CITY OF FORT WAYNE MASTER UPDATED: 1/5/15

SECTION 01 71 23

NTS: This section covers construction survey work and field engineering by the Contractor. Edit this section to suit the size and type of project. General Conditions, Paragraph GC-4.05, requires the Owner to establish reference points and specifies Contractor’s responsibilities for using, protecting and replacing (as applicable) Owner’s reference points.

As written, this section is based on a single prime contract. For a multiple-prime contract project, edit as required to clearly indicate responsibilities for field engineering and surveying.

Coordinate edits to this section with the General Conditions.

1. GENERAL
	1. DESCRIPTION

NTS: Edit Paragraph “A” as required for the project. Edit Paragraph "A" below when certain services are not required, or do not require licensed professionals.

* + 1. Contractor shall provide field engineering services and professional services of the types indicated for the Project, including:
			1. Furnishing civil, structural, and other professional engineering services specified or required to execute Contractor’s construction methods.
			2. Developing and making all detail surveys and measurements required for construction; including slope stakes, batter boards, and all other working lines, elevations, and cut sheets.
			3. Providing materials required for benchmarks, control points, batter boards, grade stakes, structure and pipeline elevation stakes, and other items.
			4. Keeping a transit, theodolite, or total station (theodolite with electronic distance measurement device); leveling instrument; and related implements such as survey rods and other measurement devices, at the Site at all times, and having a skilled instrument person available when necessary for laying out the Work.
			5. Being solely responsible for all locations, dimensions and levels. No data other than Change Order, Work Change Directive, or Field Order shall justify departure from dimensions and levels required by the Contract Documents.
			6. Rectifying all Work improperly installed because of not maintaining, not protecting, or removing without authoriza­tion established reference points, stakes, marks, and monuments.
			7. Providing such facilities and assistance necessary for Engineer to check lines and grade points placed by Contractor. Do not perform excavation or embankment Work until all cross-sectioning necessary for determining payment quantities for Unit Price Work have been completed and accepted by Engineer.

NTS: Section “1.2” is to be included if project is bid on unit price basis. Section to be deleted or revised if project is to be bid on lump sum basis.

* 1. MEASUREMENT AND PAYMENT
		1. This item is to be included in overall Project cost and not bid as a separate Work item.

NTS: For smaller projects, consider whether Article "1.3" is necessary and delete if not required. When retained, edit Article “1.3” to suit the project.

* 1. CONTRACTOR’S FIELD ENGINEER
		1. Employ and retain at the Site a field engineer with experience and capability of performing all field engineering tasks required of Contractor, including:
			1. Preparing and maintaining daily reports of activity on the Work. Submit reports to Engineer including the following information, at minimum:
				1. Number of employees at the Site.
				2. Number employees at the Site for each Subcontractor.
				3. Breakdown of employees by trades.
				4. Major equipment and materials installed as part of the Work.
				5. Major construction equipment utilized.
				6. Location of areas in which construction was performed.
				7. Materials and equipment received.
				8. Work performed, including field quality control measures and testing.
				9. Weather conditions.
				10. Safety.
				11. Delays encountered, amount of delay incurred, and the reasons for the delay.
				12. Instructions received from Engineer or Owner.

NTS: Insert at (--1--) the number of copies required, usually “two”.

* + - 1. Submit (--1--) copies of Contractor’s daily reports at Engineer’s field office by 9:00 a.m. the next working day after the day covered in the associated report. Daily report shall be signed by responsible member of Contractor’s staff, such as Contractor's project manager or superintendent, or foreman designated by Contractor as having authority to sign daily reports.
			2. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment for compliance with the Contract Documents.
			3. Maintain field office files and Drawings, record documents, and coordinate field engineering services with Subcontractors and Suppliers as appropriate. Prepare layout and coordination Drawings for construction operations.
			4. Check and coordinate the Work for conflicts and interferences, and immediately advise Engineer and Resident Project Representative, if any, of all discrepancies of which Contractor is aware.
			5. Cooperate as required with Engineer and Resident Project Representative, if any, in observing the Work and performing field inspections.
			6. Review and coordinate the Work with Shop Drawings and Contractor's other submittals.

NTS: Retain Paragraph “B” if it is expected that Contractor’s field engineer will be performing delegated design services at the site, or if Owner desires a professional engineer on-site. Delete Paragraph "B"" when not required. See the firm's Standard Construction Documents Procedure Memorandum No. 2a, "Standard Specifications Template", for example language when the Contractor's design professional has specific responsibilities and qualifications requirements.

For more on delegation of professional design services, see the firm's Standard Construction Documents Procedure Memorandum No. 10, "Delegation of Professional Design Services", and General Conditions, Paragraph 6.21.

* + 1. Contractor’s engineer shall be a registered, professional engineer of discipline required for specific service on the Project, licensed in the same state as the Site.
	1. CONTRACTOR’S SURVEYOR

NTS: On smaller projects, consider whether the surveyor needs to be a registered, licensed professional, and edit Paragraph “A” to suit the project. A licensed, registered professional is preferred when working on in close proximity to property lines. Requiring a registered, licensed professional surveyor will increase the cost of the project but should also result in higher-quality survey work. Check statutes in the jurisdiction where the project is located, and consider the type of surveying work required, before editing Paragraph "A" below.

Statutes vary from jurisdiction to jurisdiction. For example, New York State Education Law, Article 145, "Professional Engineering and Surveying", Section 7208(h), exempts the following from services requiring a registered, licensed professional surveyor in New York state, "execution by a contractor or by others of Work designed by a professional engineer, or land surveyor, or the superintendence of such Work as a superintendent, foreman, or inspector." verify applicable law in the jurisdiction of the project and edit this section accordingly.

