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DERRY-LONDONDERRY EXIT 4A  
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August 6, 2020

**SPECIAL PROVISION****AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT****Item 203.93 - Hydrogeologist**  
**Item 203.94 – Baseline Water Sampling****Add** to Description:

**1.3 Hydrogeologist.** The Design-Builder shall retain the services of a hydrogeology/hydrology consultant (Hydrogeologist) to develop a drinking water supply well monitoring plan, monitor, record, analyze and report groundwater conditions prior to, during, and after construction. This special provision is applicable to all rock excavation items under this and other sections.

**Add** to Construction Requirements**3.14 Hydrogeologist**

**3.14.1 Hydrogeologist Submittal.** The name and resumé with respective qualifications of the Hydrogeologist shall be submitted to the Engineer for approval no later than Notice to Proceed 2 (NTP2). The Hydrogeologist shall not be an employee of the Design-Builder, subcontractor, explosives manufacturer, or explosives distributor or have been previously employed in such a capacity for at least 6 months prior to the contract award date.

**3.14.2 Hydrogeologist Qualifications.** The Hydrogeologist shall be experienced in the subject of environmental effects of blasting and shall be capable of thoroughly analyzing the potential environmental effects from blasting activities. The Hydrogeologist shall be qualified to thoroughly analyze potential groundwater and surface water flow pathways that may carry contaminants off site generated by blasting activities. The Hydrogeologist shall also be qualified in constructing and maintaining groundwater flow and solute transport simulation models, hydrogeologic modeling on groundwater resource assessments, conducting aquifer characterization, risk assessments, remediation planning and permitting, analyzing and interpreting hydrogeological and hydrogeochemical data, design and supervision of field tests, and analysis of test data. The necessary documentation and analysis shall be performed by a Professional Geologist or Professional Engineer licensed in the State of New Hampshire. Proof of licensure, experience, and qualifications shall be provided with the submittal. The individual employees of the Hydrogeologist and their assignments under Items 203.93 shall be identified in the submittal. Qualifications of individuals shall be submitted for review if additional personnel are assigned to this project or if responsibilities change.

**3.14.3 Hydrogeologist Duties.** The Hydrogeologist shall develop and submit a drinking water monitoring plan. The Hydrogeologist shall monitor the quality of the groundwater by collecting, analyzing, interpreting, and reporting on groundwater data from samples collected from drinking water wells and tested per 3.14.3.2. The monitoring plan shall include:

- a) A site plan depicting the drinking water well locations within 2,000 feet of the anticipated blasting activities. A minimum of 10 wells shall be selected that are located within the 2,000 foot radius identified in the monitoring plan. Selection shall be based on the proximity to the anticipated blasting activities and shall be the closest where feasible.
- b) The site plan shall be based on and include information on local topography, subsurface conditions, nearby surface water, and any other major geologic features in close proximity to the drilling and blasting that the Hydrogeologist deems significant.
- c) Methods and equipment to be utilized during sample collection.
- d) Laboratory to be used to complete water analysis.
- e) Contingency plan outlining actions, may include but not limited to, providing bottled water, NHDES notification, additional sampling program if required, recommendations for alterations to blasting plan, to be taken if impacts to groundwater are identified in the groundwater samples.

Groundwater samples shall be collected prior to the commencement of blasting activities, once a month throughout the blasting activities, and once upon completion of the blasting activities, provided no impacts are identified. The Hydrogeologist shall obtain written acceptance by the property owners proposed in the monitoring plan to access and coordinate sampling events of the drinking water wells. All designated drinking water wells shall be sampled on the same day, and this will be known as a sampling event. Groundwater samples collected throughout blasting activities shall be analyzed for the Baseline Analysis List in 3.14.3.2. The Hydrogeologist shall employ the services of a laboratory accredited through the New Hampshire Environmental Laboratory Accreditation Program to analyze the samples. The Hydrogeologist shall analyze the groundwater test results and conditions after each sampling event. If groundwater quality impacts are identified, the Hydrogeologist shall investigate any and all potential sources of contamination and evaluate potential receptors. The Hydrogeologist shall provide the Engineer with recommendations of any additional private drinking water wells to sample and any other actions to take to address identified contamination. A report shall be provided to the Design-Builder and Engineer after each sampling event, and the report shall contain a summary of findings and provide recommendations to adjust excavation activities if it is found that groundwater is being impacted. Laboratory results shall be provided to the respective property owner and include appropriate NHDES fact sheets and contact information for a representative from the Hydrogeology consultant. The Design-Builder shall notify the property owner

