

S I X T H E D I T I O N

CONSTRUCTION SPECIFICATIONS WRITING

PRINCIPLES AND PROCEDURES

HAROLD J. ROSEN MARK KALIN
ROBERT S. WEYGANT JOHN R. REGENER JR.

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Construction Specifications Writing

Principles and Procedures

Sixth Edition

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Preface

As the Construction Specifications Institute (CSI) notes at the beginning of its *Manual of Practice*, the history of construction specifications can be traced all the way back to Noah's Ark. Instructions for construction of the Ark were expressed in specifications; there were no drawings.

So make yourself an ark of cypress wood; make rooms in it and coat it with pitch inside and out. This is how you are to build it: The ark is to be 450 feet long, 75 feet wide and 45 feet high. Make a roof for it and finish the ark to within 18 inches of the top. Put a door in the side of the ark and make lower, middle and upper decks. Genesis, Chapter 6, Verses 14–16 (The Holy Bible, New International Version, 1978, by New York International Bible Society)

Specifications alone were apparently sufficient to design and build the Ark in ancient times. Today, however, the process has become more complicated and specifications have evolved into complex documents and drawings have been added, reflecting new technologies and contractual relationships.

Both drawings and specifications have evolved as construction has become more complex. In the early 1900s, architectural drawings became virtually an art form, with ink drafting on cloth. Reproduction of drawings was by “blueprints”: white lines on blue backgrounds. Specifications were essentially notes on the drawings, except on some large projects where the notes were gathered into “book specs.” Now, production of graphic and text documents has been computerized with Computer-Aided Drafting (CAD) and at least computer-based word processing. The prospect is pending for the abolition of traditional drawings and specifications in favor of an interoperable database of information, known as the Building Information Model (BIM).

The benefits and consequences of BIM and its allied programs are being determined as this is written. Issues such as contractual duties and responsibilities, procurement (bidding) processes, compliance with regulatory requirements, and copyright protections are yet to be worked out for BIM projects. Somehow, the fundamental concept of a designer instructing a builder through specifications will prevail.

It is perceived that traditional construction documents will need to be produced for the foreseeable future. Thus, the focus of this book is on the conventional principles and procedures for production and use of construction specifications.

The Authors

Mark Kalin, FAIA, FCSI, CCS, SCIP, LEED AP

Mark Kalin is President of Kalin Associates, an independent specification consulting firm in the Boston area. In 2010, Mark is National Chair of the Sustainable Facilities Practice Group of the Construction Specifications Institute and President of Specifications Consultants in Independent Practice, an organization of independent and in-house specification writers in its 50th year. For the AIA, Mark has served as Chair of the MasterSpec Review Committee, the Library and Archives Committee, and the Specifications Professional Interest Area. For CSI, Mark has been President of the Boston Chapter and now serves on the national CSI Technical Committee.

Mark is the author of the original GreenSpec (1996) and Kalin Associates has completed specifications for over 160 projects seeking USGBC LEED certification. Mark has taught a course on Specification Writing at Harvard University's Graduate School of Design for several years, and is the primary author of the SPie Specifiers Property Set database now being used to link specification and BIM data.

Robert S. Weygant, CSI, CDT, SCIP

Robert Weygant is Owner of Sumex Design, a BIM consulting and development firm located in New Hampshire. Robert is focused on development of BIM components for manufactured products and systems while promoting the use of new interoperability standards, the integral link between BIM and construction documentation. In 2010, Robert is the National Chair of the BIM Practice Group for the Construction Specifications Institute and a member of the national CSI Technical Committee. Complete with specification, performance, and lifecycle information, Robert has developed, and continues to manage, BIM components for many major building product manufacturers.

Robert's background consists of active roles as a general contractor, draftsman, product representative, and specifier. Combining the knowledge of these roles, he has a unique perspective on how to create and manage information necessary for all aspects of a project's lifecycle and improve communication of information through new technologies and techniques.

John Regener, AIA, CCS

John Regener is an Architect and Certified Construction Specifier (CCS) working in Irvine, CA. He is a member of both the American Institute of Architects (AIA) and the Construction Specifications Institute (CSI). In addition to CCS certification, he is a Certified Construction Contract Administrator (CCCA) and a MasterFormat Accredited Instructor (MAI) by CSI. Mr. Regener has been active in CSI and its education programs and is Past-President of Specifications Consultants in

Independent Practice (SCIP). He has taught construction specifications at the community college level.

In 1992, John established an independent practice as a construction specifications writer and joined Specifications Consultants in Independent Practice (SCIP). His practice has been diverse in project types and has included commercial, industrial, hospitality, medical, and religious facilities, with about 80 percent of his projects K-12 schools. John is a frequent contributor to the specifiers' forums for 4specs and CSI.

Harold J. Rosen, PE, Hon. CSI

Harold Rosen retired in Chevy Chase, Maryland, after more than 60 years as a Professional Engineer specializing in producing construction specifications. An Honorary Member of the Construction Specifications Institute (CSI), the highest honor bestowed by the Institute, Mr. Rosen began writing construction specifications in 1942 while working for the U.S. Army Corps of Engineers, during a period of immense and extremely rapid construction due to World War II. After the war, Mr. Rosen worked for architectural firms during the busy post-war period. He witnessed firsthand the countless changes that have occurred in the construction industry and the practice of specifications writing.

Harold Rosen's experience included eight years as chief specifications writer for the New York City office of Skidmore, Owings and Merrill and eight years as an independent specifications consultant. He was one of the shapers of standard organization of construction specifications, especially the 16 Divisions that were a major organizational tool. Harold compiled and edited his articles for *Progressive Architecture* magazine into the basis for the first edition of *Construction Specifications Writing: Principles and Procedures* in 1973.

Specifications Overview

Following World War II, the pace of construction became intense, with new technologies for materials and new construction procedures. Yet, specifications writing resumed as it had been practiced since the beginning of the twentieth century. Construction contracting became highly competitive and expedience dominated over quality. "Successful" bidders were compelled to scrutinize the specifications to find the cheapest way to build. Construction specifications took on greater importance as a means of communicating design intent and quality assurance.

There were no standards for how the specification sections were placed in each book of specifications, except that there was an attempt to arrange them on the basis of chronology of the work: first earthwork, then concrete, masonry, structural steel, carpentry, and so forth. The "and so forth" varied from office to office and even

within the same office. In addition, there were no groupings of similar specifications into what are now call “Divisions,” to facilitate locating information.

In the public sector, interest in standardization carried over from war production. Experienced specifications writers from large public agencies, such as the Army Corps of Engineers (COE) and the Naval Facilities Engineering Command (NAVFAC), became involved with specifications writers from large corporations to form the Construction Specifications Institute (CSI) in 1948. Their intention was to organize construction specifications and develop recognized principles and procedures to make bidding and construction more coherent.

As a result, in 1963, CSI introduced a 16-division format for organizing specifications. In 1965, the American Institute of Architects (AIA) conceived a new title for the book of specifications, calling it the Project Manual because it contained more than the specifications. The Project Manual also contained bidding, construction contract, insurance, administration, and technical documents and specifications. CSI's 16-division format was applied to AIA's Project Manual concept and resulted in CSI's flagship document, *MasterFormat*.

After nearly four decades, *MasterFormat* plus the principles and procedures published in the *CSI Manual of Practice* have proven to be effective. The ordering of documents according to these national standards continues to evolve to this day, accommodating changes in construction contracting and construction technology.

Not only the formats but also the physical production of construction specifications has undergone major changes over the past five decades. Making multiple copies of specifications with a hectograph (a machine used for making copies of text transferred to a gelatin surface) gave way to the mimeograph machine (which used a waxed fabric stencil that had typed characters cut by a typewriter, through which ink passed onto paper). In the late 1970s, xerographic copiers using an electrostatic image transfer process to apply and fuse powdered ink onto a page became affordable for businesses.

Specifications were typewritten onto bond paper, as business documents have been produced since the typewriters took over for hand-written business correspondence. Technical improvements were made to typewriters, especially the addition of electric assistance. Innovations such as IBM's “Selectric” typewriters with their golf ball–like, interchangeable type fonts advanced the productivity of typewriters.

In the middle to late 1960s, computers began to be used to produce documents. Key punch cards and tape reels were used with mainframe computers to record text for replay through a printer that was essentially an automated typewriter. Later, punch cards and tape reels were replaced by “mag cards” (index card–size polyester sheets with magnetic recording media) and 8-inch “floppy disks” used with early generation mini-computers. In the mid-1980s the desktop personal computer (PC) superseded the minicomputer, and software was developed so that

true computer-assisted text production was realized and made available to large and small businesses and to individuals.

With the introduction of laser-controlled electrostatic printers (“laser printers”) in the late 1980s, the typewriter was supplanted by the computer for specifications production. Now PCs have capabilities that were unthinkable for even the most powerful mainframe computers four decades ago.

Some large architectural firms in the mid-1960s acquired in-house mainframe computers. Included in the use of these computers was the production of standardized documents. From this, the concept of “master specifications” was developed to make production of similar yet customized documents easier. These masters reflected the specific materials and designs that these firms had become familiar with and represented their continued and consistent experience project after project.

A national trend toward the development of master specifications started in the late 1960s and early 1970s, when large public agencies and private organizations, in addition to the AIA and CSI, began to produce standardized master texts for specifications. These masters enhanced the quality of specifications by guiding the specifier through notes and alternative choices.

However, a disturbing trend arose as a result of the availability of master specifications. Some firms decided that it was unnecessary to have a qualified construction specifier on staff to prepare project specifications. It was assumed that, with the imprimatur of the AIA and CSI on standardized master specifications, project-specific specifications could be produced less expensively by having a project designer, a job captain, or, in some cases, a draftsman edit the office masters to produce project-specific specifications. The specialized training, aptitude, and skills of a construction specifier were not recognized.

There are countless anecdotal accounts of master specifications being utilized by individuals unschooled and ill prepared to edit master specifications, producing unintended and notably negative consequences. Staff without the ability to edit, fill in blanks, and select options resulted in project specifications subject to construction claims and lawsuits, because the final specification document was replete with errors and was not in sync with the drawings.

The development of master specifications, the development of more efficient reproduction techniques, and the ease of document editing by means of word processing software have evolved. Specifications themselves have evolved into voluminous documents reflecting the growth in complexity of construction technology, the increase in regulatory (building code) requirements, the inclusion of detailed quality assurance procedures, and recently adopted provisions for sustainable design and certification have made specifications writing more challenging.

Unfortunately, as the curricula of architectural and engineering schools have kept

pace with the complexity of design and construction, education in construction documents, including construction specifications, has been largely omitted. Most colleges and universities today offer as little education in specifications and other construction contract documents as they did a half-century ago. This has led to a misconception: If it isn't taught in school, it must not be important.

There are signs that this situation may be changing. Some colleges and universities have had long-standing classes in construction specifications, construction contracts, and construction materials. Others are becoming aware of the need for architects and engineers to have basic education in written construction documents, especially with the advent of the Building Information Model (BIM) more integrated processes for design and construction. Books such as this one, with its roots back into the 1960s and others are selling because of increased interest in specifications. Internet-based education programs are being introduced for continuing education of practicing design professionals.

This increased interest in specifications will probably mean a change in the role of those design professionals whose primary task has been that of a “specifications writer.” In the future, specifications decision making and production (specifications writing) will be by generalists. The vision being promoted by those who publish specification masters is one where computer-based programs will guide a specifications process that is integrated into an overall computerized model of the facility to be designed, constructed, operated, maintained, and ultimately deconstructed or adaptively reused. Within this futuristic vision is the need for all design professionals to be educated in the production of construction specifications and other bidding and contract documents.

An analogy would be that of a young driver being given a high-performance sports car to drive. The car is a marvel of technology whose performance is dazzling. The young driver has played video games that simulate driving, and dreams of the day when the experience becomes real. The young driver in this analogy is the design professional with limited or no education in specifications and other construction contract documents. The high-performance sports car is the Building Information Model (BIM) or even a computer-assisted specifications program. The chances for a mishap or even a calamity are high.

To reduce the risk and raise the prospects of successful and profitable use of the “high-performance vehicles” now being developed for construction specifications, education and training in colleges and universities, and in continuing education programs for design professionals, are needed. Thus, this book has been produced.

Introduction

Knowledge of specification writing principles and procedures is essential to the specifier in an architectural or engineering firm in order to prepare sound, enforceable construction specifications. Unless skills are properly developed to understand and apply these principles, and unless expert knowledge of materials, contracts, and construction procedures is also applied, the architect or engineer cannot communicate successfully with the ultimate users of the specifications: facility owners, general contractors, subcontractors, materials suppliers, code authorities, and quality assurance inspectors.

What, then, constitute the principles of specification writing? Basically, the principles should encompass those factors that permit architects and engineers to understand clearly the relationship between drawings and specifications—between the graphic and the verbal—and should enable them to communicate effectively by setting forth in logical, orderly sequence information to be incorporated into the specifications portion of the construction documents.

This book presents the principles and procedures for organizing and producing construction specifications. It is intended for students in architecture and engineering curriculums and for practicing design professionals who participate in professional development and continuing education programs. It is also appropriate for others involved in the production and use of construction specifications, including facility managers, construction managers, and building product representatives.

In summary, this book presents principles and procedures for construction specifications writing as follows:

- 1. The Role of the Specifications.** Specifications are one component of the documents used for bidding and construction of a project. Another component is the drawings. The specifications and drawings are intended to work in harmony to describe what shall be built. Other components are bidding requirements and other contract requirements, which prescribe the duties and responsibilities of the primary parties of the construction contract. Bidding requirements are applicable during the procurement or bidding phase prior to actual construction. Contract requirements apply during fulfillment or execution of the Contract for construction. Each component has distinct purposes. Specifications, as written instructions, are frequently judged by courts as having greater importance than drawings when these documents are in conflict, with judgments based usually on what is contained in the specifications. This means that specifications should be carefully prepared by knowledgeable people. Chapter 1 discusses the role of specifications in detail.

2. The Relationship between Drawings and Specifications. Specifications address qualitative requirements for products, materials, and workmanship, while the drawings indicate relationships between elements and show the location, identification, dimension and size, details and diagrams of connections, and shape and form. There should not be duplication or conflict between these two documents. Instead, they should be complementary. To improve coordination between drawings and specifications, there should be standardization of the information appearing in them. Chapter 2 discusses the purposes of drawings and specifications and their relationship.

3. Organization of Specifications. For many years, specifications were arranged in a series of Sections based on the order or chronology in which various trades appeared on the construction scene. However, it was found that our increasingly complex building structures did not necessarily follow these simple rules, nor was there a uniform nationwide system of specifications. In 1963, the Construction Specifications Institute (CSI) established a uniform arrangement of the various Sections in a division-section organization titled the *CSI Format*, which in subsequent revisions has evolved into the *CSI MasterFormat*. The lists of Section numbers and titles in *MasterFormat* enable construction information to be consistently identified and retrieved. Chapter 3 discusses industry standards, including CSI formats, for organizing specifications.

4. The Project Manual and Specifications Sections. Specifications are included in a book published for the project titled the Project Manual. The Project Manual contains bidding and contract requirements and the construction contract Specifications. The Project Manual is divided into chapter-like Sections organized according to *MasterFormat*.[™] Chapter 4 discusses how to determine the level of detail for Specifications and the appropriate Section number and title according to *MasterFormat*.

5. Format for Specification Sections. Until CSI promulgated the three-part *SectionFormat*, there was no universal arrangement of information in an orderly, coherent series of paragraphs dealing with the content of the Specification Section. With the addition of *CSI PageFormat*, there are industry standards for internal organization of the Section and standardized page presentation. Chapter 5 discusses how to organize and present a Section of the Specifications.

6. Types of Specifications. There are four methods of specifying the Work of a construction Contract to be performed by the Contractor. These methods, used individually or in combination, are descriptive specifying, reference standard specifying, proprietary specifying, and performance specifying. Additionally, there are considerations of whether the

Specifications are “restrictive” (sole source or limited sources) or “nonrestrictive” (commonly known as “or equal”) Specifications. Chapter 6 discusses how to choose and use the various methods of specifying.

7. Specifications Writing Principles. After the formats for specifications and the methods of specifying are understood, the technical and procedural content of the Specifications needs to be determined. The content is described using techniques involving appropriate specifications language, workmanship requirements, and coordination among various Specifications Sections to avoid redundancy and conflicting requirements. Chapter 7 discusses these principles.

8. Bidding Requirements. Bidding requirements consist of documents that are used in the solicitation of bids and typically include the Advertisement or Invitation to Bid, the Instructions to Bidders, and the Bid Form. The specifier often prepares these documents based on instructions from the owner. Chapter 8 discusses the content, purposes, and formats for the bidding requirements.

9. General Conditions of the Contract. The Conditions of the Contract define basic rights, responsibilities, and relationships of the entities involved in the performance of the Contract. The Conditions of the Contract are an inherent part of the Owner-Contractor Agreement and are considered to be the “general clauses” of the Agreement. There are generally two types of Conditions of the Contract: the General Conditions, which are found in a standardized, preprinted document, and the Supplementary Conditions, which are project-specific modifications to the standard document. Chapter 9 discusses the General Conditions of the Contract, and Chapter 10 discusses the Supplementary Conditions of the Contract.

10. Supplementary Conditions of the Contract. Each project has unique requirements. In terms of the general clauses or Conditions of the Contract, the unique requirements are presented in the form of Supplementary Conditions of the Contract, which modify the standard preprinted General Conditions. Chapter 10 discusses the typical content of Supplementary Conditions of the Contract.

11. Bonds, Guarantees, and Warranties. To ensure performance by the Contractor and to protect the owner from premature failure of products and workmanship, the Contract Documents include provisions related to bonds, guarantees, and warranties. These are presented in general terms as part of the Contract requirements, preceding the Specifications in the Project Manual, and in Specifications Sections to describe specific provisions. Chapter 11 discusses bonds, guaranties, and warranties.

12. Division 01 - General Requirements. These are Sections of the

Specifications that apply generally to all Sections. The use of Division 1 follows one of the prime principles of Specifications writing: “Say it once.” Chapter 12 discusses the use and content of Division 01 Specifications.

13. Modifications. It is inevitable that the bidding and Contract requirements, the Specifications, and the Drawings will require revision after being issued. Chapter 13 discusses the procedures and formats for preparing the various types of modification documents.

14. Specification Language. It is imperative to use clear technical language that can be understood by those who use the Specifications. In order to communicate with proper language, the specifier must sufficiently master the tools of specifications language, including grammar, vocabulary, spelling, use of abbreviations and symbols, punctuation, capitalization, sentence structure, and the unique considerations of streamlined writing and specifications detail. The specifier must not only follow hard rules of language but must understand the subtleties of language. Chapter 14 discusses the unique language requirements of construction specifications.

15. Specification Resources. Construction technology, project delivery methods, and sources of construction information change constantly and rapidly. Chapter 15 presents some common resources useful for specifiers.

16. Products Evaluation. Other books address construction technology in much more detail than can be accommodated in this book. Chapter 16, however, discusses fundamental procedures for evaluating products, identifying necessary attributes, and selecting appropriate products to be included in the Specifications.

17. Specification Writing Procedures. Applying the principles of specifications writing is facilitated if there are established procedures for producing Specifications Sections. Chapter 17 discusses those procedures and the use of Specifications checklists when gathering information, researching, and writing.

18. Master Guide Specifications. Master guide specifications are published and nationally marketed to assist specifiers. The publishing organizations have resources to continually research, create, and maintain construction specifications. Many architectural and engineering offices and independent specifications consultants use these master guide specifications to create office-specific master specifications that serve as the basis for project-specific specifications. Chapter 18 discusses the use of master guide specifications published by commercial organizations and public agencies, as well as the development of office-specific masters.

19. Computer-Assisted Specifications. Today, several true computer-assisted specifications programs are in the marketplace. These programs offer automation features beyond word processing programs that enable the specifier to more expediently and accurately create project-specific specifications—or so the marketing materials promise. Chapter 19 discusses the history and current offerings of three of the computer-assisted specifications programs.

20. Preliminary Project Description. During the preliminary design phase of a project, an alternative format, based on building Elements, is sometimes used to provide information for scope descriptions and cost estimating. Based on *Uniformat* rather than *MasterFormat*, a Preliminary Project Description (PPD) is produced from which Specifications are derived at later phases of the project. Chapter 20 discusses the PPD.

21. Outline and Shortform Specification. Used during the preliminary design of a project, Outline Specifications are produced using either the typical three-part Section format or an abbreviated format with sequentially identified articles. Outline Specifications describe preliminary product selections and other project-specific requirements. Another abbreviated specifications format, shortform specifications, is used for less complicated projects or those of limited scope where highly detailed information is either unnecessary or inappropriate. Chapter 21 discusses outline and shortform specifications.

22. Green Specs / LEED Specs. Specifications for projects seeking USGBC LEED certification must include procedures and products that comply with the requirements for achieving individual LEED credits. Division 01 in the Project Manual will typically include requirements for LEED submittals, construction waste management, indoor air quality during construction, commissioning and the LEED Scorecard for the project. Specifications in other Divisions will include requirements including materials with recycled content, regionally sourced materials, rapidly renewable materials, certified wood, and low-emitting adhesives, sealants, paints, and flooring. While green specs for sustainable design and LEED specs may be different, the principles of specification writing apply to both.

23. Building Information Modeling (BIM) is an emerging technology affecting not just the design team, but the specifier, contractor, owner, and facilities managers. BIM couples traditional CAD-based projects with the product information and documentation associated with specific products, systems, and elements found on projects. In order for BIM to be fully effective, it requires an individual knowledgeable with not only the products and systems in the project, but the organization structure necessary to make the information useful. Just as specifications follow a

standardized format, the information within a BIM requires standardization and organization to allow clear, concise, complete, correct, and *consistent* information among the documents, drawings, and 3D models.

Appendices follow the text and provide examples of Specifications and other Bidding and Construction Contract documents.

Chapter 1

The Role of Specifications

Documents for Construction

When an Owner decides to build, renovate, or reconstruct a facility, the Owner usually engages others to prepare documents describing the Work to be performed and the contractual requirements under which construction and related administrative activities are accomplished. Contemporary construction practices in North America are varied, and construction contracts likewise express varied contractual relationships, procurement (bidding and negotiation) methods, and regional construction practices.

This complexity can be very confusing, so, for the purposes of this book, the discussion will be generally limited to the context of the traditional design-bid-build method for construction procurement, with comments occasionally describing alternative procurement methods, such as design-build, multiple prime contracts, and phased (“fast track”) construction. Also, the discussion will be in the context of three primary parties in the construction contract: the Owner, the Architect/Engineer, and the Contractor.

The Architect or Engineer, and his or her various consultants, prepare documents for construction of the facility. These develop over time, from conception of the design through gestation of design development, through the birth pangs of bidding/pricing and construction, until delivery of the completed facility at closeout of the construction Contract. Many types of documents are used during design and construction, but for actual construction three basic types of documents are used:

1. Bidding and Contract Requirements: Text documents
2. Drawings: Graphic documents
3. Specifications: Text documents

Combined, these three types of documents are called the Bidding Documents (before signing of the Agreement or “contract”) and the *Contract Documents* (after signing the Agreement or contract). The difference concerns when the documents are used. Prior to execution (signing) of the Agreement, the combined documents are known as Bidding Documents under traditional design-bid-build projects. Under design-build and certain types of construction management-type projects, the documents prior to execution of the Agreement may be known as “Procurement

Documents.” This is a fine distinction reflecting the process of negotiation for selection of product vendors and subcontractors, but in most cases, even under design-build and construction management-type projects, a competitive bidding process is used. So, “Bidding Documents” will be the term used here for the documents prior to execution of the Agreement. After execution of the agreement, the documents are known as the Contract Documents.

Bidding Documents

“Bidding documents” is a term generally used to describe the documents furnished to bidders. For traditional design-bid-build projects, the Architect/Engineer and Owner prepare the set of Bidding Documents, consisting of bidding requirements, Drawings, and Specifications. These are issued to prospective general contractor bidders for competitive bidding and for the Owner to select the Contractor named in the Agreement and referenced in other Contract Documents.

However, there are projects where the Contractor is selected by a method other than competitive bidding, such as direct selection by the Owner based on qualifications of the Contractor. In such cases, competitive bidding still occurs but it is managed by the Contractor, who issues Bidding Documents and manages the bidding process.

The primary difference in documents between Bidding Documents and Contract Documents is the inclusion in the Bidding Documents of Bidding Requirements. These generally consist of the Advertisement or Invitation to Bid, the Instructions to Bidders, the Bid Form, and other documents to be submitted to the Owner for the Owner's selection of the Contractor and modifications to the documents issued during bidding (addenda). The Bidding Requirements are removed after bidding and selection of the Contractor and are replaced by the Contract Requirements. The Contract Requirements typically consist of the executed (signed) Agreement with its related documents, such as insurance forms, bonds, and certifications. Note: the Bidding Documents typically include copies of the Agreement form and the Conditions of the Contract (General Conditions and Supplementary Conditions when industry-standard documents are used). The bidding process is described further in Chapter 8.

As noted above, two other types of documents are included in the Bidding Documents and the Contract Documents: the Drawings and the Specifications. This book will not describe principles and practices for production of the Drawings but will describe the types of information best presented on the Drawings (graphic presentation) and in the Specifications (text presentation), and the discussion will include coordination issues between the Drawings and the Specifications. Chapter 2 discusses the relationship between the Drawings and the Specifications in greater detail.

Contract Documents

“Contract Documents” is the term used for documents identified in the Agreement (construction Contract). It appears simple, but, of course, these documents can become complicated as the project delivery process becomes more complex and the relationships between the parties involved in the project become more varied and obscure. Considering the typical design-bid-build project, the Contract Documents consist of the following:

- *Agreement* —A written agreement between the Owner and the Contractor summarizing the work to be performed, the Time in which the Work shall be completed, and the Contract Sum to be paid. Also identified in the Agreement are the Contract Drawings, the Contract Specifications, and other referenced documents such as bond forms, insurance certificates, other certifications, Contractor's qualifications statement, documentation of the Contractor's financial status, subcontractors and suppliers lists, special warranty documents, and just about any other type of written document that the Owner requires. Note: the Agreement is typically prepared by the Owner's legal and insurance counsels or by the Construction Manager if one is involved in the project. The Architect/Engineer typically does not prepare the Agreement and its attachments. If the Architect/Engineer is involved in producing the Agreement and its attachments, it should be under the direction of the Owner. Architects and engineers are not trained to produce legal instruments (documents) and insurance documents, nor are they licensed to practice law and insurance underwriting.
- *Conditions of the Contract*—Typically, these consist of the General Conditions and the Supplementary Conditions. General Conditions are typically preprinted standard documents prepared by professional societies such as (for architectural projects) the American Institute of Architects (AIA) and (for engineering projects) the National Society of Professional Engineers (NSPE), American Consulting Engineers Council (ACEC), and American Society of Civil Engineers (ASCE). Together, the listed engineering societies jointly publish documents as the Engineers Joint Contract Documents Committee (EJCDC). The Conditions of the Contract are discussed in greater detail in Chapter 9.
- *Drawings*—Graphic descriptions of the Work to be performed by the Contractor. The content of Drawings and the relationship between the Drawings and Specifications are discussed in greater detail in Chapter 2.
- *Specifications*—Written descriptions of the Work to be performed by the Contractor. The types of Specifications, their content, and specification

writing principles and practices are discussed in greater detail below and in Chapters 5, 6, and 7.

- *Modifications*—Architect's Supplemental Instructions (for contracts based on AIA A201, *General Conditions of the Contract*), Field Orders (for contracts based on EJCDC C-700, *General Conditions of the Contract*), Construction Change Directives (for contracts based on AIA A201, *General Conditions of the Contract*), *Work Change Directives* (for contracts based on EJCDC C-700, *General Conditions of the Contract*), and *Change Orders* (for contracts based on both AIA and EJCDC *General Conditions of the Contract*). “Modifications” are changes to the documents after execution (signing) of the Agreement. Prior to execution of the Agreement, changes are generally made using *Addenda*. Addenda and Contract Modifications are discussed in greater detail in Chapter 13.

Often the term “construction documents” is used as a synonym for “Contract Documents.” This is incorrect. Simply stated, the Contract Documents are the documents identified in the Agreement. The Contract Documents, together with other documents used during construction, may be called construction documents. Contractually, this is a fine but important distinction. The Contractor, the Architect/Engineer, and the Owner are only obligated to perform according to the Contract Documents. Other documents may be required by the Contract Documents to be produced and used during performance of the Work under the Contract, including shop drawings, construction schedules, construction reports, meeting notes, submittals, installation instructions, test reports, permits, and certificates from authorities having jurisdiction, and operating and maintenance data. However, these are not Contract Documents, although most should become part of the “contract record documents,” which describe the completed Work of the Contract and which may be used by the Owner for operation and maintenance purposes.

Specifications

Imagine a movie or video presentation of the construction of a building, park, water or sewage treatment plant, refinery, highway, or bridge. Imagine that all the activities of construction are shown in great detail, from procurement of materials and manufactured products, through fabrication, delivery to the job site, storage and staging on the job site, surface preparation, mixing, application, installation, fitting, and finishing. Also imagine the Owner, the Architect/Engineer, the Contractor's managers and supervisors, the subcontractors, the testing and inspection agency personnel, the manufacturers' representatives, and code authorities meeting and discussing matters related to the construction. Imagine the movie or video presentation without a sound track. There is not only no background music, there is no dialog. It would be very difficult to construct the facility based only on a silent

movie. To properly understand the requirements and construct the facility, dialog is essential.

The relationship between the Contract Drawings and the Contract Specifications is equivalent to this dialog. The Contract Specifications are essential for complete understanding of the Work to be performed by the Contractor.

Most Conditions of the Contract recognize the significance of construction specifications and refer to the Specifications as part of the Contract Documents, with importance equivalent to that of the Drawings. Because of this, it is imperative that all parties identified in the Agreement (the Owner, the Architect/Engineer, and the Contractor) understand the role of the Specifications and understand how the Specifications are used during bidding and performance of the Work under the Contract. Moreover, the Architect/Engineer should be just as skilled in preparing the Specifications as in preparing the Drawings. The documents are complementary and carry equal weight for interpretation of Contract requirements.

Unfortunately, the education of architects, landscape architects, engineers, specialty designers, construction managers, constructors, inspection personnel, code authorities, manufacturers, fabricators, installers, and applicators rarely includes more than superficial instruction in written documents for construction, including construction specifications. Perhaps this is because these parties are more familiar and comfortable with graphic documents (drawings) and computations (spreadsheets and calculations). Nevertheless, proper performance of the Work requires clear, correct, and adequate descriptions of the requirements of the project, including written documents called the “Specifications.”

While the future appears to hold major changes in the way construction information is managed and presented, including object-oriented, 3D computer-assisted drafting (CAD) that blurs the lines between drawings and specifications, the current separation of information into Contract Drawings and Contract Specifications for bidding and construction will continue for many years. It is essential that those who prepare and use these documents understand their purposes and properly integrate them.

To drive this point home, realize that attorneys and some construction managers understand information written on an 8½-by-11-inch page much better than they understand what is shown on a drawing. Although the General Conditions of the Contract may state otherwise, there is a tendency in a dispute to give greater significance to the Specifications than to the Drawings. This is a particularly good reason to apply as much care in preparing the Specifications as the Drawings.

Study Questions

1. What are the three basic types of documents used in construction contracts?

- a.** Bidding and Contract Requirements
 - b.** Drawings
 - c.** Specifications
 - d.** Marketing data
- 2.** Which of the following are included in the Bidding Documents but not in the Construction Contract Documents?
- a.** Instructions to Bidders
 - b.** General Conditions of the Contract
 - c.** Agreement Form
 - d.** Bid Form
- 3.** True or False? Specifications describe the construction in text form.
- 4.** True or False? Construction specifications apply only to the Construction phase of a project.
- 5.** True or False? Development of construction specifications for a project begins during the Contract Document phase.
- 6.** True or False? Procurement documents include construction specifications.
- 7.** True or False? Design-Bid-Build and Design-Build are two valid methods to procure a construction project.
- 8.** True or False? Contract Documents are identified in the Agreement for a construction project.
- 9.** True or False? Drawings are the graphic descriptions of the work to be performed by the Contractor.
- 10.** The Agreement includes which of the following for the construction contract?
- a.** Summary of the work to be performed by the Contractor
 - b.** Time within which work shall be completed
 - c.** Amount of money to be paid by Owner to Contractor
 - d.** All of the above

Chapter 2

Relationship between Drawings and Specifications

What Goes Where

The information necessary for construction of a facility is developed by the Architect/Engineer and is presented in two basic types of documents: the Contract Drawings and the Contract Specifications. These two types of documents are a means of communicating information between the Architect/Engineer and the Contractor, but each type uses special forms of communication. One is pictorial or graphic, and the other is verbal or textual. Despite these distinctions, each type of document should complement while not contradicting or duplicating the other. In this way, each type of document fulfills its unique function.

According to *AIA Document A201-2007 - General Conditions of the Contract for Construction*, Paragraph 1.1.5, “The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.”

According to *AIA Document A201-2007*, Paragraph 1.1.6, “The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.”

In broad terms, the Contract Drawings are graphical depictions, and the Contract Specifications are written descriptions of the end result of the Work to be performed. Each type of Contract Document, whether Drawings or Specifications, contributes to the overall “story” of construction of a new, remodeled, renovated, or reconstructed facility. To repeat the metaphor used in the preceding chapter, the construction Contract is like a movie or video presentation of a story. The Contract Drawings are like the video portion of the presentation, and the Contract Specifications are the audio portion. Both are necessary for understanding the story. Without the audio portion, it would be a silent movie.

The video and audio tracks need to be synchronized. Imagine the graphic depiction of the jamb condition of an interior hollow metal door frame in a metal stud wall, coupled with the text description of a wood door frame in a wood stud

wall. Which is the correct depiction of the Work?

In both definitions from *AIA Document A201*, referred to above, the term “Work” is used. This is a very important term to understand. According to *AIA Document A201-2007*, Paragraph 1.1.3, “The term ‘Work’ means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.”

Consider that the Work may be simple or complex. Consider the broad range of activities embodied in the Work, from procurement of materials and manufactured products, through fabrication, delivery to the project site, storage and staging at the project site, surface preparation, mixing, application, installation, fitting, and finishing. Consider that the activities include administrative procedures, such as preparation and review of shop drawings, product data, and samples. Consider that the Work includes tests and inspections, as well as demonstrations, adjustments, and validation of performance, also known as “commissioning.” Consider that the Work includes activities and construction that are temporary in nature, such as temporary utilities, barriers, field offices, security, and cleaning. Descriptions of the Work need to be detailed to suit the nature of the Work—its simplicity or complexity, its need for careful craftsmanship, its need for monitoring to ensure quality, and its need for compliance with codes, standards, and administrative requirements. Most of these do not lend themselves to graphic depictions. Most are best described in written requirements presented in the Specifications.

To maintain the separate yet complementary nature of these two types of documents, to ensure that they will be interconnected without describing overlapping or contradictory requirements, and to avoid omissions in necessary information, it is essential to understand the nature of the Drawings and Specifications.

The Drawings

Drawings present a picture or a series of pictures of a project or parts of a project to be constructed. Drawings present the size, form, location, and arrangement of various elements of the project. This information should not be described in the Specifications because it is best described graphically on the Drawings. In fact, a Drawing can be considered a special language or means of communication to convey ideas of construction from one person to another. These ideas cannot be effectively conveyed by words alone.

Drawings should indicate the relationship between elements of the facility and may designate the following for each material, assembly, component, and accessory:

- *Location* of each material, assembly, component, and accessory.
- *Identification* of components and pieces of equipment. Use only generic names and locations, and coordinate terminology used on Drawings and in Specifications with short keynotes.
- Give *dimensions* of components and sizes of field-assembled components.
- Indicate *interfaces and connections* between materials, detail assemblies, and diagram systems. Indicate boundaries between materials of different capacities.
- Show *forms and relationships* of building elements.
- Indicate *limits of Work* and, as applicable, indicate areas of construction phases.
- Indicate *extent of alternates* and indicate “base bid” and “alternate bid” construction so that the scope of each condition is clear.
- Indicate work to be performed by or for the Owner under separate contracts.
- On multiple-prime contract projects, indicate *locations, limits, and extent of the Work included in separate contracts* and detail interfaces between scopes of Work.
- Identify *applicable Drawing symbols* in a schedule of symbols.
- Indicate the *graphic scale* of Drawings.

Well-prepared Drawings:

- Should not use *comprehensive or too many notes*. Redundancy should be avoided; concise notes enhance the clarity of the Drawings. The Specifications should present information in text form.
- Should not use *notes that define Work* to be performed by a *specific subcontractor or trade* unless required by authorities having jurisdiction. The Contract Documents are addressed to the Contractor, who has overall responsibility for all Work under the Contract. The General Conditions of the Contract typically note that the Contract Documents do not establish trade or subcontract jurisdiction for portions of the Work.
- Should not use *proprietary names and slang terms*. Instead, use proper, generic terms that are coordinated with the terminology used in the Specifications.
- Should not *cross-reference* with specifications by indicating “SEE SPECS.” The Specifications should always be “seen.” Use of this phrase could be interpreted to mean that there is information presented that does not require “seeing” or reading of the Specifications.

The purpose of the Drawings is to convey information regarding the intent of the design and depictions of Work to be accomplished. The Drawings may be in the form of plan views (looking down on the floor), in small- and large-scale sections (looking at a cutaway view), in details (large-scale, limited portion of the work), in diagrams and schedules (such as single-line power diagrams and finish materials schedule), and in notes (tied to specific elements by arrows or as symbols referencing keynotes on a table or listed in the margin of the Drawing).

Throughout the nineteenth century and into the early decades of the twentieth century, Drawings were organized in a simple numerical sequence, without distinctions between design discipline and construction trades. The Drawings were depictions of the end result of construction and included information regarding the structure, the finishes, the fenestrations, the portals, the weather barriers, the heating and ventilating appliances, and the decorative and accessory elements of the facility. Notations were relatively sparse and concise, yet the information was sufficient for performance of Work necessary for the project.

As construction technology became more complex and as construction contracting became more competitive, information needed to become more extensive and precise. One response was to segregate information into series of Drawings in the overall set prepared by specialist design professionals. No longer was the Architect a “master builder” who produced all-encompassing drawings. Structural engineers, mechanical engineers, and electrical engineers were engaged by the Architect to design portions of the project and to present graphic depictions of the Work on “S” (structural), “P” (plumbing), “M” (mechanical or heating/ventilating), and “E” (electrical) drawings. Over time, these expanded with inclusion of “C” (civil or site development) and “L” (landscape irrigation and planting) drawings. Specialty products and systems were included for “K” (kitchen or food service equipment), “F” (fire protection), “T” (vertical transport or elevator), and “Q” (equipment such as laboratory, medical, and process equipment).

With advances in reprographics, Drawings sometimes include aerial photography of the site, photographic presentations of existing conditions, and photographs of components to be replicated. Color as well as the more common black-and-white xerographic printing processes are becoming as common as diazo (“blueline,” “blackline,” and “sepia”) reproduction processes. True “blueprints” (white linework on a blue background) are now considered archaic and, if available, are usually prohibitively expensive. With drawings being archived on restricted-access (intranet) project websites for ready access by project team members, the traditional concept of printed drawings is being challenged. The impact of these changes is unclear at this time.

For greater discussion of organization and production of construction contract drawings, see the *National CAD Standard (NCS)*[™], available from the Construction Specifications Institute (CSI). The *NCS* has been developed by the National CAD Standard (NCS) Project Committee, a group of representatives from

many professional and industry associations, including the Construction Specifications Institute (CSI), the American Institute of Architects (AIA), and the U.S. Department of Defense Tri-Service Computer-Aided Design and Drafting and Geographic Information Systems (CADD/GIS) Center, convened by the National Institute of Building Sciences (NIBS). NCS is an industrywide effort to improve the efficiency of building design, construction, and management throughout the life cycle of building facilities. It includes:

- NCS Project Committee Report
- Introduction and Amendments to Industry Publications
- *Uniform Drawing System (UDS)*TM, published by CSI
- Plotting guidelines, developed by the National CAD Standards Project Committee
- CAD Layering GuidelinesTM, published by AIA

The Specifications

As defined above, from *AIA A201-2007*, Specifications are merely “that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.” *The New Oxford American Dictionary, Second Edition* (New York: Oxford University Press, 2005) defines the term *specification* as “a detailed description of the design and materials used to make something; a standard of workmanship, materials, etc. required to be met in a piece of work.” Neither of these definitions suffices in practice.

The definitions of Specifications and Drawings by the AIA, described above, and the dictionary definition give no indication of the relationship between the Specifications and the Drawings other than that they are both part of the Contract Documents. They are closely interrelated, however, as the metaphor of a movie or video uses both images and sound to tell a story. Both are needed to understand the requirements of the Work under the Contract and the intent of the design for the project. The Drawings and the Specifications each serve distinct purposes in telling the story. Specifications should generally describe the following:

- Type and quality of every product in the work, from the simplest material through the functioning system
- Quality of workmanship, including quality during manufacture, fabrication, application, installation, finishing, and adjusting
- Requirements for fabrication, erection, application, installation, and finishing

- Applicable regulatory requirements, including codes and standards applicable to performance of the Work
- Overall and component dimensional requirements for specified materials, manufactured products, and equipment
- Specific descriptions and procedures for allowances and unit prices in the contract
- Specific descriptions and procedures for product alternates and options
- Specific requirements for administration of the contract for construction

Specifications should not overlap or duplicate information contained on the drawings. Duplication, unless it is repeated word for word, is harmful because it can lead to contradiction, confusion, misunderstanding, and difference of opinion.

In broad terms, lines of demarcation should be established between the Drawings and the Specifications for specific elements in the project so that one does not attempt to do what is more suitable to the other. For example, the Drawings should indicate a material such as gypsum board in general terms, using graphic indications or simple notations. It should be left to the Specifications to describe specific attributes of the gypsum board, such as thickness and resistance to fire, impact, and moisture.

What if there is more than one type of material, such as gypsum board? The Specifications should assign a “type” indicator to each type of gypsum board and specify the attributes of each type. See [Exhibit 2-1](#) for an example of what the specifications should state.

[Exhibit 2-1](#) Example of Product Types and Keynote Codes.

EXAMPLE OF GYPSUM BOARD TYPES AND KEYNOTE CODES

A. Gypsum Board, Type GB1 [09250.gb1]:

1. Use: Typical walls, unless otherwise indicated.
2. Fire resistance: Fire Resistant, Type X.
3. Thickness: 5/8-inch (15.9 mm).
4. Long edges: Tapered.
5. Description: ASTM C 1396, Type X.

B. Gypsum Board, Type GB2 [09250.gb2]:

1. Use: Typical ceilings, unless otherwise directed.
2. Fire resistance: Fire Resistant, Type X.
3. Thickness: 1/2-inch (12.7 mm).
4. Long edges: Tapered.
5. Description: ASTM C 1396, proprietary product having improved fire resistance over standard Type X. Acceptable manufacturers and products:
 - a. G-P Gypsum Corp.; Firestop Type C.
 - b. National Gypsum Company; Gold Bond Fire-Shield G.
 - c. United States Gypsum Co.; SHEETROCK Brand Gypsum

C. Gypsum Board, Type GB3 [09250.gb3]:

1. Use: Exterior gypsum soffit board, for walls and ceilings in damp interior locations such as showers and laundries.
2. Fire resistance: Fire Resistant, Type X.
3. Thickness: 5/8-inch (15.9 mm).
4. Long edges: Manufacturer's standard.
5. Description: ASTM C 1396, Type X.

D. Gypsum Board, Type GB4 [09250.gb4]:

1. Use: Walls of corridors.
2. Fire resistance: Fire Resistant, Type X.
3. Thickness: 5/8-inch (15.9 mm).
4. Long edges: Tapered.
5. Description: ASTM C 1396, proprietary product having impact-resistant facing and Type-X fire-resistant core. Acceptable manufacturers and products:
 - a. National Gypsum Company; Gold Bond Hi-Abuse Wallboard.
 - b. United States Gypsum Co.; SHEETROCK Brand Abuse-Resistant Gypsum Panels.

This is the authors' recommendation for one method of identifying multiple types of similar products. Other specifiers may disagree. How does one decide which process to follow? It is a matter of professional judgment. Each design office should establish design criteria (principles) and formal policies (procedures) for production of the Drawings and Specifications. These policies should be clear and cover all likely conditions. They should be readily available to those who actually produce the documents and should be included in staff training programs.

Principles and procedures for producing Specifications will be addressed in subsequent chapters. First, however, we must discuss the design process and the resolution of conflicts and disputes during construction, which often involve issues touched upon above.

Coordinating the Design Process

To achieve proper separation of information between the Drawings and the Specifications, it is essential that development of the Specifications go hand in

hand with preparation of the Drawings. At the outset, a member of the design team for each discipline should be made responsible for establishing and keeping an all-important project checklist. This person can be the project architect or project engineer.

The project checklist should establish a schedule of what is to appear on the Drawings, what is to be described in the Specifications, and what is to be itemized and listed in schedules on the Drawings. The checklist should indicate milestones for publishing various versions of the Specifications, including preliminary or outline specifications, design coordination draft Specifications, Specifications for plancheck submissions to code authorities having jurisdiction, Specifications for use in preparing estimates of probable construction costs, Specifications for issuance to bidders, and Specifications included as a portion of the Contract Documents used for actual construction.

Accompanying the Checklist should be listings of decisions made by designers and detailers, with action items noted for matters to be developed or resolved. Changes in design and detailing should be recorded and described, with notations on why the changes were made.

In Masterspec®, published by ARCOM for the AIA, two types of supplementary documents are included with the guide Specifications, titled “Drawing Coordination Checklist” and “Specification Coordination Checklist.” These closely follow the principles and practices stated here. They are examples of fundamental coordination items that can serve as the basis for developing more comprehensive, office-specific procedures. These checklists are included in the Masterspec subscription. A/E office standard checklists should be developed otherwise.

Specifications checklists should be used to ensure that:

- 1.** Necessary items are identified appropriately in the Drawings and Specifications. Specified items need to be consistent with the indications on the Drawings. For example, if acid-resistant sinks are specified for a laboratory, the Drawings should not indicate stainless steel sinks for the laboratory, and the Drawings should indicate and the Specifications should include appropriate drain piping for acid waste.
- 2.** Specified product names and series, models, and catalog numbers are correct. Availability of specified products also needs to be verified, especially for the project location and regulatory requirements such as air quality (VOC emissions).
- 3.** Drawings and Specifications do not contain duplicate and conflicting information. Typically, Specifications supplement and amplify information shown on the Drawings, but they should not repeat the information. For example, the manufacturer and model number of a boiler should be identified in the Specifications and not on the Drawings. The ceramic tile manufacturer, pattern, and colors could be identified in a

legend associated with the Finish Materials Schedule included in the Drawings, and the Specifications would then refer to this specific information “as indicated on Legend of Finish Materials Schedule in the Drawings.”

4. Cross-references in the Specifications are correct, especially the use of Section numbers and titles for related Work specified in other Sections. Sometimes, references are made to Specifications Sections that do not exist.

5. Referenced standards are correct and applicable. Industry associations change names. Standards are superseded or withdrawn.

6. Manufacturers’ names are correct and contact information is current. The business world is in constant change, and corporate names, addresses, and telephone numbers change often.

Terminology

To ensure correct understanding on the part of users of the Drawings and Specifications, it is essential that standard terminology be employed and used consistently. Often terms are used on the Drawings that do not appear in the Specifications, and vice versa. For example, “service sink” in the Specifications should not be “janitor's sink” on the Drawings, and “G.I. flashing” on the Drawings should not be “galvanized sheet metal” in the Specifications. Worse still, “G.I. coping” on the Drawings should not be “prefabricated aluminum coping system” in the Specifications.

There have been pitched battles in architectural and engineering offices over proper terminology. Old habits die hard. Change is uncomfortable. That is why there needs to be a commitment by upper management to adopt and implement the use of proper industry-recognized terminology and to insist on coordination of terminology between the Drawings and the Specifications. Where there is an in-house specifications writer, this person can be the authority for terminology. Where a consulting specifications writer is used, either this person needs to be given authority or a senior member of the design team needs to implement instructions for the specifications consultant.

These are simple principles, and procedures for implementing them can be simple. However, they require a great deal of care and considerable expenditure of time and energy in order to be a regular part of Drawings and Specifications production.

Considerations for Users of Drawings and

Specifications

It is a common maxim that authors should know their readers. This also holds for users of Drawings and Specifications. However, catering to all possible users of the documents is not only impossible but may prove to be counterproductive and may increase the professional liability risk of architects and engineers.

First, Drawings and Specifications are prepared as from the Owner to the Contractor. The Owner and the Contractor are the two parties who sign the Agreement (contract), and the Drawings and Specifications are portions of the Contract Documents identified in the Agreement. Thus, the primary purpose is to describe the construction and services required by the Contract Documents and the responsibilities of these two parties in fulfilling their obligations under the Contract. One other party is identified in the Agreement: the Architect/Engineer. Although this person is not a signer of the Agreement, the General Conditions of the Contract and the Specifications prescribe his or her duties and responsibilities. (It is important that the Architect/Engineer ensure that the provisions of the Contract for construction are consistent with the Agreement for professional services between the Owner and the Architect/Engineer.)

Because the Contract Documents are addressed as between the Owner and the Contractor (typically a general contractor), addressing other parties who are not bound to the Owner by the signed Agreement is inappropriate and perhaps creates risk for the one who prepares the Contract Drawings and Specifications. For example, prescribing subcontract responsibilities (“concrete contractor shall prepare floor slab to receive ceramic tile”) may be a noble attempt to ensure quality, but it can backfire when subcontractors claim that certain portions of the Work are not included in the scope of their contracts with the (general) Contractor. Or it can be troublesome when the general contractor intends to have an equipment supplier be responsible for making final utility connections, including engaging licensed plumbers and electricians, when the equipment specifications state, “plumbing connections by plumbing subcontractor” or “electrical connections by electrical subcontractor.” Work may be omitted from the Contract sum or the Contract sum may include double payment for the same portion of the Work.

In typical AIA and EJCDC General Conditions of the Contract, the means, methods, techniques, and sequences of construction are stated to be solely the responsibility of the Contractor. Managing the Work is the Contractor's responsibility. There is typically a line item in applications for payment from the Contractor for this management task. Usually it is called “Division 01” or it is part of the Contractor's “overhead and profit.” When a design professional specifies how the project is managed (what the means, methods, techniques, and sequences of construction shall be, and which trade or subcontractor shall perform which portion of the Work), the design professional is assuming management responsibility over the Work.

Perhaps under some project delivery methods, such as multiple prime contracts and design-build contracts, or when a Construction Manager is involved as one of the parties in the Contract, assignment of subcontracts may be appropriate. But for the purpose of this discussion of preparation of construction specifications, the prohibition against identifying trades and subcontracts will be held. Assignment of portions of the Drawings and Specifications can be made in the Agreement or another referenced Contract document, leaving the Specifications with the traditional organization and descriptions of the Work.

Despite this, there are users of the Drawings and Specifications whose interests should be appropriately considered by the Architect/Engineer and the specifications writer without violating the principles stated above. It is a matter of organizing—rather than assigning—the information on the Drawings and in the Specifications in such a fashion that these users can find the information they need in order to fulfill their responsibilities. These users are plancheckers, cost estimators, and construction inspectors.

The interests of plancheckers, cost estimators, and construction inspectors can be represented by clear, consistent, and uniform presentation of information. Industry standards for organizing Drawings are found in the *National CAD Standard (NCS)*. For construction specifications, industry standards are presented in publications of CSI titled *MasterFormat™ - Master List of Section Numbers and Titles for the Construction Industry* and *SectionFormat™/PageFormat™ - The Recommended Format for Construction Specification Sections*. These publications are available from CSI, Alexandria, VA (www.csinet.org).

Plancheckers need to readily see compliance with applicable codes. Architects and engineers should use the Drawings and Specifications to explicitly demonstrate compliance. Sometimes, in their quest to ensure compliance with code requirements, plancheckers require specifications to recite the code or to reference certain sections and paragraphs in the code. This can be troublesome when the same Specifications and Drawings are used for the construction Contract Documents. If the Specifications cite the code, does the Contractor then assume design responsibility for code-mandated provisions? For example, suppose the Drawings recite code requirements for clearances for accessibility by persons with disabilities, but the dimensions indicated on the Drawings prevent such clearances from being achieved. Is the Contractor responsible for reconstruction to comply with the code? This has happened and the Contractor has had to bear the additional cost and time for reconstruction.

Cost estimators need to have a complete understanding of the Work under the Contract. They need coordinated Drawings and Specifications in order to prepare a complete and accurate estimate. For example, when Drawings have notes regarding louvers but no louvers are shown on building elevations or in the Specifications, should louvers be included in or omitted from the estimate or bid? If they are included, for example, and the Drawings note steel louvers but the Specifications

include aluminum louvers, which shall it be? If the Specifications indicate factory paint color on the louvers “to be selected by Architect from manufacturer's standard selection” but the Drawings indicate a custom color to match other building components, which instruction does the cost estimator follow? These matters need to be resolved for pre-bid estimates of probable construction cost and for bids to be submitted. When it comes time to buy out the Work (sign actual subcontracts) and when it comes time to make submittals for review by the Architect/Engineer, which requirements apply?

Finally, Drawings and Specifications need to be understandable by construction inspectors and the supervisors for the Contractor and subcontractors. Field representatives of the Owner, Architect, and Engineer also need to have readily understandable documents.

For example, in the Drawings, building exterior elevations and sectional views need to correctly represent the grades around the building. There should be graphic indications of below-grade walls to guide material take-offs. If a basement wall requires waterproofing, how is the area properly determined and waterproofing applied in proper locations if the below-grade conditions are not indicated?

As another example, the Specifications should generally describe preparation, mixing, application, and curing activities for products, although the Specification may reference much more detailed instructions by the product manufacturer that shall be followed.

The principle is to provide indications of activities that inspectors, supervisors, and observers should see for quality assurance. If the activity is not performed (“treat and prime galvanized steel,” for example), failure of a painted finish may result that, although solely the Contractor's responsibility to remedy, could get caught up in time-consuming disputes (“you shouldn't have let me do it wrong”).

Study Questions

1. True or False? The purpose of the Drawings and Specifications is to communicate information between the Architect/Engineer and the Contractor.
2. True or False? The term “work” is defined in the General Conditions of the Contract.
3. The Contract Drawings designate which of the following relationships between elements of a facility:
 - a. Identification of equipment
 - b. Limits of areas where work is performed
 - c. Dimensions and sizes of components in the construction
 - d. All of the above

- 4.** True or False? Drawings indicate which elements of the Work shall be performed by specific subcontractors.
- 5.** True or False? Drawings are organized according to the design discipline responsible for their preparation.
- 6.** Drawings should not indicate which of the following?
 - a.** Work performed by the Owner
 - b.** Proprietary names for products indicated
 - c.** Alternate bid conditions
 - d.** Locations for each factory-manufactured component
- 7.** Specifications should not indicate which of the following?
 - a.** Descriptions for product bid conditions
 - b.** Requirements for installation of equipment
 - c.** Dimensional requirements for locating equipment
 - d.** Quality requirements for field installation and finishing
- 8.** True or False? Repeating requirements on the Drawings and in the Specifications ensures proper installation of materials.
- 9.** Parties who rely upon Specifications for bidding and construction include all but which of the following?
 - a.** Code authorities
 - b.** Installers, erectors and applicators
 - c.** Cost consultants
 - d.** Marketing data surveyors
- 10.** True or False? Under nationally published General Conditions, the Contractor is solely responsible for the means, techniques, and sequences of construction.

Chapter 3

Organization of Specifications

History of Construction Specifications Organization

Construction Specifications in the eighteenth and nineteenth centuries consisted of a single document containing a description of all the work and materials to be included in a building. This was especially true of small, simple structures that were constructed by a general contractor who engaged all the craftsmen and did not sublet or subcontract any parts of the work. An early textbook by T. L. Donaldson titled *Handbook of Specifications* (London, 1860) provided for the arrangement of specifications on a craft basis. The specifications were divided into two general divisions, with subdivisions as follows:

Carcase	Finis hing
Excavator	Joiner
Bricklayer	Plasterer
Mason	Plumber
Slater	Painter
Founder and Smith	Glazier
Carpenter	Paperhanger
Ironmonger	Smith and bellhanger
Gasfitter	

Toward the end of the nineteenth century, specifications written for substantial buildings often broke the work into several categories or sections, such as masonry, carpentry, and mechanical work, with various allied or related subjects under each section. The masonry section included excavation, concrete, brickwork, stonework, steel columns and lintels, and waterproofing. The carpentry section included roofing, glazing, and painting, as well as carpentry. The mechanical or pipe trades consisted of plumbing, gas, and heating work. When electricity came into use, it was included in the mechanical work.

With the introduction of new materials, products, and construction techniques and equipment in the twentieth century, more than one craft or trade was needed to perform the work described in some sections. Rather than hire workers in more

crafts and trades under the contractor's direct supervision, the contractor began to sublet portions of the work to other businesses or “subcontractors,” who, in turn, hired workers in several crafts and trades to perform their subcontracted portions of the work. Sections of the specifications were written to describe work responsibilities for each subcontractor and craft or trade.

With growing sophistication of construction materials and methods of construction in the first half of the twentieth century, construction specifications similarly evolved in complexity. Specifications for larger, more complex buildings became book size, with many “chapters” or sections. Mild chaos developed as each architect/engineer used different methods to organize and identify these specifications. Trade jurisdictions and construction practices varied in different locales and regions. With the explosion of new technologies and with highly competitive markets for subcontracting and materials procurement following World War II, the process of organizing construction specifications became problematic for the construction industry. Standardization was needed for construction specifications.

The organization of construction specifications as represented in the *CSI Format* was adequate for the 1960s and 1970s, when construction technology was relatively simple compared to the proliferation of new materials and more complex conveying systems, mechanical and electrical systems, and communication systems. With the advent of more complex construction, the need for standardized organization of specifications became more apparent and more critical. It became necessary to increasingly subdivide and organize the large mass of specifications information into more manageable and understandable portions.

For convenience in writing, speed in estimating, and ease of reference, it has been found that the most suitable organization of the specifications is in a series of chapters or sections dealing with different portions of the construction work. With increasing complexity, it became impossible to assign or organize sections according to subcontract or trade.

The original concept behind the descriptions of headings (sections) in the *CSI Format* was to describe the likely subcontractor or trade that would perform the identified work. As the *CSI Format* evolved into *MasterFormat*, titles of the sections changed. Where the original titles were subjects such as the verb “carpeting,” the new titles were nouns such as “carpet.” This represented a shift from emphasis on trades or work activities to materials and products.

