

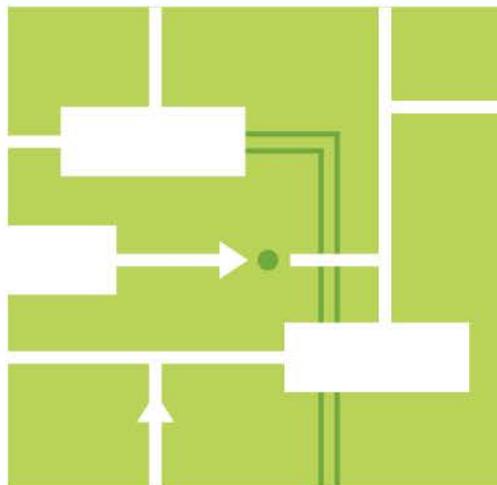
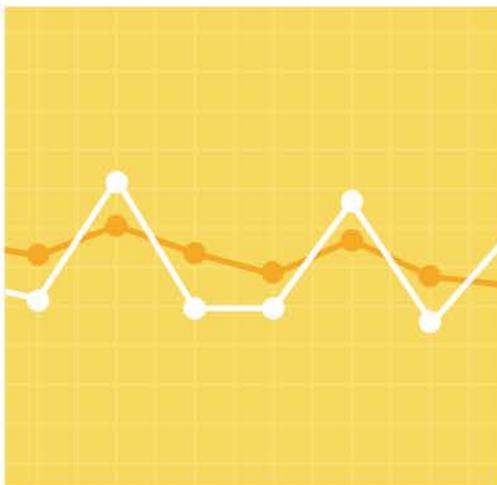


Request for Proposal Reliability Transmission Upgrade (RTU) Part 2

Boston 2028 RFP
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Note to the QTPS Respondent:

This document is intended to provide context and explanatory instructions as a guide for the submittal to an ISO issued Request for Proposal (“RFP”). The outline of this document closely matches the structure found in RFP360. RFP360 is the web based application the ISO uses to collect the QTPS Respondent’s Phase One Proposal or Phase Two Solution submissions. QTPS Respondents must gain access to RFP360 and enter their own text and documentation in the appropriate sections, as necessary. Completion of each of the sections is required for the proposals to be considered complete.

If a question does not apply to the QTPS Respondent’s Phase One Proposal, the QTPS Respondent shall mark the response with “NA” and provide a brief reason why the QTPS Respondent believes the RFP question is not applicable. All questions require a response from the QTPS Respondent. All responses have a 12,000 character limit. Narrative responses are expected to be submitted in RFP360. Attached files are not to be used unless specified in the instructions to a specific RFP360 question. Where applicable, all data shall be provided on a 100 MVA base. The calculations of equipment ratings and parameters shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Sections 1 through 9 describe the questions the QTPS Respondent(s) must answer in RFP360 for their Phase One Proposal. Although not to be responded to as part of the Phase One Proposal responses, Sections 10 through 18 are included and will be required to be answered by those QTPS Respondents that have qualifying Phase One Proposals. The final Phase Two Solution Sections 10 through 18 (which may contain modifications, deletions or additions to the questions in these sections) will be available per the schedule listed in Part 1, Section 1.3 of the RFP. The Phase One Proposal is referred to as the Phase Two Solution in Sections 10 through 18.

Phase One Proposal answers provide a high level description of the QTPS Respondent’s proposal and cost estimates. The ISO has marked the questions that it anticipates may contain confidential information as part of the response. If the QTPS Respondent submits confidential information in response to a question, that information will be treated as confidential under the ISO New England Information Policy.¹ Any responses or attachments in response to questions containing confidential information must be marked “Confidential Information” as the first two words of the answer or at the top of the attachment. The specific confidential information in the answer or on the attachment must be highlighted in yellow. Confidential information submitted in response to questions shall not include the following:

- a. The high-level design of the solution;
- b. The total estimated installed costs for the solution;
- c. The estimated Annual Transmission Revenue Requirement;
- d. Information relating to any cost-containment measures, cost-caps and rate incentives;
- e. Information regarding the proposed in-service date for the solution; and
- f. Any information that QTPS Respondent makes publically available

The QTPS Respondent’s Phase One Proposal and Phase Two Solution responses shall include all information for their proposal and any changes to interconnecting Participating Transmission Owner’s (“PTO”) facilities. For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop

¹ https://www.iso-ne.com/static-assets/documents/regulatory/tariff/attach_d/attachment_d.pdf

Transmission Solution, the QTPS Respondent is required to provide the requested information concerning PTO's facilities, unless noted otherwise.

If the ISO receives a QTPS Respondent's response and it, in the opinion of the ISO, should be marked as CEII, the ISO will question the QTPS Respondent on its lack of the CEII labelling. The QTPS Respondent has final say on the marking of material that the QTPS Respondent has provided.

Section 1

Phase One Proposal – Administrative

1.1 Primary Contact (The ISO anticipates this response may contain confidential information)

Question 1-1 - Provide primary contact information.

Designate a representative for the Phase One Proposal to be the primary contact person with the ISO and provide the following requested information in a narrative form and not in an uploaded file:

- a. Name,
- b. Title,
- c. Email Address,
- d. Telephone, and
- e. Mailing Address

The primary contact is the person the ISO will first contact if questions or additional requests for information are needed from the QTPS Respondent that cannot be addressed through RFP360. The primary contact shall have the authority to provide responses on behalf of the QTPS Respondent's organization.

1.2 Secondary Contact (The ISO anticipates this response may contain confidential information)

Question 1-2 - Provide secondary contact information.

Designate a representative for the Phase One Proposal to be the secondary contact person with the ISO and provide the following requested information in a narrative form and not in an uploaded file:

- a. Name,
- b. Title,
- c. Email Address,
- d. Telephone, and
- e. Mailing Address

The secondary contact is the person the ISO will contact if questions or additional requests for information are needed from the QTPS Respondent that cannot be addressed through RFP360 and the primary contact is unable to be contacted. Like the primary contact, the secondary contact shall have the authority to provide responses on behalf of the QTPS Respondent's organization.

1.3 Backstop Transmission Solution

Question 1-3a - Has the QTPS Respondent been identified as the Backstop Transmission Solution provider? If the response is no, then respond to Questions 1-3b through 1-3e with an "NA".

Question 1-3b - Is the Backstop Transmission Solution provider submitting a joint Phase One Proposal? If the response is no, then respond to Questions 1-3d and 1-3e with an "NA".

Question 1-3c - Is this submittal the Backstop Transmission Solution? If the response is no, then respond to Questions 1-3d and 1-3e with an “NA”.

Question 1-3d - Identify the legal names of each Backstop Developer involved in the joint Phase One Proposal.

Question 1-3e - Identify the Backstop Developer that will serve as the lead for the Phase One Proposal.

All responses shall be submitted in a narrative form and not in an uploaded file.

As described in Section 4.3(a) of Attachment K, a QTPS Respondent shall be considered a Backstop Transmission Solution provider and is required to submit a Backstop Transmission Solution for any need that would be solved by a project located within or connected to its/their existing electric system, and which it/they would therefore have an obligation to build under Section 3.09(a) of the Transmission Operating Agreement (“TOA”). All other QTPS Respondents cannot be considered as a Backstop Transmission Solution provider and cannot submit a Phase One Proposal as a Backstop Transmission Solution.

The ISO will identify the QTPS(s) which will be the Backstop Transmission Solution provider(s) at the time of the issuance of the RFP. The Backstop Transmission Solution provider(s) shall be subject to the same requirements as any other QTPS submitting a Phase One Proposal.

Only the Backstop Transmission Solution may be submitted as a joint Phase One Proposal where the ISO has identified more than one Backstop Transmission Solution provider. A Phase One Proposal that is not a Backstop Transmission Solution cannot be submitted as a joint Phase One Proposal with another QTPS Respondent or Backstop Transmission Solution provider.

If multiple Backstop Transmission Solution providers are submitting a joint Phase One Proposal, only the lead Backstop Transmission Solution provider shall submit the joint Backstop Phase One Proposal. The following information is required in the joint Backstop Transmission Solution provider’s Phase One Proposal. The lead Backstop Transmission Solution provider shall:

- a. clearly identify the legal name of each Backstop Transmission Solution provider involved in the joint Phase One Proposal and
- b. identify the lead Backstop Transmission Solution provider.

1.4 Documentation

Question 1-4 – Complete and upload the Index of Attachments file showing the list of attachment files the QTPS Respondent will be providing as responses to questions in RFP360 as stated in Section 3.6 of Part 1. (The ISO anticipates this response may contain confidential information)

The Index of Attachments file is part of the RFP package posted on the ISO website at <http://www.iso-ne.com> > System Planning > Competitive Transmission Projects.²

² <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

1.5 Attestation and Affidavit

Question 1-5 – Complete and upload the Attestation and Affidavit form. (The ISO anticipates this response may contain confidential information)

The Attestation and Affidavit form is part of the RFP package that is publicly posted on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects.³

³ <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

Section 2

Phase One Proposal - Executive Summary

Question 2 - Provide a Phase One Proposal Executive Summary.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative description of the Phase One Proposal highlighting the key project-related attributes including, at a minimum, installed cost, life-cycle cost⁴, a summary of the proposed schedule⁵, design, the timing to procure real estate, and an explanation of how the proposed project addresses the identified needs. Any cost containment provisions should also be described in this summary. This public version will be posted on the public section of the ISO's website when the list of proposals that meet the stated need is posted. It should not contain CEII or confidential information on of the project.

It is important that these executive summaries discuss key attributes of the Phase One Proposal as opposed to merely providing general descriptions of the QTPS Respondent's organization and/or accomplishments.

⁴ In the "Life-Cycle Cost Estimate Workbook" the life-cycle cost is found in cell C26 on sheet "RevReq_Full_Summary" and is referred to as "Net Present Value Revenue Requirement."

⁵ The proposed schedule includes key high-level milestones for development, siting, procurement of real estate rights, permitting, construction and completion of the Phase One Proposal.

Section 3

Phase One Proposal - QTPS Respondent Project Specification Qualification

The responses shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent must provide responses to the following three questions that relate to the qualifications and capabilities of the QTPS Respondent for this specific Phase One Proposal.

3.1 Labor Resources (The ISO anticipates this response may contain confidential information)

Question 3-1 - Describe how the QTPS Respondent has assembled a sufficiently-sized team (or planned team) with the staffing, equipment, knowledge, and skill required to undertake the design, construction, permitting, siting, operation, and maintenance for this specific Phase One Proposal.

3.2 Financial Resources (The ISO anticipates this response may contain confidential information)

Question 3-2 - Describe how the QTPS Respondent and its team (or planned team) will have sufficient financial resources; for example, satisfactory credit ratings and other financial indicators as well as the demonstrated ability to assume liability for major losses resulting from failure of any part of the facilities for this specific Phase One Proposal.

3.3 Project Management and Scheduling (The ISO anticipates this response may contain confidential information)

Question 3-3 - Describe how the QTPS Respondent has the ability to meet the proposed schedule for development and completion of the Phase One Proposal consistent with the QTPS's proposed in service date.

Section 4

Phase One Proposal - Facility Description and Cost Estimates

The intent of the questions in this section is to collect high level information on the components and cost estimates which comprise the QTPS Respondent's Phase One Proposal. Detailed modeling and cost data will be detailed in Sections 5 and 6 of this document, respectively. For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) it is the responsibility of the QTPS Respondent to provide responses, which may be based on publicly available information for the proposed upgrade.

For each question, there is an Instructions and RFP360 column. The Instructions column describes the information the ISO requires in the QTPS Respondent's Phase One Proposal submission. The RFP360 column displays sample responses to be used by the QTPS Respondent to answer the questions if applicable. The language in the RFP360 column is shown as a guide and will need to be modified to reflect the QTPS Respondent's actual responses.

Section 4.4 and Sections 4.6 through 4.22 require the QTPS Respondent to submit installed cost estimates for either the entire Phase One Proposal or an individual component of the Phase One Proposal. The cost estimates shall include material, labor and equipment, right of way, engineering/permitting/indirects, escalation, AFUDC, and contingency. Only the cost estimate amount shall be submitted in these sections. The individual items which make up the cost estimate shall be submitted in the Installed Cost Estimate Workbook which is part of the RFP package posted on the ISO website at <http://www.iso-ne.com> > System Planning > Competitive Transmission Projects.⁶ The total installed cost estimate submitted in Section 4.4 should equal the summation of all of the cost estimates provided in Sections 4.6 through 4.22.

Section 4.6 requires the QTPS Respondent to only submit the life-cycle cost estimate⁷ for their entire Phase One Proposal. For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) the QTPS Respondent is not required to include the costs of these upgrades in establishing the life-cycle cost. No supporting calculations are required to be provided as part of their Phase One Proposal to provide evidence of their quoted life-cycle cost response. For those QTPS Respondents which successfully make it onto the listing of qualifying Phase One Proposals, the ISO will require the QTPS Respondent to complete and submit a Life-Cycle Cost Estimate Workbook. A sample copy of the Life-Cycle Cost Workbook is provided in the RFP package and found on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects.⁸

The calculations of applicable ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England. ISO Planning Procedure No. 7 applies to: overhead conductors, cables, power transformers, series and

⁶ <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

⁷ Life-cycle cost is a single value and shall be calculated as the summation of the present value of annual costs over the full life span of the Phase One Proposal. (To calculate the present value of the annual costs, the discount rate is 8.3%, the inflation rate is 1.5% and the cost valuation year is 2023.) The annual costs shall include the design, engineering, construction, operation, maintenance, repair, taxes, depreciation, interest, equity, and administration costs.

⁸ <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>.

shunt capacitors/reactors, circuit breakers, switches, current transformers, wave traps, current transformers circuit components, VAR compensators and HVDC systems.

All Phase One Proposal installed cost estimates shall use the same cost valuation year determined by the ISO. For this RFP, the cost valuation year is 2023.

It is assumed that all work described in the following sections is Pool Transmission Facility (PTF)⁹ work or will become part of the PTF as a result of the Phase One Proposal. If the work described is not PTF work, then the QTPS Respondent shall identify the work as “Other” work in their RFP360 responses and in the Installed Cost Estimate Workbook.

