**SP-XX, FOUNDATION PROTECTION**

Version Date: 1/28/2022 Revised: MM/DD/YY By: XXX

1. **Description**

Work covered in this special provision is for foundation protection measures for structures as shown on the construction drawings.

1. **Definitions**

*Point of Interest:* The Point of Interest (POI) is a point at the bottom of the proposed/actual trench that is closest to the Adjacent Structure.

*Construction Excavation Zone of Influence*– The Construction Excavation Zone of Influence (ZOI) is generally defined by a boundary line starting at the POI continuing upward with a 2 horizontal to 1 vertical (2H:1V) slope and projected to the ground or as directed by the Engineer.

*Adjacent Structure*– Adjacent structure (structure) is defined as a building/structure or paved public and private roadway/driveway located within the Construction Excavation ZOI in a plan view.

*Foundation Protection* – Foundation Protection (FP) is defined as measures taken to actively support the loads imposed to facilitate construction and to prevent possible damages to adjacent structures due to excavation activities.

1. **contractor qualifications**

Foundation protection measures shall be installed and/or constructed by a qualified contractor.  The foundation protection contractor shall have a minimum of ten (10) years of experience in the installation of the foundation protection measures chosen.

1. **Construction Methods**
	1. **FOUNDATION PROTECTION FOR STRUCTURES**

**Structure Condition Survey** – The Contractor shall be responsible for performing both a pre- and post-construction Structure Condition Survey. The survey shall be sealed by a Professional Engineer registered in the State of North Carolina. The survey shall be a comprehensive inspection and consist of descriptions, photographs, measurements, and video of the interior and exterior conditions of the structure. Examples of items to be documented include existing cracks, damage, or other defects such as the operation of windows, doors, or other appurtenances.

The pre-construction structure condition survey of the structures shall be performed prior to beginning construction within 40 horizontal feet (or as directed by the City) to record any conditions that may be subject to possible damage claims.

The post-construction structure condition survey of the adjacent structures shall be performed no sooner than 45 days after construction is completed a minimum of 20 linear feet from the end of the FP.

Both structure conditions surveys shall be performed in the presence of the City’s representative, Contractor’s representative, and owner of the structure, unless the owner is deemed unresponsive as described below. Contractor shall send property owner, via certified mail, a sealed copy of each structure survey report.

**Structure Assessment Report** - The Contractor shall be responsible for preparing a Structure Assessment Report as part of both the pre- and post-construction structure condition survey. The report shall be sealed by a Professional Engineer registered in the State of North Carolina with concurrence signature by the Contractor.

The Pre-Construction Structure Assessment Report shall include, but not be limited to, the findings from the pre-construction condition survey (photographs, descriptions, measurements, etc.), a discussion of the proposed construction adjacent to the structure noting specific soil type, adjacent structure footing, foundation or slab elevation, excavation depths and widths, any potential impact to foundations and structures, and measures needed to protect the adjacent structures. If FP is deemed necessary, then the FP measures and designs, including, but not limited to, plans, drawings, calculations, and details, shall be designed and sealed by NC PE and submitted with the Structure Assessment Report. The report shall include recommendations related to leaving or removing the FP measures. Work shall not be permitted on properties, which do not have a completed pre-construction structural inspection.

The Pre-Construction Structure Assessment Report shall be submitted to the City for review two weeks prior to construction or installation of FP measures at each structure. Failure to provide for sufficient review period, time for revision and resubmittal, or incomplete submittals will not be grounds for contract time extension.

The Post-Construction Structure Assessment Report shall include, but not be limited to, the findings from the post-construction condition survey (photographs, descriptions, measurements, etc., a discussion of the completed construction adjacent to the structure including actual conditions encountered, description of the Construction Monitoring System, and the results of the monitoring, as applicable. The report shall also include as-built information about the FP installed including but not limited to descriptions of measures, depths, locations, sketches, photographs, if removed or not, etc.

The Post-Construction Structure Assessment Report shall be submitted to the City for review two weeks after the post-construction structure condition survey. Failure to provide for sufficient review period, time for revision and resubmittal, or incomplete submittals may result in delay of substantial completion or final completion.

Contractor shall send property owner, via certified mail, a sealed copy of each Structure Assessment Report.