immediately if an exceedance of a drinking water standard is detected in any of the drinking water wells sampled. An immediate verbal notification is required in the event of a drinking water standard exceedance and shall be followed up with the letter as stated above.

The Engineer shall be copied on all correspondences and notifications to property owners. The Design-Builder shall also provide bottled water to property owners if an exceedance of drinking water standards is identified to be a result of blasting.

**3.14.3.2 Baseline Analysis List.** Samples collected during construction shall be analyzed for the following parameters:

- a) nitrate (See Note 1)
- b) nitrite (See Note 1)
- c) ammonia

Note 1 - Regulated contaminant

**3.14.4 Periodic Reporting of Monitoring Results.** The Hydrogeologist shall provide a verbal periodic report within 24 hours of receipt of laboratory results, providing a summary of sample analytical results for each sampling event to the Engineer. A written periodic report presenting all analytical results and evaluations shall be provided to the Engineer within one week of receipt of laboratory results for each sampling event. A sampling event is the completion of the sampling of all of the drinking water wells in the intervals specified under 3.14.3. One electronic copy of the periodic reports shall be submitted to the Engineer. The periodic reports shall include the following items:

- a) A discussion of the hydrogeologic and hydrologic conditions (including water quality) across the project and indicate anywhere variations of water quality occur.
- b) A summarized tabulation of test results from the current and prior analysis. Drinking water quality results shall be compared to the United States Environmental Protection Agency (USEPA, 2003) maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs), and NHDES ambient groundwater quality standards (AGQS, NHDES, 2008)
- c) Evaluation of any hydrologic/hydrogeologic impacts to the regional groundwater system relative to the drilling and blasting.
- d) Recommendations to address any impacts identified.
- e) A site plan depicting sample locations delineation of areas determined to be impacted (indicating severity). This map shall be based on and include information on local topography, subsurface conditions, nearby surface water,

and any other major geologic features in close proximity to the drilling and blasting that the Hydrogeologist deems significant.

- f) Appendices including laboratory reports for the water quality sampling from the current analysis, including all field collection data associated with the collection of samples in a tabular format.
- g) The Periodic Monitoring Reports shall be certified and stamped by a Professional Geologist or Professional Engineer licensed by the State of New Hampshire.

**3.14.5.1** Any regulated contaminant detected above current ambient groundwater quality standards (AGQS) shall be reported to the New Hampshire Department of Environmental Services in accordance with PART Env-Or 600 NOTIFICATION of the Contaminated Site Management rules.

**3.14.6 Final Report of Monitoring Results.** The Hydrogeologist shall provide a final report presenting all technical data and evaluations upon completion of all sampling events at the end of the construction project to the Engineer. One electronic copy of the final report shall be submitted to the Engineer. The final report shall include the following items:

- a) A discussion of the water quality across the project and anywhere variations of water quality occur.
- b) A summarized tabulation of test results from all analysis. Drinking water quality results shall be compared to the United States Environmental Protection Agency (USEPA, 2003) maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs), and NHDES ambient groundwater quality standards (AGQS, NHDES, 2008)
- c) Evaluation of any hydrologic/hydrogeologic impacts to the regional groundwater system relative to the drilling and blasting.
- d) A site plan depicting sample locations, and delineation of areas determined to be impacted (indicating severity). This map shall be based on and include information on local topography, subsurface conditions, nearby surface water, and any other major geologic features in close proximity to the drilling and blasting that the Hydrogeologist deems significant.
- e) Appendices including all results of the water quality sampling including all field collection data associated with the collection of samples in a tabular format.
- f) The Final Monitoring Reports shall be certified and stamped by a Professional Geologist licensed by the State of New Hampshire.