4.1 Short Summary

Question 4-1 - Provide a short summary of the Phase One Proposal.

Instructions	RFP360 Response
<p>The response shall state all of the components which comprise the Phase One Proposal in a bulleted format. The type of equipment (e.g. transformers, shunt devices) shall be totaled and any work on lines (new line, rebuild, or reconductoring) shall be grouped by voltage level and the total mileage of the work shall be stated.</p> <p>When completing the response, list the components of the Phase One Proposal in the order as asked in the following sections (Sections 4.6 to Section 4.21). The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>Written response example – “To solve the stated needs the Phase One Proposal includes:</i></p> <ul style="list-style-type: none"> • <i>the reconductoring of a 345 kV line for 3.2 miles</i> • <i>the rebuild of a 230 kV line totaling 4.5 miles</i> • <i>three new 115 kV lines totaling 27.8 miles</i> • <i>one new 345 kV breaker and a half GIS station with three bays</i> • <i>two new 345/115 kV autotransformers</i> • <i>one 345/115 kV autotransformer will be replaced</i> • <i>five new capacitor banks installed in various locations, and</i> • <i>one new synchronous condenser will be installed”</i>

4.2 Geographic Map

Question 4-2 - Provide a geographic map of the Phase One Proposal.

Instructions	RFP360
<p>The geographical map shall show the Phase One Proposal full view of the route of new line(s), the route of line(s) that are being rebuilt or reconducted, the location on new station(s) and the location of station(s) where major work is being performed. Each new line and station shall be marked with an identifier</p>	<p><i>Uploaded file example</i></p>

⁹ PTF or Pool Transmission Facilities are the transmission facilities owned by PTOs, over which the ISO shall exercise Operating Authority in accordance with the terms set forth in the TOA, rated 69 kV or above required to allow energy from significant power sources to move freely on the New England Transmission System. See Section II.49 of the Open Access Transmission Tariff for more information. https://www.iso-ne.com/static-assets/documents/regulatory/tariff/sect_2/oatt/sect_ii.pdf

that will be consistently used in other responses in the RFP. Only a PDF file shall be accepted.



4.3 One Line Diagram(s)

Question 4-3 - Provide one line diagram(s) of the Phase One Proposal.

Instructions	RFP360
<p>One-line diagram(s) shall be provided to show new or modified equipment in addition to existing or already planned system changes. The detailed one-line diagram(s) of the proposed facilities shall show the connectivity between all new proposed equipment (i.e., circuit breakers, transformers, shunt-connected capacitor banks, shunt-connected reactors, dynamic reactive devices, transmission lines, etc.) and the proposed bus configuration at the Point(s) of Interconnection. Each new station, line, and equipment shall be marked with an identifier that will be consistently used in other responses in the RFP. The response requires at least one file at a minimum to be uploaded into RFP360 and only PDF files shall be accepted.</p>	<p><i>Uploaded file example</i></p>

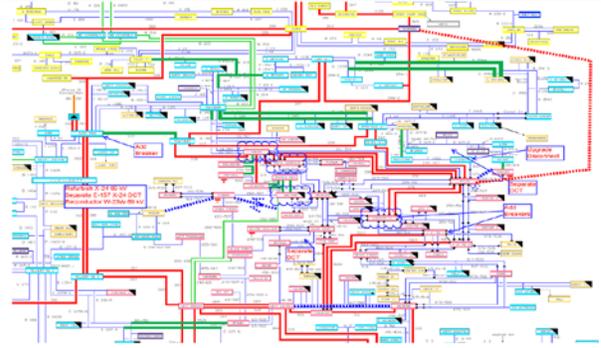
4.4 One Line Block Diagram

Question 4-4 - Provide a one line block diagram of the Phase One Proposal.

Instructions	RFP360
<p>A one line block diagram¹⁰ shall be provided to show new, modified, or removed line(s) and station(s). In addition, notes can be added to show work on a line such as separating a multiple circuit tower or reconductoring a line. The purpose of a one line block diagram is to</p>	<p><i>Uploaded file example</i></p>

¹⁰ A one line block diagram is similar to the ISO system diagram prints which show stations as blocks and the lines which connect to the stations.

show the connectivity between all new, modified, and removed lines and stations. Each new station and line shall be marked with an identifier that will be consistently used in other responses in the RFP. Only a PDF file shall be accepted.



For more clarity, see the Greater Boston Area Transmission Solutions Study, Figure 5-2 on page 73, posted on the PAC website on August 12, 2015 as an example. The report can be accessed at the following link: https://smd.iso-ne.com/operations-services/ceii/pac/2015/08/final_greater_boston_transmission_solution_study_reports.zip

4.5 Proposal Installed Cost Estimate

Question 4-5 - Provide the installed cost estimate for the Phase One Proposal.

Instructions	RFP360
The response shall state the total installed cost estimate for all of work which comprises the Phase One Proposal. The response shall be submitted in a narrative form and not in an uploaded file.	<i>Written response example – “The total installed cost estimate for the Phase One Proposal is \$X.”</i>

4.6 Proposal Life-Cycle Cost Estimate

Question 4-6- Provide the life-cycle cost estimate for the Phase One Proposal.

Instructions	RFP360
The response shall state the life-cycle cost estimate for all of work which comprises the Phase One Proposal. The response shall be submitted in a narrative form and not in an uploaded file. The life-cycle cost estimate shall not include upgrade(s) located on or connected to a PTO’s existing transmission system where the QTPS Respondent is not the PTO for the existing system element(s). Rather, such life-cycle costs shall be submitted by the responsible PTO when requested by the ISO.	<i>Written response example – “The life-cycle cost estimate for the Phase One Proposal is \$X.”</i>

<p>Note that the Life-Cycle Cost Workbook was developed to be able to accept information for up to a 60-year life, but QTPS Respondents shall only provide data for the expected life of each component.</p>	
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4.7 345 kV Line Work

Question 4-7- Describe all 345 kV line work in the Phase One Proposal and the installed cost estimate for each component of 345 kV line work.

Instructions	RFP 360
<p>The response shall state the type of work being done (new, rebuild, or reconductor), the voltage level, whether the facility is overhead or underground (OH or UG), the circuit ID, the location of all terminals for the line, the total mileage of the work, the summer normal, Long Time Emergency (“LTE”) and Short Time Emergency (“STE”) ratings¹¹ of the proposed line, and the installed cost estimate for the work. If there is more than one 345 kV line component, then an entry at the end of the response shall be added to reflect the total installed cost for all of the 345 kV line work. Each new line shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file. Do not include any multiple circuit tower work associated with this line. That information is to be provided in response to questions 4-11 and 4-12.</p>	<p><i>Written response examples – “Install a new 345 kV OH line ID# 300 from “A” station to “B” station (3.4 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Rebuild 345 kV OH 333 line from “C” station to “D” station (12.8 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Reconductor 345 kV UG line 311 from “E” station to “F” station (9.7 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>The total installed cost estimate for 345 kV line work is \$X.”</i></p>

4.8 230 kV Line Work

Question 4-8- Describe all 230 kV line work in the Phase One Proposal and the installed cost estimate for each component of 230 kV line work.

Instructions	RFP360
<p>The response shall state the type of work being done (new, rebuild, or reconductor), the voltage level, whether the facility is overhead or underground (OH or UG), the circuit ID, the</p>	<p><i>Written response examples – “Install a new 230 kV OH line ID# 200 from “G” station to “H” station (3.4 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ</i></p>

¹¹ The summer ratings are as follows: The Normal rating is a continuous 24 hour rating, the Long Time Emergency (LTE) rating is a 12 hour rating and the Short Time Emergency (STE) rating is a 15 minute rating.

<p>location of all terminals for the line, the total mileage of the work, the summer normal, Long Time Emergency (“LTE”) and Short Time Emergency (“STE”) ratings of the proposed line, and the installed cost estimate for the work. If there is more than one 230 kV line component, then an entry at the end of the response shall be added to reflect the total installed cost for all of the 230 kV line work. Each new line shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file. Do not include any multiple circuit tower work associated with this line. That information is to be provided in response to questions 4-11 and 4-12.</p>	<p><i>MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Rebuild 230 kV OH 222 line from “J” station to “K” station (12.8 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Reconductor 230 kV UG line 211 from “L” station to “M” station (9.7 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>The total installed cost estimate for 230 kV line work is \$X.”</i></p>
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4.9 115 kV Line Work

Question 4-9- Describe all 115 kV line work in the Phase One Proposal and the installed cost estimate for each component of 115 kV line work.

Instructions	RFP360
<p>The response shall state the type of work being done (new, rebuild, or reconductor), the voltage level, whether the facility is overhead or underground (OH or UG), the circuit ID, the location of all terminals for the line, the total mileage of the work, the summer normal, Long Time Emergency (“LTE”) and Short Time Emergency (“STE”) ratings of the proposed line, and the installed cost estimate for the work. If there is more than one 115 kV line component, then an entry at the end of the response shall be added to reflect the total installed cost for all of the 115 kV line work. Each new line shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file. Do not include any multiple circuit tower work associated with this line. That information is to be provided in response to questions 4-11 and 4-12.</p>	<p><i>Written response examples – “Install a new 115 kV OH line ID# 100 from “N” station to “P” station (3.4 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Rebuild 115 kV OH 111 line from “Q” station to “R” station (12.8 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Reconductor 115 kV UG line 199 from “S” station to “T” station (9.7 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>The total installed cost estimate for 115 kV line work is \$X.”</i></p>

4.10 69 kV Line Work

Question 4-10- Describe all 69 kV line work in the Phase One Proposal and the installed cost estimate for each component of 69 kV line work.

Instructions	RFP360
<p>The response shall state the type of work being done (new, rebuild, or reconductor), the voltage level, whether the facility is overhead or underground (OH or UG), the circuit ID, the location of all terminals for the line, the total mileage of the work, the summer normal, Long Time Emergency (“LTE”) and Short Time Emergency (“STE”) ratings of the proposed line, and the installed cost estimate for the work. If there is more than one 69 kV line component, then an entry at the end of the response shall be added to reflect the total installed cost for all of the 69 kV line work. Each new line shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file. Do not include any multiple circuit tower work associated with this line. That information is to be provided in response to questions 4-11 and 4-12.</p>	<p><i>Written response examples – “Install a new 69 kV OH line ID# 60 from “U” station to “V” station (3.4 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Rebuild 69 kV OH 61 line from “W” station to “X” station (12.8 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>Reconductor 69 kV UG line 62 from “Y” station to “Z” station (9.7 miles). The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The installed cost estimate is \$X.</i></p> <p><i>The total installed cost estimate for 69 kV line work is \$X.”</i></p>

4.11 Multiple Circuit Tower (MCT) Additions

Question 4-11 - Describe all work to install:

- ***new lines that will share new towers and create a new MCT configuration,***
- ***a new or existing line installed on one or more existing circuit towers to form a new or modified MCT configuration, and***
- ***the installed cost estimate for each multiple circuit tower addition.***

Instructions	RFP360
<p>The response shall state any new or modified MCT configurations resulting from new lines that will share new towers, or the installation of new or existing lines onto existing towers. Each entry shall state the lines that will comprise the new or modified MCT configuration and the total length of the MCT configuration shared by all the lines. In addition, each entry shall identify if all MCT configurations for the common lines to the MCTs are used only for station entrance and</p>	<p><i>Written Response examples = “The new 345 kV OH line ID# 300 from “A” station to “B” station and the new 115 kV OH line ID# 100 from “N” station to “P” station will be installed on the same set of towers from location “Y” to location “Z”, creating a new double circuit tower configuration that is X miles long.</i></p> <p><i>The existing 345 kV line ID# 301 from “T” station to “U” station will be moved onto the towers that carry the existing 345 kV line</i></p>

<p>exit purposes, do not exceed five towers at each station and the total length of the MCT configurations is less than one mile.</p> <p>No cost or rating information shall be provided in this section, unless the new or modified MCT only involves existing lines, and there is no reconductoring or rebuild work associated with those lines. Information on ratings and costs associated with each new line or the reconductoring or rebuilding of existing lines shall be listed with each line's corresponding entry in the appropriate section above (see Sections 4.6 to 4.9).</p> <p>The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>ID#302 from "V" station to "W" station at location "G", creating a new double circuit tower configuration that is 0.75 miles long. The installed cost estimate is \$X.</i></p> <p><i>The new 115 kV OH line ID# 100 from "N" station to "P" station will be installed on the towers that carry the "O" and "Q" lines out of the "P" station. This modified MCT configuration is less than one mile long and comprises of only 4 towers and is used only for station entrance and exit purposes.</i></p> <p><i>The total installed cost estimate for the new or modified MCT configuration work listed in this section (and not covered in Sections 4.6 to 4.9) is \$X."</i></p>
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4.12 Multiple Circuit Tower (MCT) Separations

Question 4-12 - Describe all work to separate multiple circuit towers in the Phase One Proposal and the installed cost estimate for each multiple circuit tower separation.

<p>Instructions</p> <p>The response shall state the lines that are being separated and their corresponding voltage levels, the location where the separation occurs and the installed cost estimate for the work related to the separation of the lines. No cost or rating information shall be provided in this section unless the MCT separation is the only work being done to the lines and there is no reconductoring or rebuild work associated with those lines. Information on ratings and costs associated with the reconductoring or rebuilding of existing lines shall be listed with each line's corresponding entry in the appropriate section above (see Sections 4.6 to 4.9).</p> <p>If there is more than one entry, then an entry at the end of the response shall be added to reflect the total installed cost for all of the multiple circuit tower separations. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p>RFP360</p> <p><i>Written response examples - "Separate the "A" Line (115 kV) and "B" Line (345 kV) multiple circuit tower from "X" station to "Y" station at an installed cost of \$X.</i></p> <p><i>Separate the "C" Line (115 kV) and "D" Line (115 kV) from "W" station to the "G" junction at an installed cost of \$X.</i></p> <p><i>The total installed cost estimate for the multiple circuit tower separation work is \$X."</i></p>
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4.13 New Stations Including Breakers and Switches

Question 4-13 - Describe all new station(s) installations including breakers and switches in the Phase One Proposal and the installed cost estimate for the new station(s).