**Property Owner Unresponsiveness** – The Contractor shall employ the following methods to initiate contact with the Owner of the subject structure:

1. Send a Certified letter to the structure owner,
2. Make two attempts to contact the structure owner via phone, and
3. Make four attempts to contact the structure owner in person. Each attempt at contact shall take place on separate days and at least once at the following timeframes: early morning (7:00 am – 8:00 am), during business hours (8:00 am – 5:00 pm), and early evening (6:00 pm – 8:00 pm).

If the Contractor is unable to contact the Owner, then the pre-construction and post-construction surveys shall be performed on the outside of the structures only. There shall be no entry, observations, photographs, etc. into the structure without the structure owner’s consent.

**Construction Monitoring System** – A construction monitoring system may or may not be necessary at every location FP is required. If the Contractor’s Structural Engineer determines that a construction monitoring system is necessary, construction-monitoring plans shall be specified in the Structure Assessment Report. The monitoring plan may include, but not be limited to, crack gages, settlement markers, vibration sensors, and survey control points (for monitoring vertical and/or horizontal movements) at the ground surface or on the structure. The Contractor shall regularly provide data from instrument readings to the City within 24 hours of readings. The plan shall specify measurement frequencies and values or other indicators that signal the FP may be inadequate and construction shall stop, and the notification of the Contractor and the City.

The monitoring instruments shall be removed / abandoned at the end of the project warranty period as directed by the City.

**Requirements of Excavation and Shoring** – All work shall adhere to all applicable ordinances, codes, statutory rules and regulations of the Federal, State and local authorities. In the event of a conflict, comply with the more restrictive applicable requirements.

* 1. **fOUNDATION pROTECTION (ACTIVE SHORING)**

 The Contractor shall obtain and construct all shoring to include means, methods, materials and engineering needed to construct the project. The Contractor shall construct shoring in accordance with the approved design, which provides all necessary rigidity, and supports the loads imposed to facilitate construction as shown on the plans. The design shall provide for internal and external stability of shoring, such as, but not limited to bearing capacity, settlement, sliding, overturning, internal compound stability, global stability. The design shall also take into consideration actual construction loads related to phasing, stockpiles, operation of large cranes, or operation of other large equipment near the area of shoring. All proof and verification testing of the shoring elements shall be the responsibility of the Contractor and results shall be reported to the Engineer the day after the testing was performed. The Contractor shall actively control drainage and surface runoff during the duration of construction to direct run off away from the shoring areas above and behind the shoring. The Contractor shall prevent ponding water near the shoring area and maintain drainage paths to convey water away from and around the shoring area. Per the project plans, , Contractor shall submit to the City excavation methods, details, construction sequence, active shoring design, and shoring removal methods for storm drainage and utilities. All active shoring plans shall be designed and sealed by a North Carolina Professional Engineer. City approval shall be given before any excavation has started.

The following standards are specifically referenced:

OSHA Standard 29 CRF 1926 Subpart P – EXCAVATIONS;

OSHA Technical Manual (OTM) Section V: Chapter 2 - EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING

If during the construction activity, the City determines the foundation protection measures are not performing in accordance with the Pre-Construction Structure Assessment Report, the Contractor shall re-evaluate and resubmit revised FP designs and supporting information to the City at no additional cost to the City.

1. **Measurement**

Foundation Protection for structures will be measured on a contract Lump Sum basis for each address upon completion and acceptance by the Engineer.

Structure Assessment Report (Pre- and Post- Construction) will be measured on a contract “Each” basis for each location upon completion and acceptance by the Engineer. Measurement of each Structure Assessment Report includes both pre- and post-construction reports.

Foundation Protection (Active Shoring) will be measured on a Square Foot basis for vertical face of exposed shoring as shown on the plans upon completion and acceptance by the Engineer.

1. **Payment**

Payment for Foundation Protection for structures will be made at the contract Lump Sum basis for each address. The price and payment will be full compensation for engineering and surveying fees, geotechnical testing, monitoring, installation and removal of foundation protection measures, and all incidentals necessary to complete the work as shown on the plans and described herein.

Payment for the Structure Assessment Report will be full compensation for pre- and post-construction inspections, reports, engineering and surveying fees, and all incidentals necessary to complete the report as described herein.

Foundation Protection (Active Shoring) will be paid on a Square Foot basis for vertical face of exposed shoring as shown on the plans upon completion and acceptance by the Engineer.

Payment will be made under:

**STRUCTURE ASSESSMENT REPORT EA**

**FOUNDATION PROTECTION AT [ADDRESS] LS**

**FOUNDATION PROTECTION [ACTIVE SHORING] SF**