In the April 1964 edition of *The Construction Specifier*, CSI's official magazine, the original task force chair, Bernard B. Rothschild, FAIA, wrote an article in which he stated that specifications should not attempt to separate work by union jurisdiction. Since then, there has been confusion and controversy over whether specifications sections should specify only materials, manufactured products, assemblies, and systems or should also specify the trades and subcontractors and their construction activities. Should the titles reflect both products and application,

such as “paint” rather than “painting” or “woodwork” rather than “woodworking”? Looking at the familiar *MasterFormat* - 1995 and listening to the controversies about the proposed *MasterFormat* - 2004, with its attempt to use titles based on “work results” (products + fabrication/application/installation), reveals that the matter is far from resolved.

Until April 1963, when the *CSI Format for Construction Specifications* was published, each specifier organized the specifications in a series of divisions or sections that more or less followed a time relationship or chronological order related to the order of performance of various portions of the construction work. For example, specifications for excavating and backfilling were logically placed at the beginning, followed by specifications for construction of the foundations and building framework, enclosure of the building for thermal and moisture protection, installation of doors and windows, application of building finishes, and installation of specialty products, equipment, and furnishings. Along the way, usually from beginning to end of the construction, plumbing, heating, ventilating, fire protection, electrical power, lighting, and communications systems were also constructed.

From office to office, and even within the same office, specifications frequently were written without a uniform order of sections. Sometimes the order was the one in which the sections were written. Sometimes it was in alphabetical order rather than following the usual sequence of construction. This made finding information difficult for bidders and contractors who had to work with documents for various projects produced by various specifiers. Sometimes the order presented in the specifications was inconsistent with the actual construction sequence. Complex structures often required certain mechanical trades to be involved at an early stage in the construction process, so organization according to trades or chronology was not appropriate.

It became apparent that a major overhaul was required for the organization of specification sections and that a uniform system would benefit all parties in the construction process. Organizing construction specifications under standardized general headings (Divisions) and specific headings (Sections) made for more orderly and useful specifications. Using standardized formats:

- Serves as a sequencing guide for arranging specification Sections, similar in concept to the Decimal Classification System (DCS), or, as commonly known, the “Dewey Decimal System” used in libraries
- Provides a standard, fixed framework for organizing specifications that enables readers familiar with the format to easily locate and retrieve information

One of the primary reasons the Construction Specifications Institute (CSI) was formed in 1948 was to address this issue. In the early 1960s the CSI T-1 CSI Format Task Force was formed to develop a common format for organizing

construction specifications. In 1961, an initial draft of a guideline for specifications organization, “Format and Arrangement of Specifications and Related Documents,” was developed, followed after a conference in 1962 by a second draft. This second draft organized specifications into 22 divisions. Work continued, and after a conference in September 1963, the Task Force's efforts were published in *The CSI Format for Building Specifications*.

The 1963 *The CSI Format for Building Specifications* included 16 divisions to organize the various subjects under each division. The subjects were considered “items of work,” and each subject was termed a “section.” This endeavor at organizing construction subjects had 314 sections spread among the 16 divisions and arranged alphabetically rather than numerically under each division. In Division 15 (mechanical) there were 20 headings, and in Division 16 there were 17. Also included were headings such as Bidding Requirements, Contract Forms, General Conditions, and a new category, Supplementary General Conditions, which had been worked out with the AIA to address the customizing of construction contracts using AIA's preprinted General Conditions.

In 1964, the original *The CSI Format for Building Specifications* was updated and formally published by CSI. It had 16 divisions and 1010 headings under the various divisions. The headings (sections) were still arranged alphabetically under each division. The published document was 28 total pages, with the divisions and section listings taking up 5 of those pages.

The *CSI Format* continued to grow and began to be widely accepted. In 1972, the *CSI Format*[™] was incorporated into the *Uniform Construction Index*, “A System of Formats for Specifications, Data Filing, Cost Analysis and Project Filing.” The *Uniform Construction Index* was developed by the Conference on Uniform Indexing Systems, which had as its purpose to develop a “simple, logical and flexible system for rapid classification and retrieval of technical data in the construction industry” (*Uniform Construction Index*, The Construction Specifications Institute, 1972, page 0.3, Introduction, Background). It was preceded by publication in 1966 of *Uniform System for Construction Specifications, Data Filing and Cost Accounting; Title 1 - Buildings*.

The *Uniform Construction Index* of 1972 was jointly published by:

- American Institute of Architects
- Associated General Contractors of America, Inc.
- The Construction Specifications Institute
- Consulting Engineers Council of the United States
- Council of Mechanical Specialty Contracting Industries, Inc.
- Professional Engineers in Private Practice/National Society of Professional Engineers
- Producers Council, Incorporated

- Specifications Writers Association of Canada/ Association des Rédacteurs de Devis du Canada

The *Uniform Construction Index* was also endorsed by:

- American Society of Landscape Architects
- Association of Consulting Engineers of Canada
- Canadian Construction Association
- Canadian Institute of Quantity Surveyors
- Royal Architecture Institute of Canada
- Sweet's Division, McGraw-Hill Information Systems Co.—U.S.A./Canada

Contributors to the *Uniform Construction Index* included:

- National Association of Plumbing-Heating-Cooling Contractors
- National Electrical Contractors Association, Inc.
- Sheet Metal and Air Conditioning Contractors' National Association, Inc.

There was broad representation of the construction industry in the *Uniform Construction Index* and they incorporated the *CSI Format*. This attempt to organize construction Specifications, building product information, and construction cost data into an all-encompassing system did not continue with updated versions of the *Uniform Construction Index*. However, the *CSI Format* continued to develop.

In the cost data portion of the *Uniform Construction Index*, five-digit numbers were assigned to various subjects or Sections under each of the 16 Division headings. For example, “08100” was assigned to “Metal Doors & Frames” under Division 8 - Doors & Windows. “09900” was assigned under Division 9 - Finishes to “Painting.” Otherwise, for construction specifications, the *Uniform Construction Index* went along with the instructions in the *CSI Format* for the specifier to list applicable Sections in alphabetical order under each Division.

Also in 1972, CSI published an update to the *CSI Format* titled *CSI Format - Master List of Specifications Section Titles*. It had 1220 listings (sections) and introduced a five-digit numbering scheme for sections comparable to the numbering for cost data in the *Uniform Construction Index*. In 1975, *CSI Format - Master List of Specifications Section Titles* was updated and had 1290 section listings.

In 1978, CSI published a major revision to its format, titled *MasterFormat™*—*Master List of Numbers and Titles*. This document had 2120 section listings and introduced the name *MasterFormat™* to replace *CSI Format*. It also introduced another division, “Division 0,” which caused controversy since the documents identified for Division 0 were not Specifications. They included Bidding

Requirements and Conditions of the Contract. Some professional associations objected to the implication that specifiers should prepare these legal documents.

MasterFormat was revised and published in 1983 with Division 0 numbers titled “Document Number.” Under the major (broadscope or Level Two) section numbers and titles, brief explanations were added. *MasterFormat* was again revised and published in 1988 using the format of the 1983 edition. Headings preceding Division 0 were identified as “documents” rather than sections in order to demonstrate that these were not specifications.

This began what was supposed to be a 5-year cycle for revisions to *MasterFormat*. There was supposed to be a 1993 edition, but it was delayed due to objections by specifiers to major changes in section numbers and titles and reassignment of some Sections to different Divisions.

In early 1996, the 1995 edition of *MasterFormat*TM - *Master List of Numbers and Titles for the Construction Industry* (note the subtle name change) was published jointly by the Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC). It has been widely adopted and used in the construction industry of North America. With the increasing significance of construction specifications in the construction contract documents, the section numbers and titles of *MasterFormat* have become deeply ingrained in construction specifications, cost data, building product data, and drawing keynoting.

Beginning with the 1978 edition of *MasterFormat*TM, section titles and the order of sections under each division were standardized. Also, five-digit numbers were introduced that were permanently assigned to common (Level Two) section headings. This provided a nationally recognized format for organizing construction specifications. It was endorsed by major stakeholders in design professions and construction organizations. It provided a uniform system for arranging sections under an overall 16-division format for the bound volume of specifications.

Until publication of the 1978 edition of *MasterFormat*, it was accepted practice to assign an alphanumeric code to each section of the specifications. For example, a code such as “3A” was used for the first Section in Division 3 - Concrete or “9D” was used for the fourth section in Division 9 - Finishes. These alphanumeric codes varied from project to project. For example:

Project A	Project B
Section 9A - Non-Load-Bearing Wall Framing	Section 9A - Gypsum Board
Section 9B - Gypsum Board	Section 9B - Ceramic Tile
Section 9C - Resilient Flooring	Section 9C - Resilient Flooring
Section 9D - Paints, Stains and Coatings	Section 9D - Carpeting
	Section 9E - Paints, Stains and Coatings

This system worked, but it made finding information in the specifications difficult, especially for those who were scanning the specifications to find out whether certain products were used. Also, it made filing of product information

inconsistent and filing of Specifications master documents difficult.

As *MasterFormat* developed, fixed numbers and titles for Sections were assigned. For example (*MasterFormat* 1995 Edition numbering):

Project A	Project B
Section 09110 - Non-Load-Bearing Wall Framing	Section 09250 - Gypsum Board
Section 09250 - Gypsum Board	Section 09310 - Ceramic Tile
Section 09310 - Ceramic Tile	Section 09610 - Resilient Flooring
Section 09610 - Resilient Flooring	Section 09680 - Sheet Carpet
Section 09900 - Paints and Coatings	Section 09900 - Paints and Coatings

As the example above illustrates, “gypsum board” is always “09250 - Gypsum Board” (*MasterFormat* 1995 Edition). Also, Sections are omitted or included according to the requirements of the project. If all wall framing is with wood studs, Section 09110 - Non-Load Bearing Wall Framing is not included.

Through the 1988 edition of *MasterFormat*, a concept was included to address varying degrees of detail in the information of Specifications. The terms “broadscope,” “mediumscope,” and “narrowscope” were used. These represented lesser to greater degrees of detail. For example, specifications for wood and plastic doors were expressed (*MasterFormat* 1988 Edition):

Broadscope: Section 08200 - Wood and Plastic Doors

Mediumscope: Section 08210 - Wood Doors

Narrowscope: Section 08211 - Flush Wood Doors

Narrowscope: Section 08212 - Stile and Rail Wood Doors

Mediumscope: Section 08220 - Plastic Doors

In *MasterFormat* 1995 Edition, the Broadscope, Mediumscope, and Narrowscope terms were eliminated in favor of Levels. Level One represented the Division number (01 through 16) and Levels Two through Four, respectively, to Broadscope, Mediumscope, and Narrowscope. For example (*MasterFormat* 1995 Edition):

Level One: 08 (Division number)

Level Two: Section 08200 - Wood and Plastic Doors

Level Three: Section 08210 - Wood Doors

Level Four: Section 08211 - Flush Wood Doors

Level Four: Section 08212 - Stile and Rail Wood Doors

In 2005, *MasterFormat* underwent a major revision to accommodate changes in construction technology and to make it suitable for more than building construction. It is officially titled *MasterFormat™ 2004 Edition - Master List of Numbers and Titles for the Construction Industry*. *MasterFormat* 2004 expands the number of Divisions from 16 to 50 Divisions (00 through 49), including Division 00 for procurement and contracting requirements.

Organizing Specifications According to *MasterFormat*[™] 2004

MasterFormat 2004 has been published by the Construction Specifications Institute (CSI) and is the current edition in the series dating back to the early 1960s. The 2004 edition incorporates several fundamental changes in the principles of organizing construction specifications, described below.

Specification Groups in *MasterFormat*[™] 2004

MasterFormat 2004 introduced a concept of Groups and Subgroups into the organization of construction specifications. The Groups and Subgroups themselves are not numbered but act as titled dividers to segregate groups of Divisions in *MasterFormat*.

There are two Groups under *MasterFormat 2004*:

- Procurement and Contracting Requirements Group: Division 00
 - Introductory Information
 - Procurement Requirements and Contracting Requirements
- Specifications Group: Divisions 01 through 49

The first group contains general information regarding the Project. It includes “procurement” rather than “bidding” requirements, as previously used in *MasterFormat*. This reflects the variety of project delivery methods, such as competitive bidding, design-build, and multiple prime contracts. “Procurement” is an all-encompassing term.

The second group contains what is well known as the Divisions and Sections of construction specifications. The Specifications Group has five Subgroups. The concept of Subgroups is new with *MasterFormat 2004*. The Subgroups are:

1. General Requirements Subgroup: Division 01 specifications
2. Facility Construction Subgroup: Divisions 02 through 19 specifications
3. Facility Services Subgroup: Divisions 20 through 29 specifications
4. Site and Infrastructure Subgroup: Divisions 30 through 39 specifications
5. Process Equipment Subgroup: Divisions 40 through 49

With the inclusion of Division 00, there are now 50 Divisions in *MasterFormat* (00 through 50).

With the advent of specifications Group and its five Subgroups, the chronological sequence of construction represented in the organization of Divisions has been

further broken. Former Division 15 - Mechanical and Division 16 - Electrical have been moved to the Facility Services Subgroup (Divisions 20 through 29). Most of the content of former Division 2 - Site Construction has been moved to the Site and Infrastructure Subgroup (Divisions 30 through 39). New Divisions have been created under the Process and Equipment Subgroup (Divisions 40 through 49). Work performed early in a typical project is now listed late in the list of Divisions and Sections. This moves *MasterFormat* more into being a tool for organizing construction information rather than organizing construction activities.

Another major change in *MasterFormat 2004* is the concept of specifications being describers of requirements for *work results* rather than products. Many specification writers and users have had difficulty understanding this change. Fundamentally, it embraces a principle expressed explicitly in the Conditions of the Contract. That is, the Contract Drawings and Contract Specifications do not establish subcontract and trade jurisdictions. The Contract Drawings and Contract Specifications also do not prescribe the means, methods, techniques, and sequences of construction, or they are not supposed to. According to the Conditions of the Contract, those are the responsibilities of the Contractor. This leaves the Contract Drawings and Contract Specifications with the purpose of only describing the end result rather than the process to be used. Thus, *work result* is a more proper term to use.

Divisions under *MasterFormat 2004*

For convenience, the Groups, Subgroups, and Divisions of *MasterFormat 2004* are listed below, as published by the Construction Specifications Institute (CSI). Deviation from and modification of the list are discouraged. The purpose is uniformity, which is very important in the production and use of construction specifications. This is becoming even more important as computerized linking of drawings and specifications, especially under the Building Information Model (BIM) is evolving.

DIVISION NUMBERS AND TITLES

Procurement and Contracting Requirements Group

Division 00—Procurement and Contracting Requirements

Specifications Group

General Requirements Subgroup

Division 01—General Requirements

Facility Construction Subgroup

Division 02—Existing Conditions

Division 03—Concrete

Division 04—Masonry

Division 05—Metals

Division 06—Wood, Plastics, and Composites

Division 07—Thermal and Moisture Protection

Division 08—Openings
Division 09—Finishes
Division 10—Specialties
Division 11—Equipment
Division 12—Furnishings
Division 13—Special Construction
Division 14—Conveying Equipment
Division 15—Reserved For Future Expansion
Division 16—Reserved For Future Expansion
Division 17—Reserved For Future Expansion
Division 18—Reserved For Future Expansion
Division 19—Reserved For Future Expansion
Facility Services Subgroup
Division 20—Reserved For Future Expansion
Division 21—Fire Suppression
Division 22—Plumbing
Division 23—Heating Ventilating and Air Conditioning
Division 24—Reserved For Future Expansion
Division 25—Integrated Automation
Division 26—Electrical
Division 27—Communications
Division 28—Electronic Safety and Security
Division 29—Reserved For Future Expansion
Site and Infrastructure Subgroup
Division 30—Reserved For Future Expansion
Division 31—Earthwork
Division 32—Exterior Improvements
Division 33—Utilities
Division 34—Transportation
Division 35—Waterway and Marine
Division 36—Reserved For Future Expansion
Division 37—Reserved For Future Expansion
Division 38—Reserved For Future Expansion
Division 39—Reserved For Future Expansion
Process Equipment Subgroup
Division 40—Process Integration
Division 41—Material Processing and Handling Equipment
Division 42—Process Heating, Cooling, and Drying Equipment
Division 43—Process Gas and Liquid Handling, Purification and Storage Equipment
Division 44—Pollution Control Equipment
Division 45—Industry-Specific Manufacturing Equipment
Division 46—Reserved For Future Expansion
Division 47—Reserved For Future Expansion
Division 48—Electrical Power Generation
Division 49—Reserved Future Expansion

Updates and supplemental information regarding *MasterFormat 2004* may be found at www.csinet.org/masterformat.

Each office producing construction specifications should obtain a current copy of *MasterFormat™ 2004 Edition—Master List of Numbers and Titles for the Construction Industry* in order to properly prepare office master and project-specific construction specifications. *MasterFormat* (ISBN: 0-9762399-0-6) is available from:

The Construction Specifications Institute
110 South Lincoln Street, Suite 100
Alexandria, VA 22314
800-689-2900
www.csinet.org

Construction Specifications Canada
120 Carlton Street, Suite 312
Toronto, ON, M5A 4K2
416-777-2198
www.csc-dcc.ca

Sections under *MasterFormat 2004*

Next to the change from 16 Divisions to 50 Divisions (00 through 49), the most obvious change from *MasterFormat 1995* to *MasterFormat 2004* is the change from 5-digit Section numbers to 6 digits. The change is more than simply adding a digit onto the end of a *MasterFormat 1995* number. Some new concepts in numbering and some new series of common numbering schemes have been added under *MasterFormat 2004*.

The first concept to understand for *MasterFormat 2004* Section numbering is “Levels” for the numbers. Under *MasterFormat 1995* and earlier editions, the concept of levels of detail for Sections was included, as described above. There were first three levels of detail, in *MasterFormat 1988*, expressed as Broadscope, Mediumscope, and Narrowscope. These were superseded in *MasterFormat 1995* by Levels of detail, with Levels Two through Four replacing Broadscope, Mediumscope, and Narrowscope. Level One represented the Division number.

In *MasterFormat 2004*, the Levels are Level 1 through Level 4. These Levels still express relative degree of detail or specificity but there are some special considerations. Here is an example, using doors:

Level 1: 08 ## ## - (two-digit Division number) Openings

Level 2: 08 10 00 - Doors and Frames

Level 2: 08 14 00 - Wood Doors

Level 3: 08 14 23 - Clad Wood Doors

Level 4: 08 14 23.16 - Plastic-Laminate-Faced Wood Doors

Note that there are *two* Level 2 entries. Both are correct.

Under *MasterFormat 2004*, it is possible to use either Level 2 number 08 10 00 or Level 2 number 08 14 00. The key seems to be the use of numbers ending in zero. If the second pair of numbers ends with a “0” and the third pair is “00,” then it is a Level 2 number. If the second pair ends with “1” through “9” but the third pair is “00” it is also a Level 2 number. In practice, this is a relatively insignificant matter.

Specifications for a project are typically a mixture of Sections of various levels of detail. The determining factor is the specification writer's judgment of how fine the Level of detail should be for the information in the Section.

Notice Level 4 in the example above. Level 4 is typically the six digits of Level 3 plus a decimal point and two more digits, for a total of eight. Expanding on the example, 08 14 23 - Clad Wood Doors, *MasterFormat 2004* lists three assigned Level 4 Section numbers:

08 14 23.13 - Metal-Faced Wood Doors

08 14 23.16 - Plastic-Laminate-Faced Wood Doors

08 14 23.19 - Wood Doors

Another example of Level 4 Section numbers is for steel doors:

08 13 13 - Hollow Metal Doors

08 13 13.13 - Standard Hollow Metal Doors

08 13 13.53 - Custom Hollow Metal Doors

The logic behind assignment of “.13,” “.16,” “.23,” and “.53” suffixes is not apparent. Specification writers should conform to *MasterFormat* numbers and titles as closely as possible and then use professional judgment and common sense to assign additional Section numbers and titles. It is suggested to use Level 3 numbers and titles as much as possible for project-specific specifications and reserve Level 4 numbers and titles as much as possible for filing of Sections and for office master specifications.

MasterFormat 2004 does not list all possible Level 4 Section numbers and titles. If it is desired to use an alternative Level 4, the number and title will need to be interpolated by the specification writer.

An advantage of using Level 3 and Level 4 Section numbers and titles is it splits long and complicated Sections into more concise and more easily understood Sections.

Other advantages are:

- The task of assembling a Project Manual is made easier since the specifier is able to focus on limited areas of information.

- Specifications are easier to coordinate during writing.
- The Contractor can exercise greater control during bidding and construction.

Disadvantages of using several similar sections are:

- Information may be repeated.
- The greater number of narrowly focused sections increases the size of the overall specifications.
- More effort is required to cross-reference properly between Sections.

Using more narrowly focused section numbers and titles can facilitate data filing and make it easier to find information in specifications that include many types of products with diverse requirements for quality assurance, installation materials, and installation methods. Keeping information separated can reduce the chance that improper associations between materials and methods will occur. However, it adds redundancy, as common information is repeated in similar sections.

One way to reduce redundancy is to use the “common work results” Sections at the beginning of a Division. These replace “Basic Materials and Methods” Sections that were previously assigned under *MasterFormat*, especially in Division 04 - Masonry, Division 15 - Mechanical and Division 16 - Electrical. Under *MasterFormat 2007*, all Divisions have been assigned at their beginning a Section titled “Common Work Results for ...”. In these Sections, requirements applicable to all Sections in the Division are specified, even if they do not seem appropriate or useful. They do not seem appropriate for Division 07 - Thermal and Moisture Protection and Division 09 - Finishes, where there is little in common between their Sections.

Following is the table of contents from a new public high school complex, demonstrating the application of *MasterFormat 2004*, including interpolations and adaptations (not approved by the Construction Specifications Institute).

PROJECT MANUAL - TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01 - PROJECT TITLE PAGE
 00 01 10 - TABLE OF CONTENTS
 00 11 13 - ADVERTISEMENT FOR BIDS
 00 21 13 - INSTRUCTIONS TO BIDDERS
 00 25 13 - PRE-BID MEETINGS
 00 31 26 - EXISTING HAZARDOUS MATERIAL INFORMATION
 00 31 32 - GEOTECHNICAL DATA
 00 41 00 - BID FORMS
 00 45 00 - REPRESENTATIONS AND CERTIFICATIONS
 00 52 00 - AGREEMENT FORM
 00 54 21 - ALLOWANCES SCHEDULE

00 54 22 - UNIT PRICES SCHEDULE
00 61 00 - BOND FORMS
00 62 00 - CERTIFICATES AND OTHER FORMS
00 72 00 - GENERAL CONDITIONS OF THE CONTRACT
00 94 00 - CONTRACT MODIFICATIONS
DIVISION 01 - GENERAL REQUIREMENTS
01 11 00 - SUMMARY OF THE PROJECT
01 21 00 - ALLOWANCE PROCEDURES
01 23 00 - ALTERNATE BID PROCEDURES
01 26 00 - CONTRACT MODIFICATION PROCEDURES
01 26 13 - REQUESTS FOR INTERPRETATION (RFI)
01 29 73 - SCHEDULE OF VALUES
01 29 76 - PROGRESS PAYMENT PROCEDURES
01 31 00 - PROJECT MANAGEMENT AND COORDINATION
01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION
01 33 00 - SUBMITTAL PROCEDURES
01 33 29.13 - SUSTAINABLE DESIGN REQUIREMENTS (LEED)
01 35 13 - SPECIAL PROJECT PROCEDURES
01 35 43.03 - ENVIRONMENTAL MANAGEMENT
01 35 43.23 - INDOOR AIR QUALITY REQUIREMENTS
01 35 43.26 - NOISE AND ACOUSTICS MANAGEMENT
01 41 00 - REGULATORY REQUIREMENTS
01 42 00 - REFERENCES
01 43 25 - TESTING AND INSPECTION AGENCY
01 43 39 - MOCKUPS
01 45 00 - QUALITY CONTROL
01 45 33.13 - ENVIRONMENTAL SOILS TESTING
01 50 00 - TEMPORARY FACILITIES AND CONTROLS
01 51 00 - TEMPORARY UTILITIES
01 52 00 - CONSTRUCTION FACILITIES
01 54 00 - CONSTRUCTION AIDS
01 55 19 - TEMPORARY PARKING
01 55 29 - CONSTRUCTION STAGING AREAS
01 56 00 - TEMPORARY BARRIERS AND ENCLOSURES
01 57 23 - STORM WATER POLLUTION PREVENTION
01 57 26 - TEMPORARY SECURITY CONTROLS
01 58 00 - PROJECT IDENTIFICATION AND SIGNAGE
01 60 00 - PRODUCT REQUIREMENTS
01 71 00 - EXAMINATION AND PREPARATION REQUIREMENTS
01 73 00 - EXECUTION REQUIREMENTS
01 73 29 - CUTTING AND PATCHING
01 74 11 - CLEANING REQUIREMENTS
01 74 19 - CONSTRUCTION & DEMOLITION (C&D) WASTE MANAGEMENT
01 77 00 - CONTRACT CLOSEOUT PROCEDURES
01 78 23 - OPERATION AND MAINTENANCE DATA

01 78 26 - PRODUCT WARRANTIES
01 78 29 - PROJECT RECORD DOCUMENTS
01 78 29 - FINAL SITE SURVEY
01 91 13 - GENERAL COMMISSIONING REQUIREMENTS
01 92 16 - DEMONSTRATION AND TRAINING

DIVISION 02 - EXISTING CONDITIONS

02 41 16 - STRUCTURE DEMOLITION
02 41 19 - SELECTIVE DEMOLITION

[SEE DIVISION 31 - EARTHWORK: SECTIONS FORMERLY IN DIVISION 02]

[SEE DIVISION 32 - EXTERIOR IMPROVEMENTS: SECTIONS FORMERLY IN DIVISION 02]

[SEE DIVISION 33 - UTILITIES: SECTIONS FORMERLY IN DIVISION 02]

DIVISION 03 - CONCRETE

03 11 11 - CAST-IN-PLACE CONCRETE FORMING
03 21 00 - REINFORCING STEEL
03 31 11 - STRUCTURAL CAST-IN-PLACE CONCRETE
03 48 00 - PRECAST CONCRETE SPECIALTIES
03 53 00 - PORTLAND CEMENT CONCRETE TOPPING

DIVISION 04 - MASONRY

04 22 11 - REINFORCED CONCRETE UNIT MASONRY

DIVISION 05 - METALS

05 05 13 - SHOP-APPLIED PAINT ON ALUMINUM
05 05 19 - GALVANIZED FINISHES ON STEEL
05 05 23 - ANCHORS AND FASTENERS
05 12 00 - STRUCTURAL STEEL FRAMING
05 21 00 - STEEL JOIST FRAMING
05 41 00 - STEEL DECKING
05 41 00 - STRUCTURAL METAL STUD FRAMING
05 51 00 - METAL STAIRS
05 52 13 - FABRICATED STEEL RAILINGS
05 54 13 - TRENCH AND ACCESS COVERS
05 57 00 - MISCELLANEOUS METAL FABRICATIONS
05 73 00 - ORNAMENTAL METAL RAILINGS

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES

06 10 53 - MISCELLANEOUS ROUGH CARPENTRY
06 20 23 - INTERIOR FINISH CARPENTRY
06 41 00 - ARCHITECTURAL WOOD CASEWORK
06 61 16 - SOLID SURFACING FABRICATIONS
06 64 13 - FIBER-REINFORCED PLASTIC (FRP) WALL PANELING

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 13 52 - MODIFIED BITUMINOUS SHEET WATERPROOFING
07 14 16 - COLD FLUID-APPLIED WATERPROOFING
07 19 00 - WATER REPELLENTS
07 21 00 - BUILDING THERMAL INSULATION
07 26 00 - VAPOR RETARDERS
07 41 63 - MANUFACTURED METAL ROOFING

07 42 43 - COMPOSITE PANEL SYSTEMS
07 46 13 - METAL SIDING
07 54 00.13 - MECHANICALLY-ATTACHED THERMOPLASTIC MEMBRANE ROOFING
07 62 00 - SHEET METAL FLASHING AND TRIM
07 71 00 - MANUFACTURED ROOF SPECIALTIES
07 72 13 - ROOF ACCESSORIES
07 84 13 - PENETRATION FIRESTOPPING
07 92 00 - JOINT SEALANTS
07 95 13 - EXPANSION JOINT COVER ASSEMBLIES

DIVISION 08 - OPENINGS

08 11 13 - STEEL DOORS AND FRAMES
08 14 16 - FLUSH WOOD DOORS
08 31 00 - ACCESS DOORS AND PANELS
08 84 13 - DECORATIVE PLASTIC GLAZING
08 34 17 - BI-FOLDING OVERHEAD DOORS
08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS
08 44 13 - GLAZED ALUMINUM CURTAIN WALLS
08 56 19 - PASS WINDOWS
08 63 00 - METAL-FRAMED SKYLIGHTS
08 71 00 - DOOR HARDWARE
08 81 00 - GLASS GLAZING
08 83 00 - MIRRORS
08 91 00 - LOUVERS

DIVISION 09 - FINISHES

09 22 16 - NON-LOAD BEARING METAL FRAMING
09 22 26 - SUSPENDED METAL FRAMING AND FURRING
09 26 23 - GRAFFITI-RESISTANT COATINGS
09 28 13 - CEMENTITIOUS BACKING BOARDS
09 28 23 - GYPSUM SHEATHING
09 29 00 - GYPSUM BOARD
09 30 13 - CERAMIC TILING
09 30 16 - QUARRY TILING
09 51 13 - ACOUSTICAL PANEL CEILINGS
09 54 39 - OPEN CELL CEILING SYSTEMS
09 65 19 - RESILIENT TILE FLOORING
09 65 66 - RESILIENT ATHLETIC FLOORING
09 68 13 - TILE CARPETING
09 77 33 - TACKABLE/WRITABLE WALL COVERING
09 84 11 - ACOUSTICAL SURFACE TREATMENT
09 91 00 - FIELD PAINTING
09 96 35 - CHEMICAL-RESISTANT COATINGS
09 97 16 - COATINGS FOR EXTERIOR STEEL

DIVISION 10 - SPECIALTIES

10 11 11 - VISUAL DISPLAY BOARDS
10 11 26 - TACKABLE WALL PANELS

10 14 11 - SIGNAGE
10 14 53 - PARKING AND TRAFFIC CONTROL SIGNAGE
10 21 13.29 - SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS
10 28 13 - TOILET ACCESSORIES
10 44 13 - FIRE PROTECTION SPECIALTIES
10 51 00 - METAL LOCKERS
10 75 00 - FLAGPOLES

DIVISION 11 - EQUIPMENT

11 31 00 - RESIDENTIAL EQUIPMENT
11 51 23 - LIBRARY STACK SYSTEMS
11 52 13 - PROJECTION SCREENS
11 53 00 - LABORATORY FIXTURES AND EQUIPMENT
11 66 23 - GYMNASIUM EQUIPMENT
11 68 00 - PLAY FIELD EQUIPMENT AND STRUCTURES

DIVISION 12 - FURNISHINGS

12 24 00 - WINDOW SHADES
12 35 53 - WOOD LABORATORY CASEWORK
12 36 53 - LABORATORY COUNTERTOPS
12 61 00 - FIXED AUDIENCE SEATING
12 66 00 - TELESCOPING STANDS
12 93 00 - SITE FURNISHINGS

DIVISION 13 - SPECIAL CONSTRUCTION

NOT USED

DIVISION 14 - CONVEYING EQUIPMENT

14 24 00 - HYDRAULIC ELEVATORS

DIVISIONS 15 AND 16

NOT USED - RESERVED NUMBERS

[SEE DIVISION 21 - FIRE SUPPRESSION FOR SECTIONS FORMERLY IN DIVISIONS 13/15]

[SEE DIVISION 22 - PLUMBING FOR SECTIONS FORMERLY IN DIVISION 15]

[SEE DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING FOR SECTIONS FORMERLY IN DIVISION 15]

[SEE DIVISION 26 - ELECTRICAL FOR SECTIONS FORMERLY IN DIVISION 16]

DIVISIONS 17 THROUGH AND 19

NOT USED - RESERVED NUMBERS

DIVISION 20

NOT USED - RESERVED NUMBER

DIVISION 21 - FIRE SUPPRESSION

21 05 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION
21 10 00 - WATER-BASED FIRE-SUPPRESSION SYSTEMS

DIVISION 22 - PLUMBING

22 05 00 - COMMON WORK RESULTS FOR PLUMBING
22 05 16 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
22 05 17 - METERS AND GAGES FOR PLUMBING PIPING
22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING
22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

22 05 48 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING AND PIPING AND EQUIPMENT
22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
22 07 00 - PLUMBING INSULATION
22 11 16 - DOMESTIC WATER PIPING
22 11 19 - DOMESTIC WATER PIPING SPECIAL TIES
22 13 16 - SANITARY WASTE AND VENT PIPING
22 13 19 - SANITARY WASTE PIPING SPECIALTIES
22 14 13 - FACILITY STORM DRAINAGE PIPING
22 14 23 - STORM DRAINAGE PIPING SPECIALTIES
22 40 00 - PLUMBING FIXTURES
22 66 00 - CHEMICAL-WASTE SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

23 01 30 - COMMON WORK RESULTS FOR HVAC
23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC
23 05 16 - EXPANSION FITTINGS AND LOOPS FOR HVAC
23 05 19 - METERS AND GAGES FOR HVAC PIPING
23 05 23 - GENERAL-DUTY VALVES FOR HVAC PIPING
23 05 29 - HANGERS AND SUPPORTS
23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT
23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
23 05 93 - TESTING, ADJUSTING, AND BALANCING
23 07 00 - HVAC INSULATION
23 08 00 - COMMISSIONING OF HVAC
23 09 00 - INSTRUMENTATION AND CONTROLS FOR HVAC
23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS
23 11 23 - FACILITY NATURAL-GAS PIPING
23 21 23 - HYDRONIC PUMPS
23 23 00 - REFRIGERANT PIPING
23 25 00 - HVAC WATER TREATMENT
23 31 13 - DUCTWORK
23 33 00 - AIR DUCT ACCESSORIES
23 34 16 - CENTRIFUGAL FANS
23 34 00 - AIR TERMINAL UNIT
23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES
23 38 13 - COMMERCIAL KITCHEN HOODS
23 41 00 - PARTICULATE AIR FILTRATION
23 51 00 - BREECHINGS, CHIMNEYS, AND STACKS
23 52 33 - HYDRONIC PUMPS
23 64 16 - CENTRIFUGAL WATER CHILLERS
23 65 00 - COOLING TOWERS
23 82 19 - FAN-COIL UNITS

DIVISION 24

NOT USED

DIVISION 25

NOT USED

DIVISION 26 - ELECTRICAL

26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

26 05 26 – GROUNDING AND BONDING

26 05 33 – RACEWAYS AND BOXES FOR ELECTRICAL

26 05 34 – RACEWAYS AND BOXES FOR ELECTRICAL

26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

26 23 13 – SWITCHGEAR

26 51 00 – LIGHTING

26 56 00 – EXTERIOR LIGHTING

DIVISION 27 - COMMUNICATIONS

27 05 00 – COMMON WORK RESULTS FOR COMMUNICATIONS

27 13 00 – COMMUNICATIONS CABLING AND BACKBONE

27 41 33 – MASTER ANTENNA AND TELEVISION SYSTEMS

27 51 16 – PUBLIC ADDRESS AND MASS NOTIFICATION SYSTEMS

27 51 17 – AUTONOMOUS P.A. SYSTEMS

27 51 23.A.6116 - TELEPHONE COMMUNICATION SYSTEMS, K12

27 52 25 – ASSISTIVE LISTENING SYSTEM

27 53 13 – CLOCK SYSTEMS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 16 00 – INTRUSION DETECTION SYSTEMS

28 31 11 – FIRE ALARM SYSTEMS

DIVISION 31 - EARTHWORK

31 10 00 - SITE CLEARING

31 13 33 - TREE PROTECTION AND TRIMMING

31 20 00 - EARTHWORK

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 12 11 - ASPHALTIC CONCRETE PAVING

32 12 36 - SURFACE SEALING OF ASPHALT PAVING

32 13 22 - PORTLAND CEMENT CONCRETE PAVING

32 14 13 - PRECAST CONCRETE UNIT PAVING

32 12 43 - POROUS UNIT PAVING

32 15 40 - CRUSHED STONE SURFACING

32 15 46 - BALLFIELD INFIELD SURFACING

32 17 23 - PAVEMENT MARKINGS

32 18 23.33 - SYNTHETIC RUNNING TRACK SURFACING

32 31 13 - CHAIN LINK FENCING

32 31 19 - ORNAMENTAL FENCES AND GATES

32 32 14 - CAST-IN-PLACE CONCRETE SITE WALLS

32 84 00 - PLANTING IRRIGATION

32 91 00 - PLANTING PREPARATION

32 82 00 - TURF AND GRASSES

32 93 00 - LANDSCAPE PLANTING

32 93 90 - LANDSCAPE MAINTENANCE

32 94 53 - WIRE MESH TRELLIAGE

DIVISION 33 - UTILITIES

33 10 11 - WATER SERVICE SYSTEM

33 31 11 - SANITARY SEWERAGE SYSTEM

33 40 03 - STORM DRAINAGE SYSTEM

DIVISIONS 34 THROUGH 39

NOT USED

DIVISION 41 THROUGH 49

NOT USED

APPENDICES

APPENDIX A - FORMS

FORM LETTER - CONTRACTOR'S / SUBCONTRACTOR'S / MANUFACTURER'S WARRANTY

FORM LETTER - CONTRACTOR'S / MANUFACTURER'S GUARANTEE

FORM - REQUEST FOR INTERPRETATION

FORM - SUBSTITUTION REQUEST (For Use During Bidding)

FORM - SUBSTITUTION REQUEST (For Use After Bidding)

APPENDIX B - SIGNAGE PACKAGE

APPENDIX C - HAZARDOUS MATERIALS ABATEMENT SPECIFICATIONS

Study Questions

1. True or False? Increased complexity of construction contracting has led to more complex construction specifications.
2. True or False? One of the primary reasons the Construction Specifications Institute (CSI) was formed was to establish a standard format for organizing construction specifications.
3. True or False? The original format for organizing construction specification Sections was alphanumeric with fixed alphanumeric identifiers for each commonly used building product.
4. MasterFormat has been published in all but which of the following years?
 - a. 1978
 - b. 1983
 - c. 1988
 - d. 1993
 - e. 2004
5. Which two of the following Groups are not included in MasterFormat, 2004 edition?
 - a. Procurement and Contracting Group
 - b. Specifications Group
 - c. Operations and Maintenance Group
 - d. Drawings Group

- 6.** How many specification Divisions are included in MasterFormat, 2004 edition?
- a.** 16
 - b.** 22
 - c.** 49
 - d.** 50
- 7.** In the Specifications Group of MasterFormat, 2004 edition, which Subgroup includes plumbing, HVAC and electrical specifications?
- a.** Divisions 02 through 19
 - b.** Divisions 20 through 29
 - c.** Divisions 30 through 39
 - d.** Divisions 40 through 49
- 8.** Electrical specifications are included in which Division under MasterFormat, 2004 edition?
- a.** Division 13
 - b.** Division 16
 - c.** Division 26
 - d.** None of the above
- 9.** The term “work result” introduced in MasterFormat, 2004 edition, describes which of the following?
- a.** Means, techniques, and sequences of construction
 - b.** Performance attributes of construction products
 - c.** End result of work as defined in the General Conditions of the Contract
 - d.** None of the above
- 10.** Under MasterFormat, 2004 edition, there are how many Levels of detail represented in the published Section numbers and titles?
- a.** 1
 - b.** 2
 - c.** 3
 - d.** 4
- 11.** True or False? In practice, construction specification numbers and titles should follow the same Level of detail throughout the Specifications.
- 12.** Use of Level 3 and 4 Section numbers and titles has all but which of the following advantages?
- a.** Specifications are easier to coordinate during writing.
 - b.** Sections with limited areas of information are easier to produce.
 - c.** The greater the number of narrowly focused specification Sections

validates the role of the specifications professional.

d. Segregation of information in several Sections helps avoid improper associations between specified products.

Chapter 4

The Project Manual and Specifications Sections

The Project Manual Concept

The AIA, through a national Committee on Specifications, in 1965 developed the “Project Manual” concept. AIA recognized that the book commonly called the “Specifications” or “Specs” normally contained more than the name implied. It was, in fact, a manual of project requirements and Contract Documents whose contents and functions were best implied by the title “Project Manual.”

In simple terms, the Project Manual is a bound volume or set of volumes that contains the written portion of the Bidding and Construction Contract documents. Organization of the Project Manual is typically according to *MasterFormat*, as discussed in Chapter 3, “Organization of Specifications.” Elements of the Project Manual are:

Introductory Information (Division 00)

- Title Page
- Certifications Page
- Table of Contents

Bidding Requirements (Division 00)

- Bid Solicitation: Advertisement/Invitation to Bid
- Instructions to Bidders
- Information Available to Bidders
- Bid Forms and Supplements

Contracting Requirements (Division 00)

- Agreement
- General Conditions of the Contract
- Supplementary Conditions of the Contract
- Bonds and Certificates

Specifications

- Division 01 - General Requirements
- Divisions 02 through 49 - Technical Specifications
- Refer to the detailed discussion of *MasterFormat* in Chapter 3, “Organization of Specifications”

Even simple projects, such as an individually constructed residence or a tenant space improvement project, can use the Project Manual concept. In *MasterFormat*, especially Division 00 - Procurement and Contracting Requirements, there are many topics that can be conveniently assembled and bound in book form using the Project Manual, including the “front end” documents, such as the signed Agreement form, the General Conditions of the Contract, completed insurance and bond forms, contract modification documents (change orders and construction change directives), building permits, the schedule of values, and payment applications. No project is too small for a Project Manual.

Specifications Sections

The Project Manual can be considered a book with many chapters. The chapters are grouped as described above. Some chapters contain introductory information, Bidding Requirements, and Construction Contract requirements. Other chapters concern requirements for construction to be performed under the Contract. This last group is known as “construction specifications.”

Information is divided into chapters known as “Sections.” Similar Sections are grouped into Divisions for convenience. All of this is reflected in *MasterFormat*, where the specifier determines which identifier (Section number) and title to give to the Section. Using the commonly recognized Section numbers and titles in *MasterFormat* makes locating information easier because of the familiarity gained through use of specifications organized according to *MasterFormat*.

Because construction projects vary in complexity and scale, dividing the specifications into Sections should reflect the relative complexity and scale of the construction; that is, large, complex projects with many types of products requiring very detailed descriptions, and stringent requirements for quality assurance require lengthy specifications. Conversely, projects of simple construction and small scale can be addressed with succinct text. As construction technology and project delivery arrangements have become more sophisticated, construction specifications have become more voluminous in order to accommodate increasingly stringent requirements.

Given the many subcontractors and trade workers, the documents for construction

contracts had to become more substantial. Specifications were no longer 20 or 40 pages but became, for commercial and institutional projects, hundreds or even thousands of pages long. Obviously, these voluminous specifications required organization. That is where CSI enters the picture and CSI's formats provide the required organization. Organizing and formatting the chapters or Sections of the specifications are discussed in detail in Chapter 5.

Technical Sections

In the past, Sections of the specifications were considered to be trade sections. That is, each Section described the work that a specific trade was required to accomplish. A dictionary definition of “trade” is “a skilled job, typically one requiring manual skills and special training” and “the people engaged in a particular area of business” (*New Oxford American Dictionary, Second Edition*, Oxford University Press, 2005).

A trade could be individuals or companies that perform portions of the Work of the construction Contract. “Trade” can therefore mean a craft, such as carpentry, bricklaying, or plumbing, or it can mean a business, such as a concrete subcontractor or a plumbing and heating subcontractor. When painting is considered, the “painter” may be an individual trade worker who is an employee of the general contractor or it may be a company that specializes in painting.

Specifications have reflected the increasing specialization and sophistication of construction, as described above. Yet there is a residual concept that construction specifications are divided into units of Work or trade sections, as though one trade or subcontractor could be responsible for all the Work described in the Section. This concept breaks down when the complexity of contemporary construction, especially for nonresidential projects, is considered.

Once, concrete work was the responsibility of the project's mason. Eventually, concrete work became separate from masonry work and was performed by a concrete subcontractor. Wood forms for concrete work were once specified under carpentry but are now specified under concrete work.

Doors have been traditionally made of wood and were once specified under the carpentry Section of the specifications. Wood doors and frames were considered Work to be fabricated and installed by carpenters or a millwork subcontractor. When tempered glass doors, metal doors, and bronze doors were introduced, carpenters claimed this work as being under their jurisdiction. As new methods of work developed, they were first performed by an existing trade but eventually came under the jurisdiction of a specialty subcontractor, and new skills for manufacture and installation developed. Doors have become sophisticated building elements that have fire ratings and decorative surfaces and are manufactured according to highly technical industry-recognized standards. Trade distinctions and jurisdictions became confused and irrelevant for organizing construction information in the

specifications.

It is possible that the general contractor will purchase doors from a supplier and then employ carpenters who install them. Alternatively the general contractor can subcontract both furnishing and installation of the doors to a specialty subcontractor. Although finish carpenters, employed by the specialty subcontractor, might install door hardware in the field, preparation of the doors for hardware would likely be performed in a production shop using jigs and templates for mass production. Some or all of the door hardware might be installed in a factory or shop by workers who are not members of a construction trade. Doors are now specified not according to trade (carpentry) but by construction technology (wood doors).

The complexity of construction becomes more apparent when formerly simple products, such as concrete, are considered. Virtually every design discipline and many elements of a facility involve cast-in-place concrete. Concrete is used for building foundations and for slabs on grade. That is well understood. But storm drainage structures (civil engineering) and planter walls (landscape architecture) also use cast-in-place concrete. Portland cement concrete paving is distinct from building slabs on grade, although the products used are very similar. Plumbing systems use cast-in-place concrete for thrust blocks on underground pressure lines, and the plumbing systems must penetrate concrete elements to get into, out of, and through the building. Mechanical systems such as boilers and air conditioning units require cast-in-place concrete pads, as do electrical elements such as transformers, switchgear, and parking lot light standards. Specifications for each of these elements and systems could include concrete along with the various other technologies, but accepted practice is to keep Portland cement concrete related to buildings and site structures in one place in the Specifications. But that would result in a great deal of redundancy and/or even conflicting requirements in the specifications.

This does not necessarily mean that the concrete subcontractor is responsible for providing concrete for all the elements identified. It is up to the general contractor—the only Contractor with whom the Owner has a Contract—to determine how each required portion of the Work shall be provided. The general contractor may contract with a concrete subcontractor to provide all the concrete for the project or the general contractor may require each subcontractor to make arrangements for the concrete work related to his or her building elements.

So why should specifications Sections not establish the scope of work for each trade or subcontractor? Beyond the reason that the design professional who writes the specifications is not licensed as a construction contractor to establish these scopes, there are several other contractual and practical reasons why scopes of work should not be established by the specifications.

The most important reason is that the General Conditions of the Contract state that the specifications do not establish trade or subcontract jurisdictions. *AIA A201* -

General Conditions of the Contract for Construction and *EJCDC C-700 Standard General Conditions of the Contract for Construction*, in Appendices E and F, respectively, state that specifications do not establish subcontract scopes or trade jurisdictions. Paragraph 1.2.2 of *AIA A201* states, “Organization of the Specifications into divisions, sections and articles, and arrangements of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.”

Perhaps the next most important reason that scopes of Work should not be established by the specifications is that design professionals are not trained or licensed to make such distinctions. Professional license examinations and legislative acts do not address subcontract and trade segregation as part of a design professional's services. Owner-Architect or Owner-Engineer Agreements similarly do not require these services. For the Architect or Engineer to do so involves substantial risk of error or omission and is not in the design professional's best interests, especially when there is a general contractor who is being paid by the Owner to do this service.

Another reason is that the general contractor should be given leeway to break down required work into subcontracts and trade arrangements. There are exceptions, such as when State contracting laws and regulations for publicly funded projects require segregation of portions of the work such as plumbing, HVAC, and electrical into separate prime contracts, where the design professional is required to break down the documents according to these technologies. As a general rule, this is not required. Certainly, the design professional does not want to become involved in trade disputes between the general contractor or a subcontractor and trade union.

Regional construction practices vary, and with projects being designed by most firms for construction in various regions of North America and even on other continents, it becomes burdensome for the design professional to research and adapt to these practices. The practices are important to consider, but the party most able to make and most affected by the arrangements is the general contractor. So, let the general contractor handle this matter. The design professional should focus on coherently describing building elements and systems so that each element or system can be clearly understood.

The concept of trade Sections further breaks down when there are portions of the Work that require several trades. A Section such as “Curtainwalls” specifies a complex assembly of extruded aluminum framing, steel reinforcement and supports, glass, glazing, insulation, and joint sealers. Each of these could be a separate trade Section, but it is now generally accepted that specifying the assembly rather than establishing trade responsibilities is most important. While it can be argued that the curtainwall subcontractor is a trade contractor, what are really being specified are technical requirements for the curtainwall and related administrative and contractual requirements.

Thus, current standard practice is for Sections to specify technical requirements for products and installation and to specify related administrative requirements such as submittals, quality control, and warranties.

Section Scope

Refer to the detailed discussion of *MasterFormat* in Chapter 3, “Organization of Specifications,” regarding levels of detail in Specification Sections.

For small-scale and less complex projects, Specifications can be organized into broad categories or “broadscope” (Level 2) Sections. As the complexity of a project increases, specification Sections become narrower in scope. Commonly, these are called “mediumscope” (Level 3) and “narrowscope” (Level 4) Sections.

For example, all types of wood doors may be specified in a broadscope Section titled “Wood Doors.” Separate mediumscope Sections may be prepared for flush wood doors and for stile and rail wood doors to distinguish their requirements. Flush wood doors are typically factory-manufactured, while stile and rail doors may be fabricated in a local millwork shop. Narrowscope Sections may be prepared to distinguish flush medium-density overlay (MDO) painted doors from hardwood veneer stained & varnished doors. This requires a judgment call by the specifier that depends upon the magnitude of text determined to be necessary to adequately specify requirements for a portion (Section) of the Work.

Another reason to use more narrowly focused Sections is the scale of construction. A small project, with a relatively small quantity of a portion of the Work, may have minimal administrative and quality control requirements that do not require lengthy text. A broadscope (Level 2) Section may be sufficient. Conversely, a large project, with only a few types of work but large quantities of products and more competitive pricing, more voluminous text may be required. For example, a common portion of the work such as cast-in-place concrete, may be specified in a single broadscope (Level 2) Section for a one-story wood frame structure but would be more appropriately specified in several mediumscope (Level 3) Sections for a competitively bid public school. Mediumscope Sections separating formwork, reinforcement, and concrete would be used. Another example would be distinguishing architectural-quality concrete from structural concrete by using narrowscope (Level 4) Sections for each.

Many design professionals tend to accommodate the practice of General Contractors to break apart the specifications by Sections and issue the portions to prospective subcontractors and materials suppliers. This may result in incomplete information being provided to subcontractors and materials suppliers. Since the specifier does not know how the general contractor will break down the work—and since each of several general contractors bidding for the same project may choose to do the breakdowns differently—it is not feasible for each Section of the specifications to align with trade practices or trade subcontractors.

The goal of the specifier should be to break the specifications into appropriately scaled units or Sections that are organized in accordance with *CSI MasterFormat* Section numbers and titles. Sections become units of information for specific portions of the construction that, when taken together, become the Specifications according to the General Conditions of the Contract. As *AIA A201-2007* states in Paragraph 1.1.6, “The Specifications are that portion of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.”

Formats and other discussion related to internal organization of Sections follow next, in Chapter 5, “Formats for Specification Sections.”

Alternative and Supplemental Formats for the Project Manual

Multiple Volumes of the Project Manual

Projects have many unique considerations that could render a single volume of Construction Specifications impractical.

Large and complex Projects tend to have voluminous construction specifications. A medical project, for example, could have 2000 pages in the Project Manual because of the technical complexity of the construction and many types of specialty equipment. This results in a physically unwieldy document.

A fast-track or phased construction project could have Bidding and Construction Contract Documents issued in portions, later to be brought together for permit or Project Record Documents.

A project with a combination of project delivery methods, including design-bid-build and design-build and designs by different Architect/Engineer teams for portions of the Work could have contractual relationships more clearly established if the specifications are in separate volumes.

The contractual (“legal”) considerations of a large, complex project could result in Division 00 - Procurement and Contracting Requirements and Division 01 - General Requirements being 300 or more pages, which would be better handled in a separate volume.

Appendices

The concept of Appendices in the Project Manual is not included in *CSI MasterFormat* but is not prohibited either.

Appendices have proven to be useful for including in the Project Manual copies

of documents that are classified as “Information Available to Bidders” and that do integrate well into the Specifications in Divisions 00 through 49. These could include:

- Information Available to Bidders: Geotechnical Report, Hazardous Materials Abatement Specifications (work under separate contract), existing condition photographs and Project Schedule are examples.
- Hybrid Contract Documents: A signage and graphics bid package that includes both written and graphic descriptions but does not conform to *CSI MasterFormat* and *CSI SectionFormat/PageFormat*.
- Large or Complex Tables: Door Schedule, Door Hardware Sets, Food Service or Medical Equipment Schedules.

Use of Appendices is becoming more common, especially on complex projects, although not officially recognized in *CSI MasterFormat*.

Study Questions

1. True or False? The Project Manual concept originated with the American Institute of Architects (AIA).
2. True or False? The Project Manual contains the written portion of the Bidding and Construction Documents.
3. Which of the following are included in the Project Manual?
 - a. Introductory Information
 - b. Bidding Requirements
 - c. Contracting Requirements
 - d. Specifications
 - e. All of the above
4. True or False? The Project Manual concept is only applicable to large, complex projects.
5. Which of the following reasons does not apply to why specifications Sections do not establish trade or subcontract jurisdictions?
 - a. Design professionals are neither trained nor licensed to establish trade and subcontract jurisdictions.
 - b. The General Conditions of the Contract states that the specifications do not establish trade and subcontract jurisdictions.
 - c. Regional construction practices better prescribe trade and subcontract jurisdictions.
 - d. It is less costly if established trade and subcontract jurisdictions are followed.

- 6.** True or False? Small-scale and less complex projects are more suited to Level 2 or “broadscope” Sections.
- 7.** True or False? Appendices are recognized in CSI MasterFormat, 2004 edition, for information not suitable for the standardized organization of MasterFormat.
- 8.** True or False? CSI MasterFormat, 2004 edition, prohibits the use of Appendices in the Project Manual.
- 9.** True or False? Organizing a Project Manual according to CSI MasterFormat expedites the process of breaking out portions of the specifications for bidding by subcontractors and materials suppliers.
- 10.** Which of the following is a negative attribute for the separation of the Project Manual into portions (volumes)?
- a.** The specifications (Project Manual) are easier to handle.
 - b.** Separate volumes of the Bidding and Contract Requirements may be issued for fast-track or phased construction.
 - c.** Separating specifications into volumes makes distinctions for Work designed several design professionals or teams of design professionals more explicit.
 - d.** Essential information may be omitted from separate volumes or the volumes may contain extraneous information.

Chapter 5

Formats for Specification Sections

Need for Formats for Specification Sections

The arrangement of the subject matter in an orderly, comprehensive format within a specification Section is important for several reasons. The specifier, when following a definitive procedure, is less likely to overlook any item. Similarly, the contractor, estimator, materials manufacturer, and inspector will then find the information much more easily in the individual section.

A Section in the Specifications can be considered analogous to a chapter in a book. The chapters or Sections make up the book of specifications, which is properly called the Project Manual. Unlike in conventional book, the chapter or specification Section is organized into an outline format broken down into Parts, Articles, Paragraphs, and Subparagraphs. The use and misuse of other terms to describe the breakdown of information in a specification Section is erroneous and can lead to confusion.

A typical specification Section in Divisions 02 through 49 contains two categories of paragraphs, technical and nontechnical, as follows:

Technical	Nontechnical
Materials	Scope of work
Fabrication	Delivery of materials
Workmanship	Samples and shop drawings
Installation	Permits
Tests	Guarantees
Schedules	Cleaning
Preparation	Job conditions

Specifications for Divisions 00 - Procurement and Contracting Requirements and Division 01 - General Requirements conform to the appearance of specifications from Divisions 02 through 49 but use Parts, Articles, Paragraphs, and Subparagraphs as appropriate to their content. This chapter will address only formats for specifications for Divisions 02 through 49.

SectionFormat

In the years prior to the advent of a nationally promulgated Section format, the typical Section was written to include the technical and nontechnical paragraphs in the order in which they occurred chronologically. That is, Articles, Paragraphs, and Subparagraphs were arranged in the sequence in which the Contractor would ordinarily perform the Work. Each paragraph heading was simple and self-explanatory. When the specifier followed this course, it was less likely that things would be omitted, and reliance on checklists and notes diminished accordingly.

In 1969, CSI developed and promulgated the *CSI SectionFormat*. This has since been refined and updated several times and is now jointly produced by CSI and Construction Specifications Canada (CSC), joined with *PageFormat*. *SectionFormat* and *PageFormat* are so interrelated that they are best presented in a single document.

Prior to the publication of *SectionFormat*, specifiers arranged the information within their technical sections in accordance with their own formulas, and in many instances without any specific method. In many cases, the lack of organization resulted in duplication and omission of information.

The nationally recognized *SectionFormat/Page-Format* provides guidelines for the arrangement of information within a technical Section of the specifications. It offers a concise, orderly method for specifiers to follow. See [Exhibit 5-1](#) for an example specification template that interprets *SectionFormat* and includes editing comments.

[Exhibit 5-1](#) Example Section Template.

SECTION ### ##

SECTION TITLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

LIST GENERALLY THE PRODUCTS SPECIFIED IN THIS SECTION. COORDINATE WITH ARTICLE AND MAJOR PARAGRAPH HEADINGS IN PART 2 - PRODUCTS. AVOID BEING OVERLY DESCRIPTIVE.

THIS ARTICLE IS OPTIONAL ACCORDING TO CSI *MASTERFORMAT*. IT IS RECOMMENDED FOR USE ONLY AS A FAMILIARIZATION AID FOR THOSE USING THE PROJECT MANUAL.

A. [_Element_of_Work_].

B. [_Element_of_Work_].

1.2 RELATED SECTIONS

LIST ONLY THOSE SECTIONS WHERE THERE IS A DIRECT RELATIONSHIP WITH THE WORK SPECIFIED IN THIS SECTION. THAT IS, IDENTIFY WORK SPECIFIED IN ANOTHER SECTION FOR WHICH THE INFORMATION CONTAINED IN THAT SECTION IS NECESSARY FOR PROPER AND COMPLETE UNDERSTANDING OF THE WORK SPECIFIED IN THIS SECTION.

A. Section [_Number_]; [_Description_of_related_Work_].

B. Section [_Number_]; [_Description_of_related_Work_].

1.3 ALLOWANCES

COORDINATE THIS SECTION WITH GENERAL REQUIREMENTS SPECIFIED IN DIVISION 01 - GENERAL REQUIREMENTS AND WITH BIDDING REQUIREMENTS, PARTICULARLY SUPPLEMENTARY INSTRUCTIONS TO BIDDERS AND THE BID FORM.