Instructions	RFP360
<p>The response shall state the voltage level, whether it is an air insulated substation or gas insulated substation (AIS or GIS), the breaker arrangement (e.g. breaker and a half), new name (if known), substation ID, the interrupting capability of any new breakers, other major work that is related to the new station and the installed cost estimate for the work. If there is more than one new station, then an entry at the end of the response shall be added to reflect the total installed cost for all of the new station work. Each new station shall be marked with an identifier (substation name and voltage level) that will be consistently used in other responses in the RFP. Note – Large equipment such as transformers and capacitors shall be discussed in other questions. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>Written response examples – “Install a new 345 kV AIS breaker and a half station with three bays called “T” station, ID# 3. The nine new circuit breakers will have a short circuit interrupting capability of 63 kA. The installed cost is \$X.</i></p> <p><i>Install a new 115 kV, GIS breaker and a half station with two bays called “V” station, ID# 2. The five new circuit breakers will have a short circuit interrupting capability of 50 kA. The installed cost is \$X.</i></p> <p><i>The total installed cost estimate for new station work is \$X.”</i></p>

4.14 Existing Stations Including Breakers and Switches

Question 4-14 - Describe all work in existing station(s) including breakers and switches in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
<p>The response shall state the voltage level, the name of the existing station, the major work in the existing station, the interrupting capability of any newly installed circuit breaker, and the installed cost estimate for the work. If there is more than one existing station requiring major work, then an entry at the end of the response shall be added to reflect the total installed cost for all of the existing station work. Note – Large equipment such as transformers and capacitors shall be discussed in other questions. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>Written response examples – “Reconfigure the 230 kV “X” Station from a ring bus to a breaker and a half configuration at an installed cost of \$X.</i></p> <p><i>Install a new 115 kV bay position at “Z” station to accommodate a new 115 kV line from “Y” station at an installed cost of \$X. The three new circuit breakers will have a short circuit interrupting capability of 50 kA.</i></p> <p><i>Install a new 115 kV, 63 kA breaker ID# 15 at “L” station at an installed cost of \$X.</i></p>

	<p>Replace the existing 115 kV switch at “J” station with a new 115 kV switch at an installed cost of \$X.</p> <p>The total installed cost estimate for the existing station work is \$X.”</p>
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4.15 Transformers

Question 4-15- Describe all transformer work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
<p>The response shall state the type of work being done (add, replace, or remove), the voltage level, the summer normal, LTE and STE rating in MVA, the tap changing capability and controls for the transformer if any, the station where the transformer work is taking place, and the installed cost estimate for the work. If the work includes more than one transformer, then an entry at the end of the response shall be added to reflect the total installed cost for all of the transformer work. Each new transformer shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>Written response examples – “Install a new 345/115 kV LTC autotransformer ID#30 at “P” station at an installed cost of \$X. The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The controls for the automatic tap changer will hold the voltage of the ZZZ bus to AAA p.u. with a deadband of BBB p.u.</i></p> <p><i>Replace the existing autotransformer at “D” station with a new 230/115 kV LTC autotransformer at an installed cost of \$X. The summer normal, LTE and STE ratings are XXX MVA, YYY MVA, and ZZZ MVA, respectively. The taps will be manually changed via SCADA.</i></p> <p><i>The total installed cost estimate for the autotransformer work is \$X.”</i></p>

4.16 Shunt Capacitors

Question 4-16 - Describe all shunt capacitor work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
<p>The response shall state the type of work being done (new, replace, or remove), the voltage level, the size in MVAR at nominal voltage, the switching capability and controls for the shunt capacitors, the station where the shunt capacitor work is taking place, and the installed cost estimate for the work for each shunt capacitor installation. If the work includes more than one capacitor, then an entry at the end of the response shall be added to reflect</p>	<p><i>Written response example – “Install a new 115 kV 25.2 MVAR SCADA controlled capacitor ID# 40 at “C” station at an installed cost of \$X.</i></p> <p><i>Replace the existing 14.4 MVAR capacitor at “D” station with a new 37.5 MVAR automatically controlled capacitor at an installed cost of \$X. The controls for the capacitor will place the capacitor in service when voltage is below AAA p.u. for BBB seconds on the ZZZ bus. The controls</i></p>

the total installed cost for all of the capacitor work. Each new capacitor shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.	<p><i>for the capacitor will remove the capacitor from service when voltage is above AAA p.u. for BBB seconds on the ZZZ bus.</i></p> <p><i>The total installed cost estimate for the capacitor work is \$X."</i></p>
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4.17 Shunt Reactors

Question 4-17 - Describe all shunt reactor work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
The response shall state the type of work being done (new, replace, or remove), the voltage level, the size in MVAR at nominal voltage, shunt reactor type (fixed or variable), the switching capability and controls for the shunt reactors, the station where the shunt reactor work is taking place, and the installed cost estimate for the work for each shunt reactor installation. If the work includes more than one shunt reactor, then an entry at the end of the response shall be added to reflect the total installed cost for all of the shunt reactor work. Each new shunt reactor shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.	<p><i>Written response examples – “Install a new 345 kV 75 MVAR variable, SCADA controlled Reactor ID# 50 at “R” station at an installed cost of \$X.</i></p> <p><i>Replace the existing 75 MVAR reactor at “U” station with a new variable, automatically controlled, 150 MVAR reactor at an installed cost of \$X. The controls for the automatic tap changer will hold the voltage of the ZZZ bus to AAA p.u. with a deadband of BBB p.u.</i></p> <p><i>The total installed cost estimate for the shunt reactor work is \$X."</i></p>

4.18 Dynamic Reactive Devices

Question 4-18 - Describe all dynamic reactive device work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
The response shall state the type of work being done (new, replace, or remove), the voltage level, the size in MVAR at nominal voltage, device (e.g. STATCOM, SVC, DVAR, synchronous condenser, etc.), the station where the dynamic reactive device work is taking place, the controls and the installed cost estimate for the work. If the work includes more than one dynamic reactive device, then an entry at the end of the response shall be added to reflect	<p><i>Written response examples – “Install a new 345 kV, 200 MVAR STATCOM ID# 60 at “K” station at an installed cost of \$X. The controls for the STATCOM will hold the voltage of the ZZZ bus to AAA p.u.</i></p> <p><i>Add two new 115 kV, +25/-12.5 MVAR synchronous condenser at “L” station at an installed cost of \$X. The controls for the</i></p>

<p>the total installed cost for all of the dynamic reactive device work. Each new dynamic reactive device shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>synchronous condensers will hold the voltage of the ZZZ bus to AAA p.u.</i></p> <p><i>Replace a 115 kV, 20 MVAR DVAR at "J" station with a +50/-25 synchronous condenser at an installed cost \$X.</i></p> <p><i>The total installed cost estimate for the dynamic reactive devices work is \$X."</i></p>
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4.19 Phase Angle Regulators (PARs)

Question 4-19 - Describe all phase angle regulator (PAR) work in the Phase One Proposal and the installed cost estimate for the work.

<p>Instructions</p> <p>The response shall state the type of work being done (new, replace, or remove), the voltage level, the range measured in degrees, the control scheme of the PAR, the station where the PAR work is taking place, and the installed cost estimate for the work. If the work includes more than one PAR, then an entry at the end of the response shall be added to reflect the total installed cost for all of the PAR work. Each new PAR shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p>RFP360</p> <p><i>Written response examples – "Install a new 115 kV +/- 25 degrees, automatically controlled PAR ID# 70 at "Q" station at an installed cost of \$X." The controls for the PAR will hold the MW flow between bus YYY and bus ZZZ to 85 MW +/-10 MW.</i></p> <p><i>Remove the existing +/- 25 degrees, SCADA controlled PAR at "V" station at an installed cost of \$X.</i></p> <p><i>The total installed cost estimate for the PAR work is \$X."</i></p>
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4.20 Series Reactors

Question 4-20 - Describe all series reactor work in the Phase One Proposal and the installed cost estimate for the work.

<p>Instructions</p> <p>The response shall state the type of work being done (new, replace, or remove), the voltage level, the impedance of the series reactor in % (on a 100 MVA base), the station where the series reactor work is taking place, any automatic control schemes, and on what transmission element the series reactor is being installed, and the installed cost estimate for the work. If the work includes more than one series reactor, then an entry at the end of</p>	<p>RFP360</p> <p><i>Written response examples – "Install a new 115 kV, SCADA operated 3% series reactor ID# 80 on "J" line at "C" station at an installed cost of \$X."</i></p> <p><i>Remove the existing 5% series reactor at "V" station at an installed cost of \$X.</i></p> <p><i>The total installed cost estimate for the series reactor work is \$X."</i></p>
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<p>the response shall be added to reflect the total installed cost for all of the series reactor work. Each new series reactor shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.</p>	
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4.21 Series Capacitors

Question 4-21 - Describe all series capacitor work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
<p>The response shall state the type of work being done (new, replace, or remove), the voltage level, the impedance of the series capacitor in % (on a 100 MVA base), the station where the series capacitor work is taking place, any automatic control schemes, and on what transmission element the series capacitor is being installed, and the installed cost estimate for the work. If the work includes more than one series capacitor, then an entry at the end of the response shall be added to reflect the total installed cost for all of the series capacitor work. Each new series capacitor shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.</p>	<p><i>Written response examples – “Install a new 345 kV, SCADA controlled 3% series capacitor ID# 90 on “K” line at “E” station at an installed cost of \$X.”</i></p> <p><i>Remove the existing 5% series capacitor at “N” station at an installed cost of \$X.</i></p> <p><i>The total installed cost estimate for the series capacitor work is \$X.”</i></p>

4.22 HVDC

Question 4-22 - Describe all HVDC work in the Phase One Proposal and the installed cost estimate for the work.

Instructions	RFP360
<p>The response shall state the capacity of the HVDC line in MW, the voltage level of the HVDC line, the HVDC converter terminal stations, and the installed cost estimate for the work, and the HVDC technology (e.g. VSC or conventional). If the work includes more than one HVDC line, then an entry at the end of the response shall be added to reflect the total installed cost for all of the HVDC work. Each new HVDC line</p>	<p><i>Written response example – “Install a new 1,000 MW, +/-300 kV HVDC line ID# 500 from the existing 345 kV “A” station in ME to the new 345 kV “Y” station in MA at an installed cost of \$X. The HVDC technology is VSC.”</i></p>

shall be marked with an identifier that will be consistently used in other responses in the RFP. The response shall be submitted in a narrative form and not in an uploaded file.	
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4.23 All Other Work

Question 4-23- Describe all other work in the Phase One Proposal that has not been discussed in the previous questions and the installed cost estimate for the work.

Instructions	RFP360
The response shall describe the other work that has not been discussed in the previous questions and shall include voltage level, size of equipment, the location of the work if applicable, any control schemes, and the installed cost estimate for the work. If the other work includes more than one line item, then an entry at the end of the response shall be added to reflect the total installed cost for all of the other work. The response shall be submitted in a narrative form and not in an uploaded file.	<p><i>Written response examples –Upgrade the 345 kV N line terminal equipment at “B” station at an installed cost of \$X.</i></p> <p><i>Upgrade the 115 kV S station to Bulk Power System (BPS) standards at an installed cost of \$X.</i></p> <p><i>The total installed cost estimate for all other work is \$X.”</i></p>

Section 5

Modeling Data

The responses for this section are required to be submitted in the form of attached files. Details concerning the attached files are discussed below.

The calculation of percent impedance values provided in the modeling data shall be based on a 100 MVA base.

The calculations of applicable ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England. ISO Planning Procedure No. 7 applies to: overhead conductors, cables, power transformers, series and shunt capacitors/reactors, circuit breakers, switches, current transformers, wave traps, current transformers circuit components, VAR compensators and HVDC systems.

5.1 Steady State Power Flow and Short Circuit Modeling Data

Question 5-1 – The QTPS Respondent shall submit their Phase One Proposal steady state powerflow and short circuit modeling information.

The QTPS Respondent has two options to submit their Phase One Proposal steady state power flow and short circuit modeling information.

Option 1: Submit PSSE, ASPEN, and Other Requested Files

The QTPS Respondent can submit PSSE files (for steady state power flow modeling) and ASPEN files (for short circuit modeling) and other requested files which completely define their Phase One Proposal for the purposes of steady state power flow and short circuit modeling. **This is the preferred option.**

For submitting PSSE related files to model the Phase One Proposal for steady state power flow analysis:

1. Any PSSE related files must be compatible with PSSE v33.
2. Either IDEV (.idv) or Power Flow Change Data (.raw) files are to be used to represent the Phase One Proposal in the New England steady state power flow models that will be used in the evaluation process for this RFP. Any submitted IDEV or Power Flow Change Data files must:
 - i. execute all needed actions to reflect any new, modified or deleted transmission facilities needed to represent the complete Phase One Proposal.
 - ii. be executed in the required version of PSSE without any errors on the New England steady state power flow models that will be used in the evaluation process of this RFP.
 - iii. contain instructions on the sequence of executing the submitted files if multiple files are provided.
3. A Contingency (.con) file is to be used to represent all changes to the contingency modeling information as a result of introducing the Phase One Proposal into the New England steady state power flow models that will be used in the evaluation process of this RFP. This Contingency file must only contain modeling information for contingencies that have been

added, modified or deleted as a result of the Phase One Proposal. If a contingency doesn't change based on the QTPS Respondent's Phase One Proposal, it should not be included in the Contingency file. The Contingency file must:

- i. list all new, modified and deleted contingencies due to the introduction of the Phase One Proposal in a comments section at the top of the Contingency file. Each contingency listed in this section must be labeled as either "new", "modified" or "deleted".
- ii. define, in a separate section, all new contingencies introduced by the Phase One Proposal.
- iii. define, in a separate section, all modified contingencies due to the introduction of the Phase One Proposal. The modified contingency definitions must be based on the related contingency definitions within the pre-solution contingency file provided as part of this RFP package.
- iv. be executed in the required version of PSSE without any errors on the New England steady state power flow models that will be used in the evaluation process of this RFP.
- v. be supplemented with any Load Throwover files needed to completely model all contingencies.

