Chapter 1 – The Contract Documents

Electrical contractors are called “contractors” for a reason. Contracting companies enter into contractual agreements with owners. The contractor agrees to provide the necessary labor and materials to build the project according to the contract documents.

The consequences of failing to understand requirements of the contract are significant. Every aspect of the project will be controlled by these documents and the contractor’s work will be judged by them. The contract documents are how the architect and engineer communicate the design to the contractor.

- **Drawings** – outline the **QUANTITY** of work
- **Project Manual** – explain the **QUALITY** of work

The drawings and the specifications should identify and specify every material item and the means of installation.

Early in his or her career, the estimator must have a full understanding of the contract documents. The contract documents are binding documents between an owner and the contractor. Every estimator must become very familiar with these documents and how to interpret them. The estimate can only be as accurate as the estimator’s interpretation of these documents. The contractor’s risks are increased when the estimator fails in a proper understanding of the contract documents.

When someone refers to the plans and specs, they are referring to the drawings and the project manual.

CONTRACT DOCUMENTS	
Drawings = “Plans”	**Project Manual = “Specs”**
Life Safety Phasing Geotechnical Civil Landscape Structural Demolition Architectural Plumbing Process Mechanical Electrical Telecommunications	Advertisement for Bids Instructions to Bidders – ITB Bid Form(s) Agreement or contract Bid Bond Performance Bond Value Engineering Cost Savings Sub-Contractor Listing Major Equipment Manufactures General Conditions Supplemental Conditions Special Conditions Technical Specifications

1. The Drawings

The most basic skill in becoming a quality estimator is the ability to read construction drawings. Drawings are filled with symbols, abbreviations, and notes that an estimator must translate into material quantities and/or labor hours. Drawings communicate the desired wishes of the owner and the requirements of the architect.

The architect is the lead designer of the project but does not do all the design work. The architect is usually assisted by consulting engineers such as civil, structural, mechanical, plumbing, and electrical. The architect oversees coordination of the consulting engineers and complies the final set of design drawings.

A. Drawing Organization

Most sets of drawings start with a cover sheet that provides the general information about the project.

1) **Life Safety** – Life Safety plans provide for quick reviews of critical life safety items such as construction type per allowable area, occupant loads, means of egress, fire protection systems, fire department vehicle access, hydrant locations, and more.

2) **Phasing** – Some projects require portions to be completed in succession. The Phasing drawings will usually indicate specific areas and the completion dates these areas must be completed.

3) **Landscape** – Landscape drawings may include landscape lighting and site lighting fixtures.

4) **Civil** – Prepared by a civil engineer, these drawings typically include grading, site utilities, streets, and curbs.

5) **Structural** – The structural drawings will provide the estimator with the main structure design. Slab thicknesses, foundation types, and expansion joints are found on these drawings.

6) **Demolition** – Renovations to existing facilities will usually have demolition drawings. These drawings provide areas set for complete demolition and selected removals.

7) **Architectural** – The architectural plans are the plans prepared by an architect. These will make up the bulk of the project's drawings. These typically include floor plans, elevations, and sectional plans. This set will include finish schedules, door schedules, and architectural details.

8) **Mechanical** – The architect will employ a consulting engineer to prepare the mechanical drawings. The mechanical drawings will sometimes include both HVAC and the plumbing requirements. The mechanical portion will include ductwork, air handlers, condensing units and other equipment associated with climate control of the building.

9) **Plumbing** – Plumbing drawings will detail the water lines, sewer lines, and the gas lines.

10) **Electrical** – An electrical engineer will prepare the electrical drawings. This will typically include the following drawings: site power, site lighting, branch power, lighting, fire alarm, communications, and schedules. The electrical drawings will also include a one-line diagram of the power feeders.

11) **Telecommunications** – Sometimes the electrical engineer will provide a separate set of drawings that include all telecommunications. These drawings will include but not limited to data outlets, horizontal cabling, cable trays, and data racks.

B. Drawing Types

A project's drawings not only will have a combination of different disciplines, but also different types of drawings. Each drawing type provides important information that will assist estimators understand the project.

1) **Plans** – A plan view is a horizontal view looking down from the top of the building. Most projects will have more than one plan. Some projects will have foundation plans, floor plans, and framing plans.

