the percent of the discipline hours that is expected to be worked shall be identified.

The WP represents incurred and anticipated expenditures of hours and all costs necessary to perform the work. The WP shall be sufficient detail to monitor the progress of the work. The WP shall be updated and submitted monthly and shall provide a complete explanation of any variances/deviations between the forecasted and actual hours, budget, and schedule.

This task will include all work necessary to properly administer and manage the work to successfully complete the project. The Consultant shall perform their work in accordance with industry standards, applicable codes, established LIRR procedures, and the requirements of regulatory agencies having jurisdiction.

The Consultant shall attend bi-weekly project meetings with the LIRR. These meetings will be held in the Railroad's offices, unless otherwise directed, and will include such items as review of technical issues, project work, agency communications, potential problems and open items. Key Consultant staff members, sub-consultants and subcontractors shall attend the meetings as required. The Consultant shall develop presentations as required that adequately illustrate findings and strategies using layouts/flow drawings, reports, graphs, and charts and will be responsible for minutes. This task will also include the work necessary to prepare and submit monthly invoices in a timely manner. The EC shall also maintain project record keeping:

1.1 Kickoff meeting with LIRR Project Team
1.2 Bi-weekly progress meetings
1.3 Design review meetings
1.4 Meeting with LIRR Senior Staff
1.5 Support the LIRR at public agency and community, municipality meetings as described above in Task 3
1.6 Prepare and transmit Monthly Progress Report

The Consultant shall be required to attend additional design review meetings and municipality meetings to discuss project issues as they arise. Key Consultant staff members and sub-consultants shall attend the meetings as required. The Consultant shall develop presentations, as required, that adequately illustrate findings and strategies using layouts, flow drawings, reports, graphs and charts.

**Task 13.2: Presentations**

In addition to those presentations identified in Task 3 above (Public Outreach Program), the Consultant may be required to participate in giving presentations to the MTA Board and other entities as directed by the LIRR. Presentations shall include, but may not be limited to: preparation of presentation boards, MS Power Point presentations, handouts, and color renderings of the intended design.

The Consultant shall assume a minimum of ten (10) presentations will be required during the duration of the contract.

**Task 13.3: Monthly Invoices**

The Consultant shall prepare monthly invoices in a manner that provides a comprehensive review of the project, previous month's work completed, work planned for next period, an updated project schedule and open issues. The written work plan shall contain specific details of each task and subtask included in the scope of the work. The plan shall address each task and subtask in terms of commencement and completion dates, methods of accomplishment, Consultant and LIRR responsibilities, concerns, problems and a full list of activities required to complete the effort and the responsible personnel. The monthly progress reports shall be submitted no later than ten (10) working days after the last day of each month, and shall include, at a minimum:

- Actual versus projected progress
- Projected billing statements
- Correspondence log
- Budgeted hours
- Expended hours
- Authorized budget in dollars

- Dollars expended
- Percent of dollars expended
- Forecast dollar cost at completion
- Variance of dollar cost from budget
- A narrative report including:
    - Work completed that month
    - Work scheduled for next month
    - Open Issues
    - Steps taken to resolve open issues
- Summary of each meeting including significant findings.
- Actions required by LIRR

**Project Schedule**

The EC shall complete the tasks contained in the TSOW as described below in Table 1, following Notice of Award (NOA):

**Table 1 – Project Milestones**

| Task | Description |
|---|---|
| 1 | Alignment Identification |
| 2 | Alignment Review and Verification |
| 3 | EIS Scoping, Notice of Intent and Initial Public Outreach |
| 4 | Topographic, Planimetric and Boundary Surveys |
| 5 | Develop Preliminary Design Plans and Preliminary Cost Estimates |
| 6 | Line of Sight Study/Renderings |
| 7 | Phase I Environmental Site Assessment |
| 8 | Phase II Environmental Site Assessment |
| 9 | EIS Documentation<br>• Draft public scoping documents<br>• Public Process Re Scoping<br>• Draft EIS complete<br>• Final EIS |
| 10 | Design |
| 11 | Bid Assistance |
| 12 | Public Agency Coordination Public Agency Coordination |
| 13 | Project Administration |

**Task 13.4: Prepare a Submittal Log**
The Consultant shall provide a Submittal Log in MS-EXCEL based on the contract documents, which will be utilized as a basis for the expected number of submittals to be provided and reviewed during the construction. The log shall be formatted in an excel spreadsheet and make provisions for record keeping of distribution, reviews and approvals and other items which are typically recorded in this log.

**Task 13.5: Commissioning Acceptance and Maintenance Plan (CAMP) (Option 1 Only)**
The Consultant shall prepare a Commissioning Acceptance and Maintenance Plan (CAMP) document in accordance with LIRR DPM Procedure 645. The LIRR will provide the Consultant with a copy of the LIRR procedure and a format for this log. The log shall be developed in MS-EXCEL format and will be utilized during the commissioning/acceptance period of construction.