For submitting ASPEN related files to model the Phase One Proposal for short circuit analysis:

1. Any ASPEN related files must be compatible with ASPEN OneLiner v14.
2. ASPEN Change File (.chf) files are to be used to represent the Phase One Proposal in the New England short circuit models that will be used in the evaluation process for this RFP.

Any submitted ASPEN Change File files must:

- i. execute all needed actions to reflect any new, modified or deleted transmission facilities needed to represent the complete Phase One Proposal.
- ii. be executed in the required version of ASPEN without any errors on the New England short circuit models that will be used in the evaluation process of this RFP.
- iii. have information provided on the sequence of executing the provided files if multiple files are provided.

Option 2: Submit Modeling Data Workbook and Other Requested Files

In the event that the QTPS Respondent is unable to provide Phase One Proposal modeling information through PSSE and Aspen files, the QTPS Respondent can fill out and submit the Modeling Data Workbook and other requested files and upload the files to RFP360. The ISO has provided a Modeling Data Workbook for Phase One Proposal submissions that is publicly posted on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects.¹² QTPS Respondents must utilize the Modeling Data Workbook and must complete it to the specified level of detail as described in this section and the Modeling Data Workbook:

1. The columns in the Modeling Data Workbook's worksheets have been highlighted:
 - i. **Yellow** – Required Data: a workbook containing any blank entries in a required data field will be considered incomplete.
 - ii. **No Highlight** – Optional Data
 - iii. **Grey** – No Data Required: fields that are automatically populated by the respective software program
 - iv. **Black** – No Data Allowed: leave the corresponding fields blank

¹² <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

2. A Text (.txt) file is to be used to represent all changes to the contingency modeling information as a result of introducing the Phase One Proposal into the New England steady state power flow models that will be used in the evaluation process of this RFP. This Text file must only contain modeling information for contingencies that have been added, modified or deleted as a result of the Phase One Proposal. If a contingency doesn't change based on the QTPS Respondent's Phase One Proposal, it should not be included in the Text file. The Text file must:
 - i. list all new, modified and deleted contingencies due to the introduction of the Phase One Proposal in a comments section at the top of the Text file. Each contingency listed in this section must be labeled as either "new", "modified" or "deleted".
 - ii. define, in a separate section, all new contingencies introduced by the Phase One Proposal.
 - iii. define, in a separate section, all modified contingencies due to the introduction of the Phase One Proposal. The modified contingency definitions must be based on the related contingency definitions within the pre-solution contingency file provided as part of this RFP package.
 - iv. define, in a separate section, any Load Throwover information needed to completely model all contingencies.

5.2 Stability Modeling Data

Question 5-2 – The QTPS Respondent shall submit their Phase One Proposal stability modeling information.

The QTPS Respondent has two options to submit their Phase One Proposal stability modeling information.

Option 1: Submit PSSE and Other Requested Files

The QTPS Respondent can submit PSSE files and other requested files which completely define their Phase One Proposal for the purposes of stability modeling. **This is the preferred option.**

For submitting PSSE related files to model the Phase One Proposal for stability analysis:

1. Any PSSE related files must be compatible with PSSE v33.
2. Dynamics Data (.dyr) files are to be used to represent the Phase One Proposal in the New England stability snapshot models that will be used in the evaluation process for this RFP. Any submitted Dynamic Data files must:
 - i. provide all needed dynamics models and parameters for any new or modified transmission facilities needed to represent the complete Phase One Proposal. Any models for new transmission facilities must be from the standard PSSE model library.
 - ii. be executed and initialized in the required version of PSSE without any errors on the New England steady state power flow and stability models that will be used in the evaluation process of this RFP.
 - iii. have information provided on the sequence of executing the provided files if multiple files are provided.
3. Individual IDEV (.idv), Python (.py) or PSAS (.psas) files are to be used to represent all contingencies with changes to its contingency modeling information as a result of introducing the Phase One Proposal into the New England stability snapshot models that will be used in the evaluation process of this RFP. The IDEV, Python or PSAS files must:

- i. define all new contingencies introduced by the Phase One Proposal, and include all fault impedance values, tripping actions (including reclosing) and times needed to represent those contingencies.
 - ii. modify the contingency definitions for the contingencies that are modified due to the introduction of the Phase One Proposal, and include all fault impedance values, tripping actions (including reclosing) and times needed to represent those contingencies.
 - iii. be executed in the required version of PSSE without any errors on the New England steady state power flow and stability snapshot models that will be used in the evaluation process of this RFP.
4. A listing of any stability analysis contingencies eliminated due to the Phase One Proposal based on the original set of stability contingencies provided as part of this RFP shall be provided in a Microsoft Word (.docx) file.

Option 2: Submit Modeling Data through Use of PDF, Text and Word Files

In the event that the QTPS Respondent is unable to provide Phase One Proposal modeling information through PSSE files, the QTPS Respondent can submit the required data as follows:

1. Provide all needed dynamics models and parameters for any new or modified transmission facilities needed to represent the complete Phase One Proposal through the use of PDF files that are derived from the standard PSSE model library documentation.
2. Use individual Text (.txt) files to:
 - i. define all new contingencies introduced by the Phase One Proposal, and include all fault impedance values, tripping actions (including reclosing) and times needed to represent those contingencies.
 - ii. modify the contingency definitions for the contingencies that are modified due to the introduction of the Phase One Proposal, and include all fault impedance values, tripping actions (including reclosing) and times needed to represent those contingencies.
3. Provide a listing of any stability analysis contingencies eliminated due to the Phase One Proposal. This listing must be based on the original set of stability contingencies provided as part of this RFP and shall be provided in a Microsoft Word (.docx) file.

5.3 Additional Modeling Data Information

Question 5-3- The QTPS Respondent shall upload a file that describes any special considerations when modeling the Phase One Proposal.

The QTPS Respondent shall include a Microsoft Word (.docx) file that describes any special considerations when modeling the Phase One Proposal for steady state, short circuit and/or stability analyses that would not be otherwise included in the modeling information provided in sections 5.1 and 5.2 of this document. This includes, but is not limited to, any special control strategy considerations for transformers, dynamic reactive devices, series capacitors or reactors and HVDC stations.

5.4 Handling of Conflicts

The following order shall be used to determine the controlling response if there is conflict between any provided modeling information:

1. The data submitted in PSSE files for steady state power flow modeling,
2. The data submitted in ASPEN files for short circuit modeling,
3. The data contained in any submitted stability modeling related files,
4. The data contained in the Modeling Data Workbook and contingency definitions provided in a Text file, and
5. Any other responses provided in this RFP

Section 6

Installed Cost Estimate Workbook (*The ISO anticipates the responses in this section may contain confidential information*)

Question 6 – Upload a completed Installed Cost Estimate Workbook.

The ISO has provided an Installed Cost Estimate Workbook for Phase One Proposal submissions that is publicly posted on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects.¹³ QTPS Respondents shall utilize the Installed Cost Estimate Workbook and must complete it to the specified level of detail as described in this section and upload the completed copy into RFP360 under Question 6.

At the top of the Installed Cost Estimate Workbook, the QTPS Respondent shall provide the QTPS Respondent's legal name, the Phase One Proposal name and the date the Installed Cost Estimate Workbook was completed. The Installed Cost Estimate Workbook has two sections to be completed and instructions are detailed below.

The QTPS Respondent shall not include any Phase One Proposal development costs in their installed cost estimate or their life-cycle cost estimate.

6.1 Phase One Proposal Scope Summary

Paste the response previously submitted to the RFP360 Question 4-1 (Short Summary) into the Phase One Proposal Scope Summary in the Installed Cost Estimate Workbook.

6.2 Phase One Proposal Cost Summary

The discount rate to be used is 8.3%, the inflation rate is 1.5% and the cost valuation year is 2023. All QTPS Respondent(s) are required to submit their cost estimates using the specified values.

The QTPS Respondent shall not enter data into the Phase One Proposal Installed Cost Summary table. The cells in this table are populated from the Detailed Installed Cost Summary by PTF – Project Element and Detailed Installed Cost Summary by Other – Project Element tables.

The QTPS Respondent shall enter data into the Detailed Installed Cost Summary by PTF – Project Element and Detailed Installed Cost Summary by Other – Project Element tables. For each Phase One Proposal element the QTPS Respondent shall enter the following installed cost estimates for the following categories into the table:

- a. the Phase One Proposal element,
- b. material,
- c. labor and equipment,
- d. right of way,
- e. engineering/permitting/indirects,
- f. escalation,

¹³ <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

- g. AFUDC, and
- h. contingency.

Each Phase One Proposal element shall match the work described in Sections 4.6 through 4.22. If more rows are needed to describe the QTPS Respondents Phase One Proposal, the QTPS Respondent shall insert additional rows into the Detailed Installed Cost Summary by PTF – Project Element and Detailed Installed Cost Summary by Other – Project Element tables. The total installed cost for each Phase One Proposal element can be found in column “J”. The QTPS Respondent shall use the Phase One Proposal element totals in their responses to RFP Questions 4-6 to 4-22.

Each item (b through h) above is automatically totaled in the “Detailed Installed Cost Summary By PTF – Project Element” and “Detailed Installed Cost Summary By Other – Project Element” tables. The item totals (b through h) will populate the Phase One Proposal Installed Cost Summary table and the “Total Phase One Proposal Installed Cost” in cell “E34” shall represent the QTPS Respondent’s total installed cost estimate and shall be reported in RFP360 Question 4-4. Based on the item totals (b through h), a pie chart will be created in the Installed Cost Estimate Workbook.

There is a “Notes” section in the Detailed Installed Cost Summary By PTF – Project Element and Detailed Installed Cost Summary by Other – Project Element tables to allow the QTPS Respondent to submit additional information they think would be helpful to the ISO’s evaluation of their Phase One Proposal for PTF and Other work.

Section 7

Phase One Proposal – Performance, Feasibility, and Schedule

7.1 Addressing Identified Needs

Question 7-1 - Provide a detailed explanation of how the proposed Phase One Proposal addresses the identified needs.

The responses shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe how each Phase One Proposal Element solves the identified needs described in Part 1 of the RFP in Sections 2 and 5.

A complete QTPS Respondent's submittal shall address all identified needs. If the QTPS Respondent's submittal fails to address all of the identified needs, then the submittal is incomplete and therefore rejected.

7.2 Feasibility

Question 7-2 - Provide a summary of the feasibility of the Phase One Proposal to include the ability to site, permit, build, maintain, and operate the Phase One Proposal.

The responses shall be submitted in a narrative form and not in an uploaded file.

In addition to solving the identified needs, the QTPS Respondent shall describe how their Phase One Proposal is feasible, or in other words, how easily can their Phase One Proposal be sited, permitted, built, maintained, and operated. The QTPS Respondent shall discuss any obstacles that would impede the likelihood of their Phase One Proposal to be operational in the future by their stated in-service date and risk mitigation plans if obstacles do occur.

7.3 Expandability

Question 7-3 - Provide a summary of the future system expandability of the proposed solution.

The responses shall be submitted in a narrative form and not in an uploaded file.

In addition to solving the identified needs, the QTPS Respondent shall describe how their Phase One Proposal is expandable (i.e. does the Phase One Proposal occupy all of the remaining space in a right of way or is there space remaining to build future facilities, does the Phase One Proposal take the last position in a fully built out station or are there other positions available in the station for future construction, etc.).

7.4 Performance

Question 7-4 - Provide a summary of the anticipated electric system performance of the proposed solution.

The responses shall be submitted in a narrative form and not in an uploaded file.

In addition to solving the identified needs, the QTPS Respondent shall describe how their Phase One Proposal performs (e.g. does the analysis demonstrate how robust their Phase One Proposal is

including the level of thermal and voltage margin, if any, their Phase One Proposal delivers to the system, etc.).

7.5 Schedule

Question 7-5 - Provide the proposed schedule of the Phase One Proposal including key high-level milestones for development, siting, procurement of real estate rights, permitting, construction and completion of the Phase One Proposal.

The responses shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe the proposed schedule of their Phase One Proposal. The response shall include high level scheduling milestones and a description of any issues that may impact the goal of achieving those milestone dates.

7.6 Real Estate

Question 7-6 - Provide information on the right, title, and interest in rights of way, substations, and other property or facilities, if any, that would contribute to the Phase One Proposal or the means and timeframe by which such would be obtained.

The responses shall be submitted in a narrative form and not in an uploaded file.

In addition to solving the identified needs, the QTPS Respondent shall provide real estate information that pertains to their Phase One Proposal. The QTPS Respondent shall describe the need for real estate in their Phase One Proposal and any issues that may exist that would impact the procurement of the real estate and risk mitigation plans if certain obstacles do occur.

7.7 LSP Coordination

Question 7-7 - Identify any Local System Plans (LSP) that require coordination with the proposed solution.

The responses shall be submitted in a narrative form and not in an uploaded file.

In addition to solving the identified needs, the QTPS Respondent shall discuss any coordination with PTO concerning their LSPs. The QTPS Respondent shall:

- a. identify the PTO whose LSP plan is impacted by the Phase One Proposal,
- b. briefly describe the LSP, and
- c. describe how their Phase One Proposal interacts with the PTO's LSP.

Section 8

Phase One Proposal - Cost Structure Proposals

8.1 Cost Cap or Cost Containment Mechanisms

Question 8-1- Are any cost cap or cost containment mechanisms being included as part of the proposal? If yes, provide a high level summary of the mechanisms.

The response shall be submitted in a narrative form and not in an uploaded file.

The ISO only requires the QTPS Respondent to submit a high level description for any cost caps or cost containment proposals in their Phase One Proposal. For those QTPS Respondents which successfully make it to the listing of qualifying Phase One Proposals, the ISO will require the QTPS Respondent to provide a more detailed description of any cost caps or cost containment proposals in their Phase Two Solution. The QTPS Respondent shall refer to Section 12 to view the required information the ISO will require for their Phase Two Solution.

For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.

Section 9

Phase One Proposal - Other Information

Question 9 - The QTPS Respondent shall enter any other information that has not been provided that is important to the QTPS Respondent's Phase One Proposal.