A. Allowance: Include in [Contract Sum] [Bid] the amount of \$[_Lump_Sum_Amount_] for [_Description_of_Element_of_Work_].

1.4 UNIT PRICES

COORDINATE THIS SECTION WITH GENERAL REQUIREMENTS SPECIFIED IN DIVISION 01 - GENERAL REQUIREMENTS AND WITH BIDDING REQUIREMENTS, PARTICULARLY SUPPLEMENTARY INSTRUCTIONS TO BIDDERS AND THE BID FORM.

A. Unit Price: [State in Bid] the amount per [_Unit_of_Measure_] for [_Description_of_Element_of_Work_].

1.5 ALTERNATES

COORDINATE THIS SECTION WITH GENERAL REQUIREMENTS SPECIFIED IN DIVISION 01 - GENERAL REQUIREMENTS AND WITH BIDDING REQUIREMENTS, PARTICULARLY SUPPLEMENTARY INSTRUCTIONS TO BIDDERS AND THE BID FORM.

A. Alternate Bid: The Work described in this Section is affected by [an Alternate Bid item.] [Alternate Bid items.]

B. Base Bid Condition: [_Description_of_the_Work_under_Base_Bid_].

C. Alternate Bid No. [_Number_per_Bid_Form_]: [_Description_of_the_Work_under_Alternate_Bid_item].

1.6 REFERENCES

LIST ONLY THOSE PUBLICATIONS REFERENCED IN THIS SECTION. AVOID LISTING ASTM, ANSI AND OTHER GENERALLY KNOWN REFERENCE STANDARDS. REFER TO SECTION 01 42 00 - REFERENCES FOR GUIDANCE.

A. [_Publishing_Agency_]: [_Reference_Standard_].

B. [_Publishing_Agency_]:

1. [_Reference_Standard_].
2. [_Reference_Standard_].

1.7 DEFINITIONS

DEFINE UNIQUE AND HIGHLY TECHNICAL TERMS ACTUALLY USED IN THIS SECTION, OR TERMS WHOSE PRECISE DEFINITION IS ESSENTIAL TO UNDERSTANDING THE WORK SPECIFIED.

A. [_Term_]: [_Definition_].

1.8 PERFORMANCE REQUIREMENTS

DESCRIBE BELOW PERFORMANCE CRITERIA TO BE MET BY COMPLETED DESIGN/BUILD CONSTRUCTION.

A. [_Element_of_the_Work_]: [____].

1. [_Criterion_].
2. [_Criterion_].

1.9 SUBMITTALS

COORDINATE THE FOLLOWING WITH DIVISION 01 - GENERAL REQUIREMENTS AND, TYPICALLY, SECTION 01 33 00 - SUBMITTALS PROCEDURES. IT IS NOT NECESSARY TO CROSS-REFERENCE TO SECTION 01 33 00.

A. Product Data: Submit [catalog data.] [_Description_].

B. Shop Drawings: Submit fabrication and installation drawings indicating [_Description_]. Shop drawings shall indicate surrounding construction as provided for the Project.

C. Manufacturer's Samples: Submit [_Description_]. Samples will [not] be returned after review and may [not] be incorporated in the Work.

D. Design Data: Submit [calculations] [and] [or] [test reports] [, signed by registered engineer] [, certified by independent testing service,] for [_Element_of_the_Work_], demonstrating conformance with [the Contract Drawings and Specifications] [specified performance requirements] [and] [applicable Code requirements].

E. Test Reports: Submit [____].

F. Certificates: Submit [____] certifying that [_Description_].

G. Instructions: Submit manufacturer's instructions and recommendations for [assembly] [application] [installation] of [_Element_of_the_Work_].

H. Field Reports: Submit reports by [____] for [_Element_of_the_Work_]

- I. Project Record Drawings: Indicate [_Element_of_the_Work_] on project record drawings. Refer to Section 01 77 00 - Contract Closeout Procedures.
- J. Operation and Maintenance Data: Submit for [_Element_of_the_Work_]. Comply with general requirements of Section [01 77 00 - Contract Closeout Procedures] [01 78 23 - Operation and Maintenance Data].
- K. Warranty Documents: Submit for all manufactured units and equipment specified in this Section. Refer to Section [01 78 26 - Product Warranties] [01 77 00 - Contract Closeout Procedures].

1.10 QUALITY ASSURANCE

.....
 DESCRIBE SPECIFIC REQUIREMENTS FOR QUALITY ASSURANCE MEASURES FOR WORK SPECIFIED IN THIS SECTION. SPECIFY SHOP OR FACTORY TESTS AND INSPECTIONS IN PART 2 - PRODUCTS AND SPECIFY FIELD TESTING AND INSPECTION ACTIVITIES IN PART 3 - EXECUTION.

- A. Qualifications: [Contractor-employed designers] [manufacturer-employed designers] [manufacturers] [fabricators] [installers] [applicators] shall have a minimum of [3] [5] [—] years full time experience [producing] [executing] work of similar scope and complexity, [and shall be certified] [by the system manufacturer] [in accordance with] [____]. Refer to Section 01 45 00—Quality Control.
- B. Regulatory Requirements: Regulatory Requirements, Comply with specific requirements of [____]. Refer to Section 01 35 13 - Regulatory Requirements.
- C. Certifications: [Applicator] [Installer] [Fabricator] [____] shall be certified [by the manufacturer] [by an independent testing service] to meet or exceed the minimum requirements specified herein.
- D. Field Samples: Prepare field samples of [_Element_of_the_Work_] for [review] [and] [selection] by the [Architect] [Owner] [____] of [range of] [color] [texture] [and] [finish]. Locate field samples at [____]. Approved sample[s] shall establish standards by which the Work will be judged. Note location of field samples on project record drawings.
- E. Mock-Ups: Construct full-size [working] mock-up[s] of [____] for review and approval by [Architect] [Owner] [____], showing [operation] [construction] [coordination and interface with adjoining Work]. Construct mock-ups at [____]. Approved mock-up[s] shall serve to establish standards by which the Work will be judged. Remove mock-up[s] only after Work is substantially complete and with approval of [Architect] [Owner] [____].
- F. [Pre-Installation] [Pre-Application] Conference: Convene a conference at [the project site] [the Architect's office] [____], [7] [10] [____] days prior to starting [installation] [application], to review the Drawings and Specification, the reviewed submittals, [field samples,] [mock-ups], manufacturer's instructions and recommendations, sequencing and interface considerations and project conditions. Conference shall be attended by supervisory, [installation] [fabrication] [application] and quality control personnel of Contractor and all subcontractors performing this and directly related work. [Construction Manager] [Architect] [Owner] [____] will attend the conference.

1.11 DELIVERY, STORAGE AND HANDLING

.....
 DESCRIBE BELOW SPECIAL PROVISIONS FOR PACKING AND SHIPPING PRODUCTS SPECIFIED IN THIS SECTION.

- A. Packing and Shipping: [____].

.....
 DESCRIBE BELOW SPECIAL PROVISIONS FOR ACCEPTANCE AT PROJECT SITE OF PRODUCTS SPECIFIED IN THIS SECTION.

- B. Acceptance at Site: [____].
-

DESCRIBE BELOW SPECIAL PROVISIONS FOR STORAGE AND PROTECTION OF PRODUCTS SPECIFIED IN THIS SECTION.

C. Storage and Protection: [____].

1.12 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with environmental requirements and recommendations of manufacturer for proper [installation] [application] [curing] of products.
- B. Temperature Criteria: Do not [install] [apply] [_Element_of_the_Work_] unless temperature is [_Criteria_].
- C. Wind and Weather Criteria: Do not [install] [apply] [_Element_of_the_Work_] unless weather is [_Criteria_].
- D. Field Measurements and Conditions: In addition to provisions of the Conditions of the Contract, verify dimensions and obtain field measurements prior to producing shop drawings and ordering products. Verify field conditions and condition of substrate and adjoining Work before proceeding with Work specified in this Section.

1.13 SEQUENCING AND SCHEDULING

THIS ARTICLE IS RARELY USED. IT SHOULD BE USED WHEN THERE ARE SPECIFIC SEQUENCING AND SCHEDULING REQUIREMENTS, SUCH AS COMPLETING A PORTION OF THE BUILDING BY A CERTAIN DATE TO ALLOW FOR OWNER'S USE FOR WORK UNDER SEPARATE CONTRACT (INSTALLATION OF SPECIALIZED EQUIPMENT).

- A. Sequencing and Scheduling, General: Refer to sequence requirements specified in Section 01 11 00—Summary of work and construction progress schedule requirements specified in Section 01 33 00 - Submittals Procedures.
- B. [Sequence for [_Element_of_Work_]] [Completion Schedule for [_Element_of_Work_]]: Additionally, coordinate Work specified in this Section with Work specified in Section [____]—[____] [and Section][____]—[____] to properly interface the various elements.

1.14 WARRANTY

SPECIFY ONLY THOSE REQUIREMENTS WHICH EXCEED THE CONTRACTUAL OR STATUTORY ONE YEAR WARRANTY FROM THE CONTRACTOR. BE CAREFUL ABOUT COPYING MANUFACTURER'S WARRANTY EXCLUSIONS INTO THE CONTRACT. COORDINATE WITH SECTION 01 78 36 - WARRANTIES. SEE FORMS FOLLOWING SECTION 01 78 36.

- A. Manufacturer's Guarantee: [_Period_], [_Conditions_].
- B. [Applicator's] [Installer's] Warranty: [_Period_], [_Conditions_].
- C. Warranty Bond: [_Amount_], [_Conditions_].

1.15 MAINTENANCE

THIS ARTICLE IS USED ONLY FOR UNIQUE SITUATIONS WHERE THE CONTRACTOR OR INSTALLER WILL ENTER INTO A SEPARATE CONTRACT WITH THE OWNER FOR MAINTENANCE SERVICE FOLLOWING SUBSTANTIAL COMPLETION OF THE WORK SPECIFIED. EXAMPLES: LANDSCAPE MAINTENANCE, ELEVATOR MAINTENANCE AND BOILER SERVICE AND MAINTENANCE.

- A. Maintenance Service: Provide a maintenance service contract, paid in advance, covering [_Element_of_the_Work_] for a period of [_Time_] from [Substantial Completion] [Acceptance] of the Work. Such service shall be in addition to warranty service otherwise covered by the Contract and shall include [all parts and labor] [all parts, labor and consumables].

B. Extra Materials: Provide [_Product_] in [the amount of [_Quantity_] [_Unit_of_Measure_]] [an amount equal to [_Number_] percent of [_Element_of_Work_]] delivered to [_Person_and_Location_].

PART 2 - PRODUCTS

2.1 MANUFACTURERS

THIS ARTICLE IS USED ONLY WHEN THERE IS A SINGLE MANUFACTURER FOR ALL PRODUCTS SPECIFIED IN THIS SECTION. OTHERWISE, "SPECIFIED MANUFACTURER" AND "ACCEPTABLE MANUFACTURERS" ARE SPECIFIED IN EACH ARTICLE OF PART 2 - PRODUCTS, WHERE PRODUCTS ARE SPECIFIED.

THE FOLLOWING IS BASED ON USING EITHER THE "OPEN" OR "CLOSED" PROPRIETARY METHOD OF SPECIFYING. IF A DESCRIPTIVE, REFERENCE OR PERFORMANCE METHOD IS USED, THIS ARTICLE MAY BE DELETED.

A. Specified Manufacturer: [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]; local representative [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]).

B. Acceptable Manufacturers: [None identified.] [Alternate manufacturers will be considered in accordance "or equal" provision specified in Section 01 62 00—Product Options.] [No substitutions will be considered.]

1. [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]; local representative [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]).

2. [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]; local representative [_Firm_Name_], [_City_], [_State_] ([_Telephone_No_]).

2.2 MATERIALS

SPECIFY IN THIS ARTICLE THE BASIC MATERIALS USED FOR EITHER FIELD FABRICATION OR SHOP OR FACTORY MANUFACTURE. TYPICALLY, THE PRODUCTS ARE SPECIFIED BY REFERENCE TO INDUSTRY STANDARD, SUCH AS AN ASTM STANDARD.

A. [_Product_]: [_Description_].

1. [_Element_]: [_Description_].

2. [_Element_]: [_Description_].

2.3 [MANUFACTURED UNITS] [EQUIPMENT] [COMPONENTS] [_Element_of_Work_]

SPECIFY IN THIS ARTICLE SHOP-FABRICATED OR FACTORY-MANUFACTURED PRODUCTS. PRODUCTS ARE TYPICALLY SPECIFIED BY IDENTIFYING THE MANUFACTURER, THE PRODUCT NAME AND CATALOG NUMBER OR OTHER REFERENCE INDICATION.

A. Specified Product: [____].

THE FOLLOWING IS RARELY USED BUT SHOULD BE USED WHERE THERE ARE NO TRUE EQUALS BY OTHER MANUFACTURERS.

B. Acceptable Products: [____].

C. [_Attribute_]: [_Description_].

D. [_Attribute_]: [_Description_].

E. [____].

2.4 ACCESSORIES

SPECIFY ACCESSORY PRODUCTS EITHER BY THE SPECIFIED MANUFACTURER OF THE BASIC PRODUCT OR BY OTHER MANUFACTURERS.

A. [_Product_]: [_Description_].

1. [_Attribute_]: [_Description_].
2. [_Attribute_]: [_Description_].

B. [_Product_]: [_Description_].

2.5 MIXES

SPECIFY MIXES (FORMULAS) TO BE USED FOR FIELD, SHOP OR FACTORY USE IN PERFORMING THE WORK. EXAMPLE: CONCRETE MIX.

A. [____].

2.6 FABRICATION

SPECIFY SHOP OR FACTORY FABRICATION. FIELD FABRICATION IS SPECIFIED IN PART 3.

A. Shop Assembly: [____].

B. Shop/Factory Finishing: [____].

C. Tolerances: [____].

2.7 SOURCE QUALITY CONTROL

SPECIFY TESTING AND INSPECTION ACTIVITIES TO BE PERFORMED DURING SHOP OR FACTORY FABRICATION.

A. Tests: [____].

B. Inspection: [____].

C. Verification of Performance: [____].

PART 3 - EXECUTION

3.1 EXAMINATION

THIS ARTICLE IS INCLUDED IN CSI MASTERFORMAT AND IS USED BY AIA MASTERSPEC. IT IS RECOMMENDED THAT IT GENERALLY NOT BE USED SINCE IT IS SO CLOSELY RELATED TO DIRECTING THE MEANS, METHODS, TECHNIQUES AND SEQUENCES OF CONSTRUCTION. EXCEPTIONS COULD BE SUCH MATTERS AS TESTING MOISTURE CONTENT OF SUBSTRATE AND REPORTING THE RESULT BEFORE ADHERING FINISH MATERIALS. COORDINATION OF BACKING AND BLOCKING PROVISIONS IS AN EXAMPLE OF WHAT NOT TO INCLUDE, SINCE SUCH COORDINATION IS COVERED IN DIVISION 01 - GENERAL REQUIREMENTS.

A. Examine Project conditions and completed Work and verify that [____].

B. Immediately correct all deficiencies and conditions which would cause improper execution of Work specified in this Section and subsequent Work.

C. Proceeding with Work specified in this Section shall be interpreted to mean that all conditions were determined to be acceptable prior to start of Work.

3.2 PREPARATION

SPECIFY ACTIVITIES IN PREPARATION FOR ERECTION, APPLICATION OR INSTALLATION OF PRODUCTS.

A. Protection: [____].

B. [Surface] [Substrate] Preparation: [____].

3.3 [ERECTION] [APPLICATION] [INSTALLATION]

SPECIFY REQUIREMENTS FOR ERECTION, APPLICATION OR INSTALLATION OF PRODUCTS. IF REQUIREMENTS ARE BASICALLY "IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS," THEN SIMPLY STATE SO AND DO NOT REPEAT SUCH INSTRUCTIONS AND RECOMMENDATIONS. IF THERE ARE SPECIAL CONSIDERATIONS BEYOND WHAT THE MANUFACTURER REQUIRES OR RECOMMENDS, THEN DESCRIBE THE REQUIREMENTS.

AVOID PRESCRIBING THE MEANS, METHODS, TECHNIQUES AND SEQUENCES OF CONSTRUCTION. DESCRIBE THE END RESULT, NOT HOW TO ACHIEVE THE RESULT.

A. [____].

B. [____].

C. Interface with Other Products: [____].

D. Tolerances: [____].

3.4 FIELD QUALITY CONTROL

DESCRIBE TESTS AND INSPECTIONS.

A. Field Testing and Inspection: Field inspection [and testing] will be performed as specified in Section 01450 - Quality Control.

1. [_Test_or_Inspection_]: [_Description_].

2. [_Test_or_Inspection_]: [_Description_].

B. Corrective Actions: Replace or repair Work to eliminate defects, deficiencies and irregularities.

3.5 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's Field Services: Provide field [instruction] [inspection] services by manufacturer or authorized agent of the manufacturer in accordance with general requirements specified in Section 01 16 00—Product Requirements.

B. Schedule: Schedule site attendance by [____] manufacturer during execution of the Work.

C. Reports: Submit written reports [and certification] by manufacturer that [____] has been completed in accordance with the manufacturer's instructions and recommendations.

3.6 [ADJUSTMENT AND CLEANING]

A. Labels and Coverings: Remove all labels and protective coverings from completed Work.

B. Adjustment: Check operation of functioning components and make adjustments for proper operation [within parameters of manufacturer] [and the Contract Drawings and Specifications]. [Refer to general requirements specified in Section [01 60 00 - Product Requirements] [01 75 00—Starting and Adjusting]].

C. Cleaning: Thoroughly clean the Work specified in this Section and adjoining surfaces and areas affected by [application] [installation].

1. [_Cleaning_Action_]: [_Description_].
2. [_Cleaning_Action_]: [_Description_].

3.7 DEMONSTRATION

A. Demonstration, General: Refer to general requirements specified in Section [[01 60 00 - Product Requirements] [01 75 00 - Starting and Adjusting]].

B. [_Equipment_] [_System_] Demonstration: Demonstrate [to] [Owner] [Architect] [Construction Manager] [____] that [equipment] [system] properly functions.

C. [____].

3.8 PROTECTION

A. Protection, General: In addition to general requirements specified in Section [01 50 00—Temporary Facilities and Controls,] [01 54 00—Construction Aids,] [Section 01 56 00 - Temporary Barriers and Enclosures,] Section 01 60 00 - Product Requirements and Section 01 77 00 - Closeout Procedures, comply also with the following requirements.

1. [_Protective_Action_]: [_Description_].
2. [_Protective_Action_]: [_Description_].

B. Maintenance of Protective Measures: Maintain protective devices until Work is [ready for Substantial Completion review,] [ready for Acceptance] [accepted].

C. Removal of Protective Measures: [Unless otherwise directed, remove protective devices [and complete final cleaning] [for Substantial Completion review,] [upon Acceptance of the Work,] [Protective devices will be removed by Owner.]

3.9 SCHEDULE

.....
SCHEDULE PRODUCTS SPECIFIED IN THIS SECTION WHEN SCHEDULE FORMAT IS THE MOST EFFECTIVE MANNER FOR DESCRIPTION OF WORK ATTRIBUTES. THE FOLLOWING IS A GENERAL EXAMPLE ONLY.
.....

A. [_System_] Fixtures:

[_Element_]	[_Material_]	[_Finish_]
[_Fixture_] Type 1	[_Material_A_]	[_Finish_1_]
[_Fixture_] Type 2	[_Material_A_]	[_Finish_2_]
[_Fixture_] Type 3	[_Material_B_]	[_Finish_3_]

END OF SECTION

SectionFormat is another important step toward providing a more unified approach. It permits easier access to information by manufacturers, contractors, and inspectors. It provides a checklist for the specifier so that omission of information is minimized. It provides standardization of input that permits its use in connection with computerized specifications and information retrieval.

The benefits of using *SectionFormat* are:

- It provides an industry-accepted standard for locating information within a specification Section.
- Consistent use of *SectionFormat* reduces the chance for omissions or

duplications in a project specification.

- It assists the design professional by providing a format that facilitates coordination of project documentation with a Project Manual.
- It assists specification users by consistently locating similar information in the same place in each Section of the Specifications.
- It assists the specifier by providing a standard arrangement of Articles in three parts, suitable for use in master specification systems. In writing a new Section, the standardized format helps to identify what subjects to address.

Under each Part, *SectionFormat* provides for several standard paragraph headings following a more or less regular sequence or order. Obviously, each paragraph heading may not be pertinent for every technical section and should not be used where not applicable. In addition, where paragraph heading titles would be inaccurate, they should be retitled to be consistent with the Work specified under a specific heading. For example, under Part 3 - Execution, *SectionFormat* lists a paragraph titled “Erection, Installation, Applications, Construction.” This title should be edited to reflect the content of the Section. “Erection” is applicable to a structural steel Section but “Application” is not. “Installation” is applicable to wood windows but “Erection” is not. For a Section such as earthwork, use an entirely different but appropriate term, such as “Excavation” or “Grading.”

It is important that the Article, Paragraph, and Subparagraph headings be appropriate to the Work specified in a technical Section. Do not use Articles, Paragraphs, and Subparagraphs listed in *SectionFormat* when they do not apply to the specified Work. Introduce new headings when applicable. Deviations from *SectionFormat* are proper when awkwardness would result from too close an adherence to the prescribed titles. The titles are guidelines only. There is no obligation to use all prescribed titles in every specification Section. In fact, to do so would be poor practice.

The Article, Paragraph, and Subparagraph headings also should take into account certain requirements normally specified according to the nature of the Work.

For civil engineers and those in heavy construction involved in contracts based on unit prices, an Article titled “Price and Payment Procedures” should be included following the “Summary” Article at the beginning of the Section. Reflect how this portion of the Work will be administered and payments to the Contractor will be made.

For mechanical and electrical engineers, an article titled “System Description” is appropriate near the beginning of Part 2, to present an overview of the system being specified, to fully describe an involved system prior to specifying its components and their assembly and installation. Specifications for balancing the heating and ventilating system or other mechanical and electrical items should include an article titled “Adjusting” near the end of Part 3.

For architects, an Article titled “System Startup” is appropriate for elevators but inappropriate for ceramic tiling. Use professional judgment and only include appropriate Article and Paragraph headings from *SectionFormat*.

SectionFormat was updated in 1997 to reflect and coordinate with the 1995 edition of *MasterFormat*. Similarly, *SectionFormat* was revised and updated in 2008 to coordinate with the 2004 edition of *MasterFormat*. Obtain the current edition of CSI/CSC *SectionFormat/PageFormat* from:

The Construction Specifications Institute
110 South Union Street, Suite 100
Alexandria, VA 22314
800-689-2900
www.csinet.org

Construction Specifications Canada
120 Carlton Street, Suite 312
Toronto, ON, M5A 4K2
416-777-2198
www.csc-dcc.ca

Part Numbering

Overall, a specification Section is organized using levels called Part, Article, Paragraph, and Subparagraph, as indicated below:

PART 1—GENERAL (First Level)

1.01 ARTICLE (Second Level)

A. Paragraph (Third Level)

1. Subparagraph (Fourth Level)

a. Subparagraph (Fifth Level)

1) Subparagraph (Sixth Level)

SectionFormat provides for the arrangement and presentation of information under three separate parts. The *Part* is considered the First Level of detail in a specification Section. The three Parts are:

Part 1—General

Describes administrative, procedural and temporary requirements and is an extension of Division 01 - General Requirements unique to the

section. It specifies the procedures for accomplishing portions of the Work specified in the Section and the relationships with other portions of the Work or requirements in the project.

Part 2—Products

Describes, in detail, the materials, products, equipment, systems, or assemblies that are required for incorporation into the Project. It specifies the products to be incorporated into the project as specified in the Section, including their offsite fabrication.

Part 3—Execution

Describes, in detail, preparatory actions, what on-site actions are required, and how the products shall be incorporated into the project.

Article Numbering

Article numbers are the Second Level of detail in a specifications Section. The Article Number = PART Number + Consecutive Number. Examples:

1.4 SUBMITTALS: Article in PART 1 specifying submittals

2.1 MANUFACTURERS: Article in PART 2 specifying acceptable manufacturers

3.9 FIELD QUALITY CONTROL: Article in PART 3 specifying testing and inspections to be performed at the project site

2.11 SOURCE QUALITY CONTROL: Article in PART 2 specifying testing and inspection to be performed at on off-site production facility

1.5 QUALITY ASSURANCE: Administrative requirements governing source and field quality control activities, including field samples, mock-ups, and pre-installation or pre-application conference to be convened at the project site

Paragraph Numbering

Paragraphs and Subparagraphs are subordinate levels under an Article. Paragraphs are the Third Level and use uppercase letters followed by a period (such as “A.”) for identifiers.

Subparagraphs are the Fourth Level through Sixth Level of detail. All are referred to as Subparagraphs. There are no sub-subparagraphs and sub-sub-subparagraphs.

The Fourth Level subparagraphs use an Arabic numeral followed by a period, such as “1.” for identifiers.

The Fifth Level subparagraphs use a lowercase letter followed by a period, such as “a.” for identifiers.

Sixth Level subparagraphs use an Arabic numeral followed by a parenthesis, such as “2).” for identifiers.

Although subsequent Subparagraph levels are listed in *SectionFormat*, in practice Sixth Level and greater should be reserved for lists rather than subparagraphs with sentences. Break down an Article or Paragraph into several Articles or Paragraphs to reduce complexity and avoid too subparagraphs of Fifth Level or greater.

There has been concern by some specifications writers about how to match Article numbering with contemporary word processing programs. The “leading zero” (1.03) is difficult to do with word processing programs when using the automatic paragraph numbering function. Automatic numbering function is considered by most specification writers to provide a significant productivity benefit. Those who wish to hold zealously to the leading zero go to great lengths to retain it. Master guide specification publishers, such as ARCOM for *Masterspec* and CSRF for *SpecText*, deal with the problem by dropping the leading zero. Thus, “2.4” is used rather than “2.04,” and when the numbering reaches “2.9” the next number is “2.10.” In practice, this is acceptable.

PageFormat

Accompanying and closely related to *Section-Format*, *CSI/CSC PageFormat* is a standardized presentation of text for each page of a specification Section, providing an orderly and uniform arrangement of the Articles, Paragraphs, and Subparagraphs.

- *SectionFormat* addresses the content of the Articles, Paragraphs, and Subparagraphs.
- *PageFormat* addresses the numbering of Articles, Paragraphs, and Subparagraphs.
- *PageFormat* addresses the physical arrangement on the page, such as margins, indents, headers, and footers.

The benefits of using *PageFormat* are:

- Text is presented clearly and at a density best suited for easy reading without obscuring the message or hindering rapid understanding.
- It is suitable for use in construction specifications of all types and sizes.
- It is suitable for use with most current production methods (word processing and computer-assisted specifications).

Exhibit 5-2 Example of Special Warranty Forms.

FORM LETTER

FOR CONTRACTOR'S / SUBCONTRACTOR'S / MANUFACTURER'S WARRANTY
CONTRACTOR'S/SUBCONTRACTOR'S/SUPPLIER'S LETTERHEAD

SPECIAL LIMITED PROJECT WARRANTY FOR _____ WORK.

We, the undersigned, do hereby warrant that the portion of the Work described above which we have provided for [PROJECT_NAME], [CITY], [STATE] is in accordance with the Contract Documents and that all such Work as installed will fulfill or exceed all minimum warranty requirements. We agree to repair or replace Work installed by us, together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or function within a period of (years), commencing (date identified in Notice of Completion, unless otherwise directed) and terminating (date).

The following terms and conditions apply to this warranty (obtain Owner's approval before submission):

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the Owner, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the Owner to have said defective Work repaired or replaced to be made good, and agree to pay to the Owner upon demand all moneys that the Owner may expend in making good said defective Work, including all collection costs and reasonable attorney fees.

Local Representative: For warranty maintenance, repair, or replacement service, contact:

(Name) _____
(Address) _____
(City) _____ (State) _____ (ZIP) _____
(Phone) _____ / _____

(signed) _____ (signed) _____

(Date) _____	(Date) _____
(Typed Name) _____	(Typed Name) _____
(Title) _____	(Title) _____
(Firm) _____ (Installer, applicator, manufacturer or supplier)	(Firm) _____ (Contractor)

State License No: _____

FORM LETTER

FOR CONTRACTOR'S / MANUFACTURER'S GUARANTY
CONTRACTOR'S / MANUFACTURER'S LETTERHEAD

SPECIAL LIMITED PROJECT [WARRANTY] [GUARANTY] FOR _____ WORK.

We, the undersigned, do hereby [warranty] [guaranty] that the portion of the Work described above which [we have provided] [was provided by (*Installer's or Subcontractor's Name*) for [**PROJECT_NAME**], [**City**], [**State**]] is in accordance with the Contract Documents and that all such Work as installed will fulfill or exceed all minimum warranty requirements. We agree to repair or replace Work installed by [us.] [(*Installer's or Subcontractor's Name*)] together with any adjacent Work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or function within a period of (*years*), commencing (*date indicated in Notice of Completion, unless otherwise directed*) and terminating (*date*).

The following terms and conditions apply to this [warranty] [guaranty] (*obtain Owner's approval before submission*):

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the Owner, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the Owner to have said defective Work repaired or replaced to be made good, and agree to pay to the Owner upon demand all moneys that the Owner may expend in making good said defective Work, including all collection costs and reasonable attorney fees.

Local Representative: For warranty maintenance, repair, or replacement service, contact:

(Name) _____

(Address) _____

(City) _____ (State) _____ (ZIP) _____

(Phone) ____ / _____

(signed) _____

(signed) _____

(Date) _____ (Date) _____

(Typed Name) _____ (Typed Name) _____

(Title) _____ (Title) _____

(Firm) _____ (Firm) _____
(*Installer, applicator, manufacturer or supplier*) (Contractor)

State License No: _____

Page Layout

Be adaptable and be creative in the layout of specification pages. Just as the Drawings express excellence in graphic design or are intentionally restrained graphically, for the specification Section consider the capabilities of word processing programs and go beyond the “typewriter” look of the 1960s and 1970s. Follow conventions and, for production expedience, consider using a simple page layout such as:

- Top and Bottom Margins: 1/2-inch; check printer limitations.
- Left and Right Margins: 1-inch (bound edge could be 1-1/4 inches and unbound edge could be 3/4-inch); check the word processing program for automatic features to offset pages to allow for binding of the Project Manual.
- Section Identification: Section title at the beginning of a Section and project-specific information (see [Exhibit 5-1](#)) and section title identification on each page.
- Page Number: 6-digit *MasterFormat* number followed by consecutive number for the page. Conventionally, the page number is located at the bottom center of each page, but alternatives are worth considering. See [Exhibit 5-1](#) for example.
- Section Date: Not required by *PageFormat* but potentially very important in practice. Just as each Drawing is dated, each Section of the Specifications should have a date, to distinguish original and revised Sections.
- Indentations: Conventions have been based on use of fixed-space fonts. With the more common proportional fonts now used, develop an indentation scheme to suit the desired page appearance of *SectionFormat's* outline format. The author recommends using 0.3" (8 mm) for indentations rather than the default 0.5" of most word processing programs. Using 0.1" for the first indent and 0.3" thereafter results in text of paragraphs aligning vertically. Experiment and adapt the indentation scheme to suit the desired page appearance.
- Justification: Alignment of text along margins. Left margins are always justified. Justifying right margins looks professional, especially with a proportional font. Word processing programs, when settings are properly programmed, can have blocks of text both left and right margin justified.
- Fonts and Font Size Recommendations:
 - Use 10 point or 12 point, depending upon legibility.
 - The default or generic spec font is `Courier` 10 cpi (characters per inch).
 - A **serif** font is more readable but may be visually unpleasant.
 - A `sans serif` font is more contemporary in appearance but is less readable.
 - Common fixed space fonts: `Courier` and `Letter Gothic`.
 - Common proportional fonts: Times Roman (serif) and Arial/Universe/Swiss/Helvetica (sans serif).

Enhanced Text Appearance

Another concern, dating back to when specifications were produced using typewriters, is text enhancement. That is, adding **boldface**, underlining, and *italicizing* to text and even changing the type font and font size within a Section. Text enhancements can add to the readability and visual interest of the

specifications.

A note of caution for specification writers in overall charge of production of Project Manuals: there are usually several contributors to the set of specifications, and the more elaborate the format, the more difficult it can be to follow and match the established format. Consulting mechanical and electrical engineers, landscape architects, and specialty designers such as food service equipment consultants often have difficulty with enhanced text and must spend substantial effort and time to match a complex text format.

Study Questions

1. True or False? A typical specification Section contains technical and nontechnical (contractual or procedural) information.
2. A specification Section is divided into how many Parts according to CSI SectionFormat?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
3. True or False? Measurement and payment procedures are specified in Part 4 of a specification Section, according to CSI SectionFormat.
4. Which of the following is not in CSI *SectionFormat*?
 - a. Part
 - b. Sub-Part
 - c. Paragraph
 - d. Article
5. True or False? CSI SectionFormat is adaptable to lesser and greater levels of detail in a specification Section.
6. Which of the following is not a Part title according to CSI SectionFormat?
 - a. General
 - b. Execution
 - c. Products
 - d. Payment
7. CSI PageFormat establishes all but which of the following for appearance of the Section?
 - a. Article titles
 - b. Page margins and indent settings
 - c. Type font and size

- d.** Bolding and underlining of headings.
- 8.** Which of the following are advantages for following CSI PageFormat?
- a.** Classic appearance of PageFormat enhances authority of specifications.
 - b.** PageFormat is suitable for word processing programs.
 - c.** PageFormat is adaptable for construction specifications of varying complexity.
 - d.** Text is readable.
- 9.** True or False? CSI PageFormat should be adapted to specific capabilities and practices of the architectural/engineering firm.
- 10.** True or False? Sophisticated or complex adaptations of CSI PageFormat increases the difficulty for consulting design professionals to produce consistent-appearing specifications.

Chapter 6

Types of Specifications

Methods for Writing Specifications

After products have been selected to be specified, how is information about the product presented in the specifications? In Chapter 7 the subject of specifications language is addressed. Here the discussion will be about four methods for specifying products, followed by a discussion of standardized formats for specifications sections.

Four Methods of Specifying

In *The Project Resource Manual - CSI Manual of Practice, Fifth Edition* (McGraw Hill Professional, 2004), four methods of specifying are described, with some supplements and variations.

1. *Descriptive Specifying*: Under this method, exact properties of materials and methods of installation are described in detail without using proprietary names (manufacturers' trade names).
2. *Reference Standard Specifying*: Under this method, reference is made to established standards to which the specified products and processes shall comply or conform.
3. *Proprietary Specifying*: Under this method, actual brand names, model numbers, and other proprietary information are specified.
4. *Performance Specifying*: Under this method, required results are specified and the criteria are specified by which the performance will be verified. The Contractor is free to provide any material complying with the performance criteria.

There is a role for each of these methods in the production of typical construction specifications.

Descriptive Specifications

There are several advantages and disadvantages of descriptive specifications ([Exhibit 6-1](#)).

Exhibit 6-1 Examples of descriptive specifications text.

- G. Gas Line Pressure Regulators: Single-stage, steel-jacketed, corrosion-resistant gas pressure regulators; with atmospheric vent, elevation compensator; with threaded ends for 2 inches and smaller, flanged ends for 2½ inches and larger; for inlet and outlet gas pressures, specific gravity, and volume flow indicated. Pressure regulators shall be suitable for outdoor installation.
- B. Aggregates for Regular Weight Concrete: Fine and coarse aggregates, ASTM C 33 and as follows.
1. Structural Concrete: Maximum size not larger than ¼ of narrowest dimension between forms, ½ depth of slab nor ¾ of minimum clear spacing between individual reinforcing bars; maximum aggregate size shall be ¾ inch.
 2. Other than Structural Concrete: Conform to requirements for structural concrete except maximum aggregate for concrete fill and topping shall be ¾ inch maximum and for mass concrete shall be 1 inch.

Advantages

- Descriptive specifications indicate exactly what the design intends. If the storefront framing shall be 2 inches wide by 4½ inches deep, that is what is described. If the paint shall be “champagne metallic,” then that is what is described. If the toilet seat shall have an open-front design, that is what is described.
- Descriptive specifications are applicable to all conditions, methods, or situations of a project. If the project is a modernization project or new construction, or environmentally sensitive or insensitive, descriptive specifications may be used.
- Descriptive specifications permit free competition. By their very nature, descriptive specifications do not restrict the Contractor to using specific products of specific manufacturers (that is, unless the description is warped to prevent use of competing products).
- Descriptive specifications are acceptable to all kinds of projects. This method may be used for small or large projects, for public and private projects, and for elaborate elements and for simple elements.
- Descriptive specifications provide a good basis for bidding. The description supposedly makes it clear what the result of the work shall be. For example, a description that states “¾-inch-thick basecoat” is clear, while a description that states “as necessary as a basecoat for finish coats” is not.

Disadvantages

- Descriptive specifications require the specifier to take special care in describing the design intent in order to achieve the intended results. Careful consultation and “wordsmithing” are necessary to derive a complete and understandable description.
- Descriptive specifications tend to “bulk up” specifications with more verbiage about products than other specification methods.

- Descriptive specifications are more time-consuming to produce. They require more time and care than other methods. Leaving out important information may cause misunderstanding and misinterpretation, with unsatisfactory results.
- Descriptive specifications may require more quality control efforts. Each attribute should be verified during construction by quality assurance agents for the Owner and quality control staff for the Contractor. The Contractor must monitor the products and procedures of suppliers and subcontractors. A pre-engineered, proprietary elevator system requires less construction monitoring than a custom-engineered system specified by detailed descriptions of components.
- Descriptive specifications may be too elaborate for minor construction or a simple project. Consider the descriptions of gypsum board finishes in the applicable reference standard. Writing lengthy descriptions in the contract specifications can be avoided by referencing the appropriate industry standard.
- Descriptive specifications may be ambiguous. The Contractor must interpret specifications to identify and procure products available in the marketplace. The Architect/Engineer must interpret specifications when evaluating products proposed by the Contractor. It may not be the specifier who does the interpreting but a construction contract administrator who has not participated in making the design decisions and who does not know which described attributes are essential.
- Descriptive specifications are being used less often as more complete reference standards are being developed and implemented. In such cases, the reference standard, rather than the contract Specifications, describes the product.

Common Uses

Descriptive specifications are appropriate for products for which no standards exist, for products for projects where administrative restrictions prohibit identifying proprietary products, and for situations where the architect/engineer wants to exercise tight control over the specified work.

Basic Steps in Production of Descriptive Specifications

- Research available products.
- Research critical features needed.
- Determine which features to describe on drawings and which to specify (“a picture is worth a thousand words”).
- Describe critical features (“lowest common denominator”?).

- Specify quality assurance measures to ensure that products comply with specifications (i.e., submittals, certifications and testing and inspection activities).

Reference Standard Specifications

Authors of Reference Standards

Many nonprofit trade associations of building product manufacturers publish reference standards. These associations are extremely knowledgeable about a particular aspect of construction technology, and they have established nonprofit associations dedicated to the promulgation of standards, among other mutual-benefit activities for their portion of the construction industry.

Examples

AWI: Architectural Woodwork Institute

BHMA: Builders Hardware Manufacturers Association

ARMA: Asphalt Roofing Manufacturers Association

NRCA: National Roofing Contractors Association

WSRCA: Western States Roofing Contractors Association

NEMA: National Electrical Manufacturers Association

NECA: National Electrical Contractors Association

Publishers of Standards

Trade associations and government and institutional organizations publish standards to bring diverse standards within the construction industry under a national oversight organization, such as the Steel Door Institute (SDI). Metal door and door frame standards are jointly published by SDI and the American National Standards Institute (ANSI) as an ANSI/SDI standard. Joint ANSI/ASTM standards are also published.

Examples of Associations

- ASTM: ASTM International (formerly American Society for Testing and Materials)
- ANSI: American National Standards Institute

Examples of Reference Standard Specifications

- Basic material standard: ASTM C 33 - Portland Cement

- Product standard: PS-1 - Plywood
- Design standard: SMACNA - Architectural Sheet Metal Manual
- Workmanship standard: Woodwork Institute - *Manual of Millwork*
- Test method standard: ASTM E 84 - Steiner Tunnel Test (flammability)
- Qualifications standard: AWS D1.1 - Welders Qualification
- Codes: ICC Evaluation Service Research Reports

Advantages of Reference Standard Specifications

- Widely known and accepted base for the Contractor and Owner
- Widely used materials and methods readily recognized
- Competition not limited
- Shortens specifications dramatically

Disadvantages of Reference Standard Specifications

- There may be no appropriate standard to reference. Reference standards are generally available only for commonly used products.
- Referenced standards may be obsolete. Obsolescence is a problem because some standards organizations do not update regularly to keep up with developing technology.
- Reference standard specification may mean specifying to the lowest common denominator. Standards are typically consensus documents and, in order to serve the interests of the greatest number of members of the publishing organization or faction of the industry may be more lenient than the specifier intends.
- Reference standard specifications require research and care in use. Remember, industry associations develop and promulgate standards primarily for their own benefit.
- Reference standards must be incorporated properly, including all supplementary information.

Incorrect: “Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M.” This is incomplete. The coating designation also must be specified.

Correct: “Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.”

- Reference standard specifications are more difficult to enforce. Using them is like playing a game where the design intent is encoded into an industry

standard and then decoded by the Contractor for procurement. The Contractor must interpret the specifications to identify and procure complying products available in the marketplace. Information is submitted for review by the Architect/Engineer, who must evaluate whether anything has been lost in translation and determine that the proposed product complies with both the referenced standard and the design intent.

- Reference standard specifications may require more quality control effort for the Contractor in identifying and monitoring products being provided by suppliers and subcontractors.
- Reference standard specifications may appear to be too elaborate for a minor or simple project.

Common Uses of Reference Standard Specifications

Reference standard specifications ([Exhibit 6-2](#)) are used for “commodity” products in the marketplace, where the manufacturer and brand name are not important. They are also used for products for projects where administrative restrictions prohibit identification of proprietary products.

Exhibit 6-2 Examples of reference standards specifications text.

- B. Portland Cement: ASTM C 150, type as indicated on Structural Drawings for structural concrete or Type I or Type II if not indicated. For Architectural and other concrete work, provide Type II, gray color.
- D. Fire-Resistive Gypsum Board: ASTM C 1396, Type X (special fire-resistant), typically 48-inches wide and 5/8-inch thick (3/4-inch thick, proprietary fire-resistive where indicated), square cut ends, tapered sides.
- H. Shop Primer: SSPC Paint 13, standard color.

Basic Steps in Production of Reference Standard Specifications

- Standard must be recognized as authoritative in the industry.
- Standard must be available to all parties concerned.
- Specifier should know the standard:
 - Bad reference standard = bad specification.
 - Duplication and conflict of information due to mixing of descriptive or proprietary methods with reference specifying method.
 - Address all choices.
 - Standards may refer to a particular trade or subcontractor.
 - Standards may be multiple, referring to other standards for testing and materials. Conflicts and confusion can result.
- Establish the edition date of the standard: Division 1, Section 01420 - Reference Standards and Abbreviations (or a comparable section) is commonly used to specify the applicable date generally for the specifications.

For example, applicable edition date could be as of date of the bid submission or it could be the date of the building permit.

- Incorporate the standard properly. Often in the manufacturer's literature, ASTM standards are proclaimed that look authoritative but actually only specify a test method without identifying the acceptable results.
- Enforce the requirements of the standard. If the standard states a specific metal thickness for a certain grade of product, insist that the proposed product actually comply with that requirement.

Proprietary Specifications

There are several advantages and disadvantages of proprietary specifications (Exhibits [6-3](#), [6-4](#), and [6-5](#)).

Exhibit 6-3 Examples of proprietary specifications text.

- A. Built-up Asphalt Roofing System: GAF Building Materials Corporation, GAF Specification N-B-4-M with GAF Type 5MB Mopped Flashing, 10-year guaranteed, hot applied, 4-ply system with ventilated base sheet, modified bitumen flashing materials, granule-surfaced cap sheet at horizontal surfaces and granule-surfaced modified bitumen flashing at parapet wall faces.
-
- C. Toilet Compartment System, Service and Employee Areas ("Back-of-House"): Bobrick 1036 TrimLine Series, floor and ceiling anchored, particleboard core panels, stainless steel edges.
-
- C. Synthetic Resin Polychromatic Coatings: Zolatone Series 43, inherently polychromatic coating system.
- D. Color Blend: Color blend shall be as directed by Architect. Colors may be custom tints and proportions. Provide factory mixed coatings, with colors modified in field only as directed by Architect.
- E. Primers: Zo-Wood 93, synthetic-based primer. Verify that coating is compatible with fire-retardant treatment of wood substrate.
- F. Finishes:
1. Base coat: Zo-Cryl Sealer 92, latex formulation based on an acrylic resin emulsion, specifically developed as part of Zolatone process.
 2. Finish coat: Zolatone 43, polychromatic terpolymer coating, consisting of a combination of separate and distinct pigmented color particles suspended in a chemically treated aqueous solution. Varied particle colors and sizes shall create the desired blend of colors and texture for the finish coat.

Exhibit 6-4 Examples of closed proprietary specifications text.

2.1 TOILET AND BATH ACCESSORIES

A. Specified Manufacturer: Bobrick Washroom Equipment, Inc., North Hollywood, CA (818/764-1000).

B. Acceptable Manufacturer: None identified. No substitutions will be considered or accepted.

TEXT ABOVE IS FOR SPEC WITH ONLY ONE ACCEPTABLE MANUFACTURER. TEXT BELOW IS FOR SPEC WITH MORE THAN ONE ACCEPTABLE MANUFACTURER. NOTE: NO OTHER MANUFACTURERS ARE ACCEPTABLE.

2.1 TOILET AND BATH ACCESSORIES

A. Specified Manufacturer: Bobrick Washroom Equipment, Inc., North Hollywood, CA.

B. Acceptable Manufacturers: Equivalent products of the manufacturers listed below will be acceptable.

1. American Specialties, Inc., Yonkers, NY.

2. Franklin Brass Manufacturing Co., Culver City, CA.

C. Toilet Paper Boxes: Bobrick B-272.

D. Paper Towel Boxes: Bobrick B-263.

E. Toilet Seat Cover Dispensers: Bobrick B-221.

F. Grab Bars: Bobrick B-550 Series, configurations as indicated on the Drawings.

(Text is closed proprietary because only products of three specified manufacturers may be provided.)

Exhibit 6-5 Example of open proprietary specifications text.

2.1 TOILET AND BATH ACCESSORIES

A. Specified Manufacturer: Bobrick Washroom Equipment, Inc., North Hollywood, CA.

B. Acceptable Manufacturers: Equivalent products of the following manufacturers will be accepted. Additional manufacturers will be considered in accordance with "or equal" provision specified in Section 01 62 00—Product Options.

1. American Specialties, Inc., Yonkers, NY.

2. Franklin Brass Manufacturing Co., Culver City, CA.

C. Toilet Paper Boxes: Bobrick B-272 or equal, surface-mounted, #22 gage, type 304 stainless steel, satin finish, with tumbler lock.

D. Paper Towel Boxes: Bobrick B-263 or equal, surface-mounted, type 304 stainless steel, satin finish. Door with tumbler lock and piano hinge.

E. Toilet Seat Cover Dispensers: Bobrick B-221 or equal, surface-mounted, type 304 stainless steel, satin finish.

F. Grab Bars: Bobrick B-550 Series, or equal, 1½-inches o.d., 18 gage Type 304 stainless steel tubing, 1½ inches clear between grab bar and mounting surface, concealed mounting with 3-inch diameter flange secured with 4 set screws, configurations as indicated on the Drawings.

(Note: products are not restricted to specified manufacturers, but products of unidentified manufacturers may be provided in accordance with provisions in Section 01 62 00—Product Options. Descriptive text is included to assist in evaluation of submitted products of unidentified manufacturers.)

Advantages of Proprietary Specifications

- Offers close control of product selection
- Enables preparation of more detailed and complete specifications based on precise information obtained from the manufacturer's data

- Decreases overall length of specifications
- Reduces specifications production time
- Simplifies bidding by narrowing the competition and removing product pricing as a major variable
- Reflects real life by specifying actual products in the marketplace
- Reduces the Architect/Engineer's design liability by identifying products with which the Architect/Engineer has experience and establishes a clear basis for the design intent

Disadvantages of Proprietary Specifications

- Reduces or eliminates competition
- May require products with which the Contractor has had little or poor experience
- Favors certain products and manufacturers over others

Common Uses for Proprietary Specifications

Proprietary specifications are commonly used for private commercial projects. However, proprietary specifications also may be used for publicly funded projects with certain provisions. See the discussion below regarding “closed” and “open” proprietary specifications.

“Open” versus “Closed” Specifications

“Closed” Proprietary Specifying

In closed proprietary specifications, specific products of one or more manufacturers are specified, and no substitutions will be considered.

“Open” Proprietary Specifying

In open proprietary specifications, specific products of one or more manufacturers are specified, but other manufacturers will be considered (“or equal”). It is necessary to specify the process for evaluation and acceptance of products of alternative manufacturers.

“Nonrestrictive” Specifications

Specifications are generally written to encourage competition in bidding. It may be

the policy of the Owner or the requirements of public contracting laws that specifications not restrict competition in bidding for the work. To accomplish this, specifications should be written using a method (described above) that does not restrict competition. At least two (usually three) manufacturers should be specified whose products comply with the specifications.

Specifying Method

All four of the following methods may be used, if used appropriately and correctly.

- Descriptive Specifying: Most commonly used for nonrestrictive specifications
- Performance Specifying: By nature, intentionally nonrestrictive
- Reference Specifying: By nature, nonrestrictive
- Proprietary Specifying: May be nonrestrictive by naming two or three manufacturers or by adding an “or equal” provision

De Facto Restrictive Specifying

When the specifying method is based on precise features that only one manufacturer can meet, specifications may be de facto restrictive ([Exhibit 6-6](#)). This is commonly observed in manufacturer-produced specifications that are described by the meaningless term “generic” or that have the appearance but not the true content of a “nonproprietary” (descriptive) specification. Close examination of the attributes may well reveal excessively fine tolerances, unattainable test performance (the offending manufacturer owns the only machine capable of performing the test), or unimportant dimensional and physical attributes (“cabinet 10-1/4 inches wide by 29-1/16 inches high by 6-1/2 inches deep, with swirl-polished interior surfaces”).

[Exhibit 6-6](#) Example of de facto proprietary specifications text.

2.1 HORIZONTAL-SLIDING ACCORDION-TYPE FIRE DOORS

- A. Configurations: Single-parting and bi-parting door assemblies as indicated on Drawings.
- B. Fire Ratings: UL listings as Special Purpose Fire Doors, UL 10B and ASTM E152, without hose stream test. Time ratings shall be as indicated on Drawings.
- C. Door Construction: Two parallel walls of formed steel panels, independently suspended with no pantographs or interconnections except at lead posts. Panels shall be connected by live vinyl or formed steel hinges, according to fire rating requirements.
- D. Panels: Formed steel, 24 gage by 4½ inches, formed for maximum strength, with permanent finish.
- E. Fire Insulation: Interior surfaces of both walls shall be covered with continuous fire-resistant blanket, secured to each panel with metal clip system. Fire insulation shall extend from finished floor to tracks and shall meet at interior centers of fixed jambs and lead posts, forming an effective fire and smoke barrier.
- F. Perimeter Seal: Each wall of door assembly shall have extruded live vinyl sweeps, top and bottom, forming an effective smoke and draft seal.
- G. Track and Trolley System: Track system shall consist of two parallel tracks on 8-inch centers, of 1¼ inch by 1½ inch by 14 gage formed steel. Each panel shall be supported by ½-inch diameter steel hanger pin and 1¼ inch diameter, double-race ball bearing roller. Weight factor shall be maximum 9.3 pounds per lineal foot.
- H. Lead Posts: 16 gage formed steel connected to double walls by specially adapted panels.

(Not identified is the fact that the description above is verbatim from the product catalog of the only manufacturer of such a door system.)

Performance Specifications

The term “performance specifications,” as used in this discussion, pertains to portions of a project specification rather than a whole-building performance specification ([Exhibit 6-7](#)). The key concept behind performance specifications, unlike other methods, is that performance specifications are not prescriptive about the products and processes to be used by the Contractor. Descriptive specifications require the Contractor to conform to specific materials, fabrication techniques, and methods of installation. Performance specifications allow the Contractor to be inventive and ingenious in complying with requirements of the construction contract. This can and perhaps should result in more efficient and economical construction.

[Exhibit 6-7](#) Examples of performance specifications text.

- C. Parking Lot Luminaires: Pole-mounted luminaires located within landscaped islands of parking lot and bracket-mounted luminaires mounted on exterior building walls providing illumination complying with the following criteria:
1. Average illumination: 2.50 maintained footcandles.
 2. Minimum illumination: 1.00 maintained footcandles at all locations.
 3. Maximum to minimum footcandle uniformity: 11:1 minimum to 13.1 maximum.
 4. Mounting height limitation: 28 feet.
 5. Lamp type and wattage: HID, high pressure sodium preferred, maximum 400 watts.
-
- A. Ceiling System: Integrated system of suspended support structure, acoustical panels, luminaires and HVAC supply and return air fittings complying with the following criteria:
1. Noise-Reduction Coefficient: Noise-Reduction Coefficient (NRC) 0.55 (0.50–0.60), as determined in accordance with ASTM C 423, with materials tested on mounting E-400 unless otherwise noted (ASTM E 795 procedure).
 2. Ceiling Sound Transmission Class: Ceiling Sound Transmission Class (STC) 35–39, as determined by manufacturer for continuous ceilings tested in accordance with AMA 1-II—Ceiling Sound Transmission Test by Two-Room Method.
 3. Light Reflectance: 70–74 percent, in accordance with Fed Spec SS-S118B.
-
- E. Panel Fire Rating: Class A Flame Spread Rating according to Fed Spec SS-S118B and ASTM E 84.
- F. Luminaires: Provide minimum 100 lumens and maximum 120 lumens at work surface 28-inches above finished floor.
- G. HVAC Fittings: Provide capacities for air supply and return to suit HVAC system specified elsewhere herein, with the following performance features:
1. Maximum sound pressure level shall be NC 22, based on room absorption of 8 dB (re 10^{-12} watt sound power).
 2. Air diffusion distance shall provide room air velocity less than 20 fpm.
-
- A. Temporary Connections and Fees: Contractor shall arrange for services and pay all fees and service charges for temporary power, water, sewer, gas and other utility services necessary for the Work, until Contract closeout.
-
- D. Thermal Performance: Provide for expansion and contraction of system components over cycling temperature range of 170 degrees F, without causing detrimental effects to framing system appearance and performance.

Descriptive specifications describe what the Contractor must do to achieve the intended results, while performance specifications describe the intended result and leave it to the Contractor to determine how to achieve the result. This requires that performance specifications clearly and definitively communicate the required results while not unnecessarily limiting the products, methods or means the contractor uses to achieve those results.

Advantages of Performance Specifying

- “Design intent” (end result) only is specified, giving the Contractor latitude in selecting and applying construction products in a manner that performs as the specifier intends.
- Expedites construction through systems techniques: For example, specifies a ceiling system that includes lighting, HVAC, and acoustical control features.
- Encourages development of new technologies.
- Can result in shorter specifications.
- Permits free competition.
- Applicable to all types of projects.
- Delegates technical responsibilities to the construction industry. The Contractor is responsible for the results rather than the Architect/Engineer.

Disadvantages of Performance Specifying

- No firm, equal basis for bidding.
- All criteria must be clearly defined.
- More difficult to enforce.
- Delegates technical responsibilities to the construction industry. The Contractor is responsible for the results.
- The specifier is required to take special care in describing the design intent to achieve the intended results. The Contractor must interpret specifications to identify and procure products available in the marketplace. The Architect/Engineer must interpret specifications when evaluating products proposed by the Contractor.
- Can result in longer specifications if very detailed criteria are specified.
- Can be time-consuming to produce.
- May be too elaborate for a minor or simple project.
- “Underwhelming” success so far, but interest continues to grow.

Producing Performance Specifications

For more in-depth material on performance specifications, refer to the *The Project Resource Manual - CSI Manual of Practice (PRM)*, “5.7.2 Performance Specifications.”

According to the *PRM*, there are four essentials in performance specifying:

- Attributes
- Requirements
- Criteria
- Tests

Attributes are the means by which performance characteristics are identified. An attribute, therefore, can be defined as a characteristic of performance.

Requirements are statements of desired results, usually in qualitative terms. More than one requirement may be defined for a single attribute.

Criteria are definitive statements of performance for a particular requirement stated in quantitative or qualitative terms. Criteria must be either measurable or observable. Several criteria may be needed to define a requirement completely and accurately.

Tests are checks for conformance with performance criteria and a measure of

actual or predicted performance level. A test will be associated with each criterion and may be based on a recognized industry test method, calculation or engineering analysis, observation, or professional judgment. Test results may be evaluated by conducting the specified test or simply by submitting certified results of previous testing.

Pure performance specifications are rarely used for an entire specification section. In practice, the performance method of specifying supplements other methods or the specification uses other specifying methods to supplement the performance specification.

Common Uses of Performance Specifying

For portions of construction specification, products such as ceiling, lighting, and HVAC systems lend themselves to performance specifications. On a grand scale, entire facilities may be specified by the performance method. However, the specifications format being discussed here is not used for whole-facility performance specification. Refer to other publications by the Design-Build Institute of America (DBIA) and CSI (UniFormat™) and the computer-assisted performance specification program PerSpective™ by Building Systems Design, Inc. (Atlanta, Georgia).

Selecting a Method for Specifying

The specifier should determine the following and then select an appropriate method or methods for the Specification Section.

- What does Owner require?
- What method best describes the design intent?
- What method is most appropriate for the project size and complexity?
- What method will result in the best quality of work?
- What method will result in the best price for the work?

Mixed Methods of Specifying

It is not only acceptable but recommended practice to mix methods of specifying ([Exhibit 6-8](#)). A specification section may be written using mainly the proprietary method. Real products by real manufacturers in the marketplace are specified. Then the specified product is further identified using the descriptions method and the reference standard method. Finally, performance characteristics are specified. Why the redundancy?

[Exhibit 6-8](#) Example of mixed method specifications text.