**Task 13.6: NYS Building Code Compliance (Option 1 Only)**
The Consultant shall provide the appropriate NYS Building Code checklists that will demonstrate that all elements of the design have been performed, incorporating the latest requirements of the NYS Building Code and any other required jurisdictions as necessary. The Consultant shall include a Code and Life Safety information drawing in the drawing set, summarizing all code requirements used in the design.

**Task 13.7: Stray Current (Option 1 Only)**
The Consultant shall perform an assessment of the Project Site's susceptibility to stray currents. Issues, such as proximity to Traction Power Substations, adjacency to underground utilities, ROW conditions, etc., shall be analyzed. The assessment shall include a statement regarding the level of risk from the effects of stray current in the Project Site area.

This assessment shall include a narrative on the final stray current assessment and proposed mitigating features that have been incorporated into the design. The report shall indicate how all elements of the design, and potential effects of stray currents, have been addressed.

The Final Design shall include a further assessment of stray currents at the Project Site including: measurements and evaluations, such as soil analysis, structure to structure and structure to earth resistance, stray current levels, etc. Based on the assessment and findings, the respective engineering steps shall be outlined and incorporated into the design. This assessment shall be conducted by the Designer of Record and provided to the LIRR for review.

## PROJECT DELIVERABLES

**Draft and Final Scoping Document**
The EC shall prepare a draft Scoping Document for the project in accordance with applicable regulations.

**DEIS - Public Comment**
Following incorporation of Railroad comments and approval, the EC shall publish the DEIS for public comment.

**FEIS**

Following summary and incorporation of all appropriate comments and responses, the EC shall revise the DEIS and submit the FEIS to the Railroad for review and, upon approval, publish the FEIS.

**Draft SEQRA Findings**

Following issuance of the FEIS, the EC may be requested to prepare a draft SEQRA Findings Statement. The Railroad will review, revise and approve, and the EC shall incorporate all comments and revise the Draft SEQRA Findings Statement accordingly.

**Bills of Materials (Option 1 Only)**

Bills of Materials shall be prepared as required at the preliminary design level. Each bill of materials shall be prepared in accordance with the LIRR-DPM Procedures & Guidelines, and the principles and practices of the American Association of Cost engineers (AACE). Bills of Materials shall be prepared using MS-Excel utilizing an approved LIRR format. The Consultant shall update the estimated unit cost to correspond to the year of construction. Each estimate submittal shall be delivered in hard copy and on CD ROM, along with binder with copies of all take-off sheets and material/vendor quotations. Tables will be provided showing all material/equipment required by each discipline to complete the work. The tables shall be prepared utilizing, at a minimum, the following: a) quantity takeoffs, b) material pricing data obtained from vendors, and c) listed by FA discipline and include descriptions, quantities, Railroad Stock Numbers, manufacture and part numbers and forecast lead times.

**Drawing Format:**

All drawings shall be prepared using AutoCAD in accordance with sound drafting practice, suitable for legible reproduction and in conformance to Long Island Rail Road Track, Signal, Communications and Power standard format. All signal drawings shall be completed utilizing Promis*E software (latest LIRR version).

The Consultant shall submit, within 30 workdays of Notice of Award to the LIRR for review and approval; the symbol library of AutoCAD drawings to be used in the project. This shall include but not limited to the following: a) Line weights, b) Text Fonts, c) Symbols, d) Layer standards, and e) File Naming Conversions.

The LIRR shall approve the organization of the AutoCAD files and layers conventions, conventions, block names, AutoCAD file names, etc. All sheets and blocks shall be in accordance with LIRR CAD standards. The Consultant shall use the latest approved LIRR title block to create new drawings. The title block shall be inserted at 1 to 1 and may not be scaled up or down. The drawings shall be created using AutoCAD version 2008 or LIRR compatible, AutoCAD files shall be in their native DWG format in a PC readable format. AutoCAD files converted from other AutoCAD packages are not acceptable.

The Consultant shall supply all circuit plans such that when reproduced in an 11”x 17” format all areas of the circuitry detail is easily readable and not cluttered, and with minimum of crossed or offset lines. Complete circuits shall be shown as a single sheet insofar as possible. A minimum of circuit continuations shall be used. When continuations are used, they shall be clearly specified and include the identification of the continuation sheet. Also all drawings shall provide sufficient information by means of contact and terminal numbering to easily enable the tracing and testing of the circuits.

A minimum distance of 0.40 inch shall be maintained between lines representing circuit of cable wiring. Lettering or printing shall be least 0.10 inch high. All spacing shall be in multiples of tenths of inches. Any deviation from this shall be submitted to the Engineer for approval.