The response shall be submitted in a narrative form and not in an uploaded file.

This section gives the QTPS Respondent the opportunity to provide additional information the QTPS Respondent:

- a. feels was not addressed by the other sections in the RFP and
- b. believes would be beneficial to the ISO's evaluation of their Phase One Proposal.

Section 10

Phase Two Solution – Administrative

Phase Two Solution responses require the QTPS Respondent to answer all questions. If a question does not pertain to the QTPS Respondent's Phase Two Solution, the QTPS Respondent shall respond with an "NA" and provide a brief reason why the QTPS Respondent believes the RFP question is not applicable. The QTPS Respondent shall refrain from making a reference to responses in other sections of the document as their response. Cutting and pasting responses or portion of responses from other questions as a response is acceptable.

10.1 Documentation (*The ISO anticipates this response may contain confidential information*)

Question 10-1 - Complete and upload the Index of Attachments file showing the list of attachment files the QTPS Respondent will be providing as responses to questions for the Phase Two Solution (Section 10 through 18) in RFP360 as stated in Section 3.6 of Part 1.

The same Index of Attachments file used in the Phase One Proposal shall be amended with new files for the Phase Two Solution to create a new file which includes a list of attachments for both the Phase One Proposal and Phase Two Solution.

The Index of Attachments file is part of the RFP package posted on the ISO website at <http://www.iso-ne.com> > System Planning > Competitive Transmission Projects.¹⁴

10.2 Phase One Proposal Update (*The ISO anticipates this response may contain confidential information*)

Question 10-2 - Provide certification that the information remains current and correct or update the information provided in the Phase One Proposal.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a statement certifying that the information remains current and correct or provide any necessary additional or clarifying information to the QTPS Respondent's Phase One Proposal responses.

10.3 Permits

Question 10-3 - Provide a list of all of the required major Federal, State and Local permits for the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a list of all the required major Federal, State and Local permits and describe any identified or potential risk(s) to obtain these permits for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

¹⁴ <http://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.

10.4 Updated Cost Information

Question 10-4a - Provide an updated installed cost estimate showing any changes to the installed cost estimate contained in the Phase One Proposal.

The response shall be submitted in a narrative form and not in an uploaded file.

The response shall state the updated installed cost estimate for all of work which comprises the Phase Two Solution. If the QTPS Respondent is not making changes to their Phase One Proposal installed cost estimate, their response shall state that there is no change to their Phase One Proposal installed cost estimate.

Question 10-4b - Provide an updated Installed Cost Estimate Workbook showing the changes to the installed cost of the Phase Two Solution components. (The ISO anticipates this response may contain confidential information)

The QTPS Respondents shall utilize their Phase One Proposal Installed Cost Estimate Workbook and update it and upload the completed copy into RFP360 under Question 10-4b. If the QTPS Respondent is not making changes to their Phase One Proposal Installed Cost Estimate Workbook, their response shall state that there is no change to their Phase One Proposal Installed Cost Estimate Workbook.

Information to fill out the Installed Cost Estimate Workbook can be found in Section 6.

Question 10-4c- Provide an updated life-cycle cost estimate showing the change to the life-cycle cost estimate contained in the Phase One Proposal.

The response shall be submitted in a narrative form and not in an uploaded file.

The response shall state the updated life-cycle cost estimate for all of work which comprises the Phase Two Solution. If the QTPS Respondent is not making changes to their Phase One Proposal life-cycle cost estimate, their response shall state that there is no change to their Phase One Proposal life-cycle cost estimate.

Question 10-4d - Upload a completed Life-Cycle Cost Estimate Workbook. (The ISO anticipates this response may contain confidential information)

The ISO has provided a Life-Cycle Cost Estimate Workbook for Phase Two Solution submissions that is publicly posted on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects. QTPS Respondents shall utilize the Life-Cycle Cost Estimate Workbook and must complete it upload the completed copy into RFP360 under Question 10-4d.

Instructions for completion of the Life-Cycle Cost Estimate Workbook can be found on the "Instructions" tab in the workbook. The requirement for the QTPS Respondent to provide costs does not apply for upgrade(s) located on or connected to a PTO's existing transmission system where the QTPS Respondent is not the PTO for the existing system element(s).

When completing the Life-Cycle Cost Estimate Workbook, a separate data input sheet shall be completed for each component. Note that the Life-Cycle Cost Workbook was developed to be able to accept information for up to a 60-year life, but QTPS Respondents developers shall only provide data for the expected life of each component. For purposes of completing the workbook, similar to the descriptions used in providing responses to questions 4.7 through 4.23, a component shall be as follows:

New or modifications to existing circuits including protection systems; series reactors and capacitors shall be described as a separate component

Multiple circuit tower additions, including protection systems unless already included as part of the new or modified circuits described above

Multiple circuit tower separations, including protection systems unless already included as part of the new or modified circuits described above

New stations including circuit breakers, switches, protection systems, etc. Power transformers, shunt capacitors, shunt reactors, dynamic reactive devices and phase angle regulators shall be described as separate components.

Existing stations, including circuit breakers, switches, protection systems, etc. switches, protection systems, etc. Power transformers, shunt capacitors, shunt reactors, dynamic reactive devices and phase angle regulators shall be described as separate components.

HVDC facilities, including all terminals

During the ISO's Phase Two Solution evaluation, cost information should be updated by the QTPS respondent, including the Backstop Transmission Solution provider, anytime the installed cost and/or life-cycle cost estimate changes by more than +/- 10% of the entire project. In cases where the Phase Two Solution includes modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent is not responsible for reporting installed cost and/or life-cycle cost estimate changes on the PTO's existing system element(s) and the costs of these elements are not considered in establishing the 10% threshold for the QTPS Respondent. Rather, those cost estimate changes will be reported by the responsible PTO if there is a cost change by more than +/- 10% of the total cost of the upgrades to the PTO's existing system elements. The QTPS Respondent must provide cost estimate changes for any remaining portion (excluding parts of the Phase Two Solution developed by the PTO(s) for existing system elements) of the proposal that in total change by more than +/- 10%. When any such cost estimate changes occur, the QTPS Respondent or responsible PTO shall have the obligation under this RFP to update the ISO with the following information through the RFP360 system:

- a. a revised Installed Cost Estimate Workbook showing the changes to the installed cost of the Phase Two Solution components, if applicable,
- b. a revised life-cycle cost estimate if applicable,
- c. the reasons for the changes to the installed cost and/or life-cycle cost estimate and whether those changes were within issues originally contemplated by the QTPS Respondent or whether the cost changes result from unanticipated factor, and

- d. whether the QTPS Respondent believes that the Phase One Proposal cost estimate accuracy is still valid or whether the anticipated costs will move outside of that range, and if so, by what amount.

The ISO has the right to no longer proceed with further consideration of a Phase Two Solution at any point during the process if the proposal is no longer competitive in terms of cost, electrical performance, future system expandability, or feasibility.

10.5 Regulatory Requirements over the Lifetime of the Phase Two Solution (*The ISO anticipates this response may contain confidential information*)

Question 10-5 - Describe the means by which the QTPS Respondent proposes to satisfy Federal, State or Local regulatory requirements for siting, constructing, owning and operating transmission projects.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a detailed description of any identified or potential risk(s) in meeting these regulatory requirements for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.

10.6 Updated Geographic Map

Question 10-6- Provide an updated geographic map of the Phase Two Solution.

The geographical map shall show the Phase Two Solution full view of the route of new line(s), the route of line(s) that are being rebuilt or reconductored, the location on new station(s) and the location of station(s) where major work is being performed. Each new line and station shall be marked with an identifier that will be consistently used in other responses in the RFP. Only a PDF file shall be accepted. The QTPS Respondent shall clearly mark on the geographic map any changes made from the geographic map submitted in the Phase One Proposal.

Section 11

Phase Two Solution - Design Details

11.1 Feasibility

Question 11-1 - Provide a detailed explanation of the feasibility of the Phase Two Solution to include the potential constraints and challenges for the QTPS Respondent to site, permit, build, maintain, and operate the Phase One Proposal.

The response shall be submitted in a narrative form and not in an uploaded file.

Building upon the Phase One Proposal response, the QTPS Respondent shall describe in detail how their Phase Two Solution is feasible, or in other words, how easily can their Phase Two Solution be sited, permitted, built, maintained, and operated. The QTPS Respondent shall discuss in detail any constraints and challenges that would impede the likelihood of their Phase Two Solution to be operational in the future by their stated in-service date and risk mitigation plans if obstacles do occur.

11.2 Expandability

Question 11-2 - Provide a detailed explanation of the potential future system expandability of the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Building upon the Phase One Proposal response, the QTPS Respondent shall describe in detail the potential future expandability of their Phase Two Solution (i.e. does the Phase Two Solution occupy all of the remaining space in a right of way or is there space remaining to build future facilities, does the Phase Two Solution take the last position in a fully built out station or are there other positions available in the station for future construction, etc.).

11.3 Design Standards

Question 11-3 - List the design standards used for the components of the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a list of the design standards used for the components of the Phase Two Solution. Do not provide the standards themselves unless specifically requested to do so by the ISO.

Facilities shall meet the interconnecting PTO(s) standard transmission line and substation design criteria at the interconnection point. If no interconnecting PTO(s) or applicable local standard exists, then, the applicable industry standard or Good Utility Practice will be used. As a minimum, all new facilities should comply with the current National Electric Safety Code. (List all organizations' design standards which will be used and any exceptions to design criteria which are being proposed.) For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.

11.4 Proposed Line Work

For each proposed new line or proposed modification to an existing line in the Phase Two Solution, the QTPS Respondent shall provide the following information for all proposed work on any existing or new transmission line. All responses shall be made in narrative form in RFP360 unless otherwise noted. Respond with “NA” for any questions that do not apply.

11.4.1 Line Rating

For each proposed new line (overhead line, cable or gas insulated line (GIL)) or proposed modification to an existing line (overhead line, cable or GIL), provide the following Line Rating information:

Question 11-4-1 - Limiting Element: List the line identifier, and then list the line’s thermal Summer and Winter Normal/LTE/STE ratings, and list the accompanying limiting element for each rating. The calculations of the thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

11.4.2 Routing

For each proposed new line (overhead line, cable or GIL) or proposed modification to the route of an existing line (overhead line, cable or GIL), provide the following Routing information:

Question 11-4-2a - Preliminary Line Route: List the line identifier, and then provide a full description of the proposed routing, including location, identifying any barriers or impediments, possible line crossings, and why the route was chosen.

Question 11-4-2b - Line Route Map: List the line identifier, and then provide a detailed map of the proposed routing, identifying any relevant physical or environmental elements. The Line Route Map shall be provided in a PDF file at a scale of 1”: 300-600 ft.

Question 11-4-2c - Risks: List the line identifier, and then provide a detailed description of any identified or potential risk(s) in each line routing for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

Question 11-4-2d - Other Items: Provide any other information related to ROUTING not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.3 Right-of-Way

For each proposed new line (overhead line, cable or GIL), or proposed modification to the use of an existing Right of Way associated with an existing line (overhead line, cable or GIL), provide the following Right-of-Way information:

Question 11-4-3a - Width (feet): List the line identifier, and then provide the width of Right-of-Way in feet required and how much right of way was/will be procured.

Question 11-4-3b - Description: List the line identifier, and then provide a full description of the Right-of-Way.

Question 11-4-3c - Federal, State or Local Requirements: List the line identifier, and then provide a description and documentation of Federal, State or Local requirements.

Question 11-4-3d - Clearance Requirements: List the line identifier, and then provide a description of required vegetation management in the Right-of-Way. (Example: Percentage of Right-of-Way requiring tree clearance is 10%)

Question 11-4-3e - Shared Use: List the line identifier, and then describe other uses of the ROW in addition to the facilities associated with the Phase Two Solution components (Example: Gas, railroad)

Question 11-4-3f - Risks: List the line identifier, and then provide a detail description of any identified or potential risk(s) in obtaining each line right-of-way for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

Question 11-4-3g - Other Items: List the line identifier, and then provide any other information related to RIGHT-OF-WAY not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.4 Environmental, Cultural, and Historical

For each proposed new line (overhead line, cable or GIL), or proposed modification to an existing line (overhead line, cable or GIL), provide the following Environmental, Cultural, and Historical information:

Question 11-4-4a - Study Requirements: List the line identifier, and then provide a description of environmental studies that are needed.

Question 11-4-4b - Wetland Requirements/Mitigation: List the line identifier, and then provide a description of wetland requirements and mitigation plans.

Question 11-4-4c - Floodplain Requirements/Mitigation: List the line identifier, and then provide a description of floodplain requirements and mitigation plans as specified in American Society of Civil Engineers ASCE-24.

Question 11-4-4d - Threatened and Endangered Species Mitigation: List the line identifier, and then provide a description of threatened and endangered species evaluation and mitigation plans.

Question 11-4-4e - Cultural/Historical Resource Requirements: List the line identifier, and then provide a description of cultural and/or historical resource requirements (such as those needed to address Native American archaeological resources) and mitigation plans.

Question 11-4-4f - Risks: List the line identifier, and then provide a detailed description of any identified or potential risk(s) for line environmental, cultural, and historical requirements for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

Question 11-4-4g - Other Items: Provide any other information related to ENVIRONMENTAL, CULTURAL, and HISTORICAL not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.5 Overhead Transmission Line Conductors

For each new proposed overhead transmission line, or proposed modification to the conductor of an existing overhead transmission line, provide the following overhead transmission line conductors information:

Question 11-4-5a - Type: List the line identifier, and then provide the type of conductor being used (Example: Conductor ACSR Bittern).

Question 11-4-5b - Size: List the line identifier, and then provide the size of conductor being used (kcmil) (Example: 1272).

Question 11-4-5c - Thermal Rating - List the line identifier, and then provide the Summer and Winter Normal, LTE and STE ratings (MVA). The calculations of the thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-4-5d - Number of Conductors per Phase: List the line identifier, and then provide the number of conductors per phase.