2) **Elevations** – Elevation drawings show how the building or structure looks from the outside. Typically, all four sides of a building will be shown. More than one elevation may be shown on a drawing.

3) **Sections** – Section drawings are used to show key components of the building. These drawings are a close-up view of how the structure is going to be constructed.

4) **Details** – Details on drawings are a blown-up view of a selected portion of the work. For example, a detail on a drawing may show how the cable tray is to be supported. Projects may also have details for the following: lighting fixture hanging details, utility pole connections, and poke-thru assemblies.

2. The Project Manual

The project manual is the second part of the contract documents. The project manual is sometimes referred to as the "specs." The estimator must understand the conditions of the contract and the effect they have on the bid price.

The estimator will need to do a thorough review of the spec sections that are applicable to the project he is bidding.

1) **Bidding documents** – The bidding documents typically include the following: Advertisement for Bids, Instructions to Bidders, Bid forms, and the Agreement Form or Contract.

2) **General conditions** – The general conditions set forth the rules by which the project is constructed and administrated.

3) **Supplemental conditions** – The supplemental conditions deal with the project's specific matters related to the contract. Supplemental conditions also modify items in the general conditions.

4) **Technical specifications** – The technical spec sections will comprise the majority portion of the project manual. The primary purpose of this portion of the specifications, is to set forth the following: quality of materials, standard of workmanship, and methods of installation.

Most construction specifications are arranged by the CSI MasterFormat. The estimator must be familiar with the format and arrangement of the specifications. Refer to Volume1, Appendix B, for a detailed listing of Divisions 26, 27, and 28.

CSI MasterFormat Organizational Structure

Groups
1. Procurement and Contracting Requirements Group • Procurement and Contracting • Requirements – Division 00 2. Specifications Group

Specifications Groups	
Subgroups	**Divisions**
1. General Requirements	01
2. Facility Construction	02-19
3. Facility Services	20-29
4. Site and Infrastructure	30-39
5. Process Equipment	40-49

Sections
50 Divisions Numbered with Titles
01 General Requirements 02 Existing Conditions 03 Concrete 04 Masonry 05 Metals 06 Wood, Plastics, and Composites 07 Thermal and Moisture Protection 08 Openings 09 Finishes 10 Specialties 11 Equipment 12 Furnishings 13 Special Construction 14 Conveying Equipment 15 Reserved 16 Reserved 17 Reserved 18 Reserved 19 Reserved 20 Reserved 21 Fire Suppression 22 Plumbing 23 Heating, Ventilating, and Air Conditioning (HVAC) 24 Reserved 25 Integrated Automation 26 Electrical 27 Communications 28 Electronic Safety and Security 29 Reserved 30 Reserved 31 Earthwork 32 Exterior Improvements 33 Utilities 34 Transportation 35 Waterway and Marine Construction 36 Reserved 37 Reserved 38 Reserved 39 Reserved 40 Process Integration 41 Material Processing and Handling Equipment 42 Process Heating, Cooling, and Drying Equipment 43 Process Gas and Liquid Handling, Purification, and Storage Equipment 44 Pollution and Waste Control Equipment 45 Industry-Specific Manufacturing Equipment 46 Water and Wastewater Equipment 47 Reserved 48 Electrical Power Generation 49 Reserved

Section Format
• General • Products • Execution

The section format is broken down into three sections: General, Products, and Execution. Understanding the products and execution portions is vital. The contractor must install the right specified products in the right manner.

Section format descriptions are as follows:

1) **General** – The General heading will indicate any related documents, a summary of the items, submittals, and quality assurance. Sometimes it will include any of the following: abbreviations, definitions, delivery, storage, handling, and warranty requirements.

2) **Products –** The Products heading will provide manufacturers and a list of product types and specifications for each item. Enclosure types, factory finishes, and accessories should be listed.

3) **Execution** – The Execution heading will provide installation means and methods. Under this heading the following are listed: conduit types, minimum sizes and uses, conductor materials and insulations. Connection types, mounting heights, protection, and cleaning are listed as well.

The drawings and the project manual should specify all materials and installation methods and standards for a project.

The estimator must have the ability to identify portions of the contract documents that are incomplete. When these documents are incomplete, the contractor's risk will increase. One of the main responsibilities of the estimator is identifying project risks.

The wise estimator will seek clarification on omissions in the documents prior to bidding the project.