* + 1. Employ or retain the services, as needed, at the Site a surveyor with experience and capability of performing surveying and layout tasks required in the Contract Documents and as required for the Work. Surveyor's tasks include, but are not necessarily limited to, the following:
			1. Providing required surveying equipment, including transit or theodolite, level, stakes, and surveying accessories.
			2. Establishing required lines and grades for constructing all facilities, structures, pipelines, and Site improvements.
			3. Preparing and maintaining professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the Work.
			4. Prior to backfilling operations, survey, locate, and record on a copy of the Contract Documents accurate representation of buried Work and Underground Facilities encountered.
			5. Complying with requirements of the Contract Documents relative to surveying and related Work.

NTS: Delete from Article “1.5” inapplicable requirements.

* 1. SUBMITTALS
		1. Informational Submittals: Submit the following:
			1. Field Engineering:
				1. Submit daily reports as indicated in this Section.
				2. When requested by Engineer, submit documentation verifying accuracy of field engineering including but not limited to Contractor’s survey notes and field notes for Record Documents.
	2. RECORDS
		1. Maintain at the Site a complete and accurate log of control and survey Work as it progresses.
			1. Survey data shall be in accordance with recognized professional surveying standards, Laws and Regulations, and prevailing standards of practice in Indiana. Original field notes, computations, and other surveying data shall be recorded by Contractor’s surveyor in Contractor-furnished hard-bound field books. Completeness and accuracy of survey Work, and completeness and accuracy of survey records, including field books, shall be responsibility of Contractor. Failure to organize and maintain survey records in an appropriate manner that allows reasonable and independent verifica­tion of calculations, and to allow identification of elevations, dimensions, and grades of the Work, shall be cause for rejecting the survey records, including field books.
			2. Illegible notes or data, and erasures on any page of field books, are unacceptable. Do not submit copied notes or data. Corrections by ruling or lining out errors will be unacceptable unless initialed by the surveyor. Violation of these requirements may require re-surveying the data questioned by Engineer.

NTS: In Paragraph "B", below, delete the words, "signed and sealed by professional surveyor," if Contractor's surveyor is not required to be a registered, licensed professional.

* + 1. Upon completion of foundation walls and major Site improvements, prepare a certified survey, signed and sealed by professional surveyor, showing dimensions, locations, angles and elevations of construction and locations and elevations of Underground Facilities encountered during the Work.
1. PRODUCTS (NOT USED)
2. EXECUTION

NTS: Delete from Article “3.1”, below, inapplicable requirements.

In the rare cases where the Contractor's surveyor is required to perform boundary-type surveys, applicable statutes may dictate the accuracy required for the survey. When such services are part of the Contractor's work, also add the following: "Survey work shall comply with Laws and Regulations and with American Land Title Association/American Congress of Surveying and Mapping (ALTA/ACSM) Minimum Standard Detail Requirements for ALTA/ACSM Title Surveys."

* 1. SURVEYING
		1. Reference Points:
			1. Refer the General Conditions, as may be modified by the Supplementary Conditions, regarding reference points.
			2. The Contractor is responsible for the restoration of all property corners and control monuments damaged or destroyed by construction related activities. Any disturbed monuments must be replaced by an Indiana Registered Land Surveyor, and approved by the Engineer, at the Contractor’s expense.
			3. From Owner-established reference points, establish lines, grades, and elevations necessary to control the Work. Obtain measurements required for executing the Work to tolerances specified in the Contract Documents.
			4. Establish, place, and replace as required, such additional stakes, markers, and other reference points necessary for control, intermediate checks, and guidance of construction operations.
		2. Surveys to Determine Quantities for Payment:
			1. For each application for progress payment, perform such surveys and computations necessary to determine quantities of Work performed or placed. Perform surveys necessary for Engineer to determine final quantities of Work in place.
			2. Notify Engineer at least 24 hours before performing survey services for determining quantities. Unless waived in writing by Engineer, perform quantity surveys in presence of Engineer.
		3. Construction Surveying: Comply with the following:
			1. Alignment Staking: Provide alignment stakes at 50-foot intervals on tangent, and at 25-foot intervals on curves.
			2. Slope Staking: Provide slope staking at 50-foot intervals on tangent, and at 25-foot intervals on curves. Re-stake at every ten-foot difference in elevation.
			3. Structure: Stake out structures, including elevations, and check prior to and during construction.
			4. Pipelines: Stake out pipelines including elevations, and check prior to and during construction.
			5. Road: Stake out roadway elevations at 50-foot intervals on tangent, and at 25-foot intervals on curves.
			6. Cross-sections: Provide original, intermediate, and final staking as required, for Site Work other locations as necessary for quantity surveys.
			7. Easement Staking: Provide easement staking at 50-foot intervals on tangent, and at 25-foot intervals on curves. Also provide wooden laths with flagging at 100-foot maximum intervals.
			8. Record Staking: Provide permanent stake at each blind flange and each utility cap is provided for future connections. Stakes for record staking shall be material acceptable to Engineer.
		4. Accuracy:
			1. Establish Contractor's temporary survey references points for Contractor’s use to at least second-order accuracy (e.g., 1:10000). Construction staking used as a guide for the Work shall be set at least third-order accuracy (e.g., 1:5000). Basis on which such orders are established shall provide the absolute margin for error specified below.
			2. Horizontal accuracy of easement staking shall be plus or minus 0.1 feet. Accuracy of other staking shall be plus or minus 0.04 feet horizontally and plus or minus 0.02 feet vertically.
			3. Survey calculations shall include an error analysis sufficient to demonstrate required accuracy.

+ + END OF SECTION + +