- A. Vapor-Retarding Sheet Membrane: Stego Wrap 15 mil or equal, coextruded sheet of virgin resins and additives, complying with ASTM E 1745, Class A permeance and Class B puncture resistance.
1. Vapor transmission rating: 0.006 grains/ft²/hr, when tested according to ASTM E 96 at 73.4 degrees F.
 2. Permeance rating:
 - a. New material: 0.012 perms, when tested according to ASTM E 96 at 73.4 degrees F.
 - b. After elevated temperature conditioning: 0.015 perms, ASTM E 154 Section 11 Method and ASTM E 96 Procedure B.
- B.
- c. After low temperature/bending: 0.017 perms, ASTM E 154 Section 12 Method and ASTM E 96 Procedure B.
 - d. After exposure to soil organisms: 0.014 perms, ASTM E 154 Section 13 Method and ASTM E 96 Procedure B.
 - e. After exposure to petroleum and soil poison: 0.013 perms, ASTM E 154 Section 14 Method and ASTM E 96 Procedure B.
3. Tensile strength: 48.6 lbf/in. (CD) and 47.8 lbf/in. (CDM), when tested according to ASTM E 154 Section 9 Method and ASTM D 828.
 4. Puncture resistance: 1970 grams when tested according to ASTM E 154 Section 10 Method and ASTM D 1709.
-
- B. Accessory Materials:
1. Seam tape: Stego High Density Polyethylene Tape or equal, with pressure-sensitive adhesive, minimum 4-inches wide.
 2. Pipe boots: Constructed from vapor barrier material and pressure-sensitive adhesive tape according to manufacturer's instructions.
 3. Adhesive mastic: Spray-applied contact adhesive, compatible with sheet barrier and substrate materials, with excellent water-resistive qualities, Miracle Adhesives Corporation, Bellmore, NY, Miracle 1330 Spray Adhesive, or equal.

It is redundant to specify in such a way, but the use of the specifications and the construction context need to be considered.

Reference Standards Agencies

Since the subject of reference specifications has been discussed earlier, it is relevant to discuss in more detail here reference standards and the organizations that produce them.

Architects, Engineers, and specifiers constantly make use of reference standards in specifications, but many professionals are completely unfamiliar with the processes by which these standards are developed and promulgated. Furthermore, many are not aware of the contribution they can make in participating in the development and improvement of these standards.

Standards provide several important benefits. They reduce the number of types, sizes, and qualities of materials. They standardize methods of testing, and several provide standards on the quality of workmanship.

One major benefit is the reduction in the size of construction specifications. By incorporating a reference standard in a specification, the number of words required to specify a material and the method of testing it are reduced a hundredfold. This ensures the specifier some degree of quality since the reference standard reflects the combined knowledge and experience of the people engaged in its development.

Nevertheless, if the quality of reference standards is to be improved, there must be greater participation by users. This means affiliation of individuals and companies as members of associations producing standards. Architects, Engineers, and specifiers are particularly encouraged to participate, since their interests are more objective and less biased than those of individuals representing manufacturers

and industry.

Generally, most committees producing standards are balanced working groups representing all the interests concerned with the particular standard. Typically, they are composed of manufacturers of the basic ingredients of the material, manufacturers of the end product, suppliers, independent testing agencies, consumer groups, contractors associations, representatives of public authorities, and others who have special interests in a particular standard.

ASTM Standards

The product and test standards most widely used in both the private and public sectors of construction are ASTM standards. ASTM International (formerly the American Society for Testing and Materials) is an international private, technical, scientific, and educational society devoted, in its words, to “the promotion of knowledge of the materials of engineering and the standardization of specifications and the methods of testing.”

Since 1898, this organization has conducted research on the properties of materials and has developed numerous standards concerned with the Specifications for materials, methods of testing, and definitions. An index to ASTM standards and information on membership may be obtained from the society's headquarters at 100 Barr Harbor Drive, West Conshohocken, PA 19428.

Federal Specification Standards

Among U.S. federal agencies the reference standards that were mandatory until recently were Federal Specifications (FS). ASTM committees are taking over the task of setting standards for products formerly in the FS series. Remaining Federal Specifications are in the custody of the General Services Administration. Copies of the Federal Specification Index may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ANSI Standards

Other widely used reference standards are ANSI standards, promulgated by the American National Standards Institute. In addition to developing standards on materials and testing procedures, ANSI has created many standards used in construction, including workmanship and installation procedures. This standards organization works closely with other technical societies engaged in developing standards, and many ANSI standards bear corresponding ASTM, AASHTO, NFPA, and CS standards numbers. An index of standards may be obtained from the association at 11 West 42nd Street, New York, NY 10036.

ACI Standards

The American Concrete Institute (ACI) is a nonpartisan organization that gathers and disseminates information about the properties and applications of concrete and promulgates recommended practices, referred to as “ACI standards.” A catalog of the publications of this institute is available from P.O. Box 19150, Detroit, MI 48219.

NFPA Standards

NFPA International (formerly the National Fire Protection Association) develops fire protection standards and codes that are widely used as a basis for laws and ordinances. The more widely known standards used in construction are the National Electrical Code (NEC) and the Life Safety Code (LSC). Information on membership, technical committees, and NFPA standards may be obtained from the association at Batterymarch Park, Quincy, MA 02269.

AASHTO Standards

The American Association of State Highway and Transportation Officials (AASHTO) publishes standards on highway materials in two parts, one dealing with specifications for materials and the second with methods of testing. These AASHTO standards may be obtained from this organization at 444 N Capitol Street, Washington, DC 20001.

Standards of the National Institute of Standards and Technology (NIST)

Commercial Standards (CS) and Simplified Practice Recommendations (SPR) are voluntary standards issued by NIST and developed cooperatively with industry groups. CS establishes quality requirements for products, and SPR establishes sizes and classes for stock items. The NIST has consolidated these two types of standards and provided a new name, “Product Standards (PS),” to describe these new standards being developed. The list of standards may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Study Questions

1. The four methods of specifying according to *The Project Resource Manual/CSI Manual of Practice* are all except which of the following?
 - a. Performance
 - b. Generic
 - c. Proprietary

d. Reference standard

e. Descriptive

2. True or False? An advantage of Descriptive specifications is their acceptability for all kinds of projects.

3. True or False? A disadvantage of Descriptive specifications is their tendency to be voluminous.

4. True or False? An advantage of Performance specifications is their expedience in production.

5. True or False? A disadvantage of Performance specifying is that it restricts product selection to a limited number of manufacturers.

6. True or False? An advantage of Proprietary specifications is that actual products in the marketplace are identified.

7. True or False? Open proprietary specifications are prohibited by law.

8. True or False? Reference Standard specifications require detailed descriptions of product characteristics.

9. True or False? Reference standard specifications require care for the proper incorporation of the standard into the specifications, including supplemental information such as type and grade.

10. Reference Standard specifying has all but which of the following advantages?

a. Makes specifications more concise

b. Ensures the highest quality of materials

c. Encourages competition

d. Represents attributes agreed upon by industry associations

11. True or False? As consensus documents, referenced standards may represent the “lowest common denominator” for materials quality.

12. Closed Proprietary specifications have all but which of the following attributes?

a. Encourages competitive bidding

b. Only products of the listed manufacturers may be provided

c. Quality of products is known in advance

d. Specifications may be concise because product descriptions are brief

Chapter 7

Specifications Writing Principles

Determining Content for the Specifications

What Needs to Be Specified?

Typically, the specifier and the designers meet to determine what the design includes. The specifier may study the drawings, which tend to precede the specifications, but often it is determined early in the design documentation process that the specifier has issues for discussion that precede design development. For example, the specifier may ask whether there are toilet partitions in the design. The designer may say yes, but the material and configuration of the toilet partitions have yet to be determined. This creates an action item for the designer to follow up on and the specifier to record on a preliminary list of sections to be written.

What Are Criteria for Products to Be Specified?

The requirements of the design become more refined as the design develops and as the Owner's requirements become more apparent. As preliminary estimates of probable construction cost are produced, suitable quality and cost restraints for products become more apparent. Early in the design, criteria need to be identified for:

- **Configuration Requirements:** For example, shall the toilet partitions be ceiling hung, floor-mounted with overhead bracing rails, or mounted with floor-to-ceiling pilasters?
- **Material Requirements:** For example, shall the toilet partition panels be manufactured from metal with a painted finish, from solid high-density polyethylene, from plastic laminate-face wood fiberboard, or from phenolic panels with decorative colored faces? Shall the toilet partition hardware be rated for commercial or institutional use? Will the plastic laminate on the toilet partitions be selected from the manufacturer's standard selection or will it be a custom selection from a manufacturer the partition manufacturer does not regularly buy from?

- **Performance Requirements:** For example, what is the shading coefficient for the glass, how many British Thermal Units per Hour (BTUH) shall the boiler produce, and what is the windstorm resistance rating for the roofing system?
- **Code and Regulatory Requirements:** For example, what are the building code, the plumbing code, the mechanical code, and the electrical code? Are there special amendments to the Code adopted by local jurisdictions or state agencies?
- **Code Jurisdiction:** The building occupancy and ownership of a project may determine that different codes and authorities govern. A private school is usually governed by local codes, and a public school is usually governed by statewide Codes. One may be more restrictive than the other.
- **Environmental Requirements:** Regional environmental requirements, especially those regarding air quality, storm water pollution protection, waste management, haul routes through the city, and dust management may apply.
- **Owner's Policies:** Requirements such as sustainable design and use of recycled and low-energy or high-efficiency products may apply because of the Owner's policies, although not required by code or law.

What Are Suitable Products?

After design criteria and budget guidelines are established, suitable products need to be identified. This is a complex subject. A whole book could be written on it and, in fact, several books have been published. *Fundamentals of Building Construction: Materials and Methods, 5th Edition* by Edward Allen and Joseph Iano (John Wiley & Sons, 2008) is one.

Answering the following questions will help define suitable products:

- What does the Owner or code authority require?
- What method best describes the design intent?
- What method is most appropriate for the project size and complexity?
- What method will result in the best quality of the project?
- What method will result in the best price for the project?

General and specific technical resources need to be utilized, along with industry product resources, to identify suitable products and to acquire technical information regarding the products. Until recently, the foremost resource for architectural product information has been *Sweets Catalog File*, published by McGraw-Hill Construction (McGraw-Hill Companies, New York, annual issues by subscription).

Competing publications are available, such as *First Source*[™] by Reed Construction Data (Norcross, Georgia), annually by subscription) and *ARCAT*[®]—

The Product Directory for Architects by ARCAT (Fairfield, Connecticut) are available online for no charge. Along with 4specs.com (www.4specs.com), they have search capabilities to locate and connect directly to product manufacturer's websites.

There are still analog sources of construction information in addition to the digital ones described above. One of the most valuable resources is networking. This includes networking within one's office, especially with experienced and technically knowledgeable staff members. A quick question to a veteran architect/engineer can save hours of research and changes in product selections. At the same time, beware of the statement that selections are not being recommended simply because "that's the way we always do it." New, superior, or more appropriate products may be available.

Another resource is networking with colleagues outside of one's office. This can involve a network of people who have worked together in previous years and in other situations. It can be a network of people who have come to know each other in professional associations, such as AIA, CSI, NSPE, ASHRAE, ASPE, ASCE, and ASLA. Through active participation in these organizations (not merely attending occasional meetings), professional acquaintances are developed with whom to network. In particular, CSI offers opportunities through national conventions, regional conferences, and local chapters to attend product exhibits and participate in professional development programs. Other associations have similar programs.

Verification of Product Attributes

After initial selection, the products should undergo additional evaluation. Issues such as the following should be addressed:

- **Suitability:** Do product characteristics meet all criteria of the current design? The design may have changed.
- **Manufacturer:** Does the manufacturer market the product in the locale of the project? Does the manufacturer have trained installers and applicators in the locale of the project? Does the manufacturer have factory-authorized technical support for construction and for warranty and maintenance service?
- **Installation:** Can the product be installed in the available space? Are there clearance and service access requirements that the intended product can meet?
- **Cost:** Is the initial cost within the budget, and are the life cycle operational and longevity costs acceptable?
- **History:** Does the product have a history of acceptable service and performance? Does the manufacturer have a history of acceptable support to the design professional and the owner?

Design-Build Considerations

With the increasing use of the design-build project delivery method, performance specifying is being done more often. Specific product selections may not be made for specifications issued before preparation of the design-bid proposal. Detailed performance criteria need to be developed and presented in the pre-proposal specifications. For the proposal specifications, specific products would not only need to be specified but product data would need to be presented demonstrating compliance with or deviation from specified performance criteria. These criteria may include:

- Structural serviceability
- Fire and life safety
- Habitability
- Durability
- Practicability
- Compatibility
- Maintainability
- Code acceptability
- Economics

Gathering Product-Specific Information

Once product selections have been made, detailed product information needs to be gathered. Determining the types of information needed and how to present the information is where hard-core specifications writing takes place. Without some sort of guide, this becomes a daunting task. With guidelines, it is manageable but not as easy as it might seem. The key is to follow an established format for the specifications and to know what to put in and what to leave out. These require professional judgment.

Specifying

Specification Method and Language

As presented in Chapter 6, a method of specifying needs to be determined that is suitable for the products and project requirements. Determine which method—descriptive, reference standard, proprietary, or performance—or combination of

methods should be used. Consider the owner's requirements and policies, which may preclude use of one of the methods, such as the proprietary or “closed” proprietary method. *Note: Usually a combination of methods is used.*

Determine the type of specifications language to use: indicative, imperative, or streamlined. *Note: Often a combination of language types is used.*

Remember:

- Address only the Contractor.
- Use consistent and correct terminology. Coordinate Specifications with Drawings.
- Make correct cross references.
- Be clear, complete, correct, and concise.

Specify Workmanship

Determine and specify the quality of fabrication and assembly at the source (Part 2).

Determine and specify the quality of field assembly, installation, application, and finishing (Part 3).

Other Considerations

Make suitable choices based on economic considerations. Consider the project's budget and the life cycle costs of maintenance and consumption.

Consider sustainable design and construction, whether mandated or as an ethical matter. Determine what is required by authorities having jurisdiction, and determine whether the facility is intended to achieve a certain level of sustainable design and construction (LEED certification).

Considerations for trades and subcontracts: While not specifically recommended, be realistic but do not violate the provisions of the General Conditions or assume responsibilities belonging to the Contractor. Consider whether specifying waterproofing as a component of the ceramic tile flooring assembly is advantageous for quality assurance, as compared to specifying the product in a distinct section where surface quality could become a matter of dispute between two subcontractors.

Related Documents

Many specifications sections include a statement at the very beginning, in an article titled “Related Documents,” placed before the “Summary” article. Typically, it reads, “Drawings and general provisions of the Contract, including General and

Supplementary Conditions and Division 1 Specification Sections, apply to this Section.” Well, of course they do, and the Contractor knows this very well. Why is it included? For the benefit of the Contractor when the specifications are broken up and distributed to subcontractors and suppliers for bidding. But, as discussed in other chapters, the Specifications are only written as from the Owner to the Contractor, and provisions for subcontracting are not included. The “Related Documents” article is unnecessary and redundant.

Scope of Work

Frequently, a specification section will begin with one or two articles that identify the content of the section. As indicated on *CSI SectionFormat*, the first article is titled “Summary.” Under it are several paragraph headings, including paragraphs titled “Section Includes” and “Related Sections.” It is understandable that the section should open with descriptive statements about what is written in the section. This helps the reader to find pertinent information and to distinguish between similar products in various sections. The problem comes when these statements are misused or misinterpreted to a scope of work for a trade or subcontractor.

SectionFormat does not help the matter by also including paragraphs titled “Products Supplied But Not Installed Under This Section” and “Products Installed But Not Supplied Under This Section.” The only purpose of such titles is to indicate that the section is intended to be used to define the scope of subcontracts or trade jurisdiction, which is contrary to what is stated in typical General Conditions of the Contract. For example, under Section 08 71 00—Door Hardware, the Summary article states under the paragraph “Products Supplied But Not Installed Under This Section” that door hardware shall be supplied for installation under Section 06 20 00 - Finish Carpentry. Likewise, under Section 06 20 00 - Finish Carpentry, the paragraph “Products Installed But Not Supplied Under This Section” states that door hardware is furnished under Section 08 71 00—Door Hardware. Why split the products from the installation? Because it is intended that the door hardware supplier furnish the hardware to the finish carpenter to install. As discussed in preceding chapters, this practice is not recommended, and can lead to problems and claims against the design professional.

Assuming that the above problem is resolved, there is a problem when the description of Work includes superfluous and redundant language. For example, the description may include a statement such as “furnish and install at locations indicated on the drawings all labor, materials, equipment, tools, consumables, services, temporary utilities, tests and inspections for fire extinguisher cabinets.” All of these are covered by the General Conditions of the Contract and by specifications in Division 01 - General Requirements. Simply state what is specified in the section if the Summary article is used. For example:

1. Built-up SEBS modified-bitumen roofing system

Don't write a description of all the components of the roofing system. (There's another article in *SectionFormat* that is precisely for this purpose, titled “System Description.”)

As soon as attempts are made to have all-inclusive statements at the beginning of the specification section, something will be omitted. These statements are redundant and time-consuming to produce. The Contractor is already obligated by the General Conditions to provide complete assemblies and systems. The specifier should spend time on other matters.

A review of current manufacturers' guide specifications, which are often the worst at using scope statements, indicated that the use of all-encompassing scope statements has lessened greatly. Even a review of public agency guide specifications, which also tended to use wordy scope statements, indicated the use of concise statements merely to introduce the products specified in the section.

Perhaps attention to this can be reduced but with caution, because specialty consultants, such as roofing and waterproofing consultants, often include the wordy descriptions in order to make it “clear” what the subcontractor shall do and what the General Contractor shall do. Not stated is how such complex statements “prove” that the work is complicated and requires the expertise of the consultant to make the parties live up to their obligations.

If used, the paragraph titled “Related Sections” should only list other sections that specify requirements directly related to the work in the subject section. The key is to add a short description after the section number and title that states what is in the “related” section that is actually related. For example:

1. Section 05 05 23 - Metal Fastenings: General requirements for anchors and fasteners to building substrates
2. Section 03 11 00 - Concrete Forming: Requirements for setting embedded products in cast-in-place concrete
3. Section 09 97 16 - Coatings for Exterior Steel: Primer requirements applicable to shop-fabricated components

Broadscope, Mediumscope, Narrowscope Terms

The terms “broadscope,” “mediumscope,” and “narrowscope” for specifications sections at various levels of detail for scope have been superseded by the terms “Level Two,” “Level Three,” and “Level Four.” These refer to the level of product detail covered by the section. For example, the broad-scope title “Section 07 50 00 - Membrane Roofing” (Level Two title) does not suggest what type of material is used for the membrane. It is overly broad for practical use as a specification section title. The mediumscope title “Section 07 53 00 - Elastomeric Membrane Roofing” is more clearer certainly differentiates this roofing from the more

common built-up bituminous membrane roofing. It might be even clearer and more beneficial to roofers who might want to bid on the Project if the narrow-scope title “Section 07 53 23 - Ethylene-Propylene-Diene-Monomer (EPDM) Roofing” is used.

Grandfather Clauses

Individuals who are not properly grounded in the principles of specifications writing habitually fall back on general and all-inclusive language, which often results in what are termed “grandfather clauses” by specifiers and “murder clauses” by contractors—clauses that embrace everything yet fail to be specific. A typical example of a grandfather clause might read as follows: “The Contractor shall furnish and include everything necessary for the full and complete construction of the building, whether shown or specified or not shown or described.” When an architect or engineer is incompetent, he or she takes cover behind such a series of clauses, which may be interpreted to mean anything or nothing. In their failure to be specific, these clauses will, during the course of construction, require interpretations by the architect or engineer that may be difficult to enforce.

A clause such as “Concrete floors shall be finished level as approved by the Architect” without stating a tolerance is interpreted by the Contractor as “Guess what I will make you do.” An instruction to a Contractor by means of a drawing or a specification must be specific, and no architect or engineer should expect a contractor to fulfill nonspecific requirements.

Residuary Legatee

Where several different kinds or classes of similar materials are used, they should be described in a manner that permits some material to be specified for every part of the building. This technique has been borrowed from the legal profession and is known as the “residuary legatee.” To illustrate, let us assume that in preparing a will an individual wishes to leave the bulk of his estate to his wife, but wishes to make several minor bequests to his children or to relatives. He first enumerates his minor bequests and then states, in substance, “The residue of my property I bequeath to my wife.” She is then known as the *residuary legatee*.

In applying this principle to specifications writing, the materials occurring in the smallest quantity or in the fewest places should be listed first, and the material occurring in the remaining places becomes the residuary legatee and can be covered by some such phrase as “the rest of the building.”

As examples of this technique the following samples are offered:

1. In specifying glass, one can list the following:
 - a. Obscure glass: locker room windows

- b. Tempered glass: non-rated doors and side lights
 - c. Laminated glass: acoustical windows
 - d. Fire-rated laminated glass: fire-rated doors
 - e. Clear float glass: all other interior locations
 - f. Tinted float glass: all other exterior locations
2. In specifying paint:
- a. Plaster surfaces in toilets: semi-gloss enamel
 - b. Plaster surfaces in kitchens: gloss enamel
 - c. Plaster surfaces in bedrooms: flat enamel
 - d. All other plaster: latex emulsion paint
3. In specifying concrete:
- a. 2500 psi concrete: concrete foundations
 - b. 3000 psi concrete: concrete pavements
 - c. 3500 psi concrete: all other concrete work

If this method is followed, some material will always be specified for every part of the building, whereas any other plan obliges the specifier to check all listings most carefully for fear of not including some minor portion.

Duplication-Repetition

In Chapter 2 it was noted that the necessary information for the construction of a building is communicated to a contractor in two forms, graphic (the drawings) and written (the specifications), and that these documents should complement one another. If this information overlaps, there can be duplication, which may lead to a difference in instructions and disagreements as to which is the proper document to follow.

If this duplication were exact in each instance and remained so, it might be harmless at best; but too often, the information presented on the drawings and in the specifications either does not agree in the first place or, owing to last-minute changes, errors, and differences develop that create entirely new meanings. Repetition in the Contract Documents is always dangerous and should be avoided.

Technically, duplication is an exact repetition of a sentence or a paragraph in a specification, or else it is an exact repetition of a detail on a drawing. For example, a steel ladder might be detailed on a drawing, giving the size of the side members and the diameter and spacing of the rungs. The specification should describe the quality of the material and how the rungs are let into the side members, but it should not repeat the sizes and spacing since the drawing may be altered by the draftsman, with a resulting conflict in the two documents. The unnecessary expense involved in writing and reproducing statements that merely repeat may be minor in comparison to the ultimate cost to the Owner for mistakes in specification interpretation.

An exact duplication in the specification or drawing should cause no misunderstanding. However, we seldom see exact duplication. In most cases, the specifier attempts to avoid duplication or repetition by stating in different words what has been stated elsewhere in order to amplify. But it is precisely in attempting to amplify or reiterate in different words that conflict and ambiguity occur. It is therefore good practice to make a statement only once; if it is not satisfactory, it should be discarded and rewritten rather than amplified or explained in other terms.

Study Questions

1. Which of the following criteria should not be considered in product selections?
 - a. Configuration of products
 - b. Environmental or sustainable design criteria
 - c. Code compliance
 - d. Product performance
 - e. Popularity of product
 - f. Owner's policies, including maintainability
2. Online resources for building product information include:
 - a. First Source
 - b. Builders Bargains
 - c. ARCAT
 - d. 4specs.com
3. True or False? Specifications should be addressed to the product manufacturer, supplier, and installer, who actually purchase and install products.
4. True or False? A “RELATED DOCUMENTS” Article is required by CSI SectionFormat at the beginning of each Section of the Specifications, referencing and tying the Section to Division 00 - Procurement and Contracting Requirements and to Division 01- General Requirements.

- 5.** Which of the following product attributes do not require consideration?
- a.** Initial cost
 - b.** Performance history
 - c.** Suitability for the intended use
 - d.** Perquisites furnished by manufacturer
- 6.** Trustworthy sources for construction product recommendations include all but which of the following?
- a.** Design firm's history
 - b.** Business colleagues
 - c.** Trade shows
 - d.** Well-known building product representatives
 - e.** Unsolicited email
- 7.** True or False? *Residuary Legatee* is a concept for identifying specific and general (residuary) applications for building products.
- 8.** True or False? Repetition of requirements on Drawings and in Specifications is a low-risk way of ensuring quality.
- 9.** True or False? Judgment by the specifier should be exercised to select the appropriate level of detail to specify products for a specific project.
- 10.** True or False? "RELATED SECTIONS" should be identified in each specifications Section and the specific relationship should be stated.

Chapter 8

Bidding Requirements

Three Basic Bidding Documents

A term has been introduced to describe the process where design concepts turn into physical construction. The term is *procurement*. This term encompasses the range of methods used to obtain pricing from prospective contractors and enter into contractual relationships with varying scopes of work to be performed and methods for measuring and paying for the completed work. Rather than attempt to describe all the variations that procurement can encompass, including design-bid-build and design-build processes and the fixed sum, cost-plus-fee, guaranteed maximum price payment procedures, the discussion will focus on the traditional design-bid-build process.

Bidding requirements consist of documents that are used in the solicitation of bids by an owner or an agency. The documents are directed to bidders who might be interested in submitting bids for a project. These documents consist of three essential forms: (1) an invitation dealing with advertising or notifying interested bidders of the existence of the proposed project; (2) instructions pertaining to the submission of a proposal or bid for the project; and (3) the form on which the bid is submitted by a bidder.

The three documents are *Invitation to Bid*, *Instructions to Bidders*, and *Bid Form*. Because of the varying practices of individual specifiers and the lack of order and terminology for the material preceding the technical specifications, some chaos and non-uniformity in the arrangement and nomenclature of these documents existed in the past.

Bidding requirements are neither specifications nor Contract Documents. The basic difference lies in the fact that bidding requirements apply to a bidder prior to awarding the Contract, whereas the Contract Documents apply to the Contractor and obligations that the Contractor takes on after execution (signing) of the Agreement (Contract) with the Owner. Generally speaking, certain information contained in the bidding requirements that is pertinent to a Contractor's obligations—such as time for completion, base bid, alternates, and unit prices—should be entered into the Agreement Form after awarding the contract to ensure its fulfillment by the Contractor.

Invitations to Bid are generally circulated in the case of private work to certain selected bidders, and in the case of public agencies, they are advertised in local newspapers. In any event, the Invitation to Bid, along with the Instructions to Bidders and a sample copy of the Bid Form, should be bound in the Project Manual.

Invitation to Bid

Other terms have been used for “Invitation to Bid,” but they are used somewhat incorrectly as the heading for this document. These include “Advertisement to Bid” (sometimes mandated for use in public work construction for public advertising), “Notice to Bidders,” and “Notification to Contractors.” The term “Invitation to Bid” is preferred since it best describes the intent of this document. The purpose of an Invitation to Bid is to attract bidders in sufficient numbers to ensure fair competition and to notify all parties who might be interested in submitting proposals. It should be limited to information that will tell a prospective bidder whether the work is in his or her line, whether it is within that bidder's capacity, and whether he or she will have the time to prepare a bid prior to opening ([Exhibit 8-1](#)). It should be brief, simple, and free from subject matter not consistent with its purpose. It should consist of the following elements:

- 1. *Project Title.*** State the name of the project, its location, and the project number if any.
- 2. *Identification of Principals.*** State the name and address of the architect or issuing agency, together with the date of issue.
- 3. *Time and Place for Receipt of Bids.*** State the time and place where bids will be received and whether they will be publicly opened. If they will be opened privately, indicate whether prime bidders can attend.
- 4. *Project Description.*** Provide a brief but adequate description of the project, including the size, height, and any unusual features so that the bidder will be in a position to determine whether he or she has the financial and technical ability to undertake the construction of the project.
- 5. *Type of Contract.*** State whether bids are being solicited for a single or segregated contract and on what basis.
- 6. *Examination and Procurement of Documents.*** State where the contract documents can be examined and when and where they can be obtained. Indicate whether a deposit or a charge will be required for procurement of the documents and whether there will be any refunds.
- 7. *Bid Security.*** State whether a Bid Bond or other type of bid guarantee will be required to ensure the execution of an Agreement between the Owner and the Contractor.
- 8. *Guarantee Bonds.*** State whether Performance Bonds and Labor and Materials Payment Bonds will be required to ensure the completion of

the contract.

Exhibit 8-1 Sample Invitation to Bid.

.....
USE ARCHITECT'S LETTERHEAD. EDIT TEXT TO SUIT PROJECT REQUIREMENTS. CONSULT WITH OWNER AND OWNER'S COUNSEL FOR SPECIFIC REQUIREMENTS. COORDINATE WITH INSTRUCTIONS TO BIDDERS AND SUPPLEMENTARY INSTRUCTIONS TO BIDDERS.
.....

[_Month_] [_Day_], 20[_#_]

[_Invited_General_Contractor_] [
_Street_Address_] [
_Mailing_Address_] [
City], [_State_] #####

Subject: Invitation to Bid, [_Project_Name_] [
_Architect's_Project_No_#####.##_]

Gentlemen:

INVITATION

[_Owner's_Name_] hereby invites you to bid on a General Contract, including sitework, mechanical and electrical work, to construct a [_Brief_Project_Description_]. Project areas, type of construction and general nature of the Work is described in more detail on Drawing [1] [A1] [____], located in the Drawings, and in Specification Section 01100 - Summary of the Project, located in the Project Manual.

Project site is located at [____], in [_City_], [_State_] as shown approximately on the Vicinity Map in the Drawings.

OWNER

Owner is [_Owner's_Name_], [_Mailing_Address_], [_Street_Address_], [_City_], [_State_].

ARCHITECT

Architect is [_Architect's_Name_], [_Mailing_Address_], [_City_], [_State_] [#####-####_].

BASIS OF BIDS REQUIRED

All bids shall be on a [lump sum basis, without qualifications.] [____] basis.] Segregated Bids will not be accepted.

Each bid shall be made in accordance with the Bidding Documents on file at the office of the [Owner] [Architect] [Construction Manager].

TIME OF COMPLETION

[Project shall be completed within [300] [____] calendar days from the date of Award of the Contract for Construction.] [Project shall be completed within time nominated by Bidder and stated by Bidder on Bid Form. Time of Completion will be considered in the selection of Contractor by Owner.] [Time shall not exceed [300] [____] calendar days from the date of Award of the Contract for Construction.]

BID OPENING

Owner will receive bids until [10:00 A.M.] [12:00 noon] [2:00 P.M.] [____] Pacific [Standard] [Daylight] Time on [_Month_] [_Day_], 20[____], at the office of [_Owner_] [_Architect] [_Construction_Manager_] [____], [_Street_Address_], [_City_],

[_State_]. Bids received after this time will not be accepted. [Bids will be reviewed privately and Bidders notified in writing.] [Bids will be opened and announced publicly.]

BIDDING DOCUMENTS

Bidding Documents may be examined at the office of the [Owner] [Architect] [Construction Manager]. [Bidding Documents will be issued to [invited] [pre-qualified] General Contractors in accordance with the Instructions to Bidders and Supplementary Instructions to Bidders, contained in the Project Manual in the Bidding Documents.] [Copies of Bidding Documents may be purchased from [_Reprographic_Company_] [_Street_Address_], [_City_], [_State_], [_Telephone_No_] at Bidder's expense, for the cost of reproduction.]

BIDDING PROCEDURES

Bids shall be prepared and submitted in accordance with [Document 00 21 13 - Instructions to Bidders and Document 00 22 13 - Supplementary Instructions to Bidders, contained in the Project Manual in the Bidding Documents] [instructions provided separately by the [Owner] [Construction Manager]].

BID SECURITY

[A bid security must accompany each Bid in accordance [in the amount of [10] [____] percent of the Bid price,] [in the amount, form and subject to conditions] as specified in [Document 00 21 13—Instructions to Bidders and Document 00 22 13—Supplementary Instructions to Bidders, contained in the Project Manual in the Bidding Documents.] [instructions provided separately by the [Owner] [Construction Manager].] [A bid security is not required] [____].

BIDDER'S QUALIFICATION

Bidding will be open only to [invited] [pre-qualified] General Contractors, [experienced in work comparable to that required for the Project,] licensed in the State of [California] [_State_] [and 100 percent bondable to perform the Work required]. Owner will pre-qualify General Contractors prior to issuance of Bidding Documents. General Contractors desiring to bid must complete and submit to Owner, AIA Document A305 - CONTRACTOR'S QUALIFICATION STATEMENT, 1986 Edition, and include all listed supplementary information.

RIGHT TO REJECT BIDS

Owner reserves the right to waive irregularities and to reject any and all bids.

Sincerely,

[_Name_]

[_Title_]

[_Architect's_Firm_Name_]
for the Owner

Instructions to Bidders

The Instructions to Bidders have also been identified by other terms, such as “Information for Bidders” and “Conditions of Bid.” The purpose of the Instructions to Bidders is to outline the requirements necessary to prepare and submit a bid properly. As such, they are truly detailed instructions to a bidder; they guide the bidder in soliciting information concerning discrepancies in the contract documents and provide him or her with all the information necessary to execute the bid form. The AIA document *A701 Instructions to Bidders* has been developed by the AIA, and a sample is included in Appendix E.

The Instructions to Bidders consists of the following elements:

1. *Form of Bid.* Identify the form of the bid and indicate the number of copies to be submitted.
2. *Preparation of Bid.* Describe which blank spaces in the Bid Form are to be filled in by the bidder, including base bids, alternates, unit prices, and so on.
3. *Submission of Bid.* State how bids are to be sealed, addressed, and

delivered.

4. *Examination of Documents and Site.* Instruct the bidder to examine the contract documents and the site of the proposed project in order to become familiar with all aspects of the project.

5. *Interpretation of Documents.* State how discrepancies in contract documents discovered by bidders will be interpreted and resolved by the architect.

6. *Withdrawal and Modification of Bids.* State how bids can be withdrawn or modified prior to bid opening.

7. *Award of Contract.* Describe the procedure under which the award of the contract will be made.

8. *Rejection of Bids.* State the conditions under which the bids can be rejected.

9. *Other Instructions to Bidders.* State whether certain information relative to financial status, subcontractor, and substitutions are to be submitted with the Bid Form.

If preprinted Instructions to Bidders are used, such as the AIA document *A701 Instructions to Bidders*, modifications are necessary to suit specific project requirements. The document describing these modifications is titled *Supplementary Instructions to Bidders*. An example of a *Supplementary Instructions to Bidders* is shown in [Exhibit 8-2](#).

[Exhibit 8-2](#) Sample supplementary instructions to bidders.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

I. DOCUMENT INCLUDES

- A. The following supplement or modify American Institute of Architects Document A701 - INSTRUCTIONS TO BIDDERS, referenced in Document 00 21 13 of the Project Manual. Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions, the unaltered portions of the Instructions to Bidders shall remain in effect.

II. SUPPLEMENTARY INSTRUCTIONS

~~~~~  
THE FOLLOWING ARE EXAMPLES OF SUPPLEMENTARY INSTRUCTIONS. SUPPLEMENTARY INSTRUCTIONS ARE NECESSARY TO TAILOR THE PROVISIONS OF STANDARD AIA DOCUMENT A701 TO THE PARTICULAR REQUIREMENTS OF A PROJECT.

REVIEW THESE PROVISIONS WITH THE OWNER AND THE OWNER'S LEGAL COUNSEL. EDIT THEM TO SUIT THE PROJECT.  
~~~~~

A. Article 1, DEFINITIONS, Paragraph 1.8.

Delete Paragraph 1.8 and substitute the following:

"1.8 A Bidder is a person or entity who submits a Bid. Bidders shall only be qualified General Contractors invited by Owner to submit Bids. Qualified Bidders are required to be prequalified before receiving Bidding Documents for the Project. Instructions for prequalification are in Document 00 45 13 - Bidder's Qualifications in the Project Manual."

B. Article 3, BIDDING DOCUMENTS, Paragraph 3.1 COPIES.

Refer to Subparagraph 3.1.2. Add new Clauses 3.1.2.1 and 3.1.2.2 as follows:

"3.1.2.1 Bidding Documents will be issued directly to Sub-bidders or others upon request from an invited Bidder to the Architect. Bidding Documents issued directly to Sub-bidders or others will not contain referenced pre-printed AIA Documents. AIA Documents may be obtained separately, if requested by Sub-bidders or others, for a nominal additional, non-refundable charge from the office of the Architect or from most local Chapter offices of the American Institute of Architects. Deposit provisions designated in the Invitation to Bid shall apply to Bidding Documents issued to Sub-bidders and others.

"3.1.2.2 Partial sets of Bidding Documents may be obtained as designated in the Advertisement or Invitation to Bid."

C. Article 3, BIDDING DOCUMENTS, Paragraph 3.3, SUBSTITUTIONS.

Add new Subparagraph 3.3.5 as follows:

"3.3.5 The provisions specified in Section 01 60 00 - Product Requirements of the Specifications shall apply to proposals for substitutions."

D. Article 4, BIDDING PROCEDURES, Paragraph 4.1, FORM AND STYLE OF BIDS.

Delete Subparagraph 4.1.1 and substitute the following:

"4.1.1 Bids shall be submitted in duplicate on unaltered forms identical to the Bid Form provided in the Project Manual under the heading of Document 00 41 00 - Bid Forms. Each copy of submitted Bid Form shall be signed with orig-

inal, wet-ink signature of party authorized by Bidder to enter into Contract for Construction, with name and title of signing party typed below signature."

E. Article 4, BIDDING PROCEDURES, Paragraph 4.1, FORM AND STYLE OF BIDS.

Refer to Subparagraph 4.1.1. Add new Clauses 4.1.1.1, 4.1.1.2 and 4.1.1.3 as follows:

"4.1.1.1 Each Bid shall include all Work described in the Bidding Documents. Failure to comply may be cause for rejection of Bid. Segregated Bids or assignments will not be considered.

"4.1.1.2 Bidder shall indicate on the Bid Form the percentages for overhead and profit mark-ups for changes in Work which Owner may order.

"4.1.1.3 Bidder shall indicate on the Bid Form the number of calendar days required from date of commencement of Work of Contract, as defined by the Agreement, to complete Work ready for Acceptance by Owner (Substantial Completion). Such number of calendar days shall include consideration of normal adverse conditions due to weather which can be reasonably anticipated for the Project location. Owner will evaluate and consider proposed time from commencement of Work to Substantial Completion as well as sum of Base Bid and Alternates, if any, and Unit Prices, if any, in selection of Contractor. Time of Completion stated in Invitation to Bid, if any, is the maximum number of days acceptable to Owner."

F. Article 4, BIDDING PROCEDURES, Paragraph 4.1, FORM AND STYLE OF BIDS.

After Subparagraph 4.1.7, add the following new Subparagraph 4.1.8:

"4.1.8 Attach to each copy of the Bid a Preliminary Subcontractor List, as instructed in Document 00 4336 Proposed Subcontractors Form, except percentage of Work to be performed by listed subcontractors and suppliers need not be less [five] [ten] [] percent of Base Bid Sum. Final Subcontractor List shall be submitted within [three] [seven] days of notice by Owner to Bidder and shall be prepared in conformance with Document 00 4336 Proposed Subcontractors Form, contained in the Project Manual, including stated minimum percentage of Contract Sum (Base Bid plus Alternate Bids and Unit Prices as Owner may direct) or dollar amount required for listing."

G. Article 4, BIDDING PROCEDURES, Paragraph 4.2, BID SECURITY.

Refer to Subparagraph 4.2.1. Add the following new Clauses 4.2.1.1 and 4.2.1.2:

"4.2.1.1 Bid security is required. Bid security shall accompany each Bid submitted and shall be in the amount of [five] [] percent of Bid for Base Bid.

"4.2.1.2 Bid security shall be in the form of either a certified check made payable to Owner or a bid surety bond issued by surety licensed to conduct such business in State where Project is located."

H. Article 4, BIDDING PROCEDURES, Paragraph 4.3, SUBMISSION OF BIDS.

Refer to Subparagraph 4.3.1. Add new Clauses 4.3.1.1 and 4.3.1.2 as follows:

"4.3.1.1 The party receiving bids shall be as stated on the Bid Form.

"4.3.1.2 The mailing address for submission of bids shall be as stated on the Bid Form."

Refer to Subparagraph 4.3.2. Add new Clause 4.3.2.1 as follows:

"4.3.2.1 The designated location for deposit of bids shall be as stated on the Bid Form."

I. Article 4, BIDDING PROCEDURES, Paragraph 4.4, MODIFICATION OR WITHDRAWAL OF BID.

Refer to Subparagraph 4.4.1. Add new Clause 4.4.1.1 as follows:

"4.4.1.1 In submitting a Bid, each Bidder shall agree that such Bid will not be modified, canceled or withdrawn by Bidder for a period of [thirty] [forty-five] [sixty] [_____] days following time and date for receipt of Bids."

J. Article 5, CONSIDERATION OF BIDS, Paragraph 5.2, REJECTION OF BIDS.

Change name of Paragraph 5.2 to "REJECTION AND DISQUALIFICATION OF BIDS."

Add new Subparagraph 5.2.2 as follows:

"5.2.2 Owner reserves the right to disqualify any Bid, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices by Bidder."

K. Article 7, PERFORMANCE BOND AND PAYMENT BOND, Paragraph 7.1, BOND REQUIREMENTS.

Refer to Paragraph 7.1. Delete Subparagraphs 7.1.1, 7.1.2 and 7.1.3 and substitute new Subparagraphs 7.1.1 and 7.1.2 as follows:

"7.1.1 Owner reserves the right to require, prior to execution (Award) of Contract, selected Bidder to furnish bonds covering 100 percent of Contract Sum covering faithful performance of the Contract and payment of all obligations arising thereunder.

"7.1.2 Costs for such bonds and the name of the issuing surety shall be entered where designated on the Bid Form. Surety shall be subject to acceptance by Owner and, if not acceptable, shall be replaced with a surety acceptable to Owner at no change in cost to Owner."

L. Article 7, PERFORMANCE BOND AND PAYMENT BOND, Paragraph 7.2, TIME OF DELIVERY AND FORMS OF BONDS.

At line two of Subparagraph 7.2.1, delete "not later than three days following" and substitute "promptly."

Add new Subparagraph 7.2.5 as follows:

"7.2.5 Failure or neglect to deliver such bonds shall be considered as having abandoned Contract and the bid security shall be retained as liquidated damages."

M. Article 8, FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, Paragraph 8.1, FORM TO BE USED.

Refer to Paragraph 8.1. Add new Subparagraphs 8.1.2, 8.1.3 and 8.1.4 as follows:

"8.1.2 Notwithstanding any delay in the preparation and execution of the Agreement, each Bidder shall be prepared, upon receipt of written notice of Bid acceptance to commence Work within [ten] [fourteen] calendar days following such notice or on the date of commencement stated in the Agreement, whichever is later.

"8.1.3 Upon notice of Bid acceptance, selected Bidder shall assist and cooperate with Owner in preparing Agreement and other Contract Documents, including submission of all required or requested data concerning Bidder and Sub-bidders, and provision of all information necessary for Architect to prepare, if directed by Owner, conformed Drawings and Specifications incorporating all Addenda, substitutions and other relevant data.

"8.1.4 Within [five] [_____] calendar days of presentation of prepared Agreement and, if produced, conformed Contract Drawings and Specifications, selected Bidder shall execute the Agreement unless delay is mutually agreed upon by Owner and selected Bidder."

END OF DOCUMENT

Bid Form

The Bid Form, sometimes termed the "Proposal Form" or "Form of Proposal," is a document prepared by the Architect/Engineer or issuing agency in order to ensure similarity in the preparation and presentation of bids by all bidders and to obtain a uniform basis for comparison. When only the forms prepared by the issuing agency are used, the Owner is assured that all bidders are submitting proposals on an equal basis.

The Bid Form is prepared in the form of a letter from the bidder to the Owner. It

contains the necessary blank spaces for the bidder to fill in proposed prices, as well as spaces for the required signatures and addresses ([Exhibit 8-3](#)).

Exhibit 8-3 Sample Bid Form.

[BID] [PROPOSAL] FORM	
((TO BE COMPLETED IN [DUPLICATE] [TRIPLICATE]))	
GENERAL COVENANTS	
DATE:	_____
PROJECT:	[_PROJECT_NAME_] _____ [_City,_State_] _____
	[_OWNER_] Project No. [#####.##] [_ARCHITECT_] Project No. [#####.##]
BID TO:	[_OWNER'S_NAME_] _____ [_Mailing_Address_] _____ [_Street_Address_] _____ [_City_], [_State_] _____
BIDDER:	_____ _____ _____
THE WORK	
Construction and services required by Bidding Documents, whether completed or partially completed, and including all labor, materials, equipment and services provided by or to Bidder for construction of [_BRIEF_PROJECT_DESCRIPTION_] as described in the Bidding Documents, consisting of a Project Manual dated [____], containing Bidding and Contract Requirements and Contract Specifications and Drawings as listed in the Project Manual in Document 00 01 15 - List of Drawing Sheets. The Work may constitute the whole or part of the Project.	
ACKNOWLEDGEMENTS	
1. Bidder hereby acknowledges that Bidding Documents have been received, consisting of Project Manual titled "PROJECT MANUAL For The Construction of [_PROJECT_NAME_]," dated [##/##/##], containing Bidding and Contract Requirements and Specifications, and Drawings as listed in Document 00 01 15 - List of Drawing Sheets in the Project Manual, have been received.	
2. Bidder hereby acknowledges receipt of the following Addenda: _____ _____	
3. Bidder hereby acknowledges that Bidder has examined the site and the conditions under which Work is to be performed, that Bidder has examined and is familiar with contents of Bidding Documents and that all costs associated with the site, the conditions under which Work is to be performed and all requirements of the Bidding Documents, including all Addenda, are included in the Bid.	
4. Bidder has carefully checked the figures submitted below and understands that the Owner will not be responsible for any errors or omissions on the part of the Bidder in making this Bid.	

BIDDER OBLIGATIONS

1. Bidder hereby agrees to not modify, cancel or withdraw Bid for a period of [thirty] [forty-five] [sixty] [____] days following time and date established for receipt of Bids by Owner.
2. Bidder hereby agrees to enter into and execute a Contract for Construction, if awarded, on the basis of this Bid.
3. Bidder hereby agrees to submit all data requested by the [Owner] [Construction Manager] and stated in Document 00 45 13 - Bidder's Qualifications in the Project Manual, to determine Bidder's qualifications to perform Work.
4. Bidder hereby agrees to identify subcontractors and suppliers Bidder intends to utilize for Work and to submit documentation as stated in Document 00 43 36 - Proposed Subcontractors Form in the Project Manual. [Bidder further agrees to assist Owner in determining qualifications of subcontractors and suppliers to perform Work.]

BID SECURITY

.....
EDIT THE FOLLOWING TO SUIT OWNER'S REQUIREMENTS. TYPICAL REQUIREMENTS ARE INDICATED.
.....

1. Accompanying this Bid is ____ (Insert the words, "Bidders Bond," "Cashiers Check," or "Certified Check") in an amount equal to at least [five percent (5)] [ten percent (10)] of the total Bid amount, payable to [_OWNER'S_NAME_].
2. The undersigned deposits the above named security as a Bid security and agrees that it shall be forfeited to [_OWNER'S_NAME_], as liquidated damages in case this proposal is accepted by [_OWNER'S_NAME_] and the undersigned fails to execute a contract with [_OWNER'S_NAME_], as specified in the Contract Documents.
3. In addition, should [_OWNER'S_NAME_] be required to engage the services of an attorney in connection with the enforcement of this Bid, Bidder promises to pay [_OWNER'S_NAME_] reasonable attorney's fees, incurred with or without suit.
4. Bidder hereby agrees to disposition of bid security described in the Instructions to Bidders contained in the Project Manual.

BASIS OF BIDS

1. Contract Time: Bidder hereby proposes that Contract Time described in the Bidding Documents, including all addenda, be (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern) _____ (_____) calendar days from date of commencement of Work to achieving of Substantial Completion of the entire Work. Such number of calendar days shall include consideration of normal adverse conditions due to weather which can be reasonably anticipated for the Project location.
 - a. Bidder further proposes to partially complete that portion of the building [_Description_], as described in Section 01 11 00 - Summary of Work in the Project Manual, in (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern) _____ (_____) calendar days from the date of commencement of the Work. Such number of calendar days shall include consideration of normal adverse conditions due to weather which can be reasonably anticipated for the Project location.
 - b. Bidder further proposes to partially complete that portion of the building [_Description_], as described in Section 01 11 00 - Summary of Work in the Project Manual, in (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern) _____ (_____) calendar days from the date of commencement of the Work. Such number of calendar days shall include consideration of normal adverse conditions due to weather which can be reasonably anticipated for the Project location.

2. Base Bid Sum: Bidder hereby proposes to perform Work described in Bidding Documents, [including Allowances stated in Specifications Section 01 21 00 - Allowances in the Project Manual and] including all Addenda thereto, for the Sum indicated (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern):

Sum of \$ _____

_____ Dollars

a. Allowance No. 1 - [_TITLE_]: Sum of \$[####.##] ([_AMOUNT_IN_WORDS_] Dollars)

.....
ADD ADDITIONAL ALLOWANCES TO SUIT.
.....

3. Alternate Bid Sums: Bidder hereby proposes to perform all Work described in the following Alternate Bids and in Specifications Section 01 23 00 - Alternates in the Project Manual, for the Sums indicated (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern; indicate whether sum is Add or Deduct):

a. Alternate Bid No. [_#_]: [_Brief_Description_].

Add / Deduct (indicate) Sum of \$ _____

_____ Dollars

.....
ADD ADDITIONAL ALTERNATE BIDS TO SUIT.
.....

4. Overhead and Profit Factors: Bidder hereby proposes to perform all Work which may be ordered by Owner for the percentages indicated:

a. For Work performed by Contractor under Change Order, Overhead and Profit will not exceed (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern):

_____ Percent (____%)

b. For Work performed by a subcontractor under Change Order, Overhead and Profit will not exceed (show amount in words and figures; in case of discrepancy, the amount shown in words shall govern):

_____ Percent (____%)

ATTACHMENTS

Bidder hereby acknowledges attachment to [Bid] [Proposal] Form of the following:

1. CONTRACTOR'S QUALIFICATION Form, as referenced in Document 00 45 13 - Bidder's Qualifications.
2. Preliminary SCHEDULE OF VALUES, as referenced in Document 01 29 73 - Schedule of Values in the Project Manual.
3. Preliminary SUBCONTRACTOR LISTING, as referenced in Document 00 43 36 - Proposed Subcontractors Form in the Project Manual.
4. Preliminary CONSTRUCTION PROGRESS SCHEDULE, prepared in accordance with requirements specified in Specifications Section 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE, in the Project Manual.
5. Bid security.

.....
ADD OTHER DOCUMENTS AS REQUIRED BY OWNER, SUCH AS NON-COLLUSION AFFIDAVIT, LIST OF
MINORITY- AND WOMEN-OWNED SUBCONTRACTORS, ETC.
.....

BIDDER'S INFORMATION

Firm Name: _____

Address: _____

Telephone No. _____/_____

FAX No. _____/_____

Type of Organization: _____
(Individual, Partnership, Corporation)

State in which incorporated: _____
(if applicable)

State Contractors License No.: _____

License Classification _____ Expiration Date: _____

SUBMITTED BY:

I declare under penalty of perjury that the foregoing is true and correct and that I am authorized to sign this proposal on behalf of the Bidder as an agreement to the provisions herein.

Seal of Corporation:

Signature: _____ ()

Typed Name: _____ ()

Title: _____ ()

END OF BID FORM

.....
VERIFY PAGE COUNT AND EDIT FOOTER A ACCORDINGLY. AFTER EDITING THE BID FORM, ADD ADDI-
TIONAL COPIES AS REQUIRED FOR SUBMISSION FOLLOWING THE HARD PAGE BREAK, BELOW.
.....

The Bid Form consists of the following essential elements:

1. *Addressee*. State the name and address of the individual receiving bids.
2. *Name and Address of Bidder*. State the name of the organization and the address of the bidder.
3. *Project Identification*. State the name of the project.
4. *Acknowledgment*. Provide an enumeration of the documents and a statement that the site has been visited and examined.
5. *Bid Schedule*. Provide a bid list of all the major bid proposals.

6. *Alternates*. Provide a list of all alternate prices. A description of the alternates should be set forth under Division 01 - General Requirements.
7. *Unit Prices*. Provide a list of unit prices and their description.
8. *Time of Completion*. Establish the time of completion or permit the bidder to insert his or her own time of completion.
9. *Acknowledgment of Addenda*. Provide spaces for acknowledgment of the receipt of addenda by bidders.
10. *Agreement to Accept Contract*. State the conditions under which the bidder agrees to enter into a formal contract within a specified time.
11. *Signature and Address of Bidder*. Provide spaces to be filled in by the bidder for his or her signature, address, and seal where necessary.

Study Questions

1. True or False? “Procurement” is the term used in CSI MasterFormat, 2004 edition, for the range of methods used to obtain pricing from prospective contractors and to enter into contractual relationships with varying scopes of work to be performed, and for measuring and paying for the completed work.
2. Bidding Requirements consist of all but which one of the following documents?
 - a. Invitation to Bid
 - b. Commissioning Plan
 - c. Instructions to Bidders
 - d. Bid Form
3. True or False? Bidding Requirements are not construction specifications.
4. The Invitation to Bid should address all but which of the following?
 - a. Project Title and location
 - b. Owner's budget
 - c. Time and location for receipt of bids
 - d. Type of Contract
5. True or False? Preprinted Instructions to Bidders, such as AIA A701, do not require modification.
6. The Instructions to Bidders includes all but which of the following elements?
 - a. Invitation to Bid
 - b. Interpretation of bidding requirements and how to report and resolve discrepancies

- c.** Time and location for submission of bids
 - d.** Criteria for rejection of bids
- 7.** Essential elements for the Bid Form include all but which one of the following?
- a.** Name and address of Bidder
 - b.** Building permit
 - c.** Acknowledgement of receipt of addenda
 - d.** Signature of Bidder
- 8.** True or False? The purpose of the Invitation to Bid is to attract prospective bidders.
- 9.** True or False? The Bid Security (“Bid Bond”) guarantees that the Bidder will enter into a Contract with the Owner.
- 10.** True or False? Bidding requirements become part of the Contract Documents when the Construction Contract (Agreement) is signed.

Chapter 9

General Conditions of the Contract

Contractual Relationships

The Conditions of the Contract define basic rights, responsibilities, and relationships of the entities involved in the performance of the Contract (Agreement). The Conditions of the Contract are an inherent part of the Owner-Contractor Agreement and are considered to be the “general clauses” of the Agreement. There are two types of Conditions of the Contract, typically:

1. General Conditions of the Contract
2. Supplementary Conditions of the Contract

The General Conditions will be addressed in this chapter. The next chapter will consider the Supplementary Conditions.

The General Conditions are the provisions that establish the legal responsibilities and relationships among the parties involved in the Work of the Contract. These parties are formally termed the Contractor and the Owner, but also include the former's subcontractors and the latter's consultants, such as legal and insurance counsels and marketing and leasing agents. Other parties are mentioned in the General Conditions only as needed to set forth and clarify responsibilities and relationships in more complex contractual arrangements. If there is to be a bond, the surety will play a part; if there is a Construction Manager, his or her duties will be included; if there will be multiple contracts and contractors, the basic responsibilities and relationships among them will be stated.

The Architect or Engineer, whichever is the prime design professional, is identified in the General Conditions. Although not signers of the Owner-Contractor Agreement, duties and responsibilities of the Architect or Engineer are stated in the General Conditions.

General Conditions of the Contract are often preprinted documents published by professional and other industry associations and by public agencies. In the cases where the Owner is a public agency, the General Conditions may be modified to suit specific project conditions, and there are no Supplementary Conditions.

General and Supplementary Conditions should be closely coordinated with related documents such as the Owner-Architect/Engineer Agreement, the Owner-Contractor Agreement, and Division 01 - General Requirements in the

Specifications. Duties and responsibilities prescribed in one of these documents must be consistent with the other documents. For example, if Division 01 - General Requirements states that the Architect will review mock-ups at the project site but the Owner-Architect Agreement does not provide for construction phase services by the Architect, then either the review will not be performed or the Architect, who prepared Division 01, has said that the Architect will perform the review without compensation. Similarly, if the Owner-Contractor Agreement states that the Engineer will review the layout and routing of piping and valves but the Owner-Engineer has not contracted with the Owner for such services, then the Contractor and Owner may have a difficult-to-resolve dispute if, after the piping is installed, the layout conflicts with other building components and systems.

In one case, an overzealous architect agreed in the Owner-Architect Agreement that the architect's construction phase services would be as stated in the General Conditions accompanying the Owner-Contractor Agreement. Unfortunately for the Architect, the Owner-Contractor Agreement and its General Conditions were not written when the architect signed the Owner-Architect Agreement. The architect was required to perform additional site visits, with very substantial labor charges and travel expenses.

Owners—those who undertake to build buildings and engineering works—are very diverse. Manufacturers need plants, counties want roads and bridges, a church congregation needs a new sanctuary, the township needs a new school, a developer wants to turn 1500 acres of farmland into an office park, a university needs a new co-generation plant, the Veterans Administration needs an addition for new medical diagnostic equipment and an outpatient clinic, and the Johnson family wants to build their dream house just like the one on the Saturday afternoon television program.

Despite this diversity in owners and building types, there are some consistent needs. Contractual provisions must be established for progress payments by the Owner to the Contractor. Obligations for preparation, submission, and review of shop drawings and sample reviews need to be established. Provisions for dispute resolution and contract termination or suspension need to be included in the contract. Each of these is a subject for the General Conditions and, in fact, each is addressed in standard General Conditions published by professional and industry associations.

Over 90 years ago, it was recognized that standard General Conditions would be beneficial for everyone involved in the construction contract. Owners, with their diverse building programs but similar interests, would benefit from standard General Conditions, especially if they regularly engaged in building or facility construction. Contractors would benefit from standard General Conditions because as they became familiar with the provisions—like them or not—there would be clear expectations about what the Contractor was and was not responsible for. The Architect/Engineer would also benefit from standardized documents because of

their familiarity, as with the Contractor, and also because use of standardized, coordinated documents would mean that the Architect/Engineer and Owner will have clear expectations and responsibilities during construction.

Architect General Conditions

In the absence of a unified voice for the owners, the AIA offered prospective owners of construction a set of contract conditions as early as 1888, then called the “Uniform Contract.” This was a printed contract form designed for use as the contractual agreement between the owner and the contractor. It defined many responsibilities and set forth some administrative procedures. In 1911 the Uniform Contract was divided into two parts that are familiar to us today: Standard Form of Agreement between Owner and Contractor, now called AIA A101, and General Conditions of the Contract for Construction, called AIA A201. (See Appendix E for a review-only copy of *AIA A201*.)

Engineer General Conditions

Similarly, for many years various engineering societies prepared sample agreements and contract conditions for the guidance of practicing engineers and their clients. In 1963, the Professional Engineers in Private Practice, now a division of the National Society of Professional Engineers (NSPE/PEPP), formed a contract documents committee, which published a number of contract forms. In the 1970s, the NSPE joined with two other engineering societies, the American Council of Engineering Companies (ACEC) and the American Society of Civil Engineers (ASCE), to form the Engineers Joint Contract Documents Committee (EJCDC).

EJCDC is responsible for preparing engineering-related construction contract documents similar to those AIA produces for architectural documents. EJCDC contract documents are available from the member associations. Examples of EJCDC documents are:

- *EJCDC C-520 Suggested Form of Agreement Between Owner & Contractor, Stipulated Price (2002)*
- *EJCDC C-525 Standard Form of Agreement Between Owner & Contractor, Cost Plus (2002)*
- *EJCDC C-700 Standard General Conditions of the Construction Contract (2002)*
- *EJCDC C-800 Guide to the Preparation of Supplementary Conditions (2002)*
- *EJCDC C-200 Guide to Preparation of Instructions to Bidders (2002)*

(See Appendix F for a reference-only copy of *EJCDC C-700*.)