Question 11-4-5e - Other Items: Provide any other information related to OVERHEAD TRANSMISSION LINE CONDUCTORS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.6 Overhead Transmission Line Structures

For each new proposed overhead transmission line, or proposed modification to the structures of an existing overhead transmission line, provide the following overhead transmission line structures information:

Question 11-4-6a - Configurations: List the line identifier, and then provide the configuration of the structures being built (Example: H-Frame).

Question 11-4-6b - Foundation Type: List the line identifier, and then provide the foundation type of the structures (Example: Direct Embed).

Question 11-4-6c - Type of Terrain: List the line identifier, and then provide a description of the type of terrain.

Question 11-4-6d - Material: List the line identifier, and then provide the material of the structures being built. (Example: Steel)

Question 11-4-6e - NESC Assumptions: List the line identifier, and then provide a description of NESC Assumptions. (Example: Heavy Accretion)

Question 11-4-6f - Underbuild: List the line identifier, and then indicate whether the transmission line construction includes underbuild and describe the underbuilt facilities.

Question 11-4-6g - BIL Rating: List the line identifier, and then provide the BIL rating measured in kV.

Question 11-4-6h - ROW View Diagram: Upload a PDF file(s) showing the proposed and existing ROW cross section for each new or modified line in the Phase Two Solution. The edge of ROW and edge of vegetation shall be provided along with the overall ROW width, distances from edge of ROW to edge of vegetation and edge of vegetation to the centerline of each structure.

Question 11-4-6i - Other Items - Provide any other information related to OVERHEAD TRANSMISSION LINE STRUCTURES not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.7 Overhead Transmission Line Shield Wire

For each proposed new overhead transmission line, or proposed modification to the shield wire of existing overhead transmission line, provide the following overhead transmission line shield wire information:

Question 11-4-7a - Number: List the line identifier, and then provide the number of shield wires.

Question 11-4-7b - Type: List the line identifier, and then indicate the type(s) of shield wire utilized. (Example: OPGW)

Question 11-4-7c - Number of Fiber Pairs: List the line identifier, and then provide the number of fiber pairs for shield wire. Respond with "NA" if fiber is not being utilized.

Question 11-4-7d - Size: List the line identifier, and then provide the size of shield wire (kcmil).

Question 11-4-7e - Other Items: Provide any other information related to OVERHEAD TRANSMISSION LINE SHIELD WIRE not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.8 Overhead Transmission Line Design Criteria

For each proposed new overhead transmission line, or proposed modification to the structures of an existing overhead transmission line, provide the design criteria information requested below. For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.

Question 11-4-8a - Weather Loading: List the line identifier, and then provide a description of weather loading design assumed in estimate (Example: Extreme Wind (20.9 psf, 60 F); Extreme Ice (1.00" radial, 15 F, 4psf)

Question 11-4-8b - Other Items: Provide any other information related to OVERHEAD TRANSMISSION LINE DESIGN CRITERIA not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.9 Cables

For each new proposed cable transmission line, or proposed modification to an existing cable transmission line, provide the following cables information:

Question 11-4-9a - Type: List the line identifier, and then provide the type of cable being used (Example: XLPE).

Question 11-4-9b - Thermal Rating - List the line identifier, and then provide the Summer and Winter Normal, LTE and STE ratings (MVA). The calculations of the thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-4-9c - Number of Cables per Phase: List the line identifier, and then provide the number of conductors per phase.

Question 11-4-9d - Number of Fiber Pairs: List the line identifier, and then provide the number of fiber pairs being installed. Respond with "NA" if fiber is not being utilized.

Question 11-4-9e – Physical Properties of Cable Run: List the line identifier, and then describe the physical properties of the cable run (Example: Underground, Undersea, etc.).

Question 11-4-9f – Physical Infrastructure and Installation Method to Support Cable Run: List the line identifier, and then describe the physical infrastructure and installation method needed to support the cable run (Example: Concrete trench, jet plow).

Question 11-4-9g – Cooling Method: List the line identifier, and then describe the cooling method used (Example: Circulating oil). For pipe type cables, list the pumping facilities required for each cable, and identify if the pumping facilities are shared with the cooling equipment for other transmission elements. Respond with “NA” if cooling is not required for the cable transmission line.

Question 11-4-9h – Duct Bank Layout: For each Duct Bank Layout associated with a proposed new cable or proposed modified cable, upload PDF file(s) showing the Typical Duct Bank Cross Section showing the ducts for conductors, communication, and grounding. Identify any ducts that will be spares. For each duct, indicate the size and material that will be utilized.

Question 11-4-9i – Transitions: List the line identifier, and then describe any underground to overhead transition facilities associated with the cable.

Question 11-4-9j – Accessibility for Maintenance: List the line identifier, and then describe any issues or considerations with access to the cable for maintenance reasons.

Question 11-4-9k – Description of Design Criteria Used: List the line identifier, and then describe the design criteria used for the cable.

Question 11-4-9l – Other Items: Provide any other information related to CABLES not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.10 Gas Insulated Transmission Lines

For each new proposed GIL transmission line, or proposed modification to an existing GIL transmission line, provide the following information:

Question 11-4-10a - Type: List the line identifier, and then provide the type of gas being used (Example: SF6).

Question 11-4-10b – Thermal Rating: List the line identifier, and then provide the Summer and Winter Normal, LTE and STE ratings (MVA). The calculations of the thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-4-10c – Physical Infrastructure to Support the GIL Run: List the line identifier, and then describe the physical infrastructure to support the GIL run (Example: Concrete and steel supports)

Question 11-4-10d – Accessibility for Maintenance: List the line identifier, and then describe any issues or considerations with access to the GIL for maintenance reasons.

Question 11-4-10e – Description of Design Criteria Used: List the line identifier, and then describe the design criteria used for the GIL.

Question 11-4-10f - Other Items: List the line identifier, and then provide any other information related to GAS INSULATED TRANSMISSION LINES not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.11 Line Protection

For each proposed new line (overhead line, cable or GIL), or proposed modification to the protection systems of an existing line (overhead line, cable or GIL), provide the following information:

Question 11-4-11a - Schemes: List the line identifier, and then list the protection schemes directly applied to the line, and confirm if the schemes will meet the Transmission Line Protection Criteria in NPCC Directory 4: Bulk Power System Protection Criteria.

Question 11-4-11b - Communications: List the line identifier, and then list the communication technology used to support each protection scheme directly applied to the line and confirm if the communication systems will meet the Teleprotection Criteria and Criteria for Protection Systems Utilizing IEC 61850 Protocol in NPCC Directory 4: Bulk Power System Protection Criteria. Reply with "NA" if pilot protection schemes are not directly applied to the line.

Question 11-4-11c - Reclosing: List the line identifier, and then list the reclosing schemes directly applied to the line with the accompanying reclosing times and the end of the line that first attempts to reclose.

Question 11-4-11d - Other Items: List the line identifier, and then provide any other information related to LINE PROTECTION SCHEMES not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.4.12 Other Line Considerations

For each proposed new line (overhead line, cable or GIL), or proposed modification to an existing line (overhead line, cable or GIL), provide the following information:

Question 11-4-12a - Life Expectancy: List the line identifier, and then provide description of the estimated life expectancy in years for each line.

Question 11-4-12b - Outage Coordination: List the line identifier, and then provide a description of any possible outages requiring coordination and/or scheduling to facilitate construction related to the line. Specifically identify any impacted facilities.

Question 11-4-12c - Other Items: List the line identifier, and then provide any other information related to LINE ASSUMPTIONS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5 Proposed Station Work

For each proposed new station, or modification to an existing station in the Phase Two Solution, the QTPS Respondent shall provide the information requested in this section's questions as listed below. All responses shall be made in narrative form in RFP360 unless otherwise noted. The QTPS respondent shall respond with "NA" to questions that are not applicable to their proposed Phase Two Solution.

11.5.1 Location

For each proposed new station or proposed modification to an existing station, provide the following Location information:

Question 11-5-1a – Acquisitions: List the station identifier, and then provide a description of what Acquisitions are required for Right-of-Way or station footprint and how much Right-of-Way or real estate must be procured.

Question 11-5-1b - Overall Substation Property Dimensions: List the station identifier, and then provide the Overall Substation Property Dimensions (square feet).

Question 11-5-1c – Site Preparation: List the station identifier, and then provide a description of required Site Preparation.

Question 11-5-1d - Federal, State or Local Requirements: List the station identifier, and then provide a description and documentation of Federal, State or Local requirements.

Question 11-5-1e – Risks: List the station identifier, and then provide a detailed description of any identified or potential risk(s) for each station. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

Question 11-5-1f – Other Items: List the station identifier, and then provide any other information related to LOCATION INFORMATION not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.2 Environmental, Cultural, and Historical

For each proposed new station or proposed modification to an existing station, provide the following environmental, cultural, and historical information:

Question 11-5-2a - Study Requirements: List the station identifier, and then provide a description of environmental studies that are completed, being conducted, or required.

Question 11-5-2b- Siting Improvement Requirements: List the station identifier, and then provide a description of any siting improvement requirements.

Question 11-5-2c - Wetland Requirements/Mitigation: List the station identifier, and then provide a description of wetland requirements and mitigation plans.

Question 11-5-2d- Floodplain Requirements/Mitigation: List the station identifier, and then provide a description of Floodplain requirements and mitigation plans. as specified in American Society of Civil Engineers ASCE-24.

Question 11-5-2e - Threatened and Endangered Species Mitigation: List the station identifier, and then provide a description of threatened and endangered species evaluation and mitigation plans.

Question 11-5-2f - Cultural/Historical Resource Requirements: List the station identifier, and then provide a description of cultural and/or historical resource requirements and mitigation plans.

Question 11-5-2g - Corrosive/Heavy Contamination Area Requirements: List the station identifier, and then provide a description of any corrosive/heavy contamination area requirements and mitigation plans.

Question 11-5-2h –Risks: List the station identifier, and then provide a detail description of any identified or potential risk(s) for station environmental, cultural,

and historical requirements. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.
Question 11-5-2i – Other Items: *List the station identifier, and then provide any other information related to ENVIRONMENTAL, CULTURAL, and HISTORICAL not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.*

11.5.3 Control House and Battery Bank

For each proposed new station or proposed modification to an existing station, provide the following control house and battery bank information:

Question 11-5-3a - New or Expansion: *List the station identifier, and then describe the expected need for a proposed new control house or a proposed expansion of an existing control house.*

Question 11-5-3b - Dimensions: *List the station identifier, and then provide the dimensions of the proposed new control house or proposed modification to an existing control house.*

Question 11-5-3c – Battery Bank: *List the station identifier, and then list the identifier of each proposed new control house or proposed modification to an existing control house and provide its accompanying Battery Bank information. The Battery Bank information shall comprise: the number of battery banks installed at the control house and its corresponding size (A-hour).*

Question 11-5-3d - *List the station identifier, and then list the identifier of each proposed new control house or proposed modification to an existing control house and specify any alarm schemes used to detect the unavailability of the control house’s battery bank(s).*

Question 11-5-3e - Backup Power Source: *List the station identifier, and then list the identifier of each proposed new control house or proposed modification to an existing control house and identify its backup power source.*

Question 11-5-3f – Other Items: *Provide any other information related to CONTROL HOUSE AND BATTERY BANK not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.*

11.5.4 Instrumentation and Metering

For each proposed new station or proposed modification to an existing station, provide the following instrumentation and metering information:

Question 11-5-4a - Quantity: *List the station identifier, and then provide the expected number of proposed new stand-alone CTs at each nominal voltage level (kV) at the station.*

Question 11-5-4b - Quantity: *List the station identifier, and then provide the expected number of proposed new PTs at each nominal voltage level (kV) at the station.*

Question 11-5-4c - Quantity: *List the station identifier, and then provide the expected number of proposed new CCVTs at each nominal voltage level (kV) at the station.*

Question 11-5-4d - Metering: *List the station identifier, and then describe the type of metering changes required as a result of the proposed new station or proposed modified station.*

Question 11-5-4e – Phasor Measurement Units: List the station identifier, and then list the transmission facilities and associated quantities that will be monitored due to the installation of proposed Phasor Measurement Units at the station.

Question 11-5-4f – Other Items: List the station identifier, and then provide any other information related to INSTRUMENTATION and METERING not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.5 Protection

For each proposed new station or proposed modification to an existing station, provide the following protection information:

Question 11-5-5a – Protection: List the station identifier, and then describe any Protection Information related to any proposed new protection scheme changes and proposed modified protection scheme changes. The Protection information shall, at a minimum, describe the follow: the type of protection scheme, if the protection scheme is being added, modified or removed, and the switching actions and related timings of any new or modified protection schemes.

Question 11-5-5b – Other Items: Provide any other information related to PROTECTION not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.6 Circuit Breaker

For each proposed new station or proposed modification to an existing station, provide the following circuit breaker information:

Question 11-5-6a - Quantity: List the station identifier, and then provide the expected number of proposed new circuit breakers or proposed new circuit interrupting devices at each nominal voltage level (in kV) at the station.

Question 11-5-6b – Normal Load Current Carrying Capability - Breakers: List the station identifier, and then list the lowest Normal Load Current Carrying Capability rating (kA) of the proposed new circuit breakers at each nominal voltage level (kV) at the station. The calculations of the ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-6c – Normal Load Current Carrying Capability – Interrupting Devices: List the station identifier, and then list the lowest Normal Load Current Carrying Capability rating (kA) of the proposed new circuit interrupting devices (that are not breakers) at each nominal voltage level (kV) at the station.

Question 11-5-6d – Fault Interrupting Capability - Breakers: List the station identifier, and then list the lowest Fault Interrupting Capability rating (kA) of the proposed new circuit breakers at each nominal voltage level (kV) at the station. The calculations of the ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-6e – Fault Interrupting Capacity Rating – Interrupting Devices: List the station identifier, and then list the lowest Fault Interrupting Capacity rating (kA) of the proposed new circuit interrupting devices (that are not breakers) at each nominal voltage level (kV) at the station.

Question 11-5-6f – Other Items: List the station identifier, and then provide any other information related to CIRCUIT BREAKER information not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.7 Transformers

For each proposed new station or proposed modification to an existing station, provide the following transformer information:

Question 11-5-7a – Identifiers: List the station identifier, and then list the identifiers of the proposed new transformers at the station.