Except as otherwise directed, full size sheets shall be 36 by 24 inches. All lettering shall be a font size suitable for half size reproduction. Plans, sections, and layouts required to serve, as background drawings shall be produced by the consultant to supplement available drawings. The Consultant shall also furnish final hardware plans on 11"x 17" bond paper and electronic files, and shall conform, to the SEOM Section OP-9 (General CADD and Drafting Standards), and Section OP-10 (Drawings and Plans) including dates for each plan reference.

The Consultant shall provide typical drawings for all pre-wired signal and communication house drawings. Drawings shall be sufficiently detailed to provide clear requirements for force account and vendor to follow and be measured against for completeness. This shall include but not be limited to the following level of detail:

a) cover sheet
b) index with revisions
c) layout pages
d) track design and requirements
e) drainage design
f) signal logic designs and requirements
g) power designs and requirements
h) signal house and case layouts
i) wall and rack elevations
j) structural drawings
k) foundation drawings wiring harness
l) vital and non-vital processor details and layout
m) cable layouts and requirements
n) communication system for wayside applications
o) any elements, drawings or symbols imported from other sources shall be done in such a manner as to follow the approved symbol libraries.

The approval of drawings and/or contract documents is not to be construed as authority to modify, set aside, violate, or cancel any provisions of applicable codes or ordinances.

The Consultant shall draw each mechanical layout drawing such as hut-layout to scale and to fit the title block. The electronic files, as approved by the LIRR, shall be supplied on CD ROM, uncorrupted, and free from viruses.

**Initial and In-Progress Submissions**

- Twenty-five (25) half-size (11" x 17") drawings, and twenty (20) copies of the Specifications including electronic versions for each design level as indicated under Section 6.0 - Project Assignment. Consultant shall allow 21 calendar days for LIRR's review of each submittal.
- One (1) copy of final Meeting Minutes delivered via e-mail to the LIRR Project Manager no later

than seven (7) calendar days after the respective meeting date.

- One (1) copy of the comment-tracking document delivered via e-mail to the LIRR Project Manager no later than fourteen (14) calendar days after the respective meeting date.
- Ten (10) copies of the Monthly Progress Report to the LIRR's Project Manager delivered via e-mail to the LIRR Project Manager submitted no later than ten (10) working days after the last day of each month.

**Final Submittal and Bid Documents**

- Twenty-five (25) sets of Contract Drawings (half-size, 11" x 17" drawings).
- Twenty-five (25) sets of Technical Specifications (CSI format, 8 ½" x 11", 2-sided).
- One (1) set of full-size reproducible Contract Drawings (mylars).
- Transmission of Contract Drawings on Compact Disc or other suitable electronic media, in AutoCAD format, latest version (2 copies).
- Transmission of Technical Specifications on Compact Disc or other suitable electronic media, in MS Word format (2 copies).

**Estimates**

Estimates shall be prepared for all 3rd Party and LIRR F/A construction options and packages outlined in the TSOW. Each cost estimate shall be prepared in accordance with the LIRR-DPM Procedures & Guidelines, and the principles and practices of the American Association of Cost Engineers (AACE) and "Attachment H."

**REFERENCE DOCUMENTS**

Applicable Standards include, but not limited to:

- LIRR MW-2000
- LIRR CE-1 Specifications
- AREMA–American Railway Engineering and Maintenance-of-Way Association
- MTA-LIRR Guidelines for Preparation of Technical Requirements, Fourth Edition, July 1998
- LIRR Signal Department Rules and Procedures for Construction, Maintenance, and Testing of signal systems
- The FRA's Rules Standards and Instructions
- NYS Department of Environmental Protection, NYS Department of Environmental Conservation
- LIRR Inspection Guide prepared by the Engineering Department Maintenance of Way, Structures Section, 1990 (MW 201, MW202, MW 301, and MW 302)
- American Concrete Institute Guidelines,
- American Concrete Institute (ACI) Guidelines, American Society of Test Materials (ASTM)
- ACI-364.1R: Guidelines for Evaluation of Concrete Structures prior to Rehabilitation.
- ACI-201.1R: Guidelines for Making a Condition Survey of Concrete in Service
- American Society of Testing Materials standards for material testing,
- ASCE/ANSI specifications and standards,
- New York State Guidelines for Urban Erosion and Sediment Control

LIST OF ATTACHMENTS

- Attachment A - TSOW for Surveys
- Attachment B - TSOW for Phase I Environmental Site Assessment
- Attachment C - TSOW for Phase II Environmental Site Assessment
- Attachment D - Geotechnical Investigation
- Attachment E - Project Controls System
- Attachment F - Commissioning, Acceptance, and Maintenance Plan Requirements
- Attachment G - Best Value Analysis
- Attachment H - Special Requirements for Developing an Estimate
- Attachment I - Special Requirements for Consultants Performance Reporting System
- Attachment J - Guidelines for Planning Scheduling and Requesting Track Access
- Attachment K - TSOW for Construction Phase Services (CPS)

# END OF TECHNICAL STATEMENT OF WORK