Differences between AIA and EJCDC General Conditions

The architecture and engineering societies appear to have avoided needless disagreement in preparing their General Conditions documents. By working from court cases at all levels, through similar experience in planning and building, and by inviting review by the Associated General Contractors of America (AGC), they have given the building community two sets of documents that accurately distinguish the North American tradition of building from the European and British traditions.

The engineering documents, of course, add or amplify topics needed for engineering projects, such as provisions for unit price work, availability of lands, underground conditions, and reference points.

But the AIA and EJCDC documents are very similar.

Beyond these necessary differences lie some topics in which the *EJCDC C-700 Standard General Conditions* differs from the *AIA A201 General Conditions*. For example:

- “The Work,” for engineers, is the entire completed construction; for architects, it may be completed and partially completed construction.
- For engineers, substitutions may be requested only after the Agreement is signed, and then according to detailed rules for submission and assumption of responsibility by the Contractor; for architects, these procedures are defined in the Supplementary Conditions.
- Contract closeout provisions vary. The correction (“punch”) list is made by the Engineer in the EJCDC documents, while in the AIA documents the punch list is made by the Contractor and reviewed and supplemented by the Architect.
- What is called a Work Change Directive by EJCDC is called a Construction Change Directive” by AIA.
- The responsibility for the means and methods of construction are more emphatically placed on the Contractor in the EJCDC documents than in the AIA documents.

These differences may seem subtle, but they can be substantial under the pressure of a construction contract dispute. Architects and engineers should be sensitive to the differences and check the general conditions for carryover of inappropriate provisions. For example, if the owner's representative has an engineering background, then engineering-type provisions may be inappropriately applied to a

building project. Similarly, architectural-type provisions may be applied inappropriately to general engineering construction such as storm drainage or rail transport projects.

Use of Standardized AIA and EJCDC General Conditions

Led by the AIA's documents, the pattern set by the professional societies has generally been adopted by the construction industry and its clients. Although in theory the General Conditions of each owner's contract are written by the owner's legal counsel, in fact the AIA General Conditions have been overwhelmingly adopted.

This wide use has led to testing of the General Conditions in the courtroom, in courthouse corridors, in arbitration, and, most important, in that arena where most disputes are settled: the jobsite trailer. This generally successful track record for the AIA and EJCDC documents over many years is an important argument in favor of using them wherever possible and with as few modifications as possible.

It appears that AIA *A201* has not only stood up well in court but has been deemed a fair document by owners and contractors as well. Since important contractor objections were worked out to their satisfaction in the 1915 edition of the *AIA General Conditions*, there has generally been a history of cooperation between architects and contractor groups in preparing each new edition. The notable exception was the 1966 edition, which was withdrawn and reissued in 1967 to satisfy contractors' complaints about the indemnification clause. It is notable that AIA *A201* is endorsed by the Associated General Contractors of American (AGC).

AIA has revised its General Conditions many times since 1911 and now holds to roughly a 10-year cycle of restudy and rewriting. This allows AIA and AGC to adjust to new realities of practice while sparing users the confusion of a document that is being tinkered with incessantly. Legal decisions are reflected in updated versions, and risk management considerations are also incorporated.

For a small project, AIA *A201* is considered by many owners and architects to be too voluminous and unwieldy. AIA has developed a combination agreement form and general conditions, known as the *AIA A107 Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope*, that is suitable for simple and small projects, such as tenant space improvements and residential construction. A copy of this document may be obtained from most local offices of the American Institute of Architects (AIA)

Other Private-Sector Sources for General Conditions

The AGC issues three series of General Conditions and agreement documents that are of use in special methods of project delivery advocated by AGC.

- For design-build projects, the 400 Series provides documents that define the role of each prime contractor under the overall control of the design-build entity.
- The 500 Series contains documents that handle construction management in a different way from *AIA A201/CM*. *AGC 500* allows the construction manager to do work with his or her own forces and provides for a guaranteed maximum price (GMP) option. *AGC 510* provides construction management, with the owner awarding all trade contracts.
- In the 600 Series, which primarily covers subcontract agreements, there is *AGC 645*, which is for a negotiated agreement between the owner and contractor.

Although the *AGC General Conditions* use AIA provisions as a starting point, there are distinct differences. Just as *AIA A201* has been criticized by contractors and owners for its attention to risk management for the architect's benefit, the AGC documents may tend to be disadvantageous to the Architect/Engineer. Those unfamiliar with the AGC documents should have them reviewed by the Architect/Engineer's legal and insurance (risk management) counsels, especially regarding differing treatment of contract administration, warranty, and claims.

The American Association of State Highway and Transportation Officials (AASHTO) devotes Section 100, the initial section in its *Guide Specifications for Highway Construction*, to General Provisions, which precede sections on earthwork, the several types of highway construction and highway materials. These General Provisions are not conceived as part of the Project Manual concept; there are no separate bidding requirements, supplementary conditions, or a general requirements division. Since highway material quantities cannot be predicted precisely, the work is carried out on a unit price basis. The AASHTO general provisions reflect this mode of project delivery by including detailed measurement and payment language. As would be expected with roadwork, there is suitable text covering force account work, inspection, field laboratories, traffic maintenance, erosion and sedimentation control, and protecting vegetation. Although there is a value engineering article, virtually no provision is made for substitutions, claims, or warranty of the work beyond final acceptance.

Federal Government General Conditions

For agencies in the executive branch of the U.S. federal government, the Construction Contract Clauses serve as General Conditions. The GPO Superintendent of Documents publishes and distributes the Federal Acquisition Regulation (FAR). FAR is available in the Code of Federal Regulations (48 CFR), in loose-leaf bound form and in a CD-ROM. Periodic updates are available from

the Government Printing Office and the Department of Commerce Clearinghouse. FAR governs construction as well as other procurement activities of the federal government.

Construction for the military services, Veterans Administration (VA), National Aeronautics and Space Administration (NASA), and General Services Administration (GSA) is governed by FAR contract clauses selected from CFR Title 48 and from supplements that each agency is allowed to add for its own unique purposes. Two bodies, the Defense Acquisition Regulatory Council (DAR Council) and the Civilian Agency Acquisition Council (CAA Council), prepare the contract clauses, frequently in duplicate to suit the differing needs or preferences of the Defense and Civilian Agency Councils. The work of the two councils and the secretariat is reviewed by the Office of Management and Budget (OMB).

FAR is administered for construction by three entities:

1. General Services Administration
2. Department of Defense
3. National Aeronautics and Space Administration

Each service or agency assembles clauses that are suitable for its construction projects and publishes that compendium for its own use. Form 3506 is the current designation for the GSA's primary construction contract clauses compendium. Slightly different compendia, for construction inside the United States, construction outside the United States, fixed-price contracts, unit price contracts, and so forth, become the boilerplate at the beginning of each Project Manual.

The private-sector general conditions have been tested in the courts, and are written and interpreted in the light of the law as it applies to everyone. With federal projects, however, the courts may not be involved. One does not sue the government unless the government gives permission. However, there are avenues of appeal from a Contracting Officer's decisions during construction.

Since the government knows that even it can make mistakes, and since it is in its interest to be fair with contractors and others who suffer damage working for the government, Congress has set up various appeals boards that sit as a court of claims. Over the years, FAR and its predecessors have been tested in bodies such as the Armed Services Board of Contract Appeals, the General Services Board of Contract Appeals, the NASA Services Board of Contract Appeals, the DOT Services Board of Contract Appeals, and the VA Contract Appeals Board. The procedures are much like those of the courts, and decisions handed down are published, to become precedents in subsequent cases.

Many of the features of the general conditions of professional societies have their counterpart in the federal contract clauses. However, the design professional is almost totally absent from the federal documents: the contract recognizes the government and the contractor only. In federal contracts, much attention is given to subcontractors and employment practices, as well as to audits that reveal the actual

prices paid by the contractor for materials and labor. Claims by either party are decided by the Contracting Officer within 60 days and are final, although subject to appeal.

When working under federal contract clauses, one must be aware of the many differences from private-sector documents. Specifications take precedence over drawings in some instances; correction of work and warranty provisions are mingled; there is no concept of substantial completion, only final acceptance; and quality control procedures by the Contractor are expected.

Supplements are often made to the contract clauses in such matters as labor standards and value incentive clauses. Special clauses having the effect of supplementary conditions are often added. These vary according to the service or agency writing the contract and may cover such subjects as liquidated damages, salvage, use of explosives, testing, scheduling, safety, acceleration of work, and accommodations and meals for inspectors working far from the home office.

Architects and engineers performing professional services for federal agencies should request instructions and documents from the project's Contracting Officer. Familiarization with FAR and with the agency's general provisions for the construction contract is very important.

Other Public Agency and Corporate General Conditions

General Conditions of states, municipalities, and corporations, prepared by their attorneys for their building programs, appear in most cases to have been based on some edition or of the AIA documents. Some of these tailored general conditions reflect a building climate that existed decades ago, where the administrator of the contract had powers that would be considered dangerous today, and where contractors were expected to do a complete job even if everything was not shown or specified. City solicitors and corporate counsel have added provisos that make some of these general conditions barely recognizable to a contractor who is used to working with current AIA and EJCDC documents.

Almost every general conditions document used in the nonfederal building construction sector until 1989 was based on an obsolete edition of the *AIA General Conditions*. For the legal protection of all parties, and to recognize the changes that have occurred in the building process, it is time for many of these dog-eared documents, some of which have attained the status of sacred scrolls, to be brought up to date. They should be revised to follow more closely current national professional society general conditions. AIA and EJCDC documents have been updated to reflect court decisions and changes in law, and to stay current with the way building is done today.

Supplementary Conditions

It is always necessary for the owner to modify AIA or EJCDC General Conditions to suit the unique requirements of a specific project. These modifications, in the form of additions, deletions, and substitutions to the General Conditions, are called “supplementary conditions.”

Terms such as “special conditions,” “special provisions,” “general provisions,” and “supplementary general conditions” are sometimes used. These terms are incorrect. There are General Conditions and there are Supplementary Conditions—at least according to the publishing associations. It should be left to the owner's legal counsel, who is responsible for preparation of the conditions of the contract, to establish the titles that will be used.

A new development has occurred with standard AIA General Conditions. Instead of publishing separate Supplementary Conditions, AIA offers computerized versions of their documents, particularly the *AIA A201 General Conditions*, with a publishing license, that allows the Owner's legal counsel and the Architect to make revisions to the *AIA A201* text and print the modified document. Additions, deletions, and revisions are graphically indicated in the text. Contact the AIA for information and a demonstration disk for AIA's Electronic Format Documents for more information and availability.

See Chapter 10 for further discussion of the Supplementary Conditions of the Contract.

Location of the General Conditions

The General Conditions should always be bound into (signed contract copies of) the Project Manual. See Chapters 3 and 4 for discussion of the organization and content of the Project Manual.

Duties and Responsibilities of the Architect/Engineer

The Architect/Engineer is *not* a signer of the Owner-Contractor Agreement. However, certain duties and responsibilities are described in the General Conditions for the Architect/Engineer, which generally include the following:

- Acting as the Owner's representative for matters concerning the Work (projects not under the construction management delivery method)
- Routinely visiting the construction site to observe and evaluate progress (coordinated with the Owner-Architect/Engineer Agreement)
- Validating the progress of the Work for the purpose of recommending to the Owner that progress payments be made
- Preparing Change Orders and other Contract modification documents

- Clarifying and interpreting the Contract Documents
- Exercising approval and disapproval authority on submittals
- Reviewing shop drawings and samples
- Rejecting defective and non-complying Work
- Determining dates of Substantial Completion and Final Completion

Preprinted General Conditions

To obtain standard printed General Conditions and related documents, the following associations may be contacted for precise titles, dates of issue, ordering information, and price. A note of caution: These documents are copyrighted, and some publishing organizations aggressively protect the copyright by pursuing actions against those who make unauthorized copies.

American Association of State Highway and Transportation Officials (AASHTO)

444 North Capitol Street NW, Suite 249

Washington, DC 20001

202/624-5800

www.aashto.org

American Council of Engineering Companies (ACEC): EJCDC documents

1015 15th Street NW, 8th Floor

Washington, DC 20005-2505

202/347-7474

www.acec.org

American Institute of Architects (AIA)

1735 New York Avenue, NW

Washington, DC 20006

202/626-7300 800/242-3837

www.aia.org

Also most local chapter offices of AIA

American Society of Civil Engineers (ASCE): EJCDC documents

1801 Alexander Bell Drive

Reston, VA 20191

800/548-2723

www.asce.org

Associated General Contractors of America (AGC)

333 John Carlyle Street, Suite 200

Alexandria, VA 22314

703/548-3118

www.agc.org

National Society of Professional Engineers (NSPE): EJCDC documents

1420 King Street

Alexandria, VA 22314-2715

703/684-2862

www.nspe.org

Study Questions

1. True or False? The General Conditions are comparable to the “general clauses” in a typical business contract.
2. True or False? General Conditions define the rights, responsibilities, and relationships of entities involved in the performance of the Contract.
3. True or False? General Conditions are an inherent part of the Owner-Contractor Agreement.
4. True or False? General Conditions establish basic responsibilities for the Contractor to manage subcontractors.
5. True or False? General Conditions direct how the Contractor shall prepare applications for progress payments.
6. True or False? General Conditions define the role of the Construction Manager.
7. True or False? General Conditions are modified by Division 01 - General Requirements, in the Specifications.
8. True or False? The Architect/Engineer is a signer of the Owner-Contractor Agreement.
9. True or False? General Conditions are commonly produced by professional associations.
10. True or False? General Conditions produced by professional associations rarely require modifications.
11. Which of the following is not a responsibility of the

Architect/Engineer according to the General Conditions?

- a.** Determine the scope of work performed by subcontractors
- b.** Reject defective or non-conforming work
- c.** Approve or disapprove submittals
- d.** Interpret the Contract Documents

12. Which of the following does not publish preprinted General Conditions?

- a.** National Society of Professional Engineers (NSPE)
- b.** The American Institute of Architects (AIA)
- c.** The Construction Specifications Institute (CSI)
- d.** Associated General Contractors of America (AGC)

Chapter 10

Supplementary Conditions of the Contract

Supplementary Conditions

It is always necessary to modify preprinted General Conditions of the Contract to suit specific project requirements. Both AIA and EJCDC recognize this, and both provide documents to guide the process. AIA publishes *AIA Document A505-2007 - Guide for Supplementary Conditions*, and EJCDC publishes *EJCDC C-800 Guide to the Preparation of Supplementary Conditions*. In addition, contact AIA for its electronic-format documents, including software to produce a customized version of *AIA A201 General Conditions of the Contract for Construction*, eliminating the need for separate General Conditions and Supplementary Conditions. The topics and principles for modifications to the General Conditions remain the same.

Modifications to the General Conditions take the form of additions, deletions, and substitutions and are called Supplementary Conditions. They are not called “special conditions,” “special provisions,” or “supplementary general conditions.” They are the Supplementary Conditions.

In the past, the Supplementary Conditions were larded with many topics that are, in essence, work of a general nature to be performed by the Contractor in order to construct the building or facility. These specific work topics went beyond the broad contractual provisions of the contract that are the proper scope of General and Supplementary Conditions. Out-of-place work topics in some Supplementary Conditions have included administrative matters such as who shall prepare meeting agendas and publish meeting minutes. Matters regarding temporary construction, such as the size of temporary worksite offices and the types of telecommunications services and equipment on the worksite, do not belong with provisions prescribing general responsibilities for signing parties of the contract for construction.

There is a well-meaning but misguided tendency for construction managers, who have responsibility for preparation of the General Conditions and Supplementary Conditions, to address important construction matters in the documents they control. This creates conflicts between the construction specifications, which more appropriately address detailed administrative and temporary construction matters, and the broad and authoritative General and Supplementary Conditions.

Until the advent of the *CSI MasterFormat*, there was little choice but to address administrative and temporary construction matters in the Supplementary Conditions or to create another layer to the hierarchy of documents called “special conditions.” Now, with *CSI MasterFormat*, there is a place for these detailed requirements, in Division 1 of the specifications, titled General Requirements. (Division 01 - General Requirements is discussed in detail in Chapter 12.)

To aid in determining which topics are best inserted in the General Conditions, in the Supplementary Conditions, and in Division 01 - General Requirements, AIA and EJCDC have jointly published the *Uniform Location of Subject Matter*. See [Exhibit 10-1](#) for sample pages from this document. The *Uniform Location of Subject Matter* is a compendium of practically every general subject that can come up in preparing a set of contract documents. It advises which topics are best located in the Invitation to Bids, the Instructions to Bidders, the Bid Form, the Agreement, the General Conditions, the Supplementary Conditions, and Division 01 of the specifications.

[Exhibit 10-1](#) Sample pages from Uniform Location of Subject Matter.

AIA Document A521 / EJCDC Document 1910-16

Uniform Location of Subject Matter

Information in Construction Documents

Prepared by

Engineers' Joint Contract Documents Committee

Issued and Published Jointly by

Professional Engineers in Private Practice
a practice division of the
National Society of Professional Engineers



American Consulting Engineers Council



American Society of Civil Engineers



With Participation and Joint Publication by

The American Institute of Architects



Construction Specifications Institute



Introduction

An examination of the bidding and construction documents published for the construction industry indicates that there are varying approaches to where in these documents particular subject matter is located. It is apparent that parties both familiar and unfamiliar with these documents will benefit from a reference list and location of subject matter.

With this in mind, the Engineers' Joint Contract Documents Committee (EJCDC), with concurrence of the AIA Documents Committee, has prepared the attached directory of information for those assembling these documents. The bidding and construction documents considered here are those customary to a construction project: Advertisement or Invitation, Instructions to Bidders, Bid, Agreement, General Conditions, Supplementary Conditions, General Requirements and Specifications. An understanding of the decisions reflected in the Uniform Location of Subject Matter may prove helpful.

The Contract Documents include the Agreement, General Conditions, Supplementary Conditions, General Requirements and Specifications. The Bidding Documents (Advertisement or Invitation and Instructions) are not part of the Contract Documents. Their substance pertains to relationships existing before the construction agreement or contract is signed. The Bid is only an offer to perform the Work. Performance and payment bonds and other instruments of surety, as well as Addenda and drawings, are not addressed here.

The Agreement should contain the contract price, terms of payment and retainage. In a negotiated contract, some of the terms of the Agreement may be confidential. For example, when the parties to the contract decide that the Agreement will not be made available to subcontractors or suppliers, important information about retainage and other subjects must be covered elsewhere, as in the Supplementary Conditions.

The General Conditions contain the basic provisions affecting the rights and duties of the parties involved, and should be altered only where mandated by the specific requirements of a given project and following the advice of an attorney. There are many provisions of the General Conditions that need to be supplemented, such as the procedural arrangements for the processing of Shop Drawings as set forth in Division 1 of the specifications, or the specific requirements for property and liability insurance coverage that should appear in the Supplementary Conditions.

Significant efforts have been made by the AIA and EJCDC committees to develop guidelines for preparation of Supplementary Conditions. While such documents are primarily intended for use when modifying or supplementing the basic contractual relationships, the division of subject matter between the Supplementary Conditions and General Requirements in Division 1 of the Specifications is more difficult and may appear arbitrary at times. Division 1 pertains to performance of the Work and applies to the other divisions of the Specifications. For example, language supplementing the General Conditions on Shop Drawing processing and the requirement to maintain a current marked-up set of record documents at the site will appear in Division 1, whereas amounts of property and liability insurance will appear in the Supplementary Conditions. This concept appears in CSI's *Spectext* (master specifications guide), Construction Sciences Research Foundation's *Manual of Practice*, AIA's *Masterspec*, and by AIA and EJCDC in their guidelines to the preparation of Supplementary Conditions; all of which are identified below.

This listing is intended as a guide, not only for design professionals, but also for owners, attorneys, contractors, subcontractors, lenders, sureties and others who work with these documents.

Code Symbols

The following code symbols have been used in the Uniform Location of Subject Matter:

- P = The principal or primary statement of the topic involved that includes the basic principles of the relationships to the parties.
- S = A further statement to supplement or amend the principle statement, to add details, procedural requirements or specific data applicable to the basic statement, to add language required by law or regulation, or to adapt the basic statement of principle to the requirements of the particular contract.
- X = Cross reference to where the basic or primary statement may be located.
- § = The term or subject matter referred to is not used or dealt with in the standard Contract Documents prepared by EJCDC.
- # = The term or subject matter referred to is not used or dealt with in the standard Contract Documents prepared by AIA.

In some instances, a particular matter may be coded with a "P" in two places. This is intentional, and is used to recognize that, in certain instances, repetition is acceptable (i.e., where the statement will appear in both the Agreement and the Bid), or to indicate a choice.

Bibliography

The following is a bibliography of the documents prepared by AIA, EJCDC and CSI to which this Uniform Location of Subject Matter applies.

The American Institute of Architects

- Instructions to Bidders—A70
- Owner-Contractor Agreement Form, Stipulated Sum—A101
- Owner-Contractor Agreement Form, Cost Plus a Fee—A111
- Abbreviated Owner-Contractor Agreement Form, Stipulated Sum—A107
- Abbreviated Owner-Contractor Agreement Form, Cost Plus a Fee—A117
- General Conditions of the Contract for Construction—A201
- Guide for Supplementary Conditions—A511

MASTERSPEC

- MASTERSPEC—Division 1 (General Requirements)

The Engineers' Joint Contract Documents Committee

- Guide to the Preparation of Instructions to Bidders—No. 1910-12
- Suggested Bid Form Commentary for Use—No. 1910-18
- Standard Form of Agreement Between Owner and Contractor on the Basis of a Stipulated Price—No. 1910-8-A-1
- Standard Form of Agreement Between Owner and Contractor on the Basis of Cost-Plus—No. 1910-8-A-2
- Standard General Conditions of the Construction Contract—No. 1910-8
- Guide to the Preparation of Supplementary Conditions—No. 1910-17
- Commentary for Procurement Documents—No. 1910-26-E
- Instructions to Bidders for Procurement Contracts—No. 1910-26-D
- Standard Form of Procurement Agreement Between Owner and Contractor—No. 1910-26-A
- Procurement General Conditions—No. 1910-26-B
- Guide to the Preparation of Procurement Supplementary Conditions—No. 1910-26-C

The Construction Specifications Institute

CSI Manual of Practice

Construction Documents Fundamentals and Formats Module

- FF/030 Construction Documents (CD)
- FF/040 Construction Contracts (CO)
- FF/050 Bidding Requirements (BR)
- FF/060 Conditions of the Contract (CC)
- FF/070 Specifications (SP)
- FF/100 Division 1—General Requirements (GR)
- FF/140 Allowances, Unit Prices, and Alternatives (AL)
- FF/150 Substitutions (SB)
- FF/160 Warranties (WA)

Construction Specifications Practice Module

- SP/010 The Agreement (AG)
- SP/020 Construction Bonds (CB)
- SP/030 Construction Insurance (CI)
- SP/080 Procurement Specifying (PR)
- SP/130 Design-Build (DB)

MasterFormat (CSI/CSC)

Construction Sciences Research Foundation (CSRF)

- SPECTEXT—Division 1 (General Requirements)

The American Institute of Architects is pleased to provide this sample copy of an AIA Contract Document for education purposes. Created with the consensus of contractors, attorneys, architects and engineers, the AIA Contract Documents represent over 110 years of legal precedent.

KEY OR CODE	Not Work related and not part of Contract Documents		Contract Documents						NOTES
	Advertisement or Invitation	Instructions	May be attached as Exhibit to Agreement and become one of Contract Documents	Agreement	General Conditions	Supplementary Conditions	General Requirements Division 1	Specifications Division 2-15	
SUBJECT MATTER									
A.									
Abbreviations—definition of those used in specs.								P	
Acceptance of Work					P				
Access to the Work by A/E and others (see Work)									
Addenda—definition of		X			P				
Addresses for Notices				P					
Adjustment Prices			S	S					
Agreement—definition of		X			P				
Agreement—execution of		P							
Allowances—cash		X	X		S		P	X	
Alternates/Alternatives—description of		S	X	X			P		
Alternates/Alternatives—for grouping of parts of Work in bid		S	P				S		
Alternates/Alternatives—for materials and equipment in bid		S	P	X			S		
Application for Payment—definition of (see Payment)									
Application for Payment—form or contents of (see Payment)									
Application for Final Payment (see Payment)									
Application for Progress Payment (see Payment)									
Approval (Recommendation) of Payments (see Payment)									
Arbitration					P		S		
Architect—definition of					P				§
Architect—identification of					P				§
Architect—responsibilities and limitations of					P		S		§
Architect—status during construction					P		S		§
Architect—supplemental instructions					P				§ For terms used by EJCDC, see Field Order.
Architect—visits to site					P		S		§
Assignment of Other Contracts to General Contractor							P	S	
Assignment by Contractor					P				
Availability of Land or Site					P		S	S	
Award—basis of		P							
Award—Notice of, defined (see Notice of Award)									
Award—Notice of, timing and procedure for giving (see Notice of Award)									
B.									
Before Starting Construction—Contractor's responsibilities (see Contractor)									
Before Starting Construction—Owner's responsibilities (see Owner)									
Bid—definition of		P			P				
Bid—evaluation		P							
Bid—opening procedure		P							
Bid—Owner's discretion to accept, reject or waive		P							
Bid—requirements for preparation and submission of		P							
Bid Opening—time and place		P							
Bid Security—in general and detailed requirements for		S	P						All requirements pertain to time before execution of Agreement.
Bidder—authority to sign		P	S						
Bidder—qualification of		X	P						Reference to specific laws or regulations sometimes required.
Bidding Documents—deposit refund		X	P						
Bidding Documents—obtaining		P	X						
Bonds and Insurance—in general		X			P	S			
Bonds, Bid (see Bid Security)									
Bonds, Performance and Payment—definition of					P				

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The American Institute of Architects is pleased to provide this sample copy of an AIA Contract Document for education purposes. Created with the consensus of contractors, attorneys, architects and engineers, the AIA Contract Documents represent over 110 years of legal precedent.

KEY OR CODE	Not Work related and not part of Contract Documents		Contract Documents					NOTES
	Advertisement or Invitation	Instructions	Agreement	General Conditions	Supplementary Conditions	General Requirements Division 1	Specifications Division 2-15	
P = Primary Statement of Subject Matter S = Supplementary Statement X = Cross Reference to Primary Statement # = Not used by EJCDC § = Not used by AIA								
SUBJECT MATTER								
Bonds, Performance and Payment—delivery of		P						
Bonds, Performance and Payment—requirements for	S	X		P	S			and Forms
C. Cash Allowances (see Allowances)								
Changes and Supplements to Agreement and General Conditions—not specifically allocated herein to General Requirements, Division 1.					P			
Change Order—definition of				P				
Changes in the Work				P	S			
Claims for Additional Cost or Time				P	S			
Claims for Damages				P				§
Claims, Waiver of				P				
Clarifications and Interpretations—by A/E of Bidding Documents		P						
Clarifications and Interpretations—by A/E of Contract Documents				P				
Cleaning—before construction						P		
Cleaning—during construction				P		S	S	
Cleaning—final				P		S	S	
Closing Out Project—procedures						P		
Commencing Work at the Site				P		S		
Communications During Construction				P		S		
Communications Prior to Opening of Bids		P						
Completion—Final				P		S		
Completion—Substantial (see Substantial Completion)								
Conferences and Meetings—after award but before construction				P		S		
Conferences and Meetings—during construction						P		
Conferences and Meetings—pre-award		P						#
Conferences and Meetings—pre-bid	X	P						#
Conferences and Meetings—process						P		
Conflicts, Errors or Discrepancies—reporting				P				
Construction—by other contractors				P	S			
Construction—by Owner				P	S			
Construction Change Directive				P				§ See Work Change Directive
Construction—Coordination				P	S			
Construction—Future				P				§
Construction Equipment Furnished by Contractor				P		S		
Construction Manager—identity of	S			P				§ See also AIA CM Series Documents
Construction Manager—representative of Owner and responsibilities of					P			§ See also AIA CM Series Documents
Construction Schedule				P		S		
Construction—sequences of, if specified in Contract Documents by A/E						P	S	
Coordination of Project and Work of Various Trades				P	S	S		
Continuing Work During Disputes				P				
Contract Documents—copies furnished by Owner				P	S			
Contract Documents—definition of				S	P	S		
Contract Documents—detailed listing of				P				
Contract Documents—ownership of				P				
Contract Price Breakdown by Contractor for Owner's Accounting Requirements						P		# This is not a Schedule of Values.

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Modifying the General Conditions

Although this book is limited to subjects of technical construction specifications and cannot presume to offer expertise on legal (contractual) matters, it can forewarn architects and engineers about the use of General Conditions and their modifications. The most important reason for having an owner's document that covers only the legal responsibilities and relationships of the parties is that designers are not in the business of practicing law. Under no circumstances should

design professionals draw up or modify legal (contractual) provisions unless, upon doing so, these forms and modifications are forwarded to the owner and the owner's legal and insurance counsels. To protect the design professional, responsibility for these legal forms and their modifications must, in turn, be accepted in writing by the owner and the owner's counsels. Otherwise, the design professional may be accused of practicing law or insurance counseling.

By limiting the articles in the General Conditions to those having to do only with the contractual duties, responsibilities, and relationships, and having the owner take proper responsibility in regard to them, the architect or engineer can then develop other provisions in Division 1 - General Requirements, for which a design professional should be qualified by education, training, and experience. The design professional is similarly cautioned with respect to the insurance provisions contained in the General Conditions. To prepare the necessary modifications and amendments to the General Conditions pertaining to insurance and bonds, the design professional must obtain specific directions and information from the owner's insurance counsel to ensure that the insurance provisions adequately protect the owner and other parties and are appropriate for the specific project.

Some architects and engineers include in the Project Manual only the Supplementary Conditions and reference standard General Conditions, such as AIA *A201* and EJCDC *C-700*. In signed contract copies of the Project Manual, it is necessary to include a copy of the preprinted, standard General Conditions. It is also advisable to include a copy of the General Conditions in all copies of the Project Manual, but AIA and EJCDC prohibit reproduction of their documents without licensing. The advantage of the recently developed and still-developing AIA electronic documents is that licensing has become easy and affordable. There is no practical reason now for omitting a copy of the standard General Conditions. The same is true for the AIA and EJCDC Instructions to Bidders documents.

Format of Supplementary Conditions

Assuming that the General Conditions document is not physically modified, such as when AIA's electronic version is used, the modification process should follow a simple concept: describe the physical change to be made to the document. Actual strike-throughs and interspersed notes on a printed copy of the General Conditions should not be done. The integrity of the original document should be preserved for two reasons: modifications of the printed copy could create copyright problems and, more important, the modifications tend to be difficult to read. Instead, Supplementary Conditions typically describe the physical changes to be made to the General Conditions so that a clerical person could make the changes.

Using AIA *A201 General Conditions* as the example, changes should be listed in the order of the articles of the General Conditions and should be keyed to the articles and paragraphs of the original document. New articles and paragraphs

should be added with care in order to preserve the integrity of the original document as much as possible. The *AIA A503 Guide for Supplementary Conditions* is set up this way and is recommended for use in making changes to *AIA A201*. Similarly, the *EJCDC C-800 Guide to the Preparation of Supplementary Conditions* should be used for *EJCDC C-700 General Conditions*.

Once the Supplementary Conditions are prepared, the document should be bound with the General Conditions into the Project Manual, in the proper order, and assigning the proper *CSI MasterFormat* in the table of contents.

If, for some reason, it is decided not to bind the General Conditions into the Project Manual, or to bind the document into a few copies of the Project Manual, it is recommended that the Supplementary Conditions begin with a statement such as the following: “The General Conditions of the Contract for Construction, American Institute of Architects Document A201, 16th Edition, 2007, hereinafter referred to as the General Conditions, shall be a part of the Contract Documents as fully as if bound herein.”

The following are issues that should be addressed in the Supplementary Conditions.

Bonds and Insurance

AIA has published *G612-2001 - Owner's Instructions Regarding the Construction Contract, Insurance and Bonds, and Insurance Requirements*. This document is available for download at no charge from the AIA's website (www.aia.org). Similarly, EJCDC has published *C-050 Owner's Instructions Regarding Bidding Procedures and C-051 Engineer's Request for Instructions on Bonds and Insurance for Construction*. It is recommended that these documents be used, as appropriate, before construction documents production begins. The architect/engineer's project manager or principal in charge should transmit these to the owner with an appropriate cover letter early enough so that the owner's directions will be available when documents such as the Supplementary Conditions are produced.

Owners do not always respond to this request for information in a timely manner. If the owner delays returning the instructions beyond the Project Manual's print date, the architect/engineer has no choice but to leave the specifics of insurance and bonds out of the Supplementary Conditions. It would be very unwise to make decisions of this kind on behalf of the owner even if the owner says, “Do what you usually do.” Most professional liability insurance carriers specifically exclude the architect/engineer from determining bond and insurance types and amounts of coverage. State insurance officials also take exception to architect/engineers performing insurance counseling. There are laws that govern insurance agents, and it is just as inappropriate for insurance agents to design buildings as for architects and engineers to counsel others on construction bonds and insurance.

Using the completed documents recommended above, the architect/engineer may complete the Supplementary Conditions based on the owner's directions, which supposedly are based on competent counsel. If the documents are not completed and furnished to the architect/engineer, it is recommended that the Supplementary Conditions include a statement such as the following: "The extent and cost of insurance coverage shall be as negotiated by the Owner and Contractor before execution of the Agreement and shall be as stated in the Agreement." This puts the matter into the hands of the owner or, if applicable, the construction manager.

Construction Bonds

Refer to Chapter 11 for a discussion of the bonds used during construction. In the Supplementary Conditions, the General Conditions should be modified to establish requirements for, typically, a Faithful Performance Bond and a Labor and Materials Payment Bond.

Construction Insurance

There are many risks and liabilities that concern the architect or engineer in the construction of a project. The AIA and the EJCDC General Conditions each deal with basic insurance requirements, but neither includes amounts of coverage or other types of insurance coverage that may be necessary to safeguard the interests of all parties to the contract, including the designers. Obviously, the contractor bears most of the responsibility, but the owner also has responsibilities for providing insurance during construction.

Design professionals also have insurance interest during construction. To provide protection for the design professionals (the architect/engineer and his or her consultants), their names may be added to some insurance policies as "additional insured" parties for nominal additional costs but perhaps significant insurance protection. The architect/engineer should consult with his or her insurance counsel and with the owner and the owner's insurance counsel to determine insurance types and coverage limits and other conditions.

Since the General Conditions do not state specific insurance types and coverage, Supplementary Conditions should be used to include in the Contract Documents specific requirements for insurance to be furnished by the Contractor and the Owner.

In order to be sure that the required insurance is in effect for the project, the Supplementary Conditions should require certificates of insurance or copies of insurance policies to be submitted prior to start of the work. Prescribing that a specific form be used for these certificates, such as those published by AIA and EJCDC, may be difficult for the Contractor, but these forms may also ensure that necessary information is included. Also, there should be a requirement that the

Contractor shall notify the Owner within a certain time period, usually brief, that changes in the insurance have occurred, including benign matters such as annual renewal of the policy but also significant matters such as cancellation of the policy or a change in the insurance carrier. These are potentially serious matters, and the architect/engineer should insist that the owner use competent insurance counsel for advice and directions in insurance matters.

Liquidated Damages

For projects where the time of completion is extremely important, the owner may desire to include a provision for liquidated damages in the Supplementary Conditions. Liquidated damages are based upon the concept that actual damages are difficult to determine should completion of the Work be delayed, and that the owner and contractor agree that an estimate of the value of the damage will be paid (deducted from amounts owed by the Owner to the Contractor) rather than the actual damage. However, by agreeing to payment of liquidated damages in the event of late completion by the Contractor, the Owner may give up the right to compensation for actual damages, which might exceed the liquidated damages amount. This is a legal concept that should be discussed and determined by the owner with the owner's legal counsel. The owner should direct the architect/engineer on whether to include or exclude liquidated damages and, if so, what the amount and terms shall be.

Typically, liquidated damages are stated in a dollar amount for each day that completion is delayed by the Contractor. The amount should be based on an approximation of actual damages. For example, if the facility is not available and the owner will incur overtime charges for movers and staff who will set up operations in the new or remodeled facility, then the amount could be several hundred dollars per day. If the owner will lose profits on operations, the amount could be very substantial. For example, on a new multiple-theater movie complex, the liquidated damages were \$10,000 per day.

In requiring payment of liquidated damages, it is essential to avoid even the appearance that liquidated damages will be used to penalize the Contractor rather than to compensate the Owner for damage. The daily amount must be calculated separately for each project, using a justifiable estimate of cost, and the estimate should be retained by the owner and architect/engineer to justify the amount should it be challenged later in court or arbitration. Stock daily damage amounts, used time and again by an owner regardless of project size or need, may encourage the Contractor to challenge the stated amount.

While true damages can be collected, with the help of a court if necessary, penalties are usually unenforceable. The legal concept is that one citizen cannot punish another. Punishment is reserved for the courts. Otherwise, our society would be chaos. There is no link between liquidated damages for delay and a bonus for

early completion. The two are independent. A bonus provision is not needed to make liquidated damages collectable. There is a belief that a bonus clause is needed to balance a penalty clause, but since a penalty is not within the power of the owner to exact from the contractor, the imagined balance does not exist.

Conflicts between Documents

Much in this chapter suggests that some documents have more general application than others or that some take precedence over others. Reading the assignments of topics in the *Uniform Location of Subject Matter* ([Exhibit .1](#)) reinforces this notion that the more global requirements go in the Agreement and the General and Supplementary Conditions, while more particular requirements are left for documents such as the Contract Drawings and Specifications.

The idea of a strict pecking order among the Contract Documents can be dangerous. To believe that the provisions of a “higher” document nullify the provisions of a “lower” document is to be comfortable with conflicts of a type that should not occur within any contract. A “lower” document may contain particular information that must take precedence over the more general statements made in a “higher” document.

One of the many general rules of contract interpretation is that the contract shall be read as a whole. The Architect or Engineer and the Owner or Construction Manager should be aware, as the Contract Documents are prepared, that prime importance must be given to eliminating conflicts between the various portions of the documents.

A mental diagram of the way the documents interact is useful for a specifier to maintain as the table of contents for the Project Manual is assembled. But such a diagram is not a matter of pure hierarchy; phase and time also come into play. The bidding requirements are first, not because they are most important but also because they deal with the earliest phase of the project. In the AIA way of doing things, bidding requirements effectively drop out of the set of documents when the Agreement is executed (signed) and the General and Supplementary Conditions are activated. Modifications, such as Change Orders, are last in the Division 00 series of documents at the beginning of the Project Manual, not because they are less important than the Supplementary Conditions or bond and insurance certificates but because they occur later in the construction contract administration process.

In the case of drawings and specifications, very careful attention is necessary to avoid giving precedence to either, because each is intended to complement the other.

How, then, are conflicts to be resolved without a stated hierarchy of documents or a strict order of precedence? Construction Managers and construction contract administrators are often vehement about having a hierarchy of documents established so that interpretations and decisions are easier to make.

Most disputes are resolved by applying provisions such as the one provided in the EJCDC General Conditions: “Engineer will issue . . . clarifications or interpretations of the requirements of the Contract Documents as Engineer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.” The Engineer must then do what a lawyer does to construe the meaning of a Contract. All parts must be considered to make the most reasonably inferable decision from the intent as expressed by the various requirements in the documents. The General Conditions still provide for steps that can be taken after the Engineer's decision if that decision is not acceptable to one of the parties.

Arbitration and Mediation

If a construction dispute is not resolved by the Owner and Contractor through direct negotiation by the parties, it may end up in court or in another forum. Courts are clogged with criminal matters, and civil matters such as construction-related claims take many years to be heard. Alternative dispute resolution has been developed to provide forums where construction disputes, among others, may be resolved.

AIA *A201*, Article 15 - Claims and Disputes, has two paragraphs addressing alternative dispute resolution. Paragraph 15.3 addresses mediation, and paragraph 15.4 addresses arbitration.

“Mediation” is the process whereby a mediator is engaged by the parties to hear the matter in dispute. The mediator is usually a person with knowledge and experience in construction and the particular subject in dispute. A key point is that mediation under AIA *A201* is not a binding process on the parties (Owner and Contractor).

For example, an engineer with particular expertise in chilled water systems and mediation skills would be selected by the parties to hear a dispute about why the chiller and related components do not operate within the performance criteria stated in the Specifications. The Contractor claims that the system was constructed according to the Contract Documents and that any performance shortcomings are due to errors or omissions in the design. The subcontractor claims that money should be paid by the Owner to compensate for excessive testing and balancing performed in an unsuccessful effort to make the system work as intended. The Engineer claims that construction-inefficient routing of piping and shrouding of the chiller, plus use of inferior components, are the reasons the chiller does not perform acceptably. The Owner claims 25 days of delay under the liquidated damages provisions of the Supplementary Conditions, and does not care who is responsible as long as someone else pays to fix the problem and cover the Owner's losses.

The mediator hears from all parties and assesses the problem. Based on the facts presented, the mediator may offer an opinion, based on his or her expertise, on how

the mediator expects the dispute to be resolved—that is, who will pay how much. The mediator may also endeavor to get the parties to settle the dispute and avoid additional costs for litigation and damages. The mediator's decision and recommendations are not binding, and it is up to the parties to negotiate further, with the advantage of the mediator's impartial opinion, to come to a settlement of the dispute.

“Arbitration” is a quasi-legal but formal process conducted under the rules of an organization such as the American Arbitration Association (AAA) or JAMS® (formerly Judicial Arbitration and Mediation Services). An impartial panel of arbitrators hears both sides in a dispute. The parties may be represented by legal counsel, and the rules may be much like those in a trial. The parties must accept the ruling of the arbitrators as binding and, with some exceptions for misconduct on the part of the arbitrators, the ruling is enforceable subsequently in court. Because of the binding nature of the ruling and the compromise of some legal protections in the interest of expedient resolution, some attorneys advise their clients to modify AIA *A201* to eliminate the provisions for arbitration.

This last point is very significant for architects and engineers. AIA and EJCDC General Conditions require binding arbitration, and the arbitration is required to be according to the rules of the AAA. Some attorneys may counsel their clients to agree to arbitration but under the rules of another organization such as JAMS®. The main issue, for architects and engineers, is that the owner should make an informed decision about arbitration and whether the arbitration provision should remain in the General Conditions and not be removed or modified by the Supplementary Conditions. Otherwise, if the owner does not make the decision to retain arbitration or claims not to realize that the contract required binding arbitration, the owner might claim that the architect or engineer erred in not adequately informing the owner about arbitration, and that the owner suffered monetary damage because the owner would have done better in a court hearing (lawsuit) of the case.

Guide for Producing Supplementary Conditions

Production of Supplementary Conditions based on AIA A201–*General Conditions of the Contract for Construction*, should be guided by AIA A503 - *Guide for Supplementary Conditions*, included in Appendix E–Sample AIA Documents.

Study Questions

1. True or False? Supplementary Conditions modify and expand upon the General Conditions.

2. True or False? Supplementary Conditions prescribe administrative requirements for carrying out duties and responsibilities of the General Conditions.
3. True or False? EJCDC General Conditions modify AIA General Conditions.
4. True or False? Supplementary Conditions and Division 01 - General Requirements must be coordinated.
5. True or False? Supplementary Conditions prescribe bidding procedures.
6. True or False? Modifications by the Supplementary Condition to the General Conditions should follow the order of topics in the General Conditions.
7. True or False? Supplementary Conditions prescribe specific insurance requirements for the project.
8. True or False? Liquidated damages establish responsibilities of the Owner and Contractor for failures in roofing and waterproofing.
9. True or False? Guidance for modifying General Conditions with Supplementary Conditions is available from The American Institute of Architects (AIA).
10. True or False? Unless modified by Supplementary Conditions, binding arbitration is required by AIA *A201 - General Conditions* for resolution of construction disputes.

Chapter 11

Bonds, Guaranties, and Warranties

Bonds

Bid Bond

A Bid Bond is intended to guarantee that if awarded the contract within a specified time, a bidder will enter into a contract and furnish a Performance Bond and a Payment Bond. The bidder who fails to do so is required to pay the owner the difference (not to exceed the penal sum of the bond) between the bidder's bid and a larger amount for which the owner may in good faith contract with another party to perform the work covered by the bid.

A Bid Bond is optional in private work and generally mandatory in public work. In private work, an owner may accept a Bid Bond in lieu of a certified check or a bank draft. It is recommended that the bid security be no less than 5 percent of the amount of the bid, and that this sum should be expressed as a specific number of dollars, not as a percentage of the bid. On public work, the amount of the bid security and its form may be specified by law or regulation, and such legal requirements will govern.

The AIA document *A310 Bid Bond* is often used in private work, and the requirement for it is set forth in the Invitation to Bid.

Surety Bonds

Surety bonds, sometimes called “guarantee bonds” or “construction bonds,” are essential in construction operations. They make it possible for the contractor to provide the owner with the guarantee of a responsible surety company that the Contractor will satisfactorily perform the project at the determined price and pay the Contractor's bills. Of additional interest to the Architect/Engineer is the fact that extra professional services compensation resulting from a Contractor's default caused by delinquency or insolvency is reimbursable by the use of these bonds.

A Surety Bond is an agreement under which one party, the surety, agrees to answer to another party, the obligee, for the debt, default, or failure of a third party, the principal, to fulfill the Contractor's contract obligations. A surety is usually a

corporation that underwrites or guarantees construction bonds; the obligee is usually the Owner; and the principal is the Contractor.

A Surety Bond does not impose on the surety any obligations that are separate and distinct from or additional to those assumed by the principal. Under any Surety Bond, the principal is primarily responsible, and every obligation of the surety is also that of the principal. A bond is not a substitute for the integrity, financial worth, experience, equipment, and personnel of the Contractor. Nor is such a bond an independent undertaking by the surety as long as the principal performs in accordance with the terms of the Contract Documents.

Contractor Defaults

One of the major reasons for a Contractor's default is the inadequacy of the Contractor, either on the Owner's contract or on other past or current contracts. This can derive from a variety of sources, such as deficient cost and other accounting records, unforeseen price rises, labor troubles, defaults of subcontractors, materials delays, prolonged inclement weather, and so on.

Surety Bonds provide protection against loss resulting from the failure of others to perform. Whereas the liability of the Contractor for damage may be unlimited, that of the surety is limited to a certain sum of money called the "penalty" or the "penal sum," which is set out in the bond. Such an instrument consists of an extension of credit to the Contractor, not as a loan of money but rather as an endorsement. The Performance Bond directly increases the financial responsibility of the Contractor for the benefit of the Owner by the amount of its penal sum. The architect/Engineer should instruct the Owner on the value of a Surety Bond, and should suggest that the Owner seek the advice of the Owner's legal and insurance (risk management) counsels before deciding for or against these bonds.

AIA Bond Forms

Article 11.4 of AIA *A201-2007 - General Conditions of the Contract for Construction* describes the requirement for the Contractor to provide bonds covering the faithful performance of the contract and for the payment of obligations arising thereunder. Standard forms have been prepared by the AIA in cooperation with the surety industries, and are recommended for use in all private and public construction where a statutory form is not prescribed. These forms are in AIA Document *A312 Performance Bond and Payment Bond*, available from the AIA.

- *Performance Bond, AIA Document A312*. This bond assures the Owner that the Contractor will perform all the terms and conditions of the contract between the Contractor and the Owner and in the event of default will protect the Owner against loss up to the amount of the bond penalty.

- *Payment Bond, AIA Document A312*. This bond ensures that the surety will pay the Contractor's bills for labor and materials in the event of the Contractor's default.

Formerly, these bonds were contained in one instrument. Now they are divided into two separate documents. The AIA two-bond system has merit. The inclusion in one instrument of the obligation to perform the contract and to pay laborers and material has given rise to certain difficulties in handling claims against the bond. These difficulties have resulted from the competing interests of the Owner, on the one hand, and laborers and material suppliers, on the other. Under the two-bond system, the surety is enabled to make payment without awaiting a determination as to the Owner's priority. These bonds are issued by the companies as a package, and there is usually no additional premium for the separate Payment Bond.

Amount of Bonds

A Performance Bond and a Payment Bond, each in the amount of 100 percent of the Contract sum (price), are recommended. Where a public body is the Owner, its legal counsel should obtain complete information regarding the legal requirements, amount, and form of the bond, and provide this information to the Architect/Engineer for inclusion in the Project Manual.

Statutory and Nonstatutory Bonds

Surety Bonds fall into two basic categories: statutory and nonstatutory or private. Statutory Bonds are those required by law. Some states have statutory provisions relating to bonds. On private projects, counsel for the Owner may suggest special requirements. No standard form of surety bond is applicable to every project. AIA Document *A312 Performance Bond and Payment Bond* is a step toward such standardization, and their use is urged for all private and public contracts where a statutory form is not prescribed.

Warranties and Guarantees

Before the 1976 edition of AIA Document *A201 General Conditions*, the terms “warranty” and “guarantee” were used almost interchangeably throughout the document. Since then, only the term “warranty” appears. In EJCDC Document *C-700 Standard General Conditions of the Construction Contract*, Par. 6.19A, the Contractor “warrants and guarantees” that the work will be in accordance with the Contract Documents and will not be defective. This use of both “warranty” and “guarantee” by engineers and the use of “warranty” alone by architects can be disturbing to users of the two major professional society documents.

Where should the Architect/Engineer turn when it comes time to explain these differences? In this case, most general dictionaries are of help because they pattern their definitions of warranty, guaranty, and guarantee on the same thinking that governs *Black's Law Dictionary*.

“Warranty” and “guaranty” were once the same, having entered our language as *warrant* and *garant*, spelled differently but pronounced almost alike in Norman French. Both spellings were related to the old Frankish *warjan*, which meant to protect or to vouch for the truth of something. Following *Black's Law Dictionary*, the meanings can be distilled to these thumbnail definitions:

1. *Warranty*: a promise that certain facts are true as represented and that they will remain so. A written warranty may also promise to repair or replace a product if it fails to meet the specification.
2. *Guaranty*: a promise, by a party called a “guarantor,” to make good the mistake, debt, or default of another party.
3. *Guarantee*: (1) the party to whom a guaranty is made; (2) the obligation of a guarantor.

Under the *AIA A201-2007 General Conditions*, the Contractor is required to warrant that the Contract Documents have been followed and that the Work is of good quality. That warranty can be made by the Contractor for its own work and for the work performed under its supervision by subcontractors. Engineers prefer that the Contractor warrant its own Work but offer a guarantee for the work of its subcontractors. In this, the second definition of “guarantee” is appropriately used. “Guarantee” may seem colloquial compared with “guaranty,” but *Black's Law Dictionary* supports it.

What, then, is the specifier to say to the client when asked about this difference in terminology? The best course is to understand and follow the advice of the professional society that wrote the document. Despite their different wording, each society's approach is based on legal principles. The specifier is well advised to adhere to the language of the standard general conditions being used, leaving to the client and the client's attorney the responsibility for any changes in language they may choose. See the discussion regarding modification of General Conditions in Chapter 10.

The General Warranty

The General Conditions published by both AIA and EJCDC, as well as the federal government's construction contract clauses, require that each Contractor warrant that the Work of the Contract is:

1. Constructed according to the Contract Documents
2. Free of defects

The duration of this warranty is not limited in the AIA and EJCDC General

Conditions. The warranty is open-ended and would be restricted only by statutes of limitations in the various states and by practical considerations. Practically speaking, there is difficulty in distinguishing normal wear and tear or abuse or lack of maintenance from true construction defects when the Work remains in use year after year. Although the AIA and EJCDC general warranty provisions are actually nothing more than a summary of the common law as it has developed for contracts, these provisions are very strong.

Some have confused this warranty with the one-year correction period for Work under the Contract, also required in the AIA (*AIA A201-2007* 12.2.2) and EJCDC documents. Reference to the one-year correction period for Work as “the 1-year guarantee” is erroneous, and it is also erroneous to take the position that after 1 year from the Contract completion date, the Contractor has no further obligations for the Work. “These arguments are incorrect and have been rejected by the courts,” says the EJCDC.

For further information, consult with legal counsel and research construction claims and the Uniform Commercial Code (UCC). The subjects of latent defects and when the Statute of Limitations ends responsibility vary from state to state. These subjects are very complex and legal counsel should be consulted.

Special Warranties

So far, the discussion of warranting and guaranteeing the Work has dealt with the overall responsibility of the Contractor or a prime contractor who has entered into a contract with the Owner. The AIA General Conditions also consider special warranties (*A201-2007* 9.10.4.3 and 12.2.2.1). These are warranties made by subcontractors, suppliers, and manufacturers for Work performed and products furnished for the Work. Special warranties extend beyond one year and may be two to 20 or even 30 years in duration, since their customary purpose is to obtain extended attention to correction of defects, much as the one-year period for correction of Work does for the entire Work.

A special warranty is the same as a warranty, defined earlier, but in this case it does not usually refer to the Contractor's own work, although he or she is obliged to aid in enforcing it. A special warranty most frequently applies to the work of a subcontractor, although, as usual, the language of the warranty is directed to the Contractor. The requirements of the special warranty are usually written by the specifier, taking the form of the basic parts of a contract: over what period the warranty is to be effective, to what value limit, what is to be done if the work does not perform, and who is going to make good the warranty provisions. In this way, the provisions of a special warranty that is directed to subcontract work can often be controlled by the specifier through the general contractor (the Contractor).

At the other extreme, a warranty that benefits the Owner is a producer's limited or material-only warranty. This is a special warranty offered by some manufacturers

in the hope that an unwary specifier will include it in the specifications. A warranty of this type usually severely limits the manufacturer's responsibility if something goes wrong. The specifier must be selective in deciding which special warranties to incorporate and which to keep out for the owner's protection. Between the harmful and beneficial extremes of special warranty provisions lay many offerings of industry, with names such as "warranty," "guarantee," and "service agreement," which can be examined by the specifier for the actual protection they offer. The conscientious specifier will take care to find out what such warranties add to the cost of the work, the stability of the offeror, their duration, exclusions that may render them inoperative, and features such as whether they cover the labor involved in repair or replacement or the prorated value of the material only.

When writing specifications, one must realize that many products are advertised as "guaranteed" and "warranted" or "warranted." These terms may mean something or nothing. Beware of disclaimers in printed form, and of warranties that offer nothing when a failure occurs or that make the cost of replacement as great as the cost of new work. Some manufacturers go so far as to say that they will not sell their product if their self-serving warranty is not accepted by the buyer.

The most futile exercise in warranty writing is to say, "Guarantee all ceramic tile for one year." To begin with, this statement gives the Owner nothing that the Owner did not already have in the one-year correction-of-work provision (*AIA A201-2007* 12.2.2). Second, the Owner has an extended warranty against defects and nonconforming work that will cover the Owner for years if it is not compromised by a statement such as "for one year." In addition, the statement is vague. It should at least say, "Guarantee against defects" or, if specific problems are of concern, "Guarantee against chipping, cracking, and coming loose," for example.

Note that the term "special guarantee," when used in EJCDC General Conditions, refers only to a substitution of materials or equipment.

Correction of Work

Aside from general warranty and special warranty provisions, both the AIA and EJCDC documents make provision for a one-year service agreement by the Contractor after the work is substantially complete. During this period the Contractor is required to correct Work that is defective or otherwise not in accordance with the Contract Documents. The correction-of-work provisions require the corrective work to be done upon written notice from the Owner, and they allow the Owner to correct the work if the Contractor does not do so, the cost presumably to be borne by the Contractor or his surety in such a case. Both the AIA and EJCDC go on to state that nothing contained in the correction-of-work provision is to limit the Contractor's obligations under his or her warranty, which extends an indefinite time beyond the date of completion.

The correction-of-work period may be extended in the Supplementary Conditions

to a period longer than one year. Owners should realize, however, that any service agreement costs money. The correction-of-work period costs the contractor an amount that he or she must include in the price, and any extension will cost more in proportion.

The federal government handles correction-of-work differently. There the correction period runs concurrently with a one-year warranty. Practically speaking, this has much the same effect as the warranty and correction provisions of the private sector documents. In the federal clauses, gross mistakes, latent defects, and fraud by the Contractor do not limit the government's rights.

Writing a Special Warranty

The special warranty will be written by the manufacturer or supplier who offers it as the work is performed. All the specifier does is to communicate what special warranty provisions are required. If there are industry guidelines for special warranties (whatever they are called), read them and extract as much of the industry custom as you can. After all, a special warranty that is already common with manufacturers of a product type will be easier to obtain without argument. For example, special warranties for water heaters generally will include the same points of coverage, duration, corrective action, and exclusions. With this similarity in approach, it is easy to find the small differences that offer more or less benefit to the Owner.

Manufacturer-generated warranty text often contains many exclusions. Analyze the exclusions: if they make sense, and many do, include them in your text. For instance, if stock warranty text withdraws responsibility for a roof that has been altered by someone other than the original roofer, consider saying that you will allow such an exclusion: it is common and it is fair. If you want protection by means of a special warranty, do not invent new and unheard-of requirements and expect distant roofing manufacturers two tiers below the Contractor to jump to your request on a \$20,000 order. You will find it difficult to get a piece of paper to deliver to your client. Your time may be better spent keeping an eye on the roof as it is installed.

Remember that the Owner's contract is with the Contractor (general contractor) only. Involve the Contractor in a subcontractor's or supplier's warranty as much as possible. Use the traditional elements of a Contract to spell out what is required: what, what value, how long, for whom, and by whom. Here are examples of very brief special warranty text, taking several different approaches to ensuring performance:

1. *SPECIAL WARRANTY*: The Contractor hereby warrants that the waterproofing is free from defective materials and execution and will remain so for three years after the date of Substantial Completion. Upon notification of defects within that special warranty period, the Contractor

shall make repairs and replacements at no cost to the Owner, according to AIA *A201-2007* 12.2.

This example does not require that a written warranty be submitted since it states that “the Contractor hereby warrants” and so on. By his signature on the Owner-Contractor Agreement, the Contractor has already furnished the necessary written special warranty. Note also that the text follows the form of the dictionary definition of warranty: First, there is the promise that the facts are true as represented and that they will remain so. Second, there is the promise to repair or replace the product if it fails to meet the specification.

2. SPECIAL WARRANTY: The Contractor hereby warrants that the waterproofing shall not leak or delaminate for three years after the date of Substantial Completion. Upon notification of defects within that special warranty period, the Contractor shall make repairs and replacements to leaking or delaminating waterproofing at no cost to the Owner, in accordance with AIA *A201-2007* 12.2.

Like Example 1, this special warranty, which follows the classic formula, is already signed into effect by the Contractor. It differs in that it is written in performance rather than prescriptive terms. It will be binding only if the specification states at some point, “Provide a waterproofing assembly that will not leak or delaminate.”