Question 11-5-7b – Replacements and Removals: List the station identifier, and then identify any existing transformers that will be replaced or removed by the proposed Phase Two Solution at the station. For Replacements, the identifier of the proposed new transformer shall be listed with the identifier of the transformer being replaced.

Question 11-5-7c – Proposed Manufacturer: List the station identifier, and then provide the Proposed Manufacturer for each proposed new transformer at the station. Respond with “Unknown” if the Proposed Manufacturer is not known.

Question 11-5-7d – Transformer Type: List the station identifier, and then list the identifier of each proposed new transformer and its accompanying Transformer Type (Example: Autotransformer, Phase Angle Regulator, etc.)

Question 11-5-7e – Winding Information: List the station identifier, and then list the identifier of each proposed new transformer and its accompanying Winding Information. The Winding Information shall comprise the following: number of windings and nominal voltage of each winding (kV).

Question 11-5-7f – Tap Information: List the station identifier, and then list the identifier of each proposed new transformer and its accompanying Tap Information. The Tap Information shall comprise to the following: tap range (in kV or Degrees), location of taps, tap switching capability (off load, on load, automatic), and number of taps.

Question 11-5-7g – Thermal Ratings: List the station identifier, and then list the identifier of each proposed new transformer and its accompanying Thermal Rating information. The Thermal Rating information shall comprise the following: Summer and Winter Normal, LTE and STE ratings (MVA), and the transformer cooling method associated with the thermal ratings (Example: ONAN, ONAF, or OFAF). The calculations of the thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-7h – Configuration: List the station identifier, and then list the identifier of each proposed new transformer and indicate if the transformer consists of a single three-phase unit, or three single-phase units.

Question 11-5-7i – Transportation: List the station identifier, and then list the identifier of each proposed new transformer and describe any limitations for transporting the transformer from the factory to the station site.

Question 11-5-7j – Other Items: List the station identifier, and then list the identifier of each proposed new transformer and provide any other information related to TRANSFORMERS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.8 Wave Traps

For each proposed new station or proposed modification to an existing station, provide the following wave traps information:

Question 11-5-8a - List the station identifier, and then provide the expected number of proposed new wave traps at each nominal voltage level (in kV) at the station.

Question 11-5-8b - Other Items: List the station identifier, and then provide any other information related to WAVE TRAPS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.9 Switches

For each proposed new station or proposed modification to an existing station, provide the following switches information:

Question 11-5-9a - Quantity: List the station identifier, and then provide the expected number of proposed new switches at each nominal voltage level (in kV) at the station.

Question 11-5-9b - Interrupters: List the station identifier, and then provide the expected number of proposed new interrupters at each nominal voltage level (in kV) at the station.

Question 11-5-9c - Other Items: List the station identifier, and then provide any other information related to SWITCHES not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.10 Shunt Capacitor Banks

For each proposed new station or proposed modification to an existing station, provide the following shunt capacitor bank information:

Question 11-5-10a - Identifiers and Specifications: List the station identifier, and then list the identifier of each proposed new capacitor bank and its accompanying Specification information. The Specification information shall comprise to the following: nominal connection voltage (kV), and size of capacitor bank at nominal voltage (MVAR). The calculations of the size value shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-10b - Switching Device: List the station identifier, and then list the identifier of each proposed new capacitor bank and its accompanying Switching Device information. The Switching Device information shall comprise the following: type of switching device, switching capability (manual, remote or automatic), the voltage thresholds (kV) and timing (seconds) if automatic switching is employed, and the minimum time required between switching out and switching back in the capacitor bank.

Question 11-5-10c - Other Items: List the station identifier, and then provide any other information related to SHUNT CAPACITOR BANKS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.11 Shunt Reactors

For each proposed new station or proposed modification to an existing station, provide the following shunt reactor information:

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Question 11-5-11a – Identifiers and Specifications: List the station identifier, and then list the identifier of each proposed new reactor and its accompanying Specification information. The Specification information shall comprise to the following: nominal connection voltage (kV), reactor type (fixed or variable), the size of the reactor at nominal voltage (MVAR) for fixed reactors or the maximum and minimum output of the reactor (MVAR) at either end of the reactor tap range and the corresponding number of taps for variable reactors. The calculations of the size values shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-11b - Switching Device: List the station identifier, and then list the identifier of each proposed new reactor and its accompanying Switching Device information. The Switching Device information shall comprise the following: type of switching device, switching capability (manual, remote or automatic), and the voltage thresholds (kV) and timing (seconds) if automatic switching is employed.

Question 11-5-11c – Other Items: List the station identifier, and then provide any other information related to SHUNT REACTORS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.12 Other Transmission Equipment

For each proposed new station or proposed modification to an existing station, provide the following other transmission equipment information:

Question 11-5-12a – Series Capacitors: List the station identifier, and then list the identifier of each proposed new series capacitor or proposed modified series capacitor and its accompanying Series Capacitors information. The Series Capacitors information shall comprise to the following: identifier of the transmission line to which the proposed new series capacitor or proposed modified series capacitor will be connected to, series capacitor impedance (% on 100 MVA base), Summer and Winter Normal, LTE and STE thermal ratings (MVA), description of protection schemes to accommodate the series capacitor, description of any automatic switching associated with the series capacitor. The calculations of the impedance value and thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-12b – Series Reactors: List the station identifier, and then list the identifier of each proposed new series reactor or proposed modified series reactor and its accompanying Series Reactors information. The Series Reactors information shall comprise to the following: identifier of the transmission line to which the series reactor will be connected to, series reactor impedance (% on 100 MVA base), Summer and Winter Normal, LTE and STE thermal ratings (MVA), description of protection schemes to accommodate the series reactor, description of any automatic switching associated with the series reactor. The calculations of the impedance value and thermal ratings shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-12c – FACTS Devices: List the station identifier, and then list the identifier of each proposed new FACTS device or proposed modified FACTS device and

its accompanying FACTS Devices information. The FACTS Devices information shall comprise to the following: type of FACTS device, connection voltage of the FACTS device (kV), minimum and maximum reactive power output of the FACTS device (MVAR) at nominal voltage, and description of control schemes used by the FACTS device. The calculations of the minimum and maximum reactive power output values shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-12d – Synchronous Condensers: List the station identifier, and then list the identifier of each proposed new synchronous condenser and its accompanying Synchronous Condensers information. The Synchronous Condensers information shall comprise the following: connection voltage of the synchronous condenser (kV), minimum and maximum reactive power output of the synchronous condenser (MVAR), and description of control schemes used by the synchronous condenser.

Question 11-5-12e – HVDC Terminals: List the station identifier, and then list the identifier of each proposed new HVDC terminal at the station and its accompanying HVDC Terminals information. The HVDC Terminals information shall comprise to the following: HVDC terminal type (Example: Conventional, VSC), connection voltage of the HVDC terminal (kV), minimum and maximum real power output of the HVDC terminal (MW), minimum and maximum reactive power output of the HVDC terminal at full power input and output (MVAR), description of filter banks used by the HVDC and the control strategy associated with the filter banks, and description of control schemes used by the HVDC terminal. The calculations of the maximum real power output value shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

Question 11-5-12f – Other Items: List the station identifier, and then provide any other information related to OTHER TRANSMISSION EQUIPMENT not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.13 Lightning Arrestors and BIL Rating

For each proposed new station or proposed modification to an existing station, provide the following lightning arrestors and BIL rating information:

Question 11-5-13a – Lightning Arrestors: List the station identifier, and then list the accompanying Lightning Arrestor information. The Lightning Arrestor information shall comprise the expected number of proposed new lightning arrestors, the sizes of the proposed new lightning arrestors, and the type of proposed new lightning arrestors.

Question 11-5-13b – BIL Rating: List the station identifier, and then provide the BIL Rating measured by kV Crest of substation insulators, power transformer bushings, potential transformer bushings, current transformer bushings, and power PTs, for each nominal voltage level (kV) at the station.

Question 11-5-13c – Other Items: List the station identifier, and then provide any other information related to LIGHTNING ARRESTORS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.14 Other Station Considerations

For each proposed new station or proposed modification to an existing station, provide the following information:

Question 11-5-14a - List the station identifier, and then provide a description of estimated life expectancy (years).

Question 11-5-14b - List the station identifier, and then describe any physical security measures.

Question 11-5-14c - List the station identifier, and then provide a narrative of results for any ground grid study performed.

Question 11-5-14d - List the station identifier, and then describe any mobile substation requirements during construction of the Phase Two Solution.

Question 11-5-14e - List the station identifier, and then describe any expected communication requirements not already addressed elsewhere.

Question 11-5-14f - List the station identifier, and then describe any known or expected SCADA requirements and how they are being addressed.

Question 11-5-14g - List the station identifier, and then describe any fiber optic requirements.

Question 11-5-14h - List the station identifier, and then provide a narrative and results for any reactive study performed.

Question 11-5-14i - List the station identifier, and then provide a narrative and results for any short circuit study performed.

Question 11-5-14j - List the station identifier, and then provide a narrative for any contamination prevention requirements.

Question 11-5-14k - Compliance with NPCC D4: List the station identifier, and then identify if all of the proposed work associated with the proposed new station or proposed modified station meets the applicable criteria from the NPCC Directory 4: Bulk Power System Protection Criteria for all facilities housed within the station.

Question 11-5-14l - Outage Coordination: List the station identifier, and then provide a description of any possible outages requiring coordination and/or scheduling to facilitate construction related to the station. Specifically identify any impacted facilities.

Question 11-5-14m - Other Items: List the station identifier, and then provide any other information related to SUBSTATION ASSUMPTIONS not included elsewhere in the Phase Two Solution sections or from the Phase One Proposal.

11.5.15 Station One Line Diagram(s)

Question 11-5-15 - For each proposed new station or proposed modification to an existing station, attach a Station One-Line Diagram in PDF format that illustrates all of the major components of the station and provides the following information:

- The removal or change in position of any existing facilities at the station
- Location and identification of all new:
 - Circuit breakers
 - Indicate for each new proposed circuit breaker:
 - Normal Load Current Carrying Capability (kA)¹⁵
 - Fault Interrupting Capability (kA)¹⁵
 - Transformers:
 - Indicate for each new proposed transformer:

¹⁵ The calculations of the indicated value shall be consistent with the ISO Planning Procedure No. 7: Procedures for Determining and Implementing Transmission Facility Ratings in New England.

- Summer and Winter Normal/LTE/STE thermal ratings (MVA) and the cooling method associated with the ratings
 - The number and configuration for each coil (wye, wye-grounded, delta)
 - Tap capability (manual, on-load, automatic), tap range (kV or degrees) and number of taps
- Wave Traps:
 - Indicate for each new proposed wave trap:
 - Normal Load Current Carrying Capability¹⁵ (MVA)
- Switches:
 - Indicate for each new proposed switch:
 - Normal Load Current Carrying Capability¹⁵(MVA)
 - Switching capability (manual, motor operated, SCADA controlled)
- Shunt Capacitor Banks:
 - Indicate for each new proposed shunt capacitor bank:
 - Size at nominal voltage (MVAR)¹⁵
- Shunt Reactors:
 - Indicate for each new proposed shunt reactor:
 - Size at nominal voltage (MVAR) for fixed reactors, or size range (MVAR)¹⁵ at maximum and minimum taps and the number of taps for variable reactors
- Other Transmission Devices:
 - Series Capacitors
 - Series Reactors
 - FACTS Devices
 - Synchronous Condensers
 - HVDC Terminals
 - Other devices

11.5.16 Station Three Line Diagram

Question 11-5-16 - For each proposed new station or proposed modification to an existing station, attach a detailed Station Three-Line Diagram in PDF format that illustrates all of the major components of the station and provides the following information:

- Station Perimeter and Dimensions
- The removal or change in position of any existing facilities at the station
- Location and identification of all new:
 - Control House and Battery Banks if not located within the Control House
 - Stand Alone Current Transformers (CT):
 - Indicate for each new proposed CT:
 - Normal Load Current Carrying Capability (kA)¹⁵
 - Accuracy
 - Buswork
 - Indicate for each new proposed buswork:
 - Normal Load Current Carrying Capability (kA)¹⁵
 - Potential Transformers
 - Coupling Capacitor Voltage Transformers

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- Circuit breakers
 - Indicate for each new proposed breaker:
 - Number of current transformers per bushing
 - Number of trip coils
- Transformers
- Wave Traps
- Switches
- Shunt Capacitor Banks
- Shunt Reactors
- Other Transmission Devices:
 - Series Capacitors
 - Series Reactors
 - FACTS Devices
 - Synchronous Condensers
 - HVDC Terminals
 - Other devices
- Lightning Arrestors:
 - Indicate for each new proposed lightning arrester:
 - Arrester Type
 - BIL rating

11.6 Updates to Modeling Files

Question 11-6 – Provide any updates to the modeling files/information for the Phase Two Solution and a listing that describes the modeling updates.

Provide any updates to the modeling files/information for the Phase Two Solution from what was provided for the Phase One Proposal according to the instructions of Section 5 of this document. The upload of any modeling files/information should be consistent with the instructions provided in Section 5 of this document. In addition, a listing with individual entries describing the changes to the modeling files/information shall be uploaded in a PDF file. Any changes to the modeling files/information from what was provided in the Phase One Proposal that result in a material modification will result in the elimination of the Phase Two Solution from further consideration in this RFP.

Section 12

Phase Two Solution – Cost Structure Proposals

Question 12a – Describe any cost cap or cost containment mechanisms used for the Phase Two Solution. If a cost cap or cost containment mechanism was not used, respond with an “NA”.

The response shall be submitted in a narrative form and not in an uploaded file.

If a QTPS Respondent is offering any cost caps or cost containment mechanisms to transfer any portion of the proposal’s costs ¹⁶ from New England electric customers to other entities describe with specificity:

- the cost cap or cost containment mechanisms,
- any conditions or exemptions that would apply,
- the specific risks being assumed or not assumed,
- the entities that would be assuming the risk (*The ISO anticipates this response may contain confidential information*),
- the administration of measures or commitments over the life of the Phase Two Solution,
- the benefit to transmission ratepayers.
- any adjustments, if at all, for costs that fall outside the terms and conditions presented on the required draft term sheet or agreement.

Question 12b – If a cost cap or cost containment mechanism is used, upload a draft term sheet or agreement. If a cost cap or cost containment mechanism was not used, respond with an “NA”.

The QTPS Respondent shall also provide a PDF file that contains a draft term sheet or agreement (from each portion of the proposal for which it applies) that clearly describes in detail the nature of the mechanism, including all exclusions, exceptions, conditions, enforcement mechanisms, and interaction with possible Phase Two Solution change orders.

¹⁶ Costs mean any portion of the QTPS Respondents revenue requirements that could be recoverable from New England customers without such a mechanism.

Section 13

Phase Two Solution – Financial

(For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system. *The ISO anticipates the responses in this section may contain confidential information*)

13.1 Description of Capital Resources

Question 13-1 - Provide a description of the capital resources the QTPS Respondent has available or plans to procure to fund at least one hundred percent (100%) of the estimated proposal cost provided in Cost Data Workbook of this Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

The Phase Two Solution shall include a description of the capital resources the QTPS Respondent has available or plans to procure to fund at least one hundred percent (100%) of the estimated proposal installed cost provided in the Installed Cost Estimate Workbook of the Phase Two Solution. For each funding source the QTPS Respondent shall provide a description of how much capital is available, when the funds will be obtained, the credit quality of security being offered to the provider(s) of proposal debt and equity, and what conditions must to be met to secure the funds. At a minimum, the QTPS Respondent shall identify each funding source by type with a brief description and state the costs for each funding source. If the response does not include ROE-caps on funding costs, the QTPS Respondent may submit projected interest rates and equity returns (aka cost of funds) based on the QTPS Respondent's assumed proposal creditworthiness during the construction and operational phases. If information regarding the cost of a funding source is not known, the QTPS Respondent shall submit a range or estimate of the funding costs and include a description as to why this information was not provided. QTPS Respondent may submit evidence to enhance the specificity and certainty of their bid. Such evidence could include the submission of signed agreements, demonstration of the previous use of the capital resource, and the description of mutual benefit to the QTPS Respondent and its source of financing of the Phase Two Solution.

As applicable, please identify the financial firm(s) assisting the QTPS Respondent to provide funding for construction costs and contingencies, and as required, pro-forma reserves and deposits.

13.2 Expected Capital Cash Flows

Question 13-2 - Provide a high-level narrative description of the expected cash flows between the QTPS Respondent and the funding of this Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Include a high-level narrative description of the Phase Two Solution of the expected cash flows between the QTPS Respondent and the funding of this Phase Two Solution with enough specificity to explain the timing, form, and volume of cash flows expected between the QTPS Respondent and the identified funding sources. Parties identified in the capital cash flows shall include at a minimum relevant parent organizations, affiliates, subsidiaries, financial institutions, and financial intermediaries.

13.3 Schedule of Significant Expenditures

Question 13-3 – Provide a schedule of significant expenditures to demonstrate that the expected capital cash flows of the Phase Two Solution will be available when required.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a high-level narrative description of the schedule of significant expenditures (including, but not limited to, long-lead materials, permits, land acquisition, start of construction and Right-of-Ways) to demonstrate that the expected capital cash flows of this Phase Two Solution will be available when required for the expected significant expenditures.

13.4 Capital Reserves

Question 13-4 – Provide the amount of funds immediately available to the QTPS Respondent to deal with unforeseen contingencies.

The response shall be submitted in a narrative form and not in an uploaded file.

Specify the amount of funds immediately available to the QTPS Respondent to deal with unforeseen contingencies arising during the Phase Two Solution’s development, construction, and implementation; where immediately available funds may include, but are not limited to, cash and cash equivalents, revolving credit facilities, and certain callable investor commitments.

13.5 Pro Forma Financial Statements

Question 13-5a – Provide a high-level narrative description of general financial information.

The response shall be submitted in a narrative form and not in an uploaded file.

Include a high-level narrative description of the Phase Two Solution, of general financial information including, at a minimum, audited financial statements and notes for the QTPS Respondent (and/or any parent or Affiliate providing an Acknowledgment of Support) and pro forma financial statements (Income Statements, Balance Sheets, and Cash Flow Statements) for each calendar year until the Phase Two Solution is expected to be placed into service.

Question 13-5b – Upload a completed Pro Forma Financial Statements Workbook.

The ISO has provided a Pro Forma Financial Statements Workbook for Phase Two Solution submissions that is publicly posted on the ISO website at www.iso-ne.com > System Planning > Competitive Transmission Projects.¹⁷ QTPS Respondents shall utilize the Pro Forma Financial Statements Workbook and must complete it to the specified level of detail as described in this section and upload the completed copy into RFP360 under Question 13-5b.

There is a worksheet for each of the pro forma financial statements; balance sheet, income statement and cash flow statement. The QTPS Respondent shall add their legal name in row 2 and change the Period Ending date at the top of each column to reflect each calendar year until the Phase Two Solution is expected to be placed in service for each financial statement. The QTPS

¹⁷ <https://www.iso-ne.com/system-planning/transmission-planning/competitive-transmission-projects>

Respondent may add additional columns if needed. The QTPS Respondent shall fill in their financial data for all three financial statements in the light blue highlighted cells.

Section 14

Phase Two Solution – Engineering, Surveying and Material Procurement

(For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system. The ISO anticipates the responses in this section may contain confidential information)

14.1 Engineering & Surveying

Question 14-1 - Describe the capabilities to perform the necessary engineering, design, and surveying activities to complete the proposal as described in the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative describing the capabilities, whether existing and/or anticipated, to perform the necessary engineering, design, and surveying activities specific to the Phase Two Solution.

14.2 Material Procurement

Question 14-2 - Describe the capabilities to perform the necessary material procurement activities associated with the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative describing the capabilities, whether existing and/or anticipated, to perform the necessary material procurement activities specific to the Phase Two Solution. Also include a detail description of any identified or potential risk(s) for the procurement of materials for this proposal. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for this proposal.

Section 15

Phase Two Solution – Scheduling and Real Estate

(For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.)

15.1 Phase Two Solution Implementation Schedule

Question 15-1 - Describe the implementation schedule of the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file unless otherwise noted.

A detailed implementation schedule, driven by the Phase Two Solution's in-service date, is required to be submitted and shall include, at a minimum, proposed schedules for:

- a. route and site evaluation;
- b. permitting;
- c. siting;
- d. land acquisition;
- e. engineering and design;
- f. land surveying;
- g. material procurement;
- h. construction; and
- i. commissioning/energization.

Provide any other information related to the Phase Two Solution implementation schedule including, but not limited to:

- a. a discussion of scheduling risks and proposed mitigation plans;
- b. a critical path diagram (PDF file); and
- c. a coordination plan with interconnecting incumbent Transmission Owner(s).

15.2 Route and Site Evaluation (*The ISO anticipates this response may contain confidential information*)

Question 15-2 - Provide a list of any routing and siting evaluation reports if they have been completed.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a list of any routing and siting evaluation reports that have been completed. Do not provide the evaluation reports themselves unless specifically requested to do so by the ISO.

15.3 Right-of-way & Land Acquisition (*The ISO anticipates this response may contain confidential information*)

Question 15-3a - Describe the authority the QTPS Respondent has to acquire necessary rights of way for the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe the authority the QTPS Respondent has to acquire necessary rights of way for the Phase Two Solution.

Question 15-3b – Describe the status of the acquisition of the right, title, and interest in the rights of way, substations, and other property or facilities, if any that are necessary for the Phase Two Solution. (The ISO anticipates this response may contain confidential information)

The response shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe the status of the acquisition of the right, title, and interest in the rights of way, substations, and other property or facilities, if any that are necessary for the Phase Two Solution. In addition, the QTPS Respondent shall provide a detailed description of any identified or potential risk(s) for the acquisition of the right, title and interest in the rights of way, substations, and other property or facilities for the Phase Two Solution. For each risk(s) identified, provide a specific mitigation plan (risk management plan) for how that risk(s) will be managed for the Phase Two Solution.

Question 15-4c - Describe the experience of the QTPS Respondent in acquiring rights of way. (The ISO anticipates this response may contain confidential information)

The response shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe the experience they have in acquiring rights of way.

Section 16

Phase Two Solution – Project Management, Construction, and Liability

(For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent should not include upgrades on the PTO's system.)

16.1 Project Management (*The ISO anticipates this response may contain confidential information*)

Question 16-1 - Describe the capabilities to perform the necessary project management activities associated with the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative describing the capabilities, whether existing and/or anticipated, to perform the necessary project management activities specific to the Phase Two Solution. This shall include the process to be used to manage the Phase Two Solution including details relative to scheduling, coordination, and cost management. Also, include the proposed management structure, organization, authority levels, and the QTPS Respondent's relationship to each of the contractors.

16.2 Construction (*The ISO anticipates this response may contain confidential information*)

Question 16-2 - Describe the capabilities to perform the construction of the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative describing the capabilities, whether existing and/or anticipated, to perform the necessary construction supervision, construction labor, tools, vehicles, and equipment for construction of the Phase Two Solution.

16.3 Construction Sequencing

Question 16-3 - Provide a conceptual plan for the anticipated transmission and generation outages necessary to construct the Phase Two Solution and their respective durations, and possible constraints.

The response shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall provide a conceptual plan for the anticipated transmission and generation outages necessary to construct the Phase Two Solution and their respective durations, and possible constraints.

16.4 Commissioning & Energization (*The ISO anticipates this response may contain confidential information*)

Question 16-4 - Describe the capabilities to perform the work necessary to commission the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a narrative describing the capabilities, whether existing and/or anticipated, to perform the work necessary to commission the Phase Two Solution. This shall include a description of a high level summary of the process to be used to commission the Phase Two Solution including final inspection, any necessary acceptance testing, and coordination with the terminal substation owners to develop and implement procedures to energize the line.

16.5 Liability Protection (*The ISO anticipates this response may contain confidential information*)

Question 16-5 - Provide the QTPS Respondent's planned insurance coverage.

The response shall be submitted in a narrative form and not in an uploaded file.

Describe the QTPS Respondent's planned insurance coverage, including types of coverage and insured values during the construction period and over the operational life of the Phase Two Solution facilities including but not limited to covering negligent performance. Also include the types of losses to be covered during the construction and operation of the Phase Two Solution, including specifying the extent of failure of facilities to be covered by the planned insurance during the operation of the Phase Two Solution.

16.6 Previous Applicable Experience and/or Demonstrated Ability

Question 16-6 - Describe previous applicable experience and/or demonstrated ability to implement the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a brief but descriptive summary of any existing and/or previous experiences demonstrating an ability to implement the Phase Two Solution including, but not limited to, whether the QTPS Respondent has constructed or is constructing any transmission facilities similar to the Phase Two Solution.

Section 17

Phase Two Solution – Operations and Maintenance

(For proposed modifications to existing element(s) where the QTPS Respondent is not the PTO for the existing system element(s) and the proposal is not the Backstop Transmission Solution, the QTPS Respondent is not required to include upgrades on the PTO's system.)

17.1 Preventative and/or Predictive Maintenance & Testing (*The ISO anticipates this response may contain confidential information*)

Question 17-1- Provide a description of any existing and/or planned capabilities, competencies, and processes to perform preventative and/or predictive maintenance, including vegetation management, and any necessary equipment testing.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a description of any existing and/or planned capabilities, competencies, and processes to perform preventative and/or predictive maintenance, including vegetation management, and any necessary equipment testing specific to the Phase Two Solution.

17.2 Spare Parts and Equipment (*The ISO anticipates this response may contain confidential information*)

Question 17-2 - Provide a description of any existing and/or planned capabilities, competencies, and processes to manage and maintain spare parts, equipment, and/or assembly inventories for the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a description of any existing and/or planned capabilities, competencies, and processes to manage and maintain spare parts, equipment, and/or assembly inventories for the Phase Two Solution. In addition, provide the anticipated response time to deploy such a spare part(s).

17.3 Emergency Response, Repair, Replacement, and Testing (*The ISO anticipates this response may contain confidential information*)

Question 17-3 - Provide a description of any existing and/or planned capabilities, competencies, and processes to respond to and successfully address any emergency response, repair, replacement and testing on a 24/7 basis for the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a description of any existing and/or planned capabilities, competencies, and processes to respond to and successfully address any emergency response, repair, replacement and testing on a 24/7 basis for the Phase Two Solution. The response should address the ability to handle the range from minor repairs to catastrophic events.

17.4 Financial Strategy for Facility Rebuilds and/or Replacement (*The ISO anticipates this response may contain confidential information*)

Question 17-4 - Provide a descriptive summary of the QTPS Respondent's current and/or planned financial strategy to timely facilitate and finance potential major capital replacements and/or rebuilds that may be necessary through the life of the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

Provide a descriptive summary of the QTPS Respondent's current and/or planned financial strategy to timely facilitate and finance potential major capital replacements and/or rebuilds that may be necessary through the life of the Phase Two Solution. This description shall, at a minimum, support the description of major facility replacement and/or rebuilding capabilities stated in the Phase Two Solution and demonstrate the QTPS Respondent's ability to reasonably be relied upon to address any catastrophic destruction and/or normal wear and tear.

17.5 Previous Applicable Experience and/or Demonstrated Ability

Question 17-5 - Describe previous applicable experience and/or demonstrated ability to operate, maintain, repair, and/or replace any facilities similar to the Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

The QTPS Respondent shall describe a summary of any existing and/or previous experiences demonstrating an ability to operate, maintain, repair, and/or replace any facilities similar to the Phase Two Solution.

Section 18

Phase Two Solution – Other Information

Question 18 - The QTPS Respondent shall enter any other information that has not been provided that is important to the QTPS Respondent's Phase Two Solution.

The response shall be submitted in a narrative form and not in an uploaded file.

This section gives the QTPS Respondent the opportunity to provide additional information the QTPS Respondent:

- a. feels was not addressed by the other sections in the RFP and
- b. believes would be beneficial to the ISO's evaluation of their Phase Two Solution.