3. SPECIAL WARRANTY: Before final payment the Contractor shall furnish to the Owner a three-year written warranty of products and execution provided in waterproofing the Work. The special warranty shall promise that the waterproofing is free from defective products and execution and that it shall remain so for three years after the date of Substantial Completion, and that the Contractor shall make repairs and replacements at no cost to the Owner during the special warranty period, in accordance with AIA *A20-2007* 12.2.

Example 3 is used in those instances where the Owner wants the assurance of a written special warranty separate from any promise made in the contract documents. The administrative cost to the Owner and Architect/Engineer in gaining physical possession of such a piece of paper should not be underestimated.

4 SPECIAL WARRANTY: The Contractor hereby warrants that the waterproofing is free from defective materials and execution and will remain so for three years after the date of Substantial Completion. Upon notification of defects within that special warranty period, the Contractor shall make repairs and replacements at no cost to the Owner, in accordance with AIA *A201-2007* 12.2. The Contractor shall deliver to the Owner a three-year warranty bond of a surety company approved by the Owner, guaranteeing that the Contractor or his surety will repair or replace defective waterproofing at no cost to the Owner.

Example 4 is used where the Owner wants still further assurance that a third party will undertake to answer for the performance of the Contractor (and therefore the subcontractor).

The law regarding warranties, guarantees, and sureties varies from state to state. Although the specifier may draft a realistic set of special warranty requirements for consideration by the Owner, all warranty text should be discussed with, reviewed by, and approved by the Owner or his or her legal counsel. As with all of the legal-fiscal-managerial portions of the contract documents, especially the agreement, the conditions of the contract, bidding, warranties, bonds, and insurance, the Architect/Engineer may prepare the draft from customary forms and the owner's instructions, but the final legal form of the documents should be reviewed by an attorney for the Owner who is familiar with construction and construction law.

Study Questions

1. True or False? Dollar limits for construction insurance should be established by the Architect/Engineer.
2. True or False? Requirements for Bid Bond are expressed as a percentage of the bid amount.
3. True or False? A Surety Bond guarantees that the Contractor will satisfactorily perform according to the Contract and will pay its expenses for performing the Work.
4. True or False? The meaning of the terms “warranty” and “guaranty” are determined by the author of the General Conditions.
5. True or False? Special warranties are expanded requirements fulfilled by subcontractors and product manufacturers.
6. True or False? A one-year warranty on construction is the same as the one-year Correction Period, according to AIA and EJCDC General Conditions.
7. Which of the following is untrue regarding Special Warranties?
 - a. Basic part of the Contract.
 - b. Coverage period of the warranty must be stated.
 - c. Obligation for fulfillment of Special Warranty belongs to the Contractor.
 - d. Value limit under the Special Warranty must be stated.
8. True or False? If the Contractor fails to complete the Work under the Contract, the Surety Bond protects the Owner.
9. True or False? Requirements for construction bonds and insurance are specified in Division 01 - General Requirements.
10. True or False? Laws governing warranties, guarantees, and sureties

vary from state to state.

Chapter 12

Division 01 - General Requirements

Scope of Division 01

The general requirements of the specifications consist of certain sections listed under Division 01 of the *MasterFormat* (see Chapter 3). The sections recommended by *MasterFormat* for inclusion under Division 01 - General Requirements are shown in [Exhibit 12-1](#).

[Exhibit 12-1](#) Division 01 - General Requirements.

DIVISION 1 - GENERAL REQUIREMENTS	
Section No.	TITLE
00 10 00	SUMMARY
00 20 00	PRICE AND PAYMENT PROCEDURES
00 30 00	ADMINISTRATIVE REQUIREMENTS
00 40 00	QUALITY REQUIREMENTS
00 50 00	TEMPORARY FACILITIES AND CONTROLS
00 60 00	PRODUCT REQUIREMENTS
00 70 00	EXECUTION AND CLOSEOUT REQUIREMENTS
00 80 00	PERFORMANCE REQUIREMENTS
00 90 00	LIFE CYCLE ACTIVITIES

The recommendations originally suggested under the *CSI Format*, which were published in 1963 for inclusion under Division 01 - General Requirements, consisted of alternates, alterations, inspections, tests, allowances, and temporary facilities. With subsequent updates, Division 01 has undergone various philosophical changes, depending on the views of the CSI committee charged with the responsibility for updating the *MasterFormat* at each revision. Since the inception of the 1963 *CSI Format*, the various revisions of Division 01 have seen the number of sections in Division 01 expand exponentially and their order change frequently.

The prime purpose of the general requirements in the original format was to provide a place for the nonlegal (noncontractual) and administrative requirements for construction of the project. All those general requirements not suitable for inclusion under the sections of Divisions 2 through 16 (now Divisions 02 through 49) were also expected to be set forth here by the early proponents of the *CSI Format*. As stated in Chapter 10, the Supplementary Conditions of the Contract had become the catchall document in which were specified temporary utilities,

temporary facilities, and a host of other requirements not of a legal (contractual) nature. The intention was that the establishment of a Division titled “General Requirements” would create a convenient place for instructions to the Contractor that could not logically be placed anywhere else.

Division 01 in *MasterFormat*

Division 01 in the 1995 edition of *MasterFormat* hardly resembled the original intent and scope of the general requirements Division when conceived in 1963. As noted in the introduction to the 1995 edition of *MasterFormat*, Division 01 “was completely rearranged to clarify that general requirements may apply to products and execution as well as administration” and that the “new arrangement is more closely aligned with *SectionFormat*.” Now, with the 2004 edition of *MasterFormat*, the arrangement remains similar to the 1995 edition but there are number and title changes that reflect the evolution in project procurement and delivery methods.

It is somewhat disingenuous to state that it may apply to products without qualification. Products *per se* belong in Divisions 02 through 49. Topics of general information concerning products—namely, product handling, storage, and substitution requirements—that are germane to all products used in the project are subjects to be established in Division 01 - General Requirements as procedural elements.

Execution is likewise specified. The installation of products, their application, erection, and integration into the project, are specified in Divisions 02 through 49. Basic requirements for all products in regard to examination and preparation of surfaces to receive them and final cleaning and protection are appropriately spelled out in general terms in Division 01 as procedural elements.

Facility decommissioning is also an area that is not truly the province of a specifier or a design firm. It is related primarily to needs of facility owners and managers. With the tendency of construction specifications to be used throughout the life cycle of a facility, these topics are being included in *MasterFormat*. Indeed, one of the major controversies about the 2004 edition of *Masterformat* concerned the inclusion of “life cycle” and “maintenance” categories in the format. Some questioned whether these are specifications issues, and the publishers of master guide specifications have not yet indicated that these topics will be addressed in the foreseeable future in construction specifications.

Recommended Division 01 Sections

The authors, having applied the original concept of Division 01 information in projects ranging from \$1 million to \$1 billion, suggest that the information in the examples shown in the exhibits will suffice for the vast majority of projects without

using the more than 50 section titles contained in Division 01 of the *MasterFormat*. From the standpoint of usage, the value of some of the section titles identified in the *MasterFormat* has yet to be demonstrated.

Sample shortform specification sections, delineating the scope and content of Division 01 for a small, uncomplicated project, are presented in Appendix B.

Relationship of Division 01 Sections to Other Documents

Division 01 Relationships to Bidding Requirements

Standard published General Conditions of the Contract state that bidding requirements are not part of the Contract Documents. Consequently, provisions stated *only* in the bidding requirements are not enforceable during construction contract administration. Therefore, Instructions to Bidders should cross-reference Division 01 sections to direct bidders to relevant information but should not repeat Division 01 provisions. Division 01 topics of concern to bidders include:

- Substitution, alternate, and unit price procedures
- Use of the site
- Phasing of the Work
- Owner occupancy (early or continuing)
- Owner-furnished products (OFCI)
- Definition of scope of separate prime contracts

Relationship of Division 01 to the Conditions of the Contract

Refer also to [Exhibit 12-2](#), “Relationship between conditions of the contract and Division 01 - General Requirements.”

[Exhibit 12-2](#) Relationship between conditions of the contract and Division 01 - General Requirements.

RELATIONSHIP BETWEEN CONDITIONS OF THE CONTRACT AND DIVISION 1 - GENERAL REQUIREMENTS

Conditions of the Contract An inherent part of the Agreement.	("00" file numbers)	("01" file numbers)
With the Agreement, govern the content of the entire Contract Documents (Drawings and Specifications; Other bidding and contract requirements such as bonds, insurance, information available to Bidders).		Administratively govern product specifications (Divisions 2 through 16). Describe administrative procedures for the Contract.
With the Agreement, the contents stand alone. No specific coordination is required in products specifications.		Mutually interdependent with the content of products specifications (Divisions 2 through 16).
Contain principles which are applicable to most projects nationwide.		Example: Section 01710 - Final Cleaning specifies cleaning generally; Section 08800 Glazing specifies how to clean glass.
Conditions of the Contract are in two documents:		
General Conditions	Supplementary Conditions	Division 01 - General Requirements, individual Sections
Are broad contractual conditions.	Modify broad contractual conditions to apply to particular project.	Contain specific administrative and procedural requirements.
Contain the "constants."	Modify the "constants" to apply to a specific geographic region, project type, Owner's requirements, method of contracting, A/E's practices.	Contain "variables" directly applicable to a specific project.
Content changes infrequently, providing standard practices for common understanding by all parties.	Take precedence over General Conditions by specific reference.	
Written by legal and construction experts. For each project, A/E typically uses preprinted forms (AIA A201 and EJCDC C-700 are examples) and incorporates them into Project Manual.	Content always unique, written specifically for each project, easy to determine variations from standard practices.	Content unique to each office, project type, contracting type and Owner's requirements.
Written by legal and construction experts. For each project, A/E typically uses preprinted forms (AIA A201 and EJCDC C-700 are examples) and incorporates them into Project Manual.	A/E typically prepares these <i>in consultation with Owner's legal and insurance counsels</i> for each project and incorporates them into Project Manual.	Written by A/E for each project.

General Conditions	Supplementary Conditions	Division 01 - General Requirements
Are Contract Documents. Are NOT Specifications.	Are Contract Documents. Are NOT Specifications.	Are Contract Documents. Are Specifications.
<p>Note: If preprinted General Conditions are used, then Supplementary Conditions must also be used. If unique General Conditions are used (i.e., Owner produces General Conditions for the project), then Supplementary Conditions are typically omitted.</p>		

Conditions of the Contract

The General Conditions and the Supplementary Conditions are inherent parts of the

Agreement. With the Agreement, they govern the content of the entire Contract. They contain contractual principles applicable to most projects with supplements for the particular project.

- General Conditions of the Contract
 - Are broad contractual conditions.
 - Contain “constants.” Relatively static content allows use of published standard documents from project to project (typically, AIA *A201* or EJCDC *C-700*).
- Supplementary Conditions of the Contract
 - Modify contractual conditions stated in the General Conditions.
 - Take precedence over the General Conditions.
 - Modify the “constants” of the General Conditions to suit specific requirements for the project.
 - Must be written separately for each project.
- Division 01 - General Requirements
 - Is an inherent part of the specifications.
 - Contains specific administrative and procedural requirements for administering the contractual principles of the General Conditions and Supplementary Conditions.
 - Also, administratively governs all Division 02 through 49 specification sections, carrying out the specification writing principle of “say it once.”
 - Contain specifics directly applicable to the particular project.
 - Must be written separately for each project.
- Divisions 02 through 49
 - Specify administrative requirements applicable only to a separate specification section.
 - Administrative requirements are specified in Part 1 - General, in Division 02 through 49 specification sections.

Examples: Testing

- General Conditions of the Contract: “Owner will pay for testing.”
- Division 01 - General Requirements: “Owner will engage an independent testing and inspection agency” plus information regarding authority of the agency.
- Divisions 02 through 49: Specific tests to conduct, such as test for water or air infiltration.

Examples: Submittals

- Submittals requirements in the General Conditions of the Contract ([Exhibit 12-3](#))
- An example from the Supplementary Conditions of the Contract, modifying the General Conditions of the Contract ([Exhibit 12-4](#))
- An example from Division 01 - General Requirements, Section 01 33 0 - Submittal Procedures, Part 1 - General, in which general administrative procedures are specified ([Exhibit 12-5](#))
- An example from a product specification section, Division 05, Metals, Section 05 21 00 - Steel Joist Framing, in which specific requirements for steel joist submittals are specified ([Exhibit 12-6](#))

[Exhibit 12-3](#) Sample General Conditions text regarding submittals.

<p>3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES</p> <p>3.12.1 Shop Drawings are . . .</p> <p>3.12.2 Product Data are . . .</p> <p>3.12.3 Samples are . . .</p> <p>3.12.4 Shop Drawings, Product Data and Samples are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. . . .</p> <p>3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents. . . .</p>

[Exhibit 12-4](#) Sample Supplementary Conditions text regarding submittals.

<p>K. Add Subparagraph 3.12.9 as follows:</p> <p>3.12.9 Procedures for submittals are further prescribed in Division 01 - General Requirements, Section 01 33 00 - Submittal Procedures, in the Specifications.</p>

[Exhibit 12-5](#) Sample Divisions 01 - General Requirements text regarding submittals.

<p>1.08 SHOP DRAWINGS</p> <p>A. Copies: Submit one reproducible and one print, minimum sheet size 22 inches by 17 inches or a multiple of 8½ inches by 11 inches.</p> <p>B. Preparation: Shop drawings shall be original drawings prepared for submittal review, fabrication and execution of Work. Direct copies and modified reproductions of Contract Drawings will not be accepted for review.</p> <p>C. Coordination: Show all field dimensions and relationships to adjacent or critical features of Work.</p>

Exhibit 12-6 Sample specifications section text regarding submittals.

1.05 SUBMITTALS

- A. Shop Drawings: Detailed drawings, indicating layout of joists, joist girders, special connections, joining and accessories. Include mark, number, type, location and spacing of joists and bridging. Use AWS symbols for all welds.

Relationship of Drawings and Division 01

The Contract Drawings graphically define certain Division 01 subjects, including the scope of Work and related work that may or may not be part of the Contract. There are other elements of the Work requiring close coordination between the Drawings and Division 01, including:

- Use of the site: Owner occupancy or use of the facility during construction
- Phased construction
- Multiple prime contract construction

For example, the Drawings show project limits, such as access ways, areas to be maintained clear for continuing use of the facility by the Owner, and location of temporary construction such as the construction fence and project identification signage.

Writing Division 01 Sections

Division 01 Style and Format

Division 01 sections are organized and written in the same outline style and three-part section format as the sections in Division 02 through 49. For most Division 01 sections, Part 2 - Products and Part 3 - Execution do not apply and are noted “Not applicable to this section” or a similar phrase is used. Division 01 sections specify general requirements applicable to all of the Work and are written to specify requirements broadly enough to cover the content of all sections in Divisions 02 through 49.

Organization

The reorganization of Division 1 in the 1995 edition of *MasterFormat* resulted in a more consistent and logical arrangement of sections, which also related more closely to the organization of PART 1 in the specification sections of Divisions 2 through 16. The further updating of Division 01 in *MasterFormat* 2004 edition

refined Section numbers and titles. Many public agencies and corporations have resisted changing their Division 1 section numbers and titles. A comparison of broadscope (Level 2) headings, between the 1995 and 2004 versions *MasterFormat*, is included in ([Exhibit 12-7](#)).

Exhibit 12-7 Comparison: Division 01 - 1995 versus 2004 *MasterFormat*.

1995 MasterFormat	2004 MasterFormat
01100 SUMMARY	01 10 00 SUMMARY
01200 PRICE AND PAYMENT PROCEDURES	01 20 00 PRICE AND PAYMENT PROCEDURES
01300 ADMINISTRATIVE REQUIREMENTS	01 30 00 ADMINISTRATIVE REQUIREMENTS
01400 QUALITY REQUIREMENTS	01 40 00 QUALITY REQUIREMENTS
01500 TEMPORARY FACILITIES AND CONTROLS	01 50 00 TEMPORARY FACILITIES AND CONTROLS
01600 PRODUCT REQUIREMENTS	01 60 00 PRODUCT REQUIREMENTS
01700 EXECUTION REQUIREMENTS	01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS
01800 FACILITY OPERATION	01 80 00 PERFORMANCE REQUIREMENTS
01900 FACILITY DECOMMISSIONING	01 90 00 LIFE CYCLE ACTIVITIES

A real-life example of Division 01 Sections, using a mixture of Level 2, Level 3, and Level 4 Section numbers and titles, is presented below in ([Exhibit 12-8](#)). This list is for a large, complex project and illustrates the range of topics that may be covered in Division 01.

Exhibit 12-8 Sample Division 01 - General Requirements (complex project).

DIVISION 01 – GENERAL REQUIREMENTS (COMPLEX PROJECT)	
SECTION NO.	TITLE
SECTION 01 11 00	SUMMARY OF WORK
SECTION 01 14 00	WORK RESTRICTIONS
SECTION 01 21 00	ALLOWANCES
SECTION 01 22 00	UNIT PRICES
SECTION 01 23 00	ALTERNATES
SECTION 01 25 13	PRODUCT SUBSTITUTION PROCEDURES
SECTION 01 26 00	CONTRACT MODIFICATION PROCEDURES
SECTION 01 29 00	PAYMENT PROCEDURES
SECTION 01 31 00	PROJECT MANAGEMENT AND COORDINATION
SECTION 01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
SECTION 01 33 00	SUBMITTAL PROCEDURES
SECTION 01 33 29	SUSTAINABLE DESIGN REPORTING
SECTION 01 35 00	SPECIAL PROCEDURES
SECTION 01 41 00	REGULATORY REQUIREMENTS
SECTION 01 42 00	REFERENCES
SECTION 01 43 00	QUALITY ASSURANCE
SECTION 01 43 39	MOCKUPS
SECTION 01 45 00	QUALITY CONTROL
SECTION 01 51 00	TEMPORARY UTILITIES
SECTION 01 52 00	CONSTRUCTION FACILITIES
SECTION 01 53 00	TEMPORARY CONSTRUCTION
SECTION 01 55 00	VEHICULAR ACCESS AND PARKING
SECTION 01 56 00	TEMPORARY BARRIERS AND ENCLOSURES
SECTION 01 57 00	TEMPORARY CONTROLS
SECTION 01 58 00	PROJECT IDENTIFICATION
SECTION 01 61 00	COMMON PRODUCT REQUIREMENTS
SECTION 01 62 00	PROJECT OPTIONS
SECTION 01 64 00	OWNER-FURNISHED PRODUCTS
SECTION 01 65 00	PRODUCT DELIVERY REQUIREMENTS
SECTION 01 66 00	PRODUCT STORAGE AND HANDLING REQUIREMENTS
SECTION 01 71 00	EXAMINATION AND PREPARATION
SECTION 01 73 00	EXECUTION
SECTION 01 74 00	CLEANING AND WASTE MANAGEMENT
SECTION 01 75 00	STARTING AND ADJUSTING
SECTION 01 77 00	CLOSEOUT PROCEDURES
SECTION 01 78 00	CLOSEOUT SUBMITTALS
SECTION 01 79 00	DEMONSTRATION AND TRAINING
SECTION 01 81 13	SUSTAINABLE DESIGN REQUIREMENTS
SECTION 01 81 19	INDOOR AIR QUALITY REQUIREMENTS
SECTION 01 91 13	GENERAL COMMISSIONING REQUIREMENTS
SECTION 01 91 19	FACILITY SHELL COMMISSIONING

Caution: Division 01 administrative and procedural matters and requirements for temporary facilities are cost items, the same as products and other Work specified in Divisions 02 through 49. Overspecifying of Division 01 (being overly detailed) can increase construction costs unnecessarily and create excessive obligations for the firm administering the contract.

See an example shortform (abbreviated) version of Division 01 specifications in Appendix B: Sample Division 01 - General Requirements.

Study Questions

1. True or False? Division 01 - General Requirements apply to all specifications in Divisions 02 through 49.
2. Bidding Requirements covered in Division 01 - General Requirements include all but which of the following?
 - a. Substitution procedures
 - b. Alternate bid descriptions

- c. Bid bond
 - d. Owner-furnished/Contractor-installed (OFICI) products
3. Which of the following is untrue regarding Division 01 - General Requirements?
- a. Contains project-specific administrative requirements.
 - b. Specifies administrative and procedural requirements for administering provisions in the General Conditions of the Contract.
 - c. Division 01 - General Requirements modify the General Conditions.
 - d. Division 01 - General Requirements is an inherent part of the Specifications.
4. True or False? Division 01 - General Requirements and the Drawings should be coordinated.
5. True or False? Division 01 - General Requirement specifications are written in 3-Part Section format similar to Sections in Divisions 02 through 49.
6. True or False? Facility commissioning requirements are included in Division 01 - General Requirements.
7. True or False? Requirements for administering shop drawing and product data submittals are specified in Division 01 - General Requirements.
8. Which of the following is not specified in Division 01 - General Requirements?
- a. Temporary electrical power
 - b. Delivery requirements for door hardware
 - c. Chain link construction fencing
 - d. Testing and inspection
9. True or False? The scale and sheet size for structural steel shop drawings are specified in Division 01 - General Requirements.
10. True or False? Administrative requirements for preparation and issuance of bid addenda are specified in Division 01 - General Requirements.

Chapter 13

Modifications

Modifications to Bidding and Contract Documents

Modifications to the bidding and Contract Documents will be necessary despite efforts to avoid or minimize them. The issue is how they will be documented. There are several types of documents that modify bidding and construction Contract Documents:

- Addendum
- Change Order
- Work Directive Change
- Construction Change Directive
- Field Order
- Architect's Supplemental Instructions

Addenda

The dictionary definition of an *addendum* is “a thing to be added; an addition” *Webster's Encyclopedic Unabridged Dictionary of the English Language* (Gramercy Books, New York, 1989). Each addendum is a document added to a previously prepared and issued set of bidding documents during the bid period. It becomes a part of the contract documents, such as defined by AIA *A201 General Conditions*, Article 1.1.1.

Addenda are written or graphic instruments issued to clarify, revise, add to, or delete information from original bidding documents or previous addenda. AIA *A701 Instructions to Bidders* describes an addendum as including “interpretations, corrections and changes in the Bidding Documents” (3.2.3) and states that addenda will be issued prior to receipt of bids. Similarly, EJCDC *C-700* defines addenda as modification documents published before bid opening. Addenda communicate changes in the bidding documents.

Following the AIA *A701* process for addenda:

- Addenda will be transmitted to all who are known by the issuing office to have received a complete set of bidding documents. (This is why it is important to maintain an accurate list of planholders.)
- Addenda will be made available for inspection at the location where other bidding documents are on file.
- Addenda will be issued no later than 4 days before the date set for receipt of bids, unless the addendum withdraws the Invitation for Bids, or if the addendum postpones the date bids will be received.

Purposes of Addenda

In Chapter 8, under the heading “Instructions to Bidders,” there is a discussion regarding interpretation of documents. The primary purposes of addenda are to clarify, in writing, the meaning of the Drawings and Specifications and respond to inquiries from prospective bidders regarding discrepancies, omissions, and conflicts in the bidding documents. In addition, an addendum may be used to make additional information part of the bidding documents. This information can take any of the following forms:

- Corrections of errors and omissions
- Clarifications of ambiguities
- Additions or deletions to increase or reduce the scope of the proposed work
- Other information that can affect the bid prices
- Change in the time and place for receipt of bids
- Change in the quality of the work
- Listing of additional names of qualified “or equal” products (see the discussion of Substitutions and Product Options in Chapter 16)

For example, if the drawings show sheet vinyl flooring but the specification describes vinyl composition tile flooring, one of these documents must be changed. If vinyl composition tile is actually required, the addendum should state the Drawing containing the information regarding sheet vinyl flooring, and should give the instruction to delete the term “sheet vinyl flooring” and substitute the term “resilient tile flooring.” If sheet vinyl flooring is actually required, the Specifications should be altered by the addendum with instructions to change specific paragraphs by deletions, additions, and substitutions of text, up to and including wholesale deletion and substitution of the entire section.

Precautions

- Do not issue a complex addendum that requires considerable work on the part of the bidders unless there is still sufficient time before the bid due date. If time is insufficient for assimilating such a change, postpone the bid due date.
- Do not respond verbally to a bidder's telephone inquiries. Instruct the Bidder to submit the inquiry in writing and, if a clarification is in order, answer the inquiry by a written addendum issued to all bidders so that every bidder is informed in the same manner, with the same information, and the responses are clearly documented. A recommended technique is to require, in the Instructions to Bidders, that inquiries be submitted only by facsimile (fax). Thus, there will be no chance of verbal misunderstanding.
- While an urgent change may be issued by fax, formal issuance of the addendum should still occur through established methods. With changes in communication through facsimile documents, e-mail, and intranet sites, the dissemination process is changing. The enforceability of addenda other than written ones delivered by the U.S. Postal Service or courier service is yet to be definitively determined.

In private construction work, where changes are often negotiated with the successful bidder before award of contract, changes should be summarized and incorporated into an addendum that is issued prior to execution (signing) of the Owner-Contractor Agreement form. This applies to projects under AIA contract documents. There is no such provision under EJCDC documents.

All addenda should be prepared, controlled, and issued by one party who has intimate knowledge of all the Contract Documents and who serves as the clearinghouse for gathering and arranging all the information. Consultants, such as structural, mechanical, and site engineers, should not issue addenda since they may inadvertently assign wrong addenda numbers or issue instructions that conflict with other instructions contained elsewhere in the bidding and Contract Documents.

Itemize each instruction or change within the addendum by number for future reference during construction and correspondence.

Describing Changes in Bidding Documents

Changes typically are described in addenda by one of two methods:

- **Narrative Method:** A narrative description of changes is presented that should be followed to make physical changes to the documents, in the form of strikeouts to delete text, notations, and taped text segments for revised text. The narrative should be brief and give only enough information to make the change clear. Avoid oversimplification, but be clear by repeating enough of the previous text to make each change self-explanatory.

- **Revised Page Method:** With word processing, changes and reprinting of documents are easy. By revising the section or document, changes are effectively communicated. With functions such as “track changes” in Microsoft Word and “redlining” in WordPerfect, changes may be noted and graphically indicated. If these word processing functions are not used, the revised page method may still be used, with a brief summary or narrative description as above.

This describes changes to the documents and Specifications in the Project Manual. For the Drawings, similar methods may be used, including issuing new details to be cut and pasted over existing details, or narrative descriptions for revisions, additions, and deletions to notes on the Drawings, or reissuing of an entire sheet of the drawings if the changes are extensive. Drawings revisions are typically surrounded by a “cloud” with a numeral in a triangle (“delta” or different) that is keyed to the revision box in the Drawing title block.

If there are conflicts in the Drawings, in which one detail shows one arrangement and another detail shows another arrangement, describe in the addendum the deletion of the inappropriate detail rather than make a statement that one detail shall govern over the another or that one detail is preferred over another.

Similarly, for conflicts within the Specifications, delete the inappropriate material by addendum. Do not explain that one specification is preferred and the other should be ignored. Make the revision by describing physical changes to be made to the Drawings and Specifications. Because paper is cheap, addendum revisions to the Specifications are best handled by deleting an entire section and substituting a revised section with a different publication date.

Procedures for Addenda

Addenda should be prepared and issued in a timely manner. Bidders must be given corrections and additional information in time for actual use in preparing their bids. A minor addendum can be issued as late as 5 days before bids are due without imposing hardship on bidders. It might be possible to issue a minor addendum within even a shorter time if bidders are alerted that a late addendum will be issued.

Preserve the bid date if possible. However, if a critical question arises, an addendum should be issued even if it means delaying the bid opening. This is not always possible, such as when bids must be received and reviewed prior to a scheduled meeting of the board of a public agency, which will authorize acceptance of the bid and direct that a contract be awarded to the selected bidder. Delay could mean losing several weeks or a month until the next scheduled board meeting.

Number addenda consecutively. For multiple prime contracts, provide a separate series of addenda numbers for each contract. Where feasible, use a simple system

of numbering for items within an addendum to permit future cross referencing.

Each addendum should be arranged in an orderly sequence. Following a prepared format helps to ensure that all required elements of the addendum are included. The format should follow the same sequence as the Project Manual and the Drawings as follows:

1. Introduction
2. Addendum number
3. Name of issuing party: Owner, Construction Manager, Architect, or Engineer
4. Project identification
5. Date of addendum
6. Opening remarks and instructions
7. Addendum changes, in sequence
8. Changes to prior Addenda
9. Changes to the Project Manual
10. Changes to introductory documents
11. Project Manual cover
12. Certifications
13. Table of contents
14. Changes to bidding requirements
15. Invitation to Bid
16. Instructions to Bidders
17. Bid Forms
18. Other bidding requirements
19. Changes to the Owner-Contractor Agreement and other Contract forms
20. Changes to the Owner-Contractor Agreement form
21. Change to General Conditions and Supplementary Conditions
22. Change to other Contract forms
23. Changes to Specifications, in sequence of Section numbers
24. Changes to Appendices (if included in the Project Manual)
25. Changes to Drawings, in sequence of the Index of drawings

References to addenda, the method of issue, and other pertinent facts concerning addenda are included in the Instructions to Bidders, the Bid Form, and the agreement. See [Exhibit 13-1](#) for an example of an addendum.

[Exhibit 13-1](#) Sample addendum.

ADDENDUM TO BIDDING DOCUMENTS

DATE: September 12, 2009
FROM: City of Richmond
Parks, Recreation and Community Services Division
316 E. Broadway, Room 120
Richmond, CA 94805
TO: All Prospective Bidders.
PROJECT: RICHMOND CIVIC AUDITORIUM - REHABILITATION AND UPGRADES
(City of Richmond Specifications No. 2621-A and 2569-A)
SUBJECT: Addendum No. 1

NOTICE: This Addendum modifies the original Bidding Documents and shall become part of the Contract Documents. Make the following modifications and place this Addendum in the Project Manual following the introductory document, ADDENDA under the heading of BIDDING REQUIREMENTS AND FORMS - OVERALL PROJECT. Acknowledge receipt of this addendum on the Bid Form.

This Addendum consists of two pages and the following enclosures:

- Enclosure 1: Introductory Document titled "ADDENDA," dated 9/12/09.
- Enclosure 2: Section 31 40 00 - Shoring and Underpinning, dated 9/12/09.
- Enclosure 3: Section 11 12 00 - Parking Control Equipment, dated 9/12/09.
- Enclosure 4: Sketch SK-E9-1-1, dated 8/25/09.

The Bid date, time and location for receipt of Bids are unchanged by this Addendum.

INTRODUCTORY DOCUMENTS - PROJECT MANUAL

TABLE OF CONTENTS - PROJECT MANUAL

1. Refer to TABLE OF CONTENTS dated 8/16/09. Under heading "BIDDING REQUIREMENTS AND FORMS - OVERALL PROJECT," add the following at the end of the list:

"ADDENDA 9/12/09"

2. Refer to TABLE OF CONTENTS dated 8/16/09. Make the following corrections:
 - a. Change date of Section 11 12 00 - Parking Control Equipment to 9/12/09.
 - b. Change date of Section 31 40 00 - Shoring and Underpinning to 9/12/09.

CONTRACT REQUIREMENTS AND SPECIFICATIONS

SPECIFICATIONS

SECTION 31 40 00 - SHORING AND UNDERPINNING

1. Delete Section 31 40 00 - Shoring and Underpinning dated 8/16/09 and add revised Section 31 40 00 - Shoring and Underpinning dated 9/12/09. The revised Section adds requirements for installation, maintenance and removal of shoring and underpinning.

SECTION 33 46 00 - SUBDRAINAGE

1. Delete Article 2.2 in its entirety and substitute the following. Article 2.2 has been revised to require subsurface drainage mat to be approved by the below-grade waterproofing manufacturer.

2.2 SUBSURFACE DRAINAGE MAT

- A. Specified Manufacturer: Carlisle Coatings & Waterproofing Incorporated (CCW), Wylie, TX.
- B. Acceptable Manufacturers: Equivalent products of the manufacturers listed below will be acceptable in accordance with the "or equal" provision specified in Section 01 25 13 - Product Substitution Procedures.
 1. JDR Enterprises, Inc., Alpharetta, GA.
 2. Solutia, Inc., St. Louis, MO.
- C. Subsurface Drainage Composite: CCW MiraDRAIN 6000 or 6200, prefabricated in-plane wall drainage composite, as part of overall foundation drainage system, to function as drainage system and protection for below-grade waterproofing specified in Section 07 13 00 - Sheet Waterproofing.
- D. Drainage Core: Manufacturer's standard three-dimensional, non-biodegradable, plastic material designed to effectively conduct water to foundation drainage system under maximum soil pressures.
- E. Filter Fabric, Vertical Applications: CCW MiraDRAIN 140-N, standard non-woven geotextile fabric of polypropylene or polyester fibers, or a combination of these fibers.
- F. Filter Fabric, Horizontal Applications: CCW MiraDRAIN HP 500, FW 40/10 or FW 70/20, to suit site-specific soil and fill materials, woven geotextile fabric of polypropylene or polyester fibers, or a combination of these fibers."

SECTION 07 13 00 - SHEET WATERPROOFING

1. Delete Paragraph 2.1.A. and substitute the following:

"A. Carlisle Coatings & Waterproofing Incorporated (CCW), Wylie, TX"

2. Delete Paragraph 2.1.C. and substitute the following:

"C. Sheet-Applied Waterproofing: CCW MiraDRI 860, self-adhering, cold-applied, composite sheet waterproofing, consisting of 56 mil layer of rubberized asphalt integrally bonded to cross-laminated, 4 mil high density polyethylene sheeting."

SECTION 11 12 00 - PARKING CONTROL EQUIPMENT

1. Delete Section 11 12 00 - Parking & Revenue Control System dated 8/16/09 and substitute revised Section 11 12 00 - Parking Control Equipment dated 9/12/09. The revised Section clarifies Work under the Contract and "future" (not in Contract) Work.

DRAWINGS

DRAWING C-4

1. Add Note No. 4, as follows:

"4. ALL PEDESTRIAN RAMPS SHALL HAVE A GROOVED BORDER 12" WIDE AT THE LEVEL SURFACE ALONG THE TOP OF ALL RAMPS AND EACH SIDE AT CURBS AND RAMPS."

DRAWING C-5

1. Replace Demolition Note No. 11 with the following:

“11. REMOVE EXISTING FLAGPOLE AND CONCRETE FOUNDATION. SALVAGE FLAGPOLE AND DELIVER TO OWNER AT CITY STORAGE YARD, AS DIRECTED.”

2. Replace Demolition Note No. 15 with the following:

“15. REMOVE EXISTING LAMPPOST, CONCRETE FOUNDATION AND ELECTRICAL CONDUITS. SALVAGE LAMPPOST AND DELIVER TO OWNER AT CITY STORAGE YARD, AS DIRECTED.”

DRAWING E9-1

1. Delete conduit and wiring to the four landscape step lights along the north walkway.
2. Add one additional Type “PC” pole light fixture and foundation and revise landscape lighting circuiting as indicated on enclosed Sketch SK-E9-1-1.
3. Revise landscape lighting circuiting at southeast corner of structure and add circuiting for landscape lighting at southwest corner of structure as indicated in enclosed Sketch SK-E9-1-2.

END OF DOCUMENT

Change Orders

Change Order Format

Change orders are documents describing changes to the contract documents and are issued after execution (signing) of the agreement (contract). They are written instructions to the contractor, signed by the owner, architect/engineer, and contractor, authorizing and ordering an addition, deletion, or revision to the work, including, as applicable, an adjustment to the Contract Sum or the Contract Time.

In terms of descriptions of the changes, a Change Order follows an organization and production procedure similar to those of an addendum, except that the topic of the Change Order is usually much more limited. Only one or a few topics are included in a change order. In fact, the fewer the topics, the easier it is to trace the process of the Change Order should there be a subsequent dispute or performance problem.

Change Order Procedures

Preparing and authorizing a change early in construction allows time for consideration of proposals and determination of a mutually acceptable change in Contract Time or Contract Sum (if any) without affecting Work in progress. This is not always possible, but it is a goal. Change Order procedural requirements should be specified in Division 01 - General Requirements and should be coordinated with the General Conditions and Supplementary Conditions. Change Order procedures should be included in Division 01 - General Requirements in a section

such as Section 01 26 00, Contract Modification Procedures.

- Only the Owner has authority to direct a change to be made. However, there are several ways that a change order may be initiated.
- Owner-initiated change: With the Owner's authorization, the Architect/Engineer prepares and issues a Request for Proposal (RFP) to the Contractor.
- The RFP should include a detailed description of a proposed change, with supplementary or revised drawings and Specifications as appropriate.
- The RFP may include an estimate of additions or deductions in Contract Time and Contract Sum for executing the change, and may include stipulations regarding overtime work and the period of time the requested response from the Contractor shall be considered valid.
- In response to the RFP, the Contractor prepares and submits a written proposal within a specified time period.
- The Owner, Architect/Engineer, and Contractor review the proposal and negotiate the change in Contract Time and Contract Sum as applicable. *Note:* Both time and money need to be considered. Time is money, and extension of the contract completion date may result in a claim by the Contractor for additional overhead and contract administration costs.
- When the scope of the proposed change, the change in Contract Time, and the change in Contract Sum are agreed upon by the Owner and Contractor, the Architect/Engineer prepares the formal Change Order document, typically using a preprinted document, such as *AIA G701 Change Order* or *EJCDC C-941 Change Order*, or a custom document as required by the Owner. The Change Order should reference and, as practical, include attached revised Contract Drawings and Specifications.
- Change Orders are signed by the Owner, Architect/Engineer, and Contractor.

Contractor-Initiated Change

The Contractor may propose a change by submitting a request for a change to the Architect/Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change and a full description of its effects on the Contract Sum, Contract Time, related Work, and work being performed under separate contracts. Such proposed changes may be requests to substitute products or assemblies, or to change the agreed-upon sequence of construction represented in the approved construction progress schedule, or to address unforeseen conditions such as utility lines in locations other than where previous project record drawings (“as-built” drawings) indicate.

- To keep the administrative process consistent, contractor-initiated changes may be informal in nature and lead to preparation and issuance by the Architect/Engineer of an RFP as described above.
- When the change requires urgent action, the initiation by the Contractor may be in the written form of a memorandum or letter to the Owner, with preliminary supporting information such as will be included in the Contractor's response to the eventual RFP.
- Urgent action would likely take the form of a Construction Change Directive or a Work Directive Change, described below.
- The Owner should respond to the Contractor-initiated change with preparation and issuance by the Architect/Engineer of a formal RFP.

Change orders have the following basic elements:

- Change Order number and date of issue.
- Project name and job number.
- Architect/Engineer's name and address.
- Owner's name and address.
- Contractor's name and address.
- Original Contract completion date.
- Statement that this Change Order modifies the original Contract.
- Description of revisions, including the cost of each. Reference can be made to detailed descriptions in previously issued bulletins (Architect's Supplemental Instructions or Construction Change Directive [AIA] or Work Directive Change [EJCDC]).
- Revised Contract Drawings and Specifications, referenced or, if practical, attached to the Change Order.

Construction Changes Based on Unit Costs or Quantities:

When the scope of a change in the Work cannot be accurately determined in advance, a Construction Change Directive should be executed based on mutually acceptable quantities and predetermined unit prices. Actual costs should be determined after completion of the Work, and a Change Order for this amount should be executed.

Construction Changes Based on Time and Material Costs:

When the scope of a change in the Work cannot be accurately determined in advance, a Construction Change Directive should be executed based upon an agreement that the Owner will adjust the Contract Sum and the Contract Time based

on the actual costs and time expended by the Contractor in performance of the change.

Substantiating Data for Changes in Contract Sum and Contract Time:

The Contractor should provide full information required for evaluation of proposed changes and to substantiate the costs of changes in the Work.

1. Document each quotation for a change in Contract Sum and Contract Time, with sufficient data to allow evaluation of the quotation.
2. Upon request, provide additional data to support computations:
 - a. Quantities of products, labor, and equipment
 - b. Taxes, insurance, and bonds
 - c. Overhead and profit
 - d. Justification for change in Contract Time, if claimed
 - e. Credit for deletions from the Contract, similarly documented

Cost and Time Resolution:

If the amounts for changes in contract sum and contract time cannot be agreed upon by the Owner and Contractor, they shall be resolved in accordance with provisions of the Conditions of the Contract for resolution of disputes and the following:

1. The Contractor should keep accurate records of time, both labor and calendar days, and of the cost of materials and equipment.
2. The Contractor should prepare and submit an itemized account and supporting data after completion of the changed Work within the time limits indicated in the conditions of the contract.
3. The Contractor should provide full information as required and requested for the Owner and Architect/Engineer to evaluate and substantiate proposed costs and time for the change in the Work.
4. When the Owner and Contractor determine mutually acceptable amounts for changes in the Contract Sum and Contract Time, a Change Order should be executed for these amounts.
5. The Owner should have the right to audit the Contractor's invoices and bid quotations to substantiate the costs for Change Orders.

Reconciliation of Change Orders

1. Schedule of Values: The Contractor should promptly revise the

Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjustment to the Contract Sum.

2. Construction Schedules: The Contractor should promptly revise the progress schedules to reflect changes in Contract Time, revising subschedules to adjust the time for other items of Work that may be affected by the change. The Contractor should submit revised schedules at the next Application for Payment following approval and acceptance of the Change Order.

The Owner will sign all Change Orders, Construction Change Directives, or Work Directives because each is an extension or modification of the Contract between the Owner and Contractor.

Other Modifications

There are modifications in addition to Addenda and Change Orders.

Architect's Supplemental Instructions

The Architect's Supplemental Instructions are for contracts using AIA General Conditions and are used for minor written instructions or interpretations from the Architect/Engineer to the Contractor that do not involve change orders and do not change the Contract Sum or Contract Time.

Construction Change Directives

Construction Change Directives are for contracts using AIA General Conditions and are written authorizations directing the Contractor to proceed with described changes, subject to subsequent adjustments in the Contract Sum or Contract Time through execution of a Change Order. In accordance with provisions of the *AIA A201 General Conditions*, the Owner may direct the Contractor to proceed with a change in the Work prior to formal preparation, review, and agreement of a Change Order in order to not delay construction.

The Architect prepares a Construction Change Directive that, when signed by the Owner and the Architect, instructs the Contractor to proceed with a change in the Work for subsequent inclusion in a Change Order.

Should the Construction Change Directive result in disputed costs and time adjustments, the dispute will be resolved in accordance with the dispute resolution provisions of the General Conditions and Supplementary Conditions.

Construction Change Directives should follow procedures specified above for preparation of Change Orders, except that the Contractor should immediately

proceed with the change upon receipt of the signed Change Directive and not wait until completion of the proposal and negotiation process.

Work Directive Changes

Work Directive Changes are for contracts using EJCDC General Conditions and are written directives to the Contractor to make changes in the Work, which may or may not affect the Contract Sum but are evidence that changes will be incorporated in a Change Order once value of the Work is established. The Work Directive Change operates similarly to the Construction Change Directive. EJCDC publishes document *C-940 Work Change Directive* for this purpose.

Field Order

A Field Order is for contracts using EJCDC documents only. It is an antiquated term for contracts using AIA documents (therefore, it is not a valid term). A Field Order is defined as an authorization directing the Contractor to perform minor variations in the Work when such changes do not change the Contract Sum or Contract Time. EJCDC publishes document *C-942 Field Order* for this purpose.

Study Questions

1. Construction Contract modifications include which of the following?
 - a. Change Order
 - b. Architect's Supplemental Instructions
 - c. Construction Change Directive
 - d. Addenda
2. True or False? Addenda are issued prior to signing of the Owner-Contractor Agreement.
3. The purposes of Addenda include all but which of the following?
 - a. Correct errors and omissions
 - b. Clarify ambiguous requirements
 - c. Change time and location for receipt of bids
 - d. Modify previously adopted Change Orders
4. True or False? Typical methods to describe changes in Bidding Documents are Narrative and Revised Page.
5. Addenda should include all but which of the following?
 - a. Addendum number and date
 - b. Revisions to Bidding Requirements
 - c. Revisions to Drawings

- d.** Revisions to Owner-Contractor Agreement
- 6.** True or False? Only the Owner has authority to direct a change in Contract Documents.
- 7.** Change Orders should contain all but which of the following?
 - a.** Revisions to previously executed Change Orders
 - b.** Signatures by Owner and Contractor
 - c.** Change in Bid Date and location
 - d.** Change in Contract Sum to be paid to Contractor
- 8.** True or False? A Construction Change Directive (AIA contract documents) or Work Directive (EJCDC contract documents) requires the Contractor to immediately comply with the required changes.
- 9.** True or False? Architect's Supplemental Instructions may be used to change the Contract Time and Contract Sum.
- 10** True or False? Standard forms for Change Orders are published by the American Institute of Architects (AIA) and by the Engineers Joint Contract Documents Committee (EJCDC).

Chapter 14

Specifications Language

General Precepts

It is not intended, nor indeed is it possible, for this chapter to be a primer on English grammar and readable writing. Rather, the chapter presents precepts and examples of proper specification language.

In order to communicate with proper language, the specifier must sufficiently master the tools of specifications language, including grammar, vocabulary, spelling, use of abbreviations and symbols, punctuation, capitalization, sentence structure, and the unique considerations of “streamlined” writing and specifications detail. The specifier must not only follow the rules of language but must understand the subtleties of language. It is much like carpentry. Sometimes rough carpentry, performed with power saws and pneumatic nail guns, is adequate. Sometimes finish carpentry is called for, with hand crafting and fine finishing.

Imagine that each statement in the specifications carries a dollar sign, whether it is concerned with specifying materials, instructing the Contractor on installation procedures, or describing workmanship. The Contractor expects compensation for each requirement in the Contract Documents, and the Contractor's bid theoretically reflects every statement made in the specifications and noted on the drawings. Specification language should be precise. Vague, ambiguous language indicates that the specifier may want something but is unsure about demanding it. Statements such as “tests shall be performed unless waived,” “additional shop drawings and samples may be required,” and “uneven surfaces may be cause for rejection” are examples of equivocation that plague the Contractor and lead to disputes between the Owner and Contractor.

Precise specifications can be enforced. Vague specifications are open to multiple interpretations and invariably result in the Contractor's choosing the least restrictive, most expedient, and least costly outcome. Vague specifications are difficult to enforce and cost the Owner additional money because the Contractor will claim that the most restrictive, least expedient, and most costly outcome is not what the bid was based upon, and additional time and money must be added to the Contract if a different interpretation of the specifications is enforced. It is difficult to contradict this assertion without precisely specified requirements.

The essential requirement for writing specifications, aside from knowledge of the technical content, is the ability to express oneself in proper English, or at least in the English that is conventionally used for writing construction specifications. Specifications English is not the same as the English used in reports, narratives, and business correspondence. It is certainly not the slang-laden, abbreviated English expediently used in e-mail. Specifications English is a technical style of writing, suitable for the outline format of specifications, which often relies upon terse sentences and an even, no-nonsense tone.

Construction specifications writing is the preparation of written English documents that become contractual (legally enforceable) documents. Despite this “legal” aspect of specifications, legal phraseology is not necessary and should be avoided. Likewise, eloquence and creative expressions are inappropriate for construction specifications. Specifications should state requirements in clear, concise, and correct terms in plain English.

There are four important Cs in specifications writing:

1. *Be Clear:* Avoid ambiguity. Consider the reading ability of the reader. Choose precise words that convey exact meanings.
2. *Be Correct:* Present ideas and explanations accurately and precisely. Specifications should be correct technically and grammatically. Proper terminology is important.
3. *Be Complete:* Do not leave out anything that is important. Brevity at the expense of completeness should be avoided.
4. *Be Concise:* Eliminate unnecessary words but not at the expense of clarity, correctness, or completeness. Typically, delete the articles “a,” “an,” and “the” where clarity is not diminished. Eliminate verbiage. A well-crafted specification is one containing the fewest words that can be used to complete the description and make sense. Verbosity and repetition can lead to ambiguity rather than preventing it.

Consider those who use the specifications. Specifications must be clearly written so that they can be understood by someone whose vocabulary and English comprehension are limited. A clearly written specification in English should be clear enough even for the mechanics on the job. If a mechanic cannot understand and interpret specifications, he or she will not be able to follow them.

Specified requirements should be definite, unequivocal, and understandable to the reader, whether he or she is the owner, the contractor's superintendent, a cost estimator, an architect checking shop drawings, a purchasing agent placing an order for materials, or (perish the thought) an attorney for the opposing side in a construction dispute.

Since Specifications are instructions to the Contractor, they should be definite and mandatory. To be mandatory, they must be indicative. Therefore, use the indicative “shall” with reference to the Work of the Contractor; never use the vague

and indefinite “will” or “to be.” The proper place to use “will” is in a statement describing the acts to be performed by the Owner or the Architect.

Language is a means of communication. Unlike graphic communication, where symbols and graphic indications such as crosshatching have representative meanings, written words must be carefully selected for their precise meanings. Unlike spoken words, where inflections and gestures add subtle nuances and emphasis, written language relies solely upon the printed characters on a page. Because words may have subtle connotations, they should be selected carefully to minimize misinterpretation.

Consider the word “smooth.” The dictionary defines it as “having an even surface; devoid of surface roughness.” The term “smooth” has been employed in specifications as follows: “Bituminous road surfaces shall be smooth.” Yet the preferred texture for a road surface, to reduce skidding, is a rough texture. The word “smooth” means something different for road surfaces than for concrete floors. Concrete floors may be specified to have a smooth, wood float finish, or a smooth, rubbed finish, or a smooth, troweled finish. However, in each case the degree of smoothness varies significantly, and it is necessary for the specifier to understand the differences.

It might seem preferable to specify the tool that will accomplish the intended result and rely on it to achieve the desired surface finish. For example, “Finish concrete floors with wood float,” or “rub concrete steps with carborundum stone,” or “burnish concrete floors with steel trowel” is grammatically preferable specifications writing. However, none of these adequately describes how smooth the concrete should be. Should a few swipes with a wood float, a carborundum stone, or a steel trowel be sufficient? No. Better descriptions, with measurable qualities, are needed.

Technical adequacy needs to be considered, as well as proper and preferred language. It is necessary to understand the technology, specifications language, and construction practices.

Applications

Grammar

The rules of grammar apply to specifications writing.

Subject and Verb Agreement

Single subjects require single verbs and plural subjects require plural verbs. Avoid long, complicated sentences because they make it more difficult to keep the subject and verb in agreement.

Incorrect: Two beads of sealant is applied before securing cover.

Correct: Two beads of sealant are applied before securing cover.

Preferred: Apply two beads of sealant before securing cover.

The incorrect example uses the plural subject “beads” with the singular verb “is.” The correct example uses the plural subject “beads” with the plural verb “are.” The preferred example uses a different sentence structure, described in more detail below, and lessens the chance of disagreement should the sentence be edited further and the number of “beads” be changed. The verb “apply” works with both singular and plural subjects.

Parallel Construction

Use the same style in both portions of a sentence with a compound subject or predicate. Also, use identical style when there is a series of nouns, adverbs, or prepositional phrases.

Incorrect: Inspections shall be conducted to determine quality of welds and verifying of compliance with specified tolerances.

Correct: Inspections shall be conducted to determine quality of welds and to verify compliance with specified tolerances.

Preferred: Conduct inspections to determine quality of welds and verify compliance with specified tolerances.

Inappropriate Terms

Do not use phrases with missing objects such as “as allowed” (by whom?), “as appropriate” (according to what?), “as approved” (by whom?), “as directed” (by whom?), “as indicated” (where?), “as required” (according to what or whom?), and “as necessary” (according to what or whom?). The last phrase, “as necessary,” may be appropriate if a definition is specified that establishes the criteria for determining the necessity.

Avoid Legal-Sounding Adverbs

Do not try to write “legalese.” Avoid adverbs such as “hereinafter,” “hereinbefore,” “herewith,” and “wherein.” They do not make the text more authoritative.

Avoid Certain Articles

Do not use the phrase “Any or all” (what does it mean and how is it enforced?), and avoid making an article out of “such” (“such accessories shall be silver plated”). Avoid making articles or pronouns out of certain words (“Polish said

floor with wax”). Do not use “same” either as an article (“Polish same with wax”) or as a pronoun (“Mop floor and polish same with wax”).

Avoid Certain Words and Expressions

Do not use “etc.” (what precisely are the “et cetera,” and how is a specification with this ambiguous term enforced?), “as per” (it is great-sounding spec lingo but grammatically incorrect), “in a workmanlike manner” (“workmanlike” is an ambiguous and unenforceable term), “to the satisfaction of the architect/engineer” (it is subjective, subject to abuse, and ambiguous), and “shall function as intended” (does this mean that the contractor must hire a psychic to read the mind of the architect/engineer?).

Avoid Unnecessary Words

- Eliminate superfluous words. The definite article “the” and the indefinite articles “a” and “an” need not be used in most instances. However, where these articles enhance clarity or readability, use them.

Acceptable practice: “The Contractor shall prepare a Construction Progress Schedule.”

Preferred practice: “Contractor shall prepare Construction Progress Schedule.”

- *All:* The use of “all” is usually unnecessary. The General Conditions of the Contract usually establish that the adjective “all” is implied, especially if AIA or EJCDC preprinted documents are used.

Acceptable practice: Store all millwork under shelter.

Preferred practice: Store millwork under shelter.

- *Contractor:* Avoid using “Contractor” as the subject of the sentence. Specifications are written to the Contractor; therefore, using “Contractor” is unnecessary, especially if “streamlining,” discussed below, is used.
- *Which:* “Which” and other relative pronouns such as “who” and “that” should be used sparingly, if at all.

Acceptable practice: Install bathroom accessories that are provided by Owner.

Preferred practice: Install bathroom accessories provided by Owner.

Prepositional Phrases

Sentences should be kept short in specifications. An easy way to eliminate verbiage is to use modifiers in place of prepositional phrases.

Acceptable grammar: Apply vinyl wall covering of selected pattern and color in remodeled classrooms of Building B.

Preferred grammar: Apply selected pattern and color vinyl wall covering in Building B remodeled classrooms.

Acceptable phrase: “surfaces of concrete.”

Preferred phrase: “concrete surfaces.”

Acceptable phrase: “within temperature limits recommended by manufacturer.”

Preferred phrase: “within manufacturer's recommended temperature limits.”

Include Key Headings

This is not the same as streamlined writing, but it appears similar. Key headings, stated at the beginning of a paragraph, express the topic of the paragraph and end with a colon (:). They greatly enhance the readability of specifications because the reader is able to scan the page and focus on the key words in order to find the topic of interest or concern, as in the following examples:

A. Corrosion Protection: Protect galvanized and nonferrous metal surfaces from corrosion or galvanic action by heavy coat of bituminous coating on surfaces which will be in contact with concrete or dissimilar metals.

B. Environmental Requirements: Condition interior casework and trim products to building environment. Maintain temperature and humidity at completed Work in accordance with requirements for storage.

C. Loose Segments Repair: Remove all loose concrete segments, tile, and other subfloor elements and repair subfloor with patching compound to provide a solid base for underlayment.

Sentence Structure

Imperative Mood

This is recommended for instructions covering the installation of products and equipment. The verb that clearly defines the action becomes the first word in the sentence. The imperative sentence is concise and readily understandable, as in the following examples:

- “Spread adhesive with notched trowel.”
- “Install equipment plumb and level.”
- “Apply two coats of paint to each exposed surface.”

Indicative Mood

The traditional language of specification sentences is the indicative mood, passive voice. This requires the use of “shall” in nearly every statement. This sentence structure can cause unnecessary wordiness and monotony, as in the following:

“Adhesive shall be spread with notched trowel.”

“Equipment shall be installed plumb and level.”

“Two coats of paint shall be applied to each exposed surface.

Avoid: “Contractor shall install all equipment plumb and level.”

Vocabulary

Develop and Use Proper Terminology

This is a by-product of learning construction technology and construction contracting. One way to avoid conflicts in terminology is to define the terms. Consider the following terms and their definitions.

1. Do not use “must” and “is to.” Substitute the word “shall” or use the imperative mood (described below). This prevents the inference of different degrees of obligation.

Poor practice: Each joint must be filled solid with mortar.

Poor practice: Each joint is to be filled solid with mortar.

Better practice: Each joint shall be filled solid with mortar.

Preferred practice: Fill each joint solid with mortar. (Imperative mood)

2. Do not use “any” when a choice is not intended. Because “any” implies a choice, it should not be used when a choice is not intended, as in the following examples:

Poor practice: Any materials rejected shall be removed. (This gives the contractor the unintended choice of removing some but not

necessarily all materials.)

Better practice: Materials rejected shall be removed.

Preferred practice: Remove rejected materials. (Imperative mood)

3. Do not use “either” when a choice is not intended. The word “both” should be substituted for “either” when no choice is intended.

Poor practice: Glass panels shall be installed on either side of main entrance.

Better practice: Glass panels shall be installed on both sides of main entrance.

Preferred practice: Install glass panels on both sides of main entrance. (Imperative mood)

4. Do not use “same” as a pronoun.

Poor practice: If materials are rejected, the Contractor shall replace same at no additional cost.

Better practice: Replace rejected materials at no additional cost.

5. Do not use “said” as an adjective.

Poor practice: Said materials shall be replaced at no additional cost.

Better practice: Replace rejected materials at no additional cost.

6. Do not use “and/or.” This is a stilted legal expression. The word “or” or “both” should be used in place of “and/or.”

Poor practice: Brick shall be made of clay and/or shale.

Better practice: Brick shall be made of clay, shale, or a combination of both.

7. Do not use “etc.” Placed at the end of a list of items, “etc.” shows that the specification writer obviously does not know what comprises the complete list or is too lazy to write it out. The use of “etc.” is vague and results in ambiguous specification. It puts unnecessary responsibility on the contractor and therefore should not be used. As one specification

writer puts it, “It is better to be definite even if you are wrong; then, at least, there is a firm basis for negotiating the corrections.”

Poor practice: All standing trim, running trim, etc., shall be painted.

Better practice: Paint exposed millwork. (Imperative mood)

8. Do not use the phrase “furnish and install.” Since it is established by the general conditions that the contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities, unless otherwise stipulated, for the execution and completion of the work, it is redundant to use the phrase in other sections. Define the term “provide” and use it to mean “furnish and install.” (See “Defined Terms and Expressions” below.)

Poor practice: Contractor shall furnish and install standard size face brick.

Better practice: Face brick shall be standard size.

9. Do not use the phrase “to the satisfaction of the Architect” and similar phrases, such as “as the Architect may direct,” “acceptable to the Architect,” and “in the opinion of the Architect.” Instead, specify exactly what the Architect's directions are, or definitely what would be satisfactory or acceptable to the Architect. Do not leave the Contractor guessing and at the mercy of the Architect's future decisions.

Poor practice: Brick shall be laid to the satisfaction of the Architect.

Better practice: Brick shall be laid plumb and true with all joints completely filled with mortar.

10. Do not use the phrase “a workmanlike job” and similar phrases, such as “a high-class job” or “a first-class job.” These are undefined and ambiguous expressions. Instead, the type of workmanship expected should be described in detail.

Poor practice: Brick shall be laid in a workmanlike manner.

Better practice: Brick shall be laid plumb and true with all joints completely filled with mortar.

11. Use “shall” in connection with acts of the Contractor. Do not use “will.” Use of the simple imperative mood is even better.

Poor practice: Brick will be laid in running bond.

Better practice: Brick shall be laid in running bond.

Preferred practice: Lay brick in running bond. (Imperative mood)

Defined Terms and Expressions:

In Division 01 - General Requirements, define certain terms and phrases that have specific meaning in the specifications. Examples:

- *And/or:* If used, shall mean that either or both of the items so joined are required. (This is a concession to those who prepare only a portion of the specifications and who insist on using “and/or.” It results in ambiguity but gives some leverage to the Architect/Engineer.)
- *Applicable:* As appropriate for the particular condition, circumstance, or situation.
- *Approved:* This term, when used in conjunction with the Architect/Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- *Approve(d):* Limited to duties and responsibilities of the Architect/Engineer stated in the Conditions of the Contract, for actions performed in the professional judgment of the Architect/Engineer, in conjunction with submittals, applications, and requests. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences, and procedures of construction. Approval shall not relieve the Contractor from responsibility to fulfill Contract requirements.
- *Directed:* Limited to duties and responsibilities of the Architect/Engineer stated in the conditions of the contract, meaning as instructed by the Architect/Engineer or the owner, in writing, regarding matters other than the means, methods, techniques, sequences, and procedures of construction. Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “required,” and “permitted” mean “directed by the Architect/Engineer,” “requested by the Architect/Engineer,” and similar phrases. No implied meaning shall be interpreted to extend the Architect/Engineer's responsibility to the Contractor's supervision of construction.
- *Equal or equivalent:* As determined by the Architect/Engineer as being equivalent, considering such attributes as durability, finish, function, suitability, quality, utility, performance, and aesthetic features.

- *Furnish*: Means Contractor shall procure indicated products or perform indicated services. Where used regarding products, the term “furnish” is understood and intended to mean delivery of products to site of the Work but is not intended to include the installation, application, or other action to incorporate of products, either temporarily or permanently, into the Work.
- *Indicated*: Refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as “shown,” “noted,” “scheduled,” and “specified” are used to help the reader locate the reference. There is no limitation on location.
- *Install*: Means Contractor shall receive, unload, transport, and temporarily store products at the site of the Work and to perform assembly, fitting, installation, application, erection, and similar actions as necessary to incorporate products complete in place and ready for use, including furnishing of necessary labor, materials, tools, equipment, and transportation. The term “install” is also understood and intended to include testing and inspection that is necessary for proper installation, application, erection, and similar actions and for verification of the quality of the work, as provided in the contract documents.
- *Installer*: Refers to the Contractor or an entity engaged by the Contractor as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform. *Experienced installer*: When used with “installer,” the term “experienced” means having a minimum of five previous projects similar in size to this project, knowing the precautions necessary to perform the work, and being familiar with the requirements of the authorities having jurisdiction over the work.
- *Jobsite*: Same as *Site*, defined below.
- *Necessary*: With due consideration of the conditions of the project and as determined in the professional judgment of the Architect/Engineer as being necessary for performance of the work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences, and procedures of construction.
- *Noted*: Same as *Indicated*.
- *Products*: Material, system, or equipment.
- *Project site*: Same as *Site*, defined below.
- *Proper*: As determined by the Architect/Engineer as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences, and procedures of construction, which are solely the Contractor's responsibility to determine.

- *Provide*: Means Contractor shall both “furnish” and “install” indicated products, as defined above. This definition applies equally to future, present, and past tenses, except the word “provided” may mean “contingent upon” where such is the context.
- *Regulation*: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- *Required*: Necessary for performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences, and procedures of construction, such as:
 1. Regulatory requirements of authorities having jurisdiction
 2. Requirements of referenced standards
 3. Requirements generally recognized as accepted construction practices of the locale
 4. Notes, schedules, and graphic representations on the Drawings
 5. Requirements specified or referenced in the Specifications
 6. Duties and responsibilities stated in the bidding and contract requirements
- *Scheduled*: Same as *Indicated*.
- *Selected*: As selected by the Architect/Engineer or Owner from the full national product selection of the manufacturer, unless otherwise specifically limited in the contract documents to a particular quality, color, texture, or price range.
- *Shown*: Same as *Indicated*.
- *Site*: Same as *Site of the Work* or *project site*; the area or areas or spaces occupied by the project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the project. The extent of the site is shown on the Drawings and may or may not be identical with the description of the land upon which the project is to be built.

Additional Terms

Words and terms not otherwise specifically defined on the Drawings and in the

Specifications should be as customarily defined by trade or industry practice, by reference standard, and by specialty dictionaries such as the *Dictionary of Architecture and Construction*, Fourth Edition, by Cyril M. Harris (McGraw-Hill Book Companies, 2005).

Spelling

Simply stated, spelling matters. Misspelled words may cause misunderstanding of the intended meaning. Misspelled words undermine the credibility of the specifier. Misspelling may be avoided by using the spell-check feature of most word processing programs. Use an unabridged dictionary of English and a specialized dictionary, such as the *Dictionary of Architecture and Construction*, to check spelling and proper use of terminology.

Many technical terms are not included in the spell-check vocabulary of word processing programs. However, these programs have the capability of adding user-supplied words. Of course, the added words must be correctly spelled.

Occasionally, there are two spellings for a word—for example, “caulk” and “calk,” “fascia” and “facia,” “moulding” and “molding,” and “gauge” and “gage.” The preferred practice is to use the shorter spelling. However, avoid the use of improper yet brief spellings, such as “thru” for “through.”

Punctuation

Construct sentences so that the misplacement or elimination of punctuation marks will not change the meaning or cause confusion. Follow conventional rules of punctuation. A good source for these rules is a basic English textbook, from a college-level English class, or a style manual.

Use commas to separate elements in a sentence that might otherwise seem to run together and cause confusion about the meaning. Examples:

- *Confused sentence:* After installing water heater piping insulation shall be installed.
- *Less confused sentence:* After installing water heater piping, insulation shall be installed. (Is insulation installed on both water heater and piping or only on piping?)
- *Clarified sentence:* After installing water heater, piping insulation shall be installed.
- Use commas after each item in a series to enhance readability. Placing a comma after the item preceding a conjunction is optional according to many grammarians, but it should be used—or not used—consistently. Breaking a sentence into phrases set off by commas enhances readability. *Example:* “Deliver manufactured material to the job site in original, unopened, and

undamaged containers, with name of the product and name of manufacturer clearly identified, and with manufacturer's seals and labels intact.”

- Avoid semicolons (;).
- Use a colon instead of “shall” or “shall be.” (See “Streamlined Writing” below.)
- End sentences with a period (.).

One way to avoid punctuation errors is to use short sentences and phrases. Long sentences offer opportunities for confusion and error. Break up long blocks of text by using subparagraphs.

Poor practice: Tests: Materials used in this Work shall be tested by the manufacturer before shipping. Drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, filling the entire system with water, and allowing it to stand thus filled for 3 hours. Water supply piping and hot-water tanks and heaters inside the building shall be tested by capping or plugging the openings, connecting up a test pump, filling the system with water, and applying a hydrostatic pressure of 150 psi. Water piping may be tested before fixtures or faucets are connected. Each fixture shall be tested for soundness, stability of support, and satisfactory operation of all its parts. After fixtures have been installed, all traps shall be filled and a smoke test shall be applied to expose leaks in the fixtures or connections. Piping shall have tight seals when tested. Screwed and soldered piping not tight under test shall be removed and reconstructed. Joints in cast iron piping not tight under test shall be replaced with new heaters and tanks. Certified test reports delivered to the Architect before Substantial Completion review.

Preferred practice:

A. Tests: Conduct tests as follows:

1. Materials used in this Work shall be tested by the manufacturer before shipping.
2. Drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, filling the entire system with water, and allowing it to stand thus filled for 3 hours.
3. Water supply piping and hot-water tanks and heaters inside the building shall be tested by capping or plugging the openings, connecting up a test pump, filling the system with water, and applying a hydrostatic pressure of 150 psi. Water piping may be tested before fixtures or faucets are connected.

4. Each fixture shall be tested for soundness, stability of support, and satisfactory operation of all its parts.
5. After fixtures have been installed, all traps shall be filled and a smoke test shall be applied to expose leaks in the fixtures or connections. Piping shall have tight seals when tested. Screwed and soldered piping not tight under test shall be removed and reconstructed. Joints in cast iron piping not tight under test shall be replaced with new heaters and tanks.
6. Certified test reports delivered to the Architect before Substantial Completion review.

Use of parenthetical phrases should be minimized or avoided. They add complexity and make the specifications less readable.

Capitalization

The general rule for capitalization is to capitalize the first letter of proper names and defined terms, especially the names and terms used in Agreement and the General Conditions. For example:

1. **Contract Terms:** Defined terms in the Agreement and General Conditions. These include parties to the Contract, such as the Owner and Contractor, and parties defined in the General Conditions of the Contract, including the Architect, Engineer, and Subcontractor. Also, the term “Work” should be capitalized when referring to Work as defined in the General Conditions. (See the definition of the term “Work” in Chapter 2 of this book.) Terms such as “work day” do not require capitalization.
2. **Contract Documents:** As identified in the General Conditions of the Contract, including the Agreement, General Conditions, Drawings and Specifications, Change Order, and Construction Change Directive. Shop drawings, however, are not Contract Documents and should not be capitalized.
3. **Spaces of the Building:** Principal's Office, Auditorium, Library, Teachers' Lounge, Lobby, Clinic, and Mechanical Room are examples.
4. **Grades of Materials:** B and Btr southern pine, Intermediate Heat Duty fire clay brick, Standard Grade ceramic tile, and Type I Regular Core hardwood plywood are examples. Note that terms such as “southern pine,” “douglas fir,” and “portland cement” are not capitalized because they are not proper names.
5. **Portions of the Specifications:** Within a specification section and when referencing portions of a specification section, capitalize Part and Article

titles, Article, Paragraph, and Subparagraph in a specification section. (See the discussion of the format of a specification section in Chapter 3 of this book.)

Capitalize the first letter of the first word in sentence. Capitalize the first letter of the first word following a colon (:).

Abbreviations, Acronyms, and Symbols

The principle to follow regarding abbreviations is to ensure that the reader understands what the abbreviation stands for. Often abbreviations are used when the writer does not know how to spell a word. Sometimes the use of abbreviations is a carryover from the Drawings where space is limited (or was limited when drawings were produced by manual drafting). Stop this practice when writing specifications.

Establish and enforce office standards for use of abbreviations, acronyms, and symbols. Two comprehensive sources for industry-recognized abbreviations and symbols are *Uniform Drawing System (UDS)*, Module 5, titled “Terms and Abbreviations,” and Module 6, titled “Symbols,” published in the *National CAD Standard (NCS)*, available from the Construction Specifications Institute (CSI). A comprehensive source for acronyms is *Encyclopedia of Associations*, published by Gale Research Company.

Coordinate abbreviations and symbols between Drawings and Specifications.

While a list of common abbreviations is usually specified in a Division 1 section of the specifications, explain the abbreviation in the text to enhance clarity. For example, at the first occurrence of an abbreviation or acronym, write out what the abbreviation stands for, such as “barrel (bbl)” or “Association of Home Appliance Manufacturers (AHAM).” After this, in the same specification section, use the abbreviation or acronym.

Common Abbreviations (from John Regener's office master specifications)

AC or ac	Alternating current or air conditioning (depending upon the context)
AMP or amp	Ampere
BTU	British thermal units
BTUH	British thermal units per hour
C	Celsius
CFM or cfm	Cubic feet per minute
CM or cm	Centimeter
CY or cy	Cubic yard
DC or dc	Direct current
DEG or deg	Degrees
F	Fahrenheit
FPM or fpm	Feet per minute
FPS or fps	Feet per second
FT or ft	Foot or feet

Gal or gal	Gallons
GPM or gpm	Gallons per minute
IN or in	Inch or inches
Kip or kip	Thousand pounds
KSF or ksf	Thousand pounds per square foot
KSI or ksi	Thousand pounds per square inch
KV or kv	Kilovolt
KVA or kva	Kilovolt amperes
KW or kw	Kilowatt
KWH or kwh	Kilowatt hour
LBF or lbf	Pounds force
LF or lf	Lineal foot
M or m	Meter
MM or mm	Millimeter
MPH or mph	Miles per hour
PCF or pcf	Pounds per cubic foot
PSF or psf	Pounds per square foot
PSI or psi	Pounds per square inch
PSY or psy	Per square yard
SF or sf	Square foot
SY or sy	Square yard
V or v	Volts

With the advent of word processing programs, symbols are easier to add to text. Macros (recorded instructions or key strokes in word processing software) make insertion of symbols easy. More than the symbols on the keyboard are available. There are several ASCII (American Standard Code for Information Interchange) symbol libraries that can be accessed with commercial office-grade word processing programs. These include commonly used trademark (™), registered trademark (®), copyright (©) and plus-minus. (+/-). Refer to instructions for word processing software for additional information.

Numbers

There are many accepted practices for use of numbers in specifications. Selection of the practice should be guided by the principles of making specifications unambiguous and readable. There may be tension between these two principles. Typically, it is recommended to use Arabic numerals rather than words for numbers.

Some recommend using both Arabic numerals and numbers expressed in words—for example, “sixteen (16) fasteners per panel” rather than “16 fasteners per panel.” The reasoning is based on the misbelief that “sixteen (16)” is more “legal” than simply “16.” And there is a misbelief that there would be less of a problem if the two did not agree, such as “twelve (16) fasteners per panel.” Which is the correct

interpretation: twelve or sixteen (12 or 16)?

Use Numerals Instead of Words

Generally, use numbers instead of words. Consider that the Drawings, which are Contract Documents, use numbers exclusively. There is no less risk of error by using numbers in specifications than there is on the drawings.

An exception to this principle is when numbers are used to state both size and quantity. In this case, state the quantity in words and the quality (dimension or size) in numerals—for example, “three 1/2-inch bolts,” “six 2 x 4 studs,” and “two 4-position hold-opens.” The last example, if stated in numbers only, could be misread as “2 4-position hold-opens” (twenty-four positions).

When including dimensions in the text of specifications, the following conventions are recommended:

1. Spell out feet when no inches are used—for example, “8 feet.”
2. Spell out inches when no feet are used—for example, “8 inches.”
3. When both feet and inches are used, the *CSI Manual of Practice* recommends use of symbols—for example, 8'-8" or 8'-2-1/2" Others, however, recommend using “8-feet 9-inches” because missing punctuation can cause very significant confusion. Consider readability and use professional judgment to choose a convention for dimensions, and then follow the convention consistently.
4. A complete dimension should appear on one line. This requires careful proofreading and understanding of the word processing program. There are several symbols for a dash; some are interpreted like hyphens that break words at the end of a line. Understand the difference between typewritten text and text produced with a word processor.
5. Spell out numbers ten and below. Use numerals for 11 and above.

Example: “four coats of paint,” not “4 coats of paint” (except in schedules).

Example: “12 samples of each brick unit type and color to show range of color variations.”

Use Numerals for Dimensions, Degrees of Temperature, Percent, and Money

Examples: “8-inches on center,” “2-1/2 inch-diameter pipe,” “45 degrees F (7 degrees C),” “85 percent,” and “\$250 per day.”

Use Numerals for Dates and Time

Examples: “2:00 pm on February 14, 2005.” Note that it is not written “February 14th.” Omit the “th.” Exceptions are the times “noon” and “midnight.” Which is 12:00 am? Properly, they should not be “12 noon” or “12 midnight.” However, common practice seems to be to state “12:00 noon” and “12:00 midnight” for consistency with other expressions of time in numerals and for clarity.

Decimals

Express decimals in numerals—for example, “5.75 inches.” When the quantity is less than zero, include a leading “0.” For example, “0.08-inch” or “0.16-foot.”

Fractions

Type out fractional dimensions and quantities. Although word processing programs have the capability of using special characters for fractions, such as $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$, do not use them. This means changing the default setting in the word processing program. This is a carryover from the time when typewriters could not produce these special characters, but now the reason is to avoid conflicts in converting between word processing programs. Some programs may not recognize the special character, and a converted file will lose these fractions. Thus, “3- $\frac{1}{2}$ translates as “3- .”

Examples: “3-1/2 inches” and “3/4-inch.”

Zeros

Omit zeros if clarity and consistency are not compromised. For example, “\$400” is as clear as “\$400.00” but “10 a.m.” may not be as clear or readable as “10:00 a.m.,” especially when the context includes other expressions of time such as “10:15 a.m.”

Streamlined Writing

Consider the use of *streamlined specifications*. *Pencil Points* magazine in August 1939 included an article entitled “Streamlined Specifications” by Horace W. Peaslee, FAIA, proposing writing specifications in an outline form without the use of complete sentences. The *CSI Manual of Practice* recommends and even encourages the use of streamlined specifications. After decades of practice, the authors also recommend using streamlined specifications. Streamlined specifications resolve many grammatical issues of specifications writing and help to produce clear and concise specifications. Consider these points:

1. Streamlining is the most important factor in concise specifications.
2. Streamlining is not proper English, but it is proper specifying.
3. Streamlining is not an excuse for not knowing proper English—but it definitely helps.

The key to streamlined specifications is definition of the colon (:) to mean “shall” or “shall be.” It is very helpful to include an explanatory note in Division 1 or in the supplementary conditions regarding this:

These Specifications are written in the imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” shall be included by inference where a colon (:) is used within sentences or phrases.

Examples of Streamlined Sentences

Adhesive: Spread with notch trowel.

Equipment: Installed plumb and level.

Portland Cement: ASTM C 150, Type 1.

Aggregate: ASTM C 33.

Air-entraining Agent: More-Air Brand, More-X Manufacturing Co.

Specifications Detail

Specification detail should not be confused with complexity of language. Specification detail pertains to the magnitude of specified information relative to the scope and complexity of the project. One size of specifications does not fit all projects, nor does it fit portions of a single project. Professional judgment is needed to determine the appropriate level of detail for project-specific construction specifications.

Specification detail should be commensurate with the complexity and required quality of the project. A speculative warehouse shell building requires less specification detail than a corporate headquarters office building. A tract house requires less specification detail than a mansion-like custom residence. Although similar in construction quality, a multiunit residential complex requires greater specification detail than a single tract house; the multiplied effect of small details in the specifications significantly affects the overall cost.

At the same time, there may be an unintended cost impact of bulky specifications to consider. There is a prejudice at work in the construction industry that says that the bigger the specs, the more expensive the project. This may be a reaction by those who are uncomfortable with written documents or who simply are functionally illiterate. However, specifications are considered well crafted when they cover all important details without elaborate and unnecessary language. This is the main argument for shortform specifications.

This, then, brings the discussion back to the beginning of this chapter and the four Cs in specifications writing:

1. Be clear.
2. Be correct.
3. Be complete.
4. Be concise.

These principles are in dynamic tension in the specifications. There needs to be balance between completeness and conciseness. There needs to be balance between conciseness and clarity. Sometimes more information is necessary and sometimes brevity causes no significant consequence. And there needs to be correctness, which requires care in crafting the specifications so that expedience, often represented in conciseness, does not inhibit proper selection and description of products and their application.

Study Questions

1. True or False? Since specifications are part of a construction Contract, requirements should be expressed in legal terms in order to be enforceable.
2. True or False? To ensure that the Contractor understands a specification, it is preferable to state a requirement in Part 2 of a Section and then repeat it in Part 3.
3. True or False? The term “shall” is used typically in regard to actions required of the Contractor.
4. True or False? When using a “master specification,” retain requirements for inapplicable material in case they should be added.
5. True or False? Since specifications will be used by attorneys to adjudicate disputes between the Owner and Contractor, the specifications should use legal-sounding language.
6. True or False? Each statement in a specification, whether describing workmanship or quality of materials, affects the cost of the Work.
7. True or False? Clear, correct, complete, and concise refer to the elements of good specification writing.
8. True or False? Use of colloquial language and slang construction terms aids understanding by users of the Specifications and enhances the credibility of the Architect/Engineer.
9. True or False? The statement “Concrete floors shall be level and finished smooth” is vague and unenforceable because no criteria is included that defines and measures levelness and smoothness.
10. True or False? Use of precise language is desirable if a specification

is to be followed explicitly.

Chapter 15

Specifications Resources

Overview

The scope of constructions specifications is extremely broad, encompassing the spectrum of materials from acoustical ceilings through zinc coatings. No individual specifier can possibly have a complete and intimate knowledge of all building products, nor can the specifier possibly keep up with the constant changes in building products. Even when the specifier has a focused design discipline, such as one of the engineering professions, or a construction technology, such as door hardware and waterproofing, change in technology is still daunting. Information overload due to the ever-increasing complexity of construction technology is a great challenge.

Knowing where to look for information, and how to identify and extract the applicable information, is half of the battle. Knowing how to apply the information according to recommended specifications organization, and writing principles and procedures, is another major component of the equation. All of this takes place in a construction project delivery environment that is rapidly evolving and a business environment that is increasingly competitive. To make the situation more manageable, the specifier must acquire and use resources that enable information to be located, extracted, and recorded expediently and correctly.

Due to rapid and fundamental changes in how construction information is recorded, identified, and retrieved, it is impossible to describe with certainty what the future of specifying will be. It is the authors' opinion that (1) current trends in building products and project delivery methods will continue to lead to significant changes in specifying, and (2) the traditional principles and procedures for specifications will endure. That is, computer-assisted information management programs will be used with computer-assisted drafting (CAD) for specifications production, but it will be essential to understand and apply the fundamental principles of construction contracts and construction technology to the process in order for competent specifications to be produced.

In *Alice's Adventures in Wonderland* and *Through the Looking Glass* by Lewis Carroll (1865), Alice was traveling and came to a fork in the road. She asked the Cheshire Cat, "Would you tell me, please, which way I ought to go from here?" In response, the Cheshire Cat said, "That depends a good deal on where you want to

go.” Alice replied, “It doesn't much matter where.” The cat responded aptly, “Then I suppose it doesn't matter what road you take.”

Mark Kalin, FAIA, FCSI, CCS, uses the term “fake specs” to describe construction specifications prepared without proper thought and understanding. The specifier who does not know what the end result (the specifications) shall be and does not understand construction technology, product evaluation, contractual duties and responsibilities, terminology, and the subtleties of specifications language will be like Alice trying to decide what to do.

To paraphrase the above passage, if you don't know where you are going or what you are doing, it doesn't matter where you go or what you do. Concerning construction information management, project delivery methods, construction contracts, and production of construction drawings and specifications, too often those who produce construction specifications merely “go through the motions.” They do not understand the consequences of choices, and therefore they don't understand which choices to make.

It is essential that specifiers develop suitable resources for preparing construction specifications in order to be informed and able to make proper choices.

Construction Specifications Resources

In previous editions of this book, at this point listings of publications, businesses, associations, and other resources were included. The problem is, these lists are immediately out of date. Change happens quickly. Industry associations not only relocate but also change their names. Building code publishers are joining together under new association names, and new alternatives are being published. International considerations are affecting the scope of the construction industry. The North America market includes the United States, Canada, and Mexico in increasingly equal measures, with impacts of different languages and construction practices.

The key to accessing current resources is the Internet. High-speed connections are now the norm. Large and small architectural and engineering firms and even individuals who are independent construction specifiers have high-speed Internet service. Design professionals are not only wired but use online resources intensely. Reference books and building product catalogs may sit on shelves in the specifier's office but they are used occasionally. Too often the information is out of date. With high-speed Internet service and powerful search engines, information is limited only by the source's commitment to providing timely and comprehensive.

Building product manufacturers, standards associations, code authorities, and publishers of construction specifications–related documents are routinely accessed by specifiers through on the Internet and e-mail. Therefore, the lists of resources

below will emphasize current Internet sources and some printed publications and associations. While it is still possible to prepare construction specifications using print resources—indeed, print resources have some advantages—the predominant resources are found through online communications of the Internet.

General Resources for Construction Specifications

There are several Internet sites for locating and acquiring current construction information. Perhaps the most comprehensive and suitable one for specifiers is titled “Construction Specifiers Library” and is found on the website of Building Systems Design, Inc. (BSD): www.bssoftlink.com/library/speclibrary-principles.htm. This library includes links to numerous businesses, organizations, and specifications-related resources. It also includes a comprehensive glossary and links to building product search engines. Even competing guide specifications publishers are listed, and there are complete listings of federal agency sites where construction specifications are available.

BSD's website, www.bssoftlink.com, also addresses general specifying and design topics, including:

- Whole building performance specifying
- Energy and environment
- Design-build
- Agreements and General Conditions

ARCOM has a competing website at www.arcomnet.com, portions of which are accessible by non-subscribers to *MasterSpec*. Find the page titled “Resource Links” for general specifications resources.

CSI has many resources available at its website, www.csinet.org, including (for CSI members) access to archives of CSI's magazine, the *Construction Specifier*. CSI also has a bookstore that sells publications related to specifications, construction, and design.

The Internet has not abolished books. Indeed, the Internet has made finding and acquiring books easier. Book publishers, such as John Wiley & Sons, have corporate websites that include the capability of locating and purchasing books by the publisher (www.wiley.com/WileyCDA). One of the most notable e-commerce firms is Amazon.com, which is best known for book sales (www.amazon.com). Using the search engine of a book publisher's website or the generic book sales website, current publications can be identified and purchased for expedient delivery directly from the warehouse to the buyer's door. Even used books can be found, usually for lower costs, and out-of-print books can be located.

The Construction Specifications Institute (CSI) publishes a definitive work

encompassing the entire life cycle of a construction project: the *Project Resource Manual - CSI Manual of Practice* (New York: McGraw-Hill Professional, 2005). The *PRM*, as it is called, is organized in eight modules and covers the following topics:

- Fundamentals and Formats
- Construction Specifications Practice
- Construction Contract Administration (with a separate CD of forms)
- Construction Product Representation

Supplementing the *PRM* are two other publications essential for construction specifications writing:

- *MasterFormat, 2004 Edition, Master List of Numbers and Titles for the Construction Industry* (published jointly in 2004 by the Construction Specifications Institute, Alexandria, Virginia, and Construction Specifications Canada, Toronto, Ontario)
- *SectionFormat/PageFormat, The Recommended Format for Construction Specifications* (published jointly in 2008 by the Construction Specifications Institute, Alexandria, Virginia, and Construction Specifications Canada, Toronto, Ontario)

Contact CSI:

The Construction Specifications Institute
110 South Union Street, Suite 100
Alexandria, VA 22314
703/684-0300 or 800/689-2900
www.csinet.org

Contact CSC:

Construction Specifications Canada
120 Carlton Street, Suite 312
Toronto, ON M5A 4K2
416/777-2198
www.csc-doc.ca

Construction Reference Books

The following dictionaries cover a broad range of construction types, including

historical building materials, archaic terminology, slang terms, and specialized construction terms.

The Construction Dictionary, 9th ed., by the Greater Phoenix Chapter of the National Association of Women in Construction (NAWIC) (www.constructiondictionary.com)

Dictionary of Architecture and Construction, 4th ed., by Cyril M. Harris (McGraw-Hill Book Company, 2005) ISBN: 0-07-135178-7

Construction Glossary: An Encyclopedic Reference and Manual, 2nd ed., by J. Stewart Stein (John Wiley & Sons, 1993) ISBN: 0-471-56933-X

A Visual Dictionary of Architecture by Francis D. K. Ching (John Wiley & Sons, 1996) ISBN: 0-471-28821-7

Means Illustrated Construction Dictionary by Howard Chandler (R.S. Means Company, 1991) ISBN: 0-876-29218-X

The Wiley Dictionary of Civil Engineering and Construction (Wiley Professional, 1999) ISBN 978-0-471-18115-6

The following books cover construction contracts and construction contract administration:

The Architect's Handbook of Professional Practice, 14th ed., by the American Institute of Architects (John Wiley & Sons, 2008, with updates) ISBN: 978-0-470-00957-4

The Building Professional's Guide to Contract Documents, 3rd ed., by Waller S. Poage (R.S. Means Co., 2000) ISBN: 0-876-29577-4

Smith, Currie & Hancock LLP's Common Sense Construction Law: A Practical Guide for the Construction Professional, 2nd ed., by Robert B. Ansley, Jr., Thomas J. Kelleher, Jr., and Anthony D. Lehman (general editors) (John Wiley & Sons, 2005) ISBN: 0-471-66209-7

Construction Graphics: A Practical Guide to Interpreting Working Drawings by Keith A. Bisharat (John Wiley & Sons, 2008) ISBN: 978-0-470-13750-5

Construction Contract Law for Managers, Architect and Engineers by Nancy J. White (Delmar Cengage Learning, 2007) ISBN: 978-1418048471

Construction Project Administration, 7th ed., by Ed Fisk (Prentice Hall, 2002) ISBN: 0-130-98472-8

A Guide to Successful Construction: Effective Contract Administration by Arthur F. O'Leary

Contractor's Guide to Change Orders: How to Resolve Disputes and Get Paid, 2nd ed., by Andrew M., Civitello, Jr. and William D. Locher, JD (BNI Publications, 2002) ISBN: 978-1557014276

The following books cover architectural and engineering design and construction technology in general and specific terms:

Americans with Disabilities Act Accessibility Guidelines Manual (ADAAG) by the U.S. Access Compliance Board (www.access-board.gov/adaag/html/adaag.htm) Note: ADAAG has been superseded by UFAS, below.

Uniform Federal Accessibility Standards (UFAS) by the U.S. Access Compliance Board (www.access-board.gov/ufas/html/ufas.htm)

Time-Saver Standards for Building Types, 4th ed., by Joseph De Chiara, Michael J. Crosbie, and Mike Crosbie (McGraw-Hill Professional, 2001) ISBN: 0-070-16387-1

Time-Saver Standards for Interior Design and Space Planning, 2nd ed., by Joseph De Chiara, Julius Panero, and Martin Zelnik (McGraw-Hill Professional, 2001) ISBN: 0-071-34616-3

Architectural Graphic Standards, 11th ed., by the American Institute of Architects, (John Wiley & Sons, 2002) ISBN: 978-0471700913

Construction Principles, Materials, and Methods, 7th ed., by H. Leslie Simmons (John Wiley & Sons, 2001) ISBN: 0-471-35640-9

Fundamentals of Building Construction: Materials and Methods, 4th ed., by Edward Allen and Joseph Iano (John Wiley & Sons, 2003) ISBN: 0-471-21903-7

Building Materials: Dangerous Properties of Products in MasterFormat Divisions 7 and 9 by H. Leslie Simmons and Richard J. Lewis, Sr. (John Wiley & Sons, 1997) ISBN: 0-471-29084-X

Architectural Materials for Construction by Harold J. Rosen, PE, FCSI, and Tom Heineman, FCSI (McGraw-Hill Professional, 1995) ISBN: 0-070-53741-0

Green Building Materials: A Guide to Product Selection and Specification by Ross Spiegel and Dru Meadows (John Wiley & Sons, 2006) ISBN: 978-0471700898

Mechanical and Electrical Equipment for Buildings, 10th ed., by Ben Stein and John S. Reynolds (John Wiley & Sons, 2005) ISBN: 978-0471465911

Materials Standards

Standards for materials have been devised and issued in the United States by national technical associations and by the federal government to provide uniform criteria, grades, and tests.

The U.S. federal government is privatizing the standards-making process. By

executive order, the former Federal Specifications are not to be cited if an adequate private standard exists. FS, CS, SPR, IS, and PS documents are no longer to be developed by the federal government and are to be withdrawn in time. Specifications and standards by private-sector organizations, such as ASTM International (formerly the American Society for Testing and Materials) and the American National Standards Institute (ANSI), are superseding the former Federal Specifications and standards. ASTM and ANSI have responded with many new standards, organized similarly to the former federal standards, using identical product types and classes in many cases. Confusion has thus been minimized as the standards-setting process is taken over by industry and consumer-oriented organizations.

Originally called the National Standards System Network (NSSN), this organization has become NSSN—A National Resource for Global Standards (see www.nns.org). From this site, “QuickLinks” provides direct linkage to more than 200 federal, state, and local government agency websites focused on standards, regulations, legislation, and technical issues. The site is operated by the ANSI.

The NSSN site is the current source of standards and specifications for federal agencies. From this site, documents may be downloaded with restrictions. The primary restriction is that the party downloading documents must have a contract with a federal government agency that requires the acquisition of the standard or specification. General access and downloading is not possible.

Federal specifications were once the primary reference in construction specifications for General Services Administration, Department of Defense, and National Aeronautics and Space Administration projects. With a few exceptions, these federal specifications have been rendered obsolete for construction purposes. They have been replaced by non-government standards (NGS), which are familiar in commercial and nonfederal institutional construction.

NGS specifications and standards are the standards of ASTM International and ANSI, as noted above. Other association standards, such as those of the Architectural Woodwork Institute, Tile Council of America, and Steel Door Institute (SDI), have also been adopted. Sometimes the adopted standard is a joint standard, such as ANSI 250.8, which is SDI 100.

Similarly, Commercial Standards (CS), Product Standards (PS), Simplified Practice Recommendations (SPR), and Industry Standards (IS), formerly issued by the Department of Commerce, have been withdrawn and are no longer indexed or sold. Exceptions are two Product Standards (PS) for plywood and softwood lumber (PS 1 and PS 20, respectively), still available from the National Institute of Standards and Technology (NIST). Also remaining is Consumer Products Safety Commission (CPSC) Standard 16CFR1201 for safety glazing.

Those requiring specifications and standards applicable to federal agencies may also access these documents through the Construction Criteria Base (CCB) at www.ccb.org. The CCB is an extensive electronic library of construction guide

specifications, manuals, standards, and many other essential criteria documents published on the Internet and on a set of eight CD-ROM disks or one DVD by the nonprofit National Institute of Building Sciences. Updated continuously at www.ccb.org and on disk twice a year in April and October, CCB contains the complete unabridged, approved, current electronic equivalents of over 10,000 documents and executable programs, direct from 18 federal agencies and over 100 industry organizations. CCB is an effective tool for finding and using current, approved U.S. construction criteria. Subscription information can be found at www.ccb.org/subscribe.html.

The former American Society for Testing and Materials is now an international organization with a name to suit: ASTM International. Founded in 1898, ASTM International is a nonprofit organization that provides a global forum for the development and publication of voluntary consensus standards for materials, products, systems, and services. Over 30,000 individuals from 100 nations are members of ASTM International, including producers, users, consumers, and representatives of government and academia. In over 130 varied industry areas, ASTM standards serve as the basis for manufacturing, procurement, and regulatory activities. ASTM International provides standards that are accepted and used in research and development, product testing, quality systems, and commercial transactions around the globe.

ASTM standards, individually or in *ASTM Standards in Building Construction*, may be obtained from:

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
610/832-9585

ANSI is a private, nonprofit organization (501(c)3) that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI's mission is to enhance both the global competitiveness of U.S. business and the quality of American life by promoting and facilitating voluntary consensus standards and conformity assessment systems and safeguarding their integrity. ANSI standards may be obtained online at <http://webstore.ansi.org/ansidocstore/default.asp> or by contacting ANSI at:

American National Standards Institute (ANSI)
25 West 43rd Street, 4th Floor
New York, NY 10036
212/642-4900

In some cases, synopses of standards are available from the publishing organization's website. Try the website prior to purchasing very expensive and seldom-read documents.

Master Guide Specifications

Master guide specifications serve as an aid in the preparation and development of construction specifications. These are being supplanted by true computer-assisted specifications, but in the meantime, subscriptions to portions or all of the libraries of guide specifications and supporting documents may be obtained from the publishers. Master guide specifications will be discussed further in Chapter 18. Major sources for master guide specifications are:

MasterSpec

ARCOM, Inc.
332 E. 500th Street
Salt Lake City, UT 84111
801/521-9162 or 800/424-5080
www.arcomnet.com

SpecText

Construction Sciences Research Foundation, Inc. (CSRF)
The CSRF Support Center
P.O. Box 926
Bel Air, MD 21014-0926
410/838-7525 or 877/SPECTXT (773-2898)
www.spectext.com

UFGS—Unified Facilities Guide Specifications (Federal agency specifications)

Construction Criteria Base (CCB)
National Institute for Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
202/289-7800 or 877/222-5667
www.ccb.org/docs/ufgshome/UFGSToc.htm

GreenSpecs and Master Shortform Specifications

Kalin Associates
1121 Washington Street
Newton, MA 02465
617/964-5477 or 800/565-2546
www.kalinassociates.com

Automated Construction Specifications Programs

Automated or computer-assisted specifications will be discussed in Chapter 19. Resources are:

BSD SpecLink®

Building Systems Design, Inc.
3520 Piedmont Road NE, Suite 415
Atlanta, GA 30305
404/365-8900 or 888/273-7638
www.bssoftlink.com

Specware (Masterworks™ and Linx™)

ARCOM, Inc.
332 E. 500th Street
Salt Lake City, UT 84111
801/521-9162 or 800/424-5080
www.arcomnet.com

EditSpec

Construction Sciences Research Foundation, Inc. (CSRF)
The CSRF Support Center
P.O. Box 926
Bel Air, MD 21014-0926
410/838-7525 or 877/SPECTXT (773-2898)
www.spectext.com

e-Specs and e-Specs for Revit

InterSpec LLC
100 Commercial Street
Portland, ME 04101
207/772-6135 or 888/507-7327

SpecsIntact (based on the Unified Facilities Guide Specifications)

Kennedy Space Center, FL 32899
321/867-8800
<http://specsintact.ksc.nasa.gov/>

Journals and Periodicals

Construction industry periodicals occasionally have construction specifications–related articles. However, articles on topics such as those addressed in this book

are infrequently published. An exception is CSI's *The Construction Specifier*, which after several years of neglecting its core constituency—construction specifiers—regularly publishes articles on Division 1 - General Requirements specifications issues and construction technology. Subscription information may be found at CSI's website, www.csinet.org, or at www.constructionspecifier.com. A subscription to *The Construction Specifier* is included with CSI membership.

General construction industry publications sometimes contain articles on construction specifications. Typically, however, they focus on construction technology and architectural and engineering design. Examples:

Architectural Record

877/876-8093

<http://archrecord.construction.com>

Building Design & Construction

2000 Clearwater Drive

Oak Brook, IL 60523

www.bdcmag.com

Consulting-Specifying Engineer

2000 Clearwater Drive

Oak Brook, IL 60523

www.csemag.com

Engineering News-Record

877/876-8208

www.enr.com

Other architecture and engineering magazines have occasional articles on construction contract documents and construction specifications. Contact industry associations, code associations, and professional societies for information regarding subscriptions and editorial content.

Newsletters with a focus on construction specifications are published by several corporate and professional associations and are available for free downloading. These include:

- *KnowHow* by Specifications Consultants in Independent Practice (SCIP): www.scip.com
- *Creating a Common Language* by The Construction Sciences Research Foundation (CSRFF), publisher of SPECTEXT: www.csrf.org
- SpecPress by ARCOM, Inc. (publisher of MasterSpec, Masterworks, and Linx): www.arcomnet.com
- *Building Science Newsletter* by the National Institute of Building Sciences

- *Canadian Building Digest* by the National Research Council

Building Codes and Ordinances

There are codes and ordinances promulgated by authorities having jurisdiction over public agencies. These agencies include cities, counties, states, and special districts. The purpose of the codes and ordinances is to protect health, life, and property. Included are zoning regulations, building codes, fire and life safety codes, plumbing codes, mechanical (HVAC) codes, and electrical codes. These codes should be consulted to ensure that the project design and specified requirements comply with applicable regulations. Where appropriate, references to these codes and ordinances should be incorporated in specifications. Often plancheckers require citation of code requirements in the specifications to ensure compliance during construction.

Occasionally, these codes may cover only minimum standards and types of construction. The Architect/Engineer or specifier may exercise professional judgment and determine that construction shall be of higher quality than that required under the codes.

Buildings and other facilities have been governed by model codes published by regional code associations and adopted as law by governing authorities. Major cities such as New York City, Los Angeles, and San Francisco and states such as Massachusetts and California have adopted their own codes, often based on model codes but with significant amendments. Other unique codes are found in Florida, such as the Metro-Dade South Florida Building Code.

An effort has been made to consolidate, standardize, and simplify building codes. Statewide codes have been adopted, with some local amendments to suit unique requirements. With the merging of several code associations, state-to-state standardization has occurred.

ICC Codes and Standards

In 1994, Building Officials and Code Administrators International, Inc. (BOCA), the International Conference of Building Officials (ICBO), and Southern Building Code Congress International, Inc. (SBCCI) formed the International Code Council (ICC). In 1997, the Council of American Building Officials (CABO) also joined. This resulted in the 1999 publication of a series of international codes covering most aspects of construction and other facilities, including:

- International Building Code
- International Energy Conservation Code
- International Existing Building Code

- International Fire Code
- International Fuel Gas Code
- International Mechanical Code
- ICC Performance Code
- International Plumbing Code
- International Private Sewage Disposal Code
- International Property Maintenance Code
- International Residential Code
- International Zoning Code
- ICC Electrical Code

This means that the former BOCA National Building Code, CABO One and Two Family Dwelling Code, Standard Building Code and Uniform Building Code and their related plumbing, mechanical and other codes no longer apply. According to ICC, more than 95 percent of U.S. cities, counties, and states adopt building and safety codes published by the ICC.

While this merger would seem to indicate that architects, engineers, and specifiers will only need to refer to one series of codes from one model code association (ICC), practical experience suggests that there will be numerous local amendments to address matters such as disaster mitigation (windstorm and earthquake), energy conservation, accessibility, innovative technology, and fire protection. Responsible design professionals need to confirm the exact codes, including special amendments, that apply to the project and comply with these special requirements.

In California, all jurisdictions are mandated to adopt the California Building Code, which is based on the International Building Code (ICC) with State of California amendments. Not only is the statewide Code derived from the ICC but several local jurisdictions, notably the cities of San Francisco and Los Angeles, and Los Angeles County, have each adopted additional amendments to the California Building Code. Further, for projects under State jurisdiction for planchecking and permitting, such as public school projects under the Division of the State Architect, (DSA) and medical facilities under the Office of Statewide Health Planning and Development, (OSHPD), additional amendments for accessibility and structural safety (seismic design) and more specific adaptations and interpretations of the Statewide Code have been adopted.

So, while most building codes have been standardized, it seems some are more standard than others. The specifier must confirm what are the applicable Codes to which the specifications must conform. For further information, contact the following organizations:

Headquarters (FC)

International Code Council
5203 Leesburg Pike, Suite 600
Falls Church, VA 22041
703/931-4533
www.iccsafe.org

Birmingham District Office (BIR)
International Code Council (ICC)
900 Montclair Road
Birmingham, AL 35213-1206
205/591-1853

Chicago District Office (CH)
4051 W Flossmoor Road
Country Club Hills, IL 60478-5795
800/214-4321

Los Angeles District Office (LA)
5360 Workman Mill Road
Whittier, CA 90601-2298
800/284-4406

NFPA Codes and Standards

Competing with ICC is the National Fire Protection Association (NFPA). Now officially known by its initials only, NFPA is an international nonprofit organization founded in 1896 and is best known for codes and standards related to fire and life safety. NFPA has published over 300 safety codes and standards. The most prominent ones are:

- *NFPA 1*, Fire Prevention Code™: Provides the requirements necessary to establish a reasonable level of fire safety and property protection in new and existing buildings.
- *NFPA 13*, Installation of Sprinkler Systems: Rules that apply to the full range of fire sprinkler systems, from concept to installation.
- *NFPA 54*, National Fuel Gas Code: Safety requirements for fuel gas installations.
- *NFPA 70*, National Electrical Code®: A widely used and accepted code for

electrical installations.

- *NFPA 101, Life Safety Code®*: Establishes minimum requirements for new and existing buildings to protect building occupants from fire, smoke, and toxic fumes.
- *NFPA 5000®, Building Construction and Safety Code®*: A building code developed through an open, consensus-based process that is accredited by ANSI. *NFPA 5000 will be a cornerstone of the Comprehensive Consensus Codes (C3) set.*

For further information, contact:

NFPA

1 Batterymarch Park

P.O. Box 9101

Quincy, MA 02169-7471

617/770-3000 or 800/344-3555

www.nfpa.org

It is important for architects, engineers, and specifiers to monitor developments in codes and standards and remain current through continuing education and professional development activities. In practice, too many design decision-makers have barely a superficial understanding of codes and standards. Taking a basic course on building codes, especially building code interpretation, is highly recommended.

Evaluation Reports

A final source of codes and standards information, applicable to ICC Codes and standards, are the publications of the ICC Evaluation Service (ICC-ES). Concurrent with the establishing of the ICC, ICC-ES assimilated the evaluation services of the four model code associations that formed ICC. These were CABO National Evaluation Service, BOCA Evaluation Services, ICBO Evaluation Service, and SBCCI Public Service Testing and Evaluation Services. Through “legacy” evaluation services, ICC-ES has a history that goes back more than 70 years.

At time of publication of this book, ICC-ES is both adopting new ICC-ES evaluation reports and retaining “legacy reports” originally issued under the rules of one of the legacy evaluation services. Eventually, all reports will be reevaluated and issued as ICC-ES evaluation reports. ICC-ES reports may be viewed and downloaded online from www.icc-es.org/Evaluation_Reports/index.shtml. For further information, contact:

ICC Evaluation Service

5360 Workman Mill Road

Whittier, CA 90601-2298

562/699-0543

www.icc-es.org

Materials Investigations

A valuable service that has been performed by some governmental agencies and national technical associations is the laboratory investigation of properties of building materials and the structural elements of buildings, as well as the performance of mechanical equipment for buildings. Many of these reports have also been compiled on the basis of the experience record of many individuals who have been closely associated with certain materials. Examples of these resources are:

Building Science Series (NIST BSS)

National Institute of Standards and Technology

100 Bureau Drive

Gaithersburg, MD 20899-3460

301/975-6478

www.nist.gov

Council Notes and Research Reports

Building Research Council

School of Architecture, University of Illinois at Urbana-Champaign

1 East St. Mary's Road

Champaign, IL 61820

<http://brc.arch.uiuc.edu/Pubcatalog.htm>

The Wood Handbook FPL-GTR-113

Forest Products Laboratory

USDA Forest Service

One Gifford Pinchot Drive

Madison, WI 53726-2398

608/231-9200

www.fpl.fs.fed.us

Approval Guide

FM Global (Factory Mutual Insurance Co.)

1301 Atwood Avenue / P.O. Box 7500

Johnston, RI 02919

401/275-3000

www.fmglobal.com

UL Building Materials, Roofing Materials and Systems, Fire Protection Equipment, Fire Resistance Directory

Listing Information Services—5152XGNK

Underwriters Laboratories, Inc.

333 Pfingsten Road

Northbrook, IL 60062-2096

847/664-2899 or 800/704-4050

<http://ulstandardsinfolnet.ul.com>

Association Standards

Other pertinent architectural and engineering information can be found in standards issued by various manufacturing, contracting, and technical associations. Some frequently referenced sources are:

ACI Manual of Concrete Practice

American Concrete Institute / ACI International

38800 Country Club Drive

Farmington Hills, MI 48331

248/848-3700

www.aci-int.org

Aluminum Curtain Wall Design Manual and Metal Curtain Wall Design Manual; ANSI/AAMA/NWDA 101 / IS 2-97 Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; Anodic Finishes / Painted Aluminum

American Architectural Manufacturers Association (AAMA)

1827 Walden Office Square, Suite 550

Schaumburg, IL 60173-4268

847/303-5664

www.aamanet.org

Standard Specifications for Transportation Materials and Methods of Sampling and Testing

American Association of State Highway and Transportation Officials (AASHTO)

444 North Capitol Street NW, Suite 249

Washington, DC 20002

202/624-5800

www.aashto.org

North American Specification for the Design of Cold-Formed Steel Structural Members

American Iron and Steel Institute (AISI)

1140 Connecticut Avenue, Suite 705

Washington, DC 20036

202/452-7100

www.steel.org

AISC Steel Construction Manual

American Institute of Steel Construction

One East Wacker Drive, Suite 3100

Chicago, IL 60601-2001

312/670-2400 or 800/644-2400

www.aisc.org

Architectural Woodwork Quality Standards Illustrated

Architectural Woodwork Institute (AWI) and Architectural Woodwork Manufacturers Association of Canada (AWMAC)

1952 Isaac Newton Square

Reston, VA 20190

703/733-0600 or 800/449-8811

www.awinet.org

ASHRAE Standards and Guidelines

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

1791 Tullie Circle NE

Atlanta, GA 30329

404/636-8400 or 800/527-4723

www.ashrae.org

AWWA Standards

American Water Works Association (AWWA)

666 Quincy Avenue

Denver, CO 80235

303/794-7711 or 800/926-7337

www.awwa.org

Certified Product Listings

CSA International (CSA) (Formerly: IAS—International Approval Services)

178 Rexdale Boulevard
Toronto, Ontario, Canada M9W 1R3
416/747-4000 or 866/797-4272
www.csa-international.org

GANA Glazing Manual

Glass Association of North America (GANA)
2945 SW Wanamaker Drive, Suite A
Topeka, KS 66614
785/271-0208
www.glasswebsite.com

Technical Notes—Brick and Tile

Brick Industry Association (BIA)
11490 Commerce Park Drive
Reston, VA 22091
703/620-0010
www.bia.org

Architectural Sheet Metal Manual and numerous HVAC-related documents

Sheet Metal and Air-Conditioning Contractors National Association (SMACNA)
4201 Lafayette Center Drive
Chantilly, VA 20151-1209
703/803-2980
www.smacna.org

Handbook for Ceramic Tile Installation

Tile Council of North America, Inc.
100 Clemson Research Boulevard
Anderson, SC 29625
864/646-8453
www.tileusa.com

Manufacturers' Product Data

Manufacturers' catalogs are other specification reference sources. However, the suggested specifications in these catalogs should be used with caution. Some catalogs and websites include manufacturers' specifications that are appropriately written, while others are vague and written so as to exclude competitors' products.

Therefore, they often fail to provide precise, informative, and clear subject matter.

When using specifications produced by manufacturers, it is absolutely essential to be discriminating in using the text. Do not use clauses as written unless every statement is clearly understood. Modify the language where necessary to ensure competition and complete understanding.

Sources of manufacturers' product data include the following. Those known to include access to construction specifications in word processing formats are noted by the publisher.

ARCAT, The Product Directory for Architects (including access to library of manufacturers' specifications in word processing formats, CAD details, and BIM objects)

ARCAT, Inc.
1077 Bridgeport Avenue
Shelton, CT 06484
203/929-9444
www.ARCAT.com

First Source (including Spec-Text data format and Manu-Spec guide specifications)

Reed Construction Data
30 Technology Parkway South, Suite 100
Norcross, GA 30092
770/417-4000 or 800/906-3406
www.FirstSourceONL.com

Sweet's Catalog File—Architects, Engineers & Contractors Edition

McGraw-Hill Construction Sweets
Two Penn Plaza, 10th Floor
New York, NY 10121
800/442-2258
www.sweets.com

[4specs.com](http://www.4specs.com) (comprehensive online directory of links to manufacturers' websites, with discussion forums on construction specifications topics)

www.4specs.com

Specifications published by ARCAT, ARCOM (*Product MASTERSPEC®*, available to *MasterSpec* subscribers and issued by the manufacturer), *Manu-Spec* (issued by First Source and BSD (accessible by *SpecLink+* subscribers) conform to CSI *SectionFormat* and *PageFormat* and comply with the specifications writing criteria of the *Project Resource Manual - CSI Manual of Practice*.

General References

Additional reference sources for materials, workmanship, standards, tests, and general information are contained in the publications of various associations of manufacturers, technical societies, and contractors associations. Names and addresses of these associations are updated annually in the *Encyclopedia of Associations*, published by Gale Research Co., Detroit, available at most libraries. For convenience, see the current listings available from the Building Systems Design, Inc. (BSD) website at www.bsdssoftlink.com.

American Institute of Architects Documents

These documents are available from the American Institute of Architects (AIA) (www.aia.org), including most local chapter offices. Contact the national office at the following address or a local office for a current list of documents and ordering instructions.

American Institute of Architects (AIA)
1735 New York Avenue, NW
Washington, DC 20006
202/626-7300 or 800/365-2724
www.aia.org/documents

The following documents may be suitable for reference or for inclusion with the bidding and construction contract documents in the Project Manual:

- *A101™-2007*, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum
- *A101™/CMA-1992*, Standard Form of Agreement Between Owner and Contractor-Stipulated Sum, Construction Manager - Adviser Edition
- *A105™-1993*, Standard Form of Agreement Between Owner and Contractor for a Small Project, and *A205™ -1993*, *General Conditions of the Contractor for Construction of a Small Project* (two-document set)
- *A105™-2007*, Standard Form of Agreement Between Owner and Contractor for a Residential or Small Commercial Project
- *A107™-1997*, Abbreviated Standard Form of Agreement Between Owner and Contractor for Construction Projects of Limited Scope Stipulated Sum
- *A111™-1997*, Standard Form of Agreement Between Owner and Contractor Cost of the Work Plus a Fee, with a Negotiated Guaranteed Maximum Price (GMP)
- *A114™-2001*, Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price (GMP)

- *A121™ CMc-2003*, Standard Form of Agreement Between Owner and Construction Manager Where the Construction Manager is also the Constructor (also AGC Document 565)
- *A131™ CMc-2003*, Standard Form of Agreement Between Owner and Construction Manager Where the Construction Manager is also the Constructor and Where the Basis of Payment is the Cost Plus a Fee and there is no Guarantee of Cost
- *A132™-2009*, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Advisor Edition
- *A133™-2009*, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the Basis of Payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price
- *A134™-2009*, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the Basis of Payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price
- *A141™-2004*, Standard Form of Agreement Between Owner and Design-Builder
- *A142™-2004*, Standard Form of Agreement Between Design-Builder and Contractor
- *A175™ID-2003*, Standard Form of Agreement Between Owner and Vendor for Furniture, Furnishings and Equipment where the basis of payment is a Stipulated Sum
- *A201™-2007*, General Conditions of the Contract for Construction
- *A201™-2007*, Commentary (free for downloading at www.aia.org/documents)
- *A201™ 1997 to 2007*, Comparison (free for downloading at www.aia.org/documents)
- *A201™/CMa-1992*, General Conditions of the Contract for Construction, Construction Manager-Adviser Edition
- *A201™/SC-1999*, Federal Supplementary Conditions of the Contract for Construction
- *A275™ ID-2003*, General Conditions of the Contract for Furniture, Furnishings, and Equipment
- *A305™-1986*, Contractor's Qualification Statement
- *A310™-1970*, Bid Bond
- *A312™-1984*, Performance Bond and Payment Bond
- *A401™-1997*, Standard Form of Agreement Between Contractor and Subcontractor
- *A501™-1995*, Recommended Guide for Competitive Bidding Procedures and Contract Awards for Building Construction

- *A503TM-2007*, Guide for Supplementary Conditions (free for downloading at www.aia.org/documents)
- *A511TM/CMa-1993*, Guide for Supplementary Conditions, Construction Manager - Adviser Edition (free for downloading at www.aia.org/documents)
- *A521TM-1995*, Uniform Location of Subject Matter
- *A701TM-1997*, Instructions to Bidders
- *A775TM ID-2003*, Invitation and Instructions for Quotation for Furniture, Furnishings and Equipment
- *G601TM-1994*, Request for Proposal Land Survey
- *G602TM-1993*, Request for Proposal Geotechnical Services
- *G605TM-2000*, Notification of Amendment to the Professional Services
- *G606TM-2000*, Amendment to the Professional Services Agreement
- *G607TM-2000*, Amendment to the Consultant Services Agreement
- *G612TM-2001*, Owner's Instructions Regarding the Construction Contract, Insurance and Bonds, and Bidding Procedures (free for downloading at www.aia.org/documents)
- *G701TM-2001*, Change Order
- *G701TM/CMa-1992*, Change Order, Construction Manager - Adviser Edition
- *G702TM-1992*, Application and Certificate for Payment
- *G702TM/CMa-1992*, Application and Certificate for Payment, Construction Manager - Adviser Edition
- *G703TM-1992* Continuation Sheet
- *G704TM-2000*, Certificate of Substantial Completion
- *G704TM/CMa-1992*, Certificate of Substantial Completion, Construction Manager-Adviser Edition
- *G706TM-1994*, Contractor's Affidavit of Payment of Debts and Claims
- *G706ATM-1994*, Contractor's Affidavit of Release of Liens
- *G707-1994*, Consent of Surety to Final Payment
- *G707ATM-1994*, Consent of Surety to Reduction in or Partial Release of Retainage
- *G709TM-2001*, Proposal Request
- *G710TM-1992*, Architect's Supplemental Instructions
- *G711TM-1972*, Architect's Field Report
- *G712TM-1972*, Shop Drawing and Sample Record
- *G714TM-2007*, Construction Change Directive
- *G714TM/CMa-1992*, Construction Change Directive, Construction Manager - Adviser Edition
- *G715-1991*, Instruction Sheet and Attachment for ACORD Certificate of

Insurance

- *G804-2001*, Register of Bid Documents
- *G805-2001*, List of Subcontractors
- *G806-2001*, Project Parameters Worksheet
- *G807-2001*, Project Team Directory
- *G808-2001*, Project Data
- *G809-2001*, Project Abstract
- *G810-2001*, Transmittal Letter

Engineers Joint Contract Documents Committee (EJCDC) Documents

The following EJCDC documents are forms, commentaries, and other documents useful to those engaged in the preparation of bidding and contract documents for engineering projects. They are offered through the American Consulting Engineers Council, the American Society of Civil Engineers, and the National Society of Professional Engineers.

American Consulting Engineers Council (ACEC)

1015 15th Street, 8th Floor, NW

Washington, DC 20005-2605

202/347-7474

www.acec.org/shoppingcart/

American Society of Civil Engineers (ASCE)

1801 Alexander Bell Drive

Reston, VA 20191-4400

703/295-6300 or 800/548-2723

www.asce.org/ejcdc/

National Society of Professional Engineers (NSPE)

1420 King Street

Alexandria, VA 22314

703/684-2800

www.nspe.org/ejcdc/home.asp

EJCDC documents may be suitable for inclusion with the bidding and construction contract documents in the Project Manual. Prospective documents are:

- *Standard General Conditions of the Construction Contract (C-700)*
- *Standard Form of Agreement Between Owner and Contractor; Stipulated Price (C-520)*
- *Standard Form of Agreement Between Owner and Contractor; Cost-Plus (C-525)*
- *Work Change Directive (C-940)*
- *Change Order (C-941)*
- *Field Order (C-942)*
- *Certificate of Substantial Completion (C-625)*
- *Contractor's Application for Payment (C-620)*
- *Suggested Instructions to Bidders for Construction Contracts (C-200)*
- *Guide to the Preparation of Supplementary Conditions (C-800)*
- *Suggested Bid Form for Construction Contracts (C-410)*
- *Engineer's Request for Instructions on Bonds and Insurance for Construction (C-051)*
- *Owner's Instructions Concerning Bonds and Insurance for Construction (C-052)*
- *Notice of Award (C-510)*
- *Notice to Proceed (C-550)*
- *Construction Performance Bond (C-610)*
- *Construction Payment Bond (C-615)*
- *Bid Bond; Penal Sum Form (C-430)*
- *Bid Bond; Damages Form (C-435)*
- *Owner's Instructions Regarding Bidding Procedures (C-050)*

Study Questions

- 1.** True or False? A construction dictionary is essential for producing and using construction specifications.
- 2.** Materials Standards are available from all but which of the following?
 - a.** The Construction Specifications Institute (CSI)
 - b.** National Institute for Science and Technology (NIST)
 - c.** American National Standards Institute (ANSI)
 - d.** ASTM International
- 3.** Comprehensive master guide specifications are available from which of the following?
 - a.** ARCOM, Inc.: *MasterSpec*

- b.** National Institute for Building Sciences (NIBS): *UFGS*
 - c.** Construction Sciences Research Foundation (CSRF): *SpecText*
 - d.** All of the above
- 4.** True or False? Building Codes and related Standards are necessary resources for specifications production.
- 5.** True or False? ICC Evaluation Reports describe conditions for acceptance of specific products for use in jurisdictions governed by the International Building Code (IBC).
- 6.** True or False? Manufacturing, contracting, and technical associations publish nationally recognized industry standards.
- 7.** Proprietary manufacturers' specifications are available through which of the following?
- a.** ARCAT
 - b.** CMD FirstSource
 - c.** ARCOM, Inc.
 - d.** BSD SpecLink
 - e.** The Construction Specifications Institute (CSI)
- 8.** Online resource to identify building products and manufacturers include which of the following?
- a.** www.4specs.com (www.4specs.com)
 - b.** CMD FirstSource (www.cmdfirstsource.com)
 - c.** ARCAT (www.arcat.com)
 - d.** All of the above
- 9.** True or False? Model contract documents are published by The American Institute of Architects (AIA) and the Engineers Joint Contract Documents Committee (EJCDC).
- 10.** True or False? Building product manufacturer's websites are often resources for selection and specification of appropriate products.

Chapter 16

Product Selection

Product Selection Factors

The selection of products for the design of a facility is the responsibility of the Architect or Engineer of Record. There are many factors to consider when selecting and evaluating materials, equipment, components, and systems for use in construction. Some are mandated, and others are determined by applying architecture and engineering principles. Still others are ethical, economic, and political. The architect or engineer also is responsible for selecting products and designing assemblies that result in an integrated design for the project. These factors combine, requiring the architect or engineer to understand the technology represented in the design and appropriately address the various product selection factors, appropriately using the methods for specifying the products discussed in Chapter 5.

Mandated Requirements

The first and perhaps most obvious factor in product selection is what is mandated. Sources of those mandates include the applicable building code, regulations, laws, and ordinances, and the stated requirements, policies, and preferences of the owner. Especially on institutional projects (educational, correctional, and medical facilities), mandated requirements are abundant.

Fire and Life Safety Requirements

Review of the drawings at the Design Development phase of a project should reveal the fire and life safety requirements. When these are determined, products complying with the fire and life safety requirements should be listed according to the CSI *MasterFormat* section number. For example, if fire-resistive gypsum board is needed for walls, partitions, and ceilings, this should be noted to be included in the gypsum board section. If doors in fire-rated walls and partitions are needed, this should be noted to be included in the steel doors and frame section and (if used) in the wood doors section. If access panels are needed in fire-rated walls and ceilings, this should be noted to be included in the access doors and panels section.

If ducts pass through fire-rated walls and floors/ceilings, then it should be noted that fire dampers are needed on ductwork and the specifications should include a section for firestopping and smoke seals.

Carefully going through the drawing plans, sections, and details as they develop will enable the project architect or engineer to identify for the specifier what needs to be specified. Handing a set of drawings to the specifier without consultation with the architect or engineer, who is very knowledgeable about the project, is inefficient and leads to false assumptions, overspecifying, and underspecifying.

The more clearly the drawings indicate fundamental fire and life safety information, including ratings of walls, partitions, and ceilings, plus exitways and room occupancies, the easier it will be for the specifier (and planchecker) to understand the project design and select appropriate products.

Structural Safety Requirements

It is not only the structural engineer who must address seismic design issues. As lessons are learned from analyses of major earthquakes, the more seismic safety provisions become mandated by code. The 1994 earthquake in Northridge, California, involved heavy shaking and damage to building structural elements, which was not surprising. What was surprising was the damage to mechanical and electrical systems. Sprinkler piping was often severed, and systems were rendered useless; leakage caused flooding and extensive damage as well. HVAC equipment and ductwork were put out of commission due to failed anchorages. Emergency power was not available at one hospital because the violent shaking of the earthquake damaged the internal components of the emergency generator's switchgear. The generator started, but the electrical load could not be shifted to it.

Mechanical and electrical engineers, as well as architects and structural engineers, must address the seismic requirements in revised building, mechanical, and electrical codes. This is not a phenomenon limited to California. Alaska, the Pacific Northwest, Missouri, and other locations with a high seismic risk will require attention to structural safety.

Storm Damage Resistance

Areas subject to windstorm damage, including Pacific islands such as Guam, the Gulf and Atlantic coasts of the United States, the Caribbean islands, and Midwestern areas subject to tornados all require attention to structural safety requirements. Architects and engineers need to comply not only with lateral bracing and roof structural anchorages requirements but also with strengthened glass framing and missile-resistant glass requirements.

The consequences of hurricane damage can cost billions of dollars, as evidenced by Hurricane Andrew (1992; \$40.7 billion), Hurricane Katrina (2005; \$90 billion),

Hurricane Rita (2005; \$11 billion), and Hurricane Ike (2008; \$32 billion). Building codes have been updated and will continue to be updated to require facilities to be more resistant to storm damage. These requirements will be reflected in the selection and specification of building products.

Accessibility

Access compliance in facility designs is not a building code matter. It is a civil rights matter. This makes it even more serious for architects and engineers. Federal and federally funded facilities require compliance with accessibility regulations, most commonly the U.S. federal *Uniform Facility Accessibility Standards (UFAS)* (which superseded the Americans with Disability Act Accessibility Guidelines for Buildings and Facilities [AADAG]). These regulations are usually the basis of state/province and local accessibility regulations.

Accessibility regulations address not only architectural barriers and matters such as toilet room grab bars and lever handles on doors, but also many other matters including those affecting civil, landscape, plumbing, and electrical components. For example, slip resistance and gradients of exterior walking surfaces, plumbing fixtures, and electrical outlet locations are governed by accessibility regulations. Product selections must consider use by the physically challenged.

Sustainable Design and Construction

Government entities at federal, state/province, and local levels are mandating sustainable design of facilities, which includes selection of products used in construction. Even corporations are mandating sustainable designs, as evidenced by the LEED 2.0 certified corporate headquarters for the Premier Automotive Group (Ford Motor Company) in Irvine, California, and the LEED registered South Campus Office Development for Toyota Motor Sales, U.S.A., in Torrance, California (a 624,000-square-foot complex constructed at a cost comparable to that of a conventional commercial office building). Both projects were designed by LPA, Inc., of Irvine (specifications consultant: David E. Lorenzini, FCSI, CCS, Associate AIA, of Architectural Resources Company, Leesburg, Virginia).

Sustainable design involves far more than selecting products with recycled materials content. It means designing from the project's inception to meet energy conservation and waste management criteria.

Energy Conservation

This is a major topic for architects and mechanical and electrical engineers. States such as Massachusetts and California have highly developed and restrictive energy conservation regulations affecting thermal insulation, air and water vapor barriers, mechanical equipment efficiency, lighting fixtures, and building controls such as

energy management and control systems. Energy conservation is now an integral part of the design of all types of buildings, from individual residences to schools, hospitals, commercial office buildings, hotels, restaurants, and even warehouses. Product selections must be made with sensitivity to energy conservation factors.

Waste Management

This is an increasing issue for municipalities, and local waste management regulations must be determined and followed. The city of Vancouver, British Columbia, is a leader in the development of waste management specifications for Division 1 - General Requirements. For LEED-certified projects, construction waste not only is required to be separated for recycling, but offsite disposal shall be minimized.

LEED Certification

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings by the U.S. Green Building Council (USGBC). USGBC represents segments of the building industry and has developed LEED standards for several programs including:

- LEED-EB, for Existing Buildings, Upgrades, Operations, and Maintenance
- LEED-NC, New Construction and Major Renovations
- LEED for Schools
- LEED-CS, for Core & Shell Development
- LEED-CI, for Commercial Interiors

LEED provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED emphasizes state-of-the-art strategies for sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. LEED recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training, and practical resources. Refer also to Chapter 22 – Green Specs / LEED Specs.

Design Criteria

Occupancy and Use

Consider the occupancy and use of the facility. Institutional occupancies have more restrictive criteria than commercial occupancies. Commercial occupancies put building elements to heavier use than residential occupancies. Products suitable for heavy-duty use may be overdesigned for a residential use, with commensurate overpricing. Conversely, residential-grade materials may be unsuitable for heavier loads, greater frequencies of use, and resistance to soiling of commercial and institutional occupancies.

There are occasions when the design challenge is to build products that appear residential in character while performing at institutional quality. An example is congregate living or senior housing, especially assisted-living facilities. Products in living units may be satisfactory if they are of residential quality, but common area finishes, hardware, and fire performance require the same criteria as for an institutional setting such as a dormitory or hospital. Even hospitals sometimes require residential-appearing products, such as in alternative birthing rooms that resemble hotel rooms or residential bedrooms but have provisions for rapid access to medical equipment and are in compliance with hospital standards for infection control.

The designer must understand these criteria in order to select appropriate products. The architect, engineer, owner, and construction manager must understand that heavier-duty products need higher construction budgets.

Life Expectancy

Related to the above discussion is the criterion of life expectancy. For a hotel, guest room finishes might have a life expectancy of only a few years. For a tenant space in a commercial office building, the washability of paint on a wall might be less than that for a residence. The tenant space may have an expected life of a few years before remodeling. Public schools might be built with a life expectancy of 20 or 30 years, which is what building codes tacitly assume is the life of a building. Products need to be selected based on the expected life of the building.

In southern California, two projects represent extremes in life expectancy. A new campus for Soka University, a private university constructed in 2002, has products selected for an expected life of 100 years for the facility. In Los Angeles, Our Lady of Angels Cathedral was constructed with products and details for a 400-year expected life.

Meanwhile, many public schools constructed in the 1950s and 1960s with intended functional life of 20- to 30-years life are now 40 to 50 years old without major reconstruction. Modernization and rehabilitation of existing schools and construction of new schools are being performed with economy (lowest initial cost) as primary design criteria. School construction is forecast as a major segment for future construction. Similarly, medical facilities and other public facilities are requiring major construction programs. And there is a growing backlog for new

housing.

Designers should understand the life expectancy of products when making selections and should endeavor to inform the owner of options in product selections that balance cost and quality over the expected life of the facility.

Geography and Environment

Architects and engineers are designing projects throughout North America and on other continents. Geophysical factors vary widely throughout the United States and Canada. Designers need to understand these factors when making product selections.

Corrosion considerations at a coastal location are generally more important than those in an inland or desert location. Galvanized sheet metal may be adequate for most locations but not in a tropical environment such as that of Hawaii or Puerto Rico. Alclad (aluminum alloy sheet coated with pure aluminum) may be necessary in high-humidity and salt-air environments. Stainless steel door frames and doors may be necessary in the corrosive environment of a sewage treatment plant, and the stainless steel may even need to be coated for additional corrosion resistance (stainless steel is technically only “corrosion-resistant” steel).

A residential complex designed for the relatively benign coastal environment of southern California will almost certainly self-destruct under the snow loads and freeze-thaw conditions of a mountain ski resort. This has been proven, unfortunately, at several complexes with large financial settlements after extended litigation.

Energy consumption in a desert environment such as Phoenix, Arizona, or in the severe winter cold of Buffalo, New York, warrants selection of products that are very energy efficient. Now the “greening” of designs, both for ethical and statutory reasons, is the norm. Aluminum windows and storefront framing, and glass and glazing are being selected with thermal performance in mind. Not only in severe weather environments but in more moderate climates are thermally high-performance products being selected and specified. The cost of energy and the heightened sensitivity to environmental impacts have made energy efficiency a high criterion.

Not only energy considerations but resistance to storm forces need to be considered. In coastal environments such as South Florida and along the Atlantic and Gulf coasts, resistance of window and storefront framing and glass to extremely high winds and airborne objects is mandated by code. Designs in tropical environments such as Guam, must be designed for even higher wind speeds than what is familiar in the Continental United States.

The designer and specifier need to identify these factors and apply them when making product selections:

- Proposed life span of the structure, the geographic location, the environment, and the proposed occupancy
- Professional judgment of the responsible design professional

Using Performance Characteristics

[Exhibit 16-1](#) is provided to aid the designer and specifier in analyzing the performance characteristics of products. Each product under consideration should have applicable factors from the “Performance Characteristics” list addressed and performance criteria assigned. This way, the specifier will be less likely to overlook an essential attribute.

[Exhibit 16-1](#) Example of performance characteristics.

PERFORMANCE CHARACTERISTICS	
Structural Serviceability	Water permeability
Natural forces	Moisture expansion and drying shrinkage
Wind	Water absorption
Seismic	Water vapor transmission
Strength	Durability
Compression	Adhesion of coatings
Hardness	Blistering
Indentation	Delamination
Modules of rupture	Dimensional stability
Shear tension	Expansion
Torsion	Shrinkage
Fire Safety	Volume change
Fire resistance	Mechanical properties
Flame spread	Resistance to bursting
Smoke development	Resistance to fatigue
Toxicity	Resistance to splitting
Habitability	Resistance to tearing
Acoustic properties	Resistance to wear
Sound absorption	Abrasion
Sound reflectance	Scratching
Sound dispersion	Scrubbing
Sound transmission	Scuffing
Noise reduction coefficient	Weathering
Hygiene, comfort, safety	Bactericidal
Air infiltration	Chemical fumes
Mildew resistance	Fading
Slip resistance	Freeze-thaw
Toxicity	Ozone
Vermin infestation	Ultraviolet (UV) radiation
Thermal properties	Compatibility
Thermal expansion	Chemical interaction
Thermal shock	Differential thermal movement
Thermal transmittance	Galvanic interaction
Thermal resistance	

An attribute is an inherent characteristic. The use of an analytical approach, such as suggested by [Exhibit 16-1](#), will trigger other essential inquiries that might not otherwise surface since this is a coherent interrogation. Although the list may be long, the specifier may not need to examine every attribute, since a particular material intended for use in a particular portion of the building may not be subjected to the specific performance.

In using [Exhibit 16-1](#), which is a list of attributes sought in a product, there are two additional elements that must be considered to determine whether the product meets the needs of the attribute: (1) criterion and (2) test. For example, if the attribute “flame spread” is an essential attribute for a ceiling material in an exit corridor, most fire codes and building codes establish a flame spread not to exceed 25. The material to be specified would be required to meet this criterion, measured by test method ASTM E 84. So the performance could be expressed as:

- Attribute: Flame spread
- Criterion: Not to exceed 25
- Reference test standard: ASTM E 84

The accomplished specifier will usually have no difficulty in assessing traditional building materials for specific geographic and environmental conditions. Certain materials have a long history of performance under known conditions. However, with the recent developments in building materials, particularly those that are the products of modern chemistry, the same long-term performance behavior patterns cannot be applied.

Even traditional materials will experience faster degradation when used in new geographical environments or when the environment changes. For example, Brownstone, quarried in arid climates in the American West, fares poorly when used for steps and facades of “brownstones” in New York City that are subject to substantial abrasion, moisture, freeze-thaw cycles, and de-icing chemicals. As another example, marbles that withstood several millennia in structures on the Acropolis in Athens have shown marked deterioration in less than 100 years when exposed to the products of combustion generated by automobile fumes and acid rain.

Performance characteristics of products need to be evaluated under the conditions of use in order to foresee problems such as those described above.

New Products Considerations

For new products, there are two major areas that involve materials evaluation. The first deals with the development of a product or material to fit a particular situation created by specific requirements. The second involves an evaluation of the properties of a new material or product to determine whether the manufacturer's claims match its test results, thus warranting the use of its product.

For development of a product to meet a specific requirement, the specifier must establish the conditions of use and the criteria for testing and acceptance. For example, if a floor will be subjected to unusual hazards, such as moisture, acid spillage, hot jet fuels, or printers' ink, a standard commercial flooring material

would probably not satisfy all the criteria. Specific design criteria need to be established. The specifier would have to research and determine which fluids would be likely to spill on the floor and to what extent the proposed flooring should resist the effects of such spillage.

The specifier would also need to take into account resistance to abrasion, slip resistance, indentation, hardness, heat resistance, and similar factors. Then the specifier could establish the overall criteria and select certain ASTM test procedures by which these characteristics would be measured. After determining which test procedure to use, the specifier could set minimum and maximum values for test results and either identify products that meet these criteria or develop criteria that a manufacturer would be required to meet with a custom-made product. Unless a specific composition is specified, the end product from a manufacturer could be an epoxy, neoprene, polyester, acrylic, or urethane formulation. The specific basic ingredients are not important to the specifier. The end result (or the performance characteristics determined by the materials evaluation) is all that counts.

New products are developed by manufacturers either to fill a specific need or to improve existing products. For the most part, manufacturers, rather than architects, have taken the lead in developing new products. After they are developed, the manufacturer brings the items to the attention of architects and specifiers. Where the new products are referenced by the manufacturer to a reference standard, such as a federal, ASTM, or ANSI specification, there is no major problem in evaluating them. However, many new products are specifically designed by manufacturers to keep ahead of their competition.

In these cases, the physical and chemical properties are not referenced to known standards. A specifier investigating these products finds them difficult to evaluate without normal standards of comparison. Sometimes the manufacturer develops its own test methods, and the results have no correlation with standard test procedures.

What procedures does a specifier follow in evaluating new products? The specifier must take several factors into account. One is the integrity of the manufacturer. Has it had a successful record of developing good products? Has it field tested the new product? Is there any correlation between its field tests and its laboratory tests? Has it tested the significant properties of the product?

The reliability of the source of the information and its authenticity should be investigated. Check with other architects and engineers, if they are given as references, to determine whether the condition of use is similar to that proposed for your project. Demand additional test data if necessary. Suggest specific properties to be tested.

Review the problems to be encountered in the field in the handling and installation of a new product. Will there be an adequate, fully trained corps of tradespeople who understand how to handle the product? Are there franchised applicators? Are there any special precautions to be observed with respect to

volatile solvents, flammable materials, or staining of adjacent surfaces?

The evaluation of new or untried materials for possible use should include discussions with the manufacturer to obtain long-term guarantees to ensure additional safeguards for the client and the design professional.

For a more comprehensive treatise on materials and their evaluation and selection, the reader is directed to *Architectural Materials for Construction* by Harold J. Rosen, PE, FCSI, and Tom Heineman, FCSI (McGraw-Hill Professional, 1995; ISBN: 0-070-53741-0).

Substitutions and Product Options

The construction side of the project team has a strong incentive to reduce costs. As a result, general contractors, subcontractors, and product suppliers usually want to substitute less costly products for those specified. This is not necessarily an indictment of architects and engineers for “gold plating” the facility design. It means that there is always pressure to construct cheaper and faster. In lay terms, it means shopping at Walmart rather than Nordstrom or Neiman-Marcus.

Under competitive bidding for public projects, the substitution process is intense and aggressive. Residential projects, especially multiunit housing for low- and middle-income occupants, also involve intense pressure for cost reduction and substitutions. Sometimes a process called “value engineering” is used to apply reason to the substitution process where the lifecycle cost and performance of products and assemblies are considered. Experience indicates, however, that this process is applied too late in the design process (such as immediately prior to and during bidding, rather than during the Design Development phase), so that the only factor is reduction of the initial cost.

There are built-in disincentives when the Owner's representative or Construction Manager is required only to construct the facility on time and within budget. Quality considerations are ignored, and the consequences are deferred to operation and maintenance of the facility. Meanwhile, the responsibilities of the architect or engineer are unchanged, and poor performance or premature failure of products is blamed on the responsible design professional. It is strange that design professionals are willing to assume additional financial risk by accepting inferior products, while others benefit financially from decisions for which they do not have to take responsibility.

This discussion emphasizes how serious substitutions and product options can be.

When proprietary products are used as the basis of design, it is almost impossible to identify and name all the competitive products in the marketplace. With international trade increasing, the problem has become staggering. To make the process manageable, a “specified manufacturer” is usually identified and “acceptable manufacturers” are listed whose equivalent products will be

acceptable. This invites or ensures competitive pricing while realistically specifying known products available in the marketplace. The brand-name products of the specified manufacturer, including catalog numbers, are specified. Attributes of the specified products, such as reference standards compliance and physical descriptions of the products, are included to make submittals reviews and reviews of substitution requests easier.

When acceptable products are not known, the specifications typically state, “Acceptable manufacturers: None identified” or “Acceptable manufacturers: Unknown.” To keep the competitive process in force, the infamous term “or equal” is used. See Chapter 6 for a discussion of the “or equal” provision, as well as the following.

No phrase in specifications has been subject to more severe criticism than “or equal.” The problems that have arisen from its use, the countless seminars that have been held to discuss alternative approaches, and the many magazine and newsletter articles that have appeared over the years attest to the fact that use of this term is not satisfactory in controlling the selection of products to be used for construction. No more satisfactory solution has developed to address the need to allow multiple sources of construction products in order to keep pricing competitive.

Use of “or equal” has often led to conflicts about who shall determine what is an “equal” product. Is it the architect/engineer? Is it the owner's representative or construction manager? Is it the general contractor?

To make the “or equal” provision and the general subject of substitutions manageable, clearly established procedures are needed for determining the equivalence of products. In Division 01 - General Requirements in the specifications, “or equal” needs to be defined, and the criteria and procedures for determination of acceptability of products under the “or equal” provision or other well-defined criteria for substitutions should be specified. These criteria and procedures are usually specified in Section 01 16 00 - Product Requirements. See the example of a shortform Section 01 60 00 - Product Requirements in Appendix B. See [Exhibit 16-2](#) for example text for product options and [Exhibit 16-3](#) for example text for substitution provisions and procedures.

[Exhibit 16-2](#) Example of product options text.

1.3 GENERAL PRODUCT REQUIREMENTS

- A. **Products, General:** "Products" include items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock, and include materials, equipment, assemblies, fabrications and systems.
1. **Named Products:** Items identified by manufacturer's product name, including make or model designations indicated in the manufacturer's published product data.
 2. **Materials:** Products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.
 3. **Equipment:** A product with operating parts, whether motorized or manually operated, that requires connections such as wiring or piping.
- B. **Specific Product Requirements:** Refer to requirements of Section 01 45 00 - Quality Control and individual product Specifications Sections in Divisions 2 through 48 for specific requirements for products.
- C. **Minimum Requirements:** Specified requirements for products are minimum requirements. Refer to general requirements for quality of the Work specified in Section 01 45 00 - Quality Control and elsewhere herein.
- D. **Product Selection:** Provide products that fully comply with the Contract Documents, are undamaged and unused at installation. Comply with additional requirements specified herein in Article titled "PRODUCT OPTIONS."
- E. **Standard Products:** Where specific products are not specified, provide standard products of types and kinds that are suitable for the intended purposes and that are usually and customarily used on similar projects under similar conditions. Products shall be as selected by Contractor and subject to review and acceptance by the Architect.
- F. **Product Completeness:** Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- G. **Code Compliance:** When applicable Codes products to comply with prescribed attributes, all products, other than commodity products prescribed by Code, shall have a current ICC Evaluation Service, Inc. (ICC ES). Refer to additional requirements specified in Section 01 41 00 - Regulatory Requirements.
- H. **Interchangeability:** To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same product and interchangeable throughout the Work. When options are specified for the selection of any of two or more products, the product selected shall be compatible with products previously selected.
- I. **Product Nameplates and Instructions:**
1. Except for required Code-compliance labels and operating and safety instructions, locate nameplates on inconspicuous, accessible surfaces. Do not attach manufacturer's identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.
 2. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as the following example:

Name of manufacturer
Name of product
Model and serial number
Capacity
Operating and Power Characteristics
Labels of Tested Compliance with Codes and Standards
 3. For each item of service-connected or power-operated equipment, provide operating and safety instructions, permanently affixed and of durable construction, with legible machine lettering. Comply with all applicable requirements of authorities having jurisdiction and listing agencies.

1.4 PRODUCT OPTIONS

- A. Product Options: Refer to General Conditions of the Contract, Articles 3.4.2 and 3.5.1. Provisions of [*applicable_procurement_law*] shall apply, as supplemented by the following general requirements.
- B. Products Specified by Description: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that has the specified attributes and otherwise complies with specified requirements.
- C. Products Specified by Performance Requirements: Where Specifications require compliance with performance requirements, provide product(s) that comply and are recommended by the manufacturer for the intended application. Verification of manufacturer's recommendations may be by product literature or by certification of performance from manufacturer.
- D. Products Specified by Reference to Standards: Where Specifications require compliance with a standard, provided product shall fully comply with the standard specified. Refer to general requirements specified in Section 01 42 19 - Reference Standards regarding compliance with referenced standards, standard specifications, codes, practices and requirements for products.
- E. Products Specified by Identification of Manufacturer and Product Name or Number:
1. "Specified Manufacturer": Provide the specified product(s) of the specified manufacturer.
 - a. If only one manufacturer is specified, without "acceptable manufacturers" being identified, provide only the specified product(s) of the specified manufacturer.
 - b. If the phrase "or equal" is stated or reference is made to the "or equal provision," products of other manufacturers may be provided if such products are equivalent to the specified product(s) of the specified manufacturer. Equivalence shall be demonstrated during submission of required submittals.
 2. "Acceptable Manufacturers": Product(s) of the named manufacturers, if equivalent to the specified product(s) of the specified manufacturer, will be acceptable in accordance with the requirements specified herein in the Article titled "OR EQUAL PRODUCTS."
 3. Unnamed manufacturers: Products of unnamed manufacturers will be acceptable only as follows:
 - a. Unless specifically stated that substitutions will not be accepted or considered, the phrase "or equal" shall be assumed to be included in the description of specified product(s). Equivalent products of unnamed manufacturers will be accepted in accordance with the "or equal" provision specified herein, below.
 - b. If provided, products of unnamed manufacturers shall be subject to the requirements specified herein in the Article titled "OR EQUAL PRODUCTS."
 4. Quality basis: Specified product(s) of the specified manufacturer shall serve as the basis by which products by named acceptable manufacturers and products of unnamed manufacturers will be evaluated. Where characteristics of the specified product are described, where performance characteristics are identified or where reference is made to industry standards, such characteristics are specified to facilitate evaluation of products by identifying the most significant attributes of the specified product(s).
- F. Products Specified by Combination of Methods: Where products are specified by a combination of attributes, including manufacturer's name, product brand name, product catalog or identification number, industry reference standard, or description of product characteristics, provide products conforming to all specified attributes.
- G. "Or Equal" Provision: Where the phrase "or equal" or the phrase "or approved equal" is included, product(s) of unnamed manufacturer(s) may be provided as specified above in subparagraph titled "Unnamed manufacturers."
1. The requirements specified herein in the Article titled "OR EQUAL PRODUCTS" shall apply to products provided under the "or equal" provision.
 2. Use of product(s) under the "or equal" provision shall not result in any delay in completion of the Work, including completion of portions of the Work for use by Owner or for work under separate contract by Owner.
 3. Use of product(s) under the "or equal" provision shall not result in any costs to Owner, including design fees and permit and plancheck fees.

4. Use of product(s) under the "or equal" provision shall not require substantial change in the intent of the design, in the opinion of the Architect. The intent of the design shall include functional performance and aesthetic qualities.
 5. The determination of equivalence will be made by the Architect and such determination shall be final.
- H. Visual Matching: Where Specifications require matching a sample, the decision by the Architect on whether a proposed product matches shall be final. Where no product visually matches but the product complies with other requirements, comply with provisions for substitutions for selection of a matching product in another category.
- I. Selection of Products: Where requirements include the phrase "as selected from manufacturer's standard colors, patterns and textures," or a similar phrase, selections of products will be made by indicated party or, if not indicated, by the Architect. The Architect will select color, pattern and texture from the product line of submitted manufacturer, if all other specified provisions are met.

1.5 "OR EQUAL" PRODUCTS

- A. "Or Equal" Products: Products are specified typically by indicating a specified manufacturer and specific products of that manufacturer, with acceptable manufacturers identified with reference to this "or equal" provision. If Contractor proposes to provide products other than the specified products of the specified manufacturer, provisions of General Conditions of the Contract and [applicable_procurement_law_] shall apply. Contractor shall submit if and when directed by Architect, complete product data, including drawings and descriptions of products, fabrication details and installation procedures. Include samples where applicable or requested.
1. Submit a minimum of 4 copies. Form and other administrative requirements shall be as directed by the Owner's Representative.
 2. Include appropriate product data for the specified product(s) of the specified manufacturer, suitable for use in comparison of characteristics of products.
 - a. Include a written, point-by-point comparison of characteristics of the proposed substitute product with those of the specified product.
 - b. Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the Work and to construction to be performed by the Owner and by others under separate contract with the Owner, that will be necessary if the proposed substitution is accepted.
 3. "Or Equal" product submissions shall include a statement indicating the substitution's effect on the Construction Schedule. Indicate the effect of the proposed products on overall Contract Time and, as applicable, on completion of portions of the Work for use by Owner or for work under separate contract by Owner.
 4. "Or Equal" product submissions shall include signed certification that the Contractor has reviewed the proposed products and has determined that the products are equivalent or superior in every respect to product requirements indicated or specified in the Contract Documents, and that the proposed products are suited for and can perform the purpose or application of the specified product indicated or specified in the Contract Documents.
 5. "Or Equal" product submissions shall include a signed waiver by the Contractor for change in the Contract Time or Contract Sum due to the following:
 - a. "Or equal" product failed to perform adequately.
 - b. "Or equal" product required changes in other elements of the Work.
 - c. "Or equal" product caused problems in interfacing with other elements of the Work.
 6. If, in the opinion of the Architect, the "or equal" product request is incomplete or has insufficient data to enable a full and thorough review of the proposed products, the proposed products may be summarily refused and determined to be unacceptable.
- B. Product Substitutions: For products not governed by the "or equal" provision, comply with substitution provisions of the General Conditions of the Contract and requirements specified in Section 01 25 13 - Product Substitution Procedures.

Exhibit 16-3 Example substitution provisions and procedures text.

1.2 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. Substitutions, General: Catalog numbers and specific brands or trade names are used in materials, products, equipment and systems required by the Specifications to establish the standards of quality, utility and appearance required. Alternative products which are of equal quality and of required characteristics for the purpose intended may be proposed by Contractor, subject to provisions of the General Conditions of the Contract, Paragraphs 3.4.2, 3.5.1 and 7.3.7 and subject to the following:

1. See Section 01 60 00 - Product Requirements, for requirements regarding product options.
2. Substitutions will only be authorized by properly executed Change Order or Construction Change Directive.

B. Substitution Provisions:

1. Documentation: Substitutions will not be considered if they are indicated or implied on shop drawing, product data or sample submittals. All requests for substitution shall be by separate written request from Contractor. See paragraph below for documentation required for submission of request for substitution.
2. Cost and Time Considerations: Substitutions will not be considered unless a net reduction in Contract Sum or Contract Time results to Owner's benefit, including redesign costs, life cycle costs, plancheck and permit fees, changes in related Work and overall performance of building systems.
3. Design Revision: Substitutions will not be considered if acceptance will require substantial revision of the Contract Documents or will substantially change the intent of the design, in the opinion of the Architect. The intent of the design shall include functional performance and aesthetic qualities.
4. Data: It shall be the responsibility of the Contractor to provide adequate data demonstrating the merits of the proposed substitution, including cost data and information regarding changes in related Work.
5. Determination by Architect: Architect will determine the acceptability of proposed substitutions and Owner's Representative will notify Contractor in writing of acceptance or rejection. The determination by the Architect regarding functional performance and aesthetic quality shall be final.
6. Non-Acceptance: If a proposed substitution is not accepted, Contractor shall immediately provide the specified product.
7. Substitution Limitation: Only one request for substitution will be considered for each product.

C. Request for Substitution Procedures:

1. Contractor shall prepare a request for substitution and submit the request to Architect through Owner's Representative for review and recommendation for acceptance or rejection. Formal acceptance or rejection of substitutions shall be by Owner's Representative, based on recommendation by Architect.
 - a. Submit a minimum of 4 copies.
 - b. Present request for substitution using form provided by Owner's Representative.
 - c. Comply with other administrative requirements as directed by Owner's Representative.
2. Substitution requests shall include complete product data, including drawings and descriptions of products, fabrication details and installation procedures. Include samples where applicable or requested.
3. Substitution requests shall include appropriate product data for the specified product(s) of the specified manufacturer, suitable for use in comparison of characteristics of products.
 - a. Include a written, point-by-point comparison of characteristics of the proposed substitute product with those of the specified product.
 - b. Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the Work and to construction to be performed by the Owner and by others under separate contracts with Owner, that will be necessary if the proposed substitution is accepted.
4. Substitution requests shall include a statement indicating the substitution's effect on the Construction Schedule. Indicate the effect of the proposed substitution on overall Contract Time and, as applicable, on completion of portions of the Work for use by Owner or for work under separate contracts by Owner.
5. Except as otherwise specified, substitution requests shall include detailed cost data, including a proposal for the net change, if any, in the Contract Sum.
6. Substitution requests shall include signed certification that the Contractor has reviewed the proposed substitution and has determined that the substitution is equivalent or superior in every respect to product requirements indi-

cated or specified in the Contract Documents, and that the substitution is suited for and can perform the purpose or application of the specified product indicated or specified in the Contract Documents.

7. Substitution requests shall include a signed waiver by the Contractor for change in the Contract Time or Contract Sum because of the following:
 - a. Substitution failed to perform adequately.
 - b. Substitution required changes in other elements of the Work.
 - c. Substitution caused problems in interfacing with other elements of the Work.
 - d. Substitution was determined to be unacceptable by authorities having jurisdiction.
8. If, in the opinion of the Architect, the substitution request is incomplete or has insufficient data to enable a full and thorough review of the intended substitution, the substitution may be summarily refused and determined to be unacceptable.

D. Contract Document Revisions:

1. Should a Contractor-proposed substitution or alternative sequence or method of construction require revision of the Contract Drawings or Specifications, including revisions for the purposes of determining feasibility, scope or cost, or revisions for the purpose of obtaining review and approval by authorities having jurisdiction, revisions will be made by Architect or other consultant of Owner who is the responsible design professional, as approved in advance by Owner's Representative.
2. Services of Architect, other responsible design professionals and Owner for researching and reporting on proposed substitutions or alternative sequence and method of construction shall be paid by Contractor when such activities are considered additional services to the design services contracts of Architect or other responsible design professional under contract with Owner.
3. Costs of services by Architect, other responsible design professionals and Owner shall be paid, including travel, reproduction, long distance telephone and shipping costs reimbursable at cost plus usual and customary mark-up for handling and billing.
4. Such fees shall be paid whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by Owner and a Change Order or Construction Change Directive is executed.
5. Such fees shall be paid from Contractor's portion of savings if a net reduction in Contract Sum results. If fees exceed Contractor's portion of net reduction, Contractor shall pay all remaining fees unless otherwise agreed in advance by Owner's Representative.

Using Product Information Resources

In Chapter 15, resources for construction specifications are identified and discussed. The following supplement that discussion.

ICC-ES Evaluation Reports

Determining code compliance for products is made easier by evaluation and research reports. As discussed in Chapter 15, major model building code associations have combined to form the International Code Council (ICC). ICC Evaluation Service publishes evaluation reports for building products, with recommendations and conditions of acceptance by building officials. Current reports may be found at the ICC-ES website: www.icc-es.org/Evaluation_Reports/index.shtml.

Evaluation reports were also published by the four code associations that formed ICC. These legacy reports are being superseded by ICC-ES reports, but in the interim they are available through the ICC-ES website above.

ICC-ES evaluation reports are an excellent resource for specifiers who wish to use the reference standard method of specifying and minimize the text in a specification section. By referencing an ICC-ES report, a tremendous amount of information is incorporated into the contract documents. In addition to being an

expedient way to comply with building code requirements, this also saves a great deal of research time for the architect, engineer, and specifier.

Product Evaluations

Subscribers to *MasterSpec*, published by ARCOM for the AIA, receive *MasterSpec Evaluations*. Even subscribers to the short language version of *MasterSpec* receive the *Evaluations*. In addition to providing an introduction and overview of products specified in a section, *MasterSpec Evaluations* provide product information that enables the specifier to compare and select products.

Construction Specifications Canada's *TEK-AID* program of technical guides also provides guidance for product selections. Reed Construction Data (www.reedconstructiondata.com) publishes *Build-Select Product Data* for the Canadian construction market.

For the U.S. construction market, Reed Construction Data publishes *Spec-Data*, which presents construction information in a 10-part format: product name, manufacturer contact data, product description, technical data, installation recommendations, product availability and costs, warranty, maintenance, technical services, and filing systems.

The foremost unpublished resource for product evaluations is building product representatives. Ethical, knowledgeable, and responsive representatives are invaluable to specifiers. Over time, specifiers get to know building product representatives who are reliable and whose recommendations can be counted on to be fair. These representatives tend to represent the leading products in the marketplace. Their products may not be the least expensive, but they usually serve as the basis of design because of their quality and the available resource of a local product representative.

Sweet's Catalog File—Architects, Engineers & Contractors Edition, published by McGraw-Hill Construction Sweets, is a multivolume set of manufacturers' catalogs conveniently bound in green books. Several versions of *Sweets* are published. Unfortunately, participation by building product manufacturers in *Sweets* is steadily declining. Other sources of product information, including manufacturers' websites and product search websites such as *Sweets* own (www.sweets.com), are replacing printed product data.

Online building product information should be more current and substantial than that published in *Sweets Catalog File* and other printed forms such as manufacturers' product binders. Manufacturers are coming to realize the shift by architects, engineers, and specifiers to online resources and are developing substantial websites containing not only product information but also automated selection programs.

Resources for locating building product manufacturers' websites, in addition to *Sweets*, include:

- [4specs.com](http://www.4specs.com): www.4specs.com, with very comprehensive listings of manufacturers' websites organized according to *MasterFormat* section numbers and titles
- *ARCAT*[™], *The Product Directory for Architects*: www.ARCAT.com; synopses of building products and manufacturers listed by *MasterFormat* section numbers, including listings of manufacturers' websites
- *First Source*[™]: www.FirstSourceONL.com; synopses of building products and manufacturers listed by *MasterFormat* section numbers, including listings of manufacturers' websites. *Spec-Data* are available through this website

Communicating and Recording Product Selections

Conscientious project architects and engineers, and their designers and job captains, often send product information to specifiers. This information is usually just a start for product research and selection. Due to lack of familiarity with what is needed by specifiers (and drafters who need similar information), the information is often superficial and lacks an important consideration: detailed selection of capacities, sizes, finishes, and other options.

For example, a project designer unfamiliar with loading dock equipment sent copies of manufacturers' catalog pages for a specific series of loading dock leveler to the specifier. However, this literature contained a table of sizes, capacities, and operating range of the leveller and a highlighted list of options. None of these were marked, highlighted, or otherwise indicated for selection. This information was of limited value to the specifier without the necessary detailed design decisions. A time-consuming interchange of e-mail and telephone calls was necessary to resolve the matter because the project designer did not understand all the detailed design decisions that must be made for all products.

Checklists, "action item" lists, and memoranda are helpful for identifying and recording design decisions that must be made and that have been made. Preliminary Project Descriptions are useful tools, as are Outline Specifications; see Chapters 20 and Chapter 21, respectively, for further discussion of these documents.

Whenever product information is discussed in e-mail or memoranda, it is very helpful to categorize the documentation in the "subject" heading of the e-mail or memorandum using the CSI *MasterFormat* section number and title; discussions of products can be structured by this information. It is easier to find pertinent information in an action item list if the list is organized according to *MasterFormat*. This is not as burdensome as it might seem. Familiarity with

common *MasterFormat* section numbers and titles comes quickly.

Organized selection and communication processes greatly aid the designers and specifiers to communicate and ensure that appropriate products are specified.

Study Questions

1. True or false? Building materials of long-standing require reevaluation when used in new circumstances.
2. True or False? A new material may be acceptable if the manufacturer provides laboratory test results demonstrating compliance with specified requirements.
3. An attribute is:
 - a. A test method
 - b. An inherent characteristic
 - c. Neither
4. True or False? Traditional building materials require little or no analysis when used in familiar situations.
5. True or False? A manufacturer's product data sheet with test results is sufficient to warrant specification of the product.
6. True or False? A new product with performance descriptions in a manufacturer's marketing material is a guarantee of its suitability.
7. True or False? A quarried stone can be used in all geographic locations.
8. True or False? Reference standards used by a manufacturer to test a new product are a good basis for evaluating the product.
9. When two or three materials are joined together in a detail in an exterior application, it is best to analyze the detail for:
 - a. Galvanic interaction
 - b. Chemical interaction
 - c. Differential thermal movement
 - d. All of the above
10. When utilizing a new product, it is best to know whether there are:
 - a. Approved installing contractors.
 - b. Fully trained mechanics
 - c. Any special precautions and limitations to be followed.
 - d. All of the above

Chapter 17

Specifications Writing Procedures

Getting Started

How does one write construction specifications?

The uninitiated architect or engineer, faced with the task of writing construction specifications for a project, does what other novices with no basic understanding of the principles and procedures of specifications writing have done. With an urgent need to produce specifications, the specifier often succumbs to the expedient practice of taking similar specifications from a (hopefully) similar project or (worst of all) copies verbatim specifications produced by product manufacturers. Recognizing that some changes are unavoidable, the novice specifier proceeds to cut and paste from various versions of specifications and manufacturers' product data, writes in requirements to reduce the design professional's risk and control the bidding process, and deletes requirements that are not understood or appreciated. The resulting patchwork is published and issued for bidding, planchecking, or both. During bidding and planchecking, the specifications are coordinated with the drawings, which may have been produced in a similar manner using graphic details cut, pasted, and adapted from other projects. This cynical description is unfortunately too representative of actual practices.

Neutralizing the cynicism, it must be said that there is value in using previous project specifications. There is constant learning in the specifications writing process. What is learned needs to be carried forward to new projects. This is the "corporate memory" of the firm and represents many design decisions. It is appropriate to build on past experience, but only if past work is used as a resource for a current project and documents are not thoughtlessly copied.

Product Selections

Where does one start when producing a set of construction specifications? Rarely does the specifier start with a blank page. Start production of construction specifications by making design decisions for products, assemblies, and systems. See Chapter 16 for a discussion of the product selection process.

Construction specifications should be written according to an organized process

that is complete but not burdensome. Just as a good drafter develops systematic methods of laying out drawings and follows drafting conventions, the specifier should be disciplined about acquiring, recording, and applying product information. A systematic approach also expedites production of the specifications because more timely and complete decisions are made. Because similar projects usually use similar products, decisions from previous projects can quickly be used to develop specifications for the current project; these decisions must be reviewed and validated. It is a waste of time and energy to act on decisions that were erroneous and find out that products must be revised, added, or deleted. While it is not advisable to blindly copy construction specifications from other projects, building on experience by considering and recording past project product information is wise. The product information must be validated, just as for new product selections.

Product selections begin during the Schematic Design and Design Development phases of the design of a project (to use AIA terminology for convenience). In these phases, design decisions are made and recorded in the Preliminary Project Descriptions (PPDs) and Outline Specifications. Other communication devices, such as memoranda and checklists, may also be used to prompt and record design decisions and product selections. In Chapters 20 and 21, the topics of Preliminary Project Descriptions (PPDs) and Outline Specifications are discussed in detail.

PPDs and Outline Specifications provide the advantage of product selections prior to drawings production. For this reason, they may be used to guide detailing of the drawings. Drafters are informed of what to detail and can make appropriate decisions. Yet, by their nature, PPDs and Outline Specifications are preliminary, and many decisions about specific products must be made during the Construction Documents (CD) phase of the design. During the CD phase, project architects and engineers and job captains need to work with the specifier in order to make informed, coordinated decisions. The earlier basic decisions are made and recorded, the more efficiently drawings and specifications can be produced.

With a substantial PPD and set of Outline Specifications, the specifier is prepared to review the developed design with the project architect or engineer, project designers, job captains, manufacturers' representatives, and the Owner or Construction Manager. A Project Manual Checklist and checklists for construction specifications are effective aids in the process of identifying and recording detailed decisions about products, assemblies, and systems beyond the superficial descriptions of the PPD and Outline Specifications.

Conduct a review of project requirements using the outline specifications, which are based on the same 49-division *MasterFormat* as the construction specifications. Mark the decisions on a set of the Outline Specifications and work from these specifications until the first draft of the full construction specifications is published. If there are no Outline Specifications, use a comprehensive table of contents from the office master specifications sections. Another choice is to go

through *MasterFormat* itself, noting sections to be included. *MasterFormat* provides brief descriptions of what is included in each section.

Sometimes the specifier is simply provided a set of preliminary drawings and told to make some specifications to accompany them. This is a poor way to communicate. In addition, there are undoubtedly design decisions and products yet to be identified and included in the set of drawings. No effective program for telepathic communication between the specifier and other project team members is known. Project architects and engineers must take the time to make clear, complete design decisions and communicate them to the specifier in a timely manner.

Keynotes included in the drawings greatly aid in identifying products to be specified. The specifier can rapidly go through the keynotes and list these products. However, there are occasions when keynotes backfire. This often occurs when the “office master” list of keynotes is included in the set and extraneous notes result. Products get specified because they are in the keynotes but ultimately are not used. Conversely, products that are unique to the project but not included in the office master keynotes may be overlooked. For example, it is a waste of time to try to find out where metal louvers are located in the drawings when an extraneous keynote about louvers is included. Also, time is wasted seeking direction from the project architect or engineer regarding materials and finishes needed to write the specifications when in fact the product is not used.

Project Information

A Project Manual Checklist should be used to identify basic information that is needed for preparation of bidding and construction contract documents and construction specifications. Download from the AIA website document *G612*, *Owner's Instructions to the Architect Regarding the Construction Contract*, and use it as a guide to obtaining basic information regarding the project. For engineering projects using EJCDC construction contract documents, obtain *EJCDC C-050*, *Owner's Instructions Regarding Bidding Procedures and Construction Contract Documents*; *EJCDC C-051*, *Engineer's Letter to Owner Requesting Instructions Concerning Bonds and Insurance for Construction*; and *EJCDC C-052*, *Owner's Instructions to Engineer Concerning Bonds and Insurance for Construction*. See Chapter 15 for information regarding sources for these documents.

Additionally, there is basic information regarding the project that should be assembled, recorded, and disseminated, including:

- Project Directory: Firm or agency names, contact persons, addresses, telephone numbers, and e-mail addresses. For example:
 - Owner
 - Owner's consultants: Geotechnical engineer, hazardous materials

- remediation consultant, testing and inspection agency, specialty designers under direct contract with the Owner (graphics designer and interior furnishings designer)
- Construction Manager or Program Manager (if applicable)
- Prime design professional (Architect or Engineer)
- Prime design professional's consultants: sustainable design (LEED) consultant, civil engineer, landscape architect, acoustician, door hardware consultant, food service equipment designer, laboratory designer, medical equipment designer, theatrical equipment designer, audio/visual systems designer, mechanical engineers (plumbing and HVAC), electrical engineer, and low-voltage systems engineers
- Authority having Jurisdiction (AHJ): Building department, fire department, health department, public works department, air quality control district, and waste management authorities
- Serving Utilities: Storm drainage, domestic water, landscape water, sewer, gas, steam, power, cable television, and telecommunications
- Contractor or Prime Contractors (if known)
- Major Subcontractors (if known)
- Codes and Regulations
 - Building codes: Model codes plus amendments applicable to the locale of the project
 - Industrial safety regulations
 - Accessibility regulations
 - Regional and local regulations: Air quality, waste management, and vector control
 - Public safety and security regulations: Background checks of workers and airport security
- Owner's Policies and Procedures: Parking restrictions and regulations, infection control procedures, noise restrictions, exhaust fume controls, work hours restrictions, and access restrictions
 - Other information appropriate to the project

Another key to starting the construction specifications is a clear, concise, complete, and correct statement of what is the project. A section such as Section 01 10 00 - Summary is an effective tool for describing what is the work under the contract for construction and what is work to be performed outside of the contract that might affect work under the contract. Review *MasterFormat* for Section 01 10 00 - Summary, for descriptions of Level Three headings that could be applicable.

It is recommended that this section be titled Section 01 10 00 - Summary of the Project and that it describe the entire project. This is to clearly establish the context

in which the work will be performed, including descriptions of work under separate contracts that might conflict with or affect work under the contract. This is also where requirements for coordination and management by the contractor of these other activities might be established. This puts a burden on the contractor to manage all construction, but it also provides the contractor with justification for charging in the contract sum for construction management services.

See Appendix A for a sample Project Manual checklist. Because this is written prior to CSI's pending major update of *MasterFormat*, review the current version of *MasterFormat* for section numbers and titles. It is expected that the 1995 edition of *MasterFormat* will be used for many years during transition of product data, master specifications, and related data to new formats.

Specifications Format

Each specifier has unique format requirements for the construction specifications. Although CSI *SectionFormat* and *PageFormat* may be the bases for the project construction specifications format, there will be differences in detail. Sometimes these are due to professional judgment and creativity by the specifier and sometimes these are due to requirements and restrictions of the owner. For consultants to the architect or engineer, there are many different formats to suit various specifiers' requirements.

Refer back to Chapter 5 for a discussion of specifications formats. See [Exhibit 17-1](#) for sample specifications production standards for page format instructions.

[Exhibit 17-1](#) Sample specifications production standards.

SPECIFICATIONS PRODUCTION STANDARDS

WORD PROCESSING INFORMATION

Word Processing Program: Microsoft Word 2007

Printer Font: Arial 10pt.

Deliverable Specifications: Printed on white 20 lb bond paper, 1-sided plus specifications files on CD-ROM disk in Adobe Acrobat (.pdf) format suitable.

SECTION FORMAT

3-PART Format: Follow CSI *SectionFormat™*:

PART 1 - GENERAL
PART 2 - PRODUCTS
PART 3 - EXECUTION
(do not use additional PARTs)

Outline Format: Construction specifications follow the unique format established by CSI *SectionFormat™* and *PageFormat™* with the following exceptions and clarifications (note paragraph spacing).

PART 1 - GENERAL	(1st Level)
1.01 ARTICLE	(2nd Level)
A. Paragraph	(3rd Level)
1. Subparagraph	(4th Level)
a. Subparagraph	(5th Level)
1) Subparagraph	(6th Level)

Article Numbers: "PART" number plus consecutive number (e.g., 1.3 = third Article under PART 1; 2.11 = eleventh Article under PART 2; 3.1 = first Article under PAR 3). "Leading 0" is unnecessary (1.4 rather than 1.04).

Paragraph Numbers: As indicated above.

Schedules: At end of PART 3, by convention, rather than end of PART 2.

PAGE FORMAT

Page Margins: 0.5" Top and Bottom; 1" Left and 1" Right.

Tab Settings: Relative to margin, set at -0.5", 0", 0.1" and every 0.3" thereafter.

Paragraph Numbering: Follow CSI *PageFormat™* except Article numbers do not require leading "0" after period (1.4 rather than 1.04).

Headers and Footers: Each Section shall include headers and footers. Footers shall include Section number, Section name and Page number. Format shall vary for odd and even number pages for 2-sided printing, so that Page number is always on unbound edge. Header shall be constant throughout the Specifications and identify the Project and Section publication date. MS Word template file for Section styles and header text will be provided by specifications writer.

Specifying Method

Refer back to Chapter 6 and the four methods of specifying:

1. Descriptive specifying
2. Reference standard specifying

3. Proprietary specifying

4. Performance specifying

As noted in Chapter 6, there is a role for each of these methods in the production of typical construction specifications sections. One method, however, will be the dominant method, and this needs to be determined for the project as a whole and for individual specifications sections. The key determinants are the type of funding for the project and the requirements of the owner for competitive pricing of the work to be performed under the contract.

Typically, if the funding is from a public source, the project is required to be competitively bid and sole-source specifying of products is prohibited except under certain conditions. Again referring back to Chapter 6, review the discussion of nonrestrictive and restrictive (including de facto restrictive) specifying. For projects with public-source funding, specifications typically use descriptive or reference standard methods of specifying.

If the funding is from a private source and there is no policy against restrictive product selection and specification, then specifications may use descriptive, reference standard, or proprietary methods of specifying.

Choose the method for specifying products that suits the requirements of the project. For example, for a publicly funded project, the reference standard method of specifying may be used as the primary method, with the descriptive method used for supplementary information to identify the most significant attributes to assist in evaluating submittals and substitution requests. Another example is specifying products by manufacturer, trade name, and catalog number, using the proprietary method of specifying as the primary method and adding reference standard and descriptive information, again to assist in evaluating submittals and substitution requests.

When the specifying method is determined, gather current and appropriate information regarding the selected products for inclusion in the specifications text.

Specifications Detail

There are two considerations regarding detail of the specifications. One is the detail level of the specifications section, and the other is the amount of information used within the section to describe the attributes of the specified products.

Refer back to the discussion of levels of detail for specifications sections in Chapter 3. Choose the level of detail to use for the project specifications for each section. Shall a Level Two (broad-scope) section number and title be used or a Level Three (medium-scope) or Level Four (narrow-scope) number and title? This is somewhat related to the level of detail used in the specifications text for the section and the method of specifying discussed above. It is also related to the draft section that is used as the basis of the project-specific specifications.

Starting with the draft, from the office master guide specifications or another source, determine whether the source document is Level Two, Level Three, or Level Four. That in itself might make the determination. If it is Level Four, then that will probably be the level used for the project-specific section. If it is Level Two and contains several types of similar products but only one is used, then it could be edited down and retitled as a Level Four section. Conversely, if several similar products are necessary for the project but the specifications will not require a great deal of written detail, the Level Four specifications could be combined into Level Three or Level Four sections.

For example, if the project includes metal toilet partitions and solid (HDPE) panel toilet partitions, but the specifications will be written using the proprietary method without much supplementary text, then a single Section 10 21 13 - Toilet Partitions could be written rather than two separate sections: Section 10 21 13.13 - Metal Toilet Partitions and Section 10 21 13.19 - Plastic Toilet Partitions.

With the level of detail of the section number and title determined, the amount of detail required for the text is necessary. If the project is privately funded and what the architect specifies is what must be provided by the Contractor, without alternate manufacturers or substitutions and without substantial descriptions of the installation and quality control provisions, then the level of detail of the text may be low. If the project is publicly funded or will be competitively bid, then greater detail will be necessary.

All the attributes of the products must be specified so that the quality of the products and installation is clearly stated. If there are extensive quality assurance provisions (submittals, samples, and mock-ups) and quality control provisions (source-control testing during manufacture, fabrication, field inspection, and testing), then the section will require a high level of detail.

It is essential to choose appropriate levels of detail. It is embarrassing when the specifier uses a section from a public school or hospital project, with a high level of specification detail, for a commercial office project. This also adds unnecessary cost if the excessive quality assurance and quality control provisions are followed.

Order of Sections to be Produced

The order of sections to be completed—the work plan for specifications production—should be based on two concepts: (1) what needs to be decided or produced earliest, and (2) what is known and can be specified.

On a building project, the consulting mechanical engineer may have total responsibility for production of all specifications for fire protection, plumbing, HVAC, energy management, and other building controls. The consulting electrical engineer may have responsibility for electrical power, building interior and exterior lighting and a signal system such as assistive listening. However, theatrical

lighting and specialty neon lighting may be the specification responsibility of specialty consultants. Fire and intrusion alarms may be specified by the project electrical engineer or they may be delegated, sometimes on a design-build basis, to another party. Telecommunications systems for the project may require rough-in (conduits and junction/outlet boxes) to be specified by the electrical engineer, with actual installation of wiring and outlet devices under a separate contract by the owner. Accordingly, it is important early in the project to understand these systems and assign clear responsibilities for design and construction documents production.

There are other sections that the specifier typically provides to other consultants to edit, such as the civil engineer, landscape architect, and structural engineer. The door hardware consultant might also use a draft section from the specifier, and specialty designers such as food service equipment, gymnasium equipment, and medical and laboratory equipment designers might use the specifier's drafts. Sections used by these consultants should be prepared and transmitted to the responsible designers early in the specifications production process. These consultants typically mark up the drafts and return them to the specifier for production of the final document. This is usually the most expedient method and ensures consistency of format, language, and specifications style. The specifier reviews the drafts, eliminates inconsistencies and clarifies other issues, and performs word processing.

Sections produced by the specifier are completed when information is available. There are some sections that are common to most projects, such as gypsum board and painting, and these are often completed first and set aside for review with the project architect. Other sections may be started without full information in order to get the editing process underway and issues identified. As issues are identified, they are recorded for review with the project architect or engineer.

When Outline Specifications are produced for the project, many of the specifications issues (product selection and installation) are identified and often resolved so that the specifier may proceed. Generally, the detailed technical and product issues are not identified during Design Development when the Outline Specifications are produced. They become apparent during editing of project-specific construction specifications.

Editing and Writing Specification Text

A novice specifier might start editing the text of a specification section at the beginning. This is not a bad idea. Start with the "Summary" or "Section Includes" article. State what is in the section. This can be extracted readily from the outline specifications. If there are no outline specifications, how is this summary information determined? It is typically determined by starting to edit the section at Part 2 - Products. For sections containing an extensive listing of equipment or other

scheduled products, which *SectionFormat* locates at the end of Part 3 - Execution, begin with the scheduled products.

There is an order in the article headings of Part 2 - Products, starting with basic materials and progressing through manufactured products to shop or factory fabrication requirements and source quality control:

- Manufacturers
- Materials
- Manufactured units
- Equipment
- Components
- Accessories
- Mixes
- Fabrication
- Finishes
- Source Quality Control

Not all of these headings should be used in a specification section. Use only those that are applicable, and adapt the titles to suit the products specified. Typically, the headings “Manufactured Units,” “Equipment,” and “Components” are not used, but the actual product names are. See [Exhibit 17-2](#) for examples.

[Exhibit 17-2](#) Sample article headings, Part 2 - Products.

SAMPLE ARTICLE HEADINGS, PART 2 - PRODUCTS

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
- 2.2 MATERIALS
- 2.3 PRIMERS
- 2.4 K-SERIES STEEL JOISTS
- 2.5 LONG-SPAN STEEL JOISTS
- 2.6 JOIST GIRDERS
- 2.7 JOIST ACCESSORIES
- 2.8 FABRICATION

SECTION 07 71 00 - ROOF SPECIALTIES

PART 2 - PRODUCTS

- 2.1 REGLETS AND FLASHING
- 2.2 FORMED ALUMINUM PARAPET COPINGS
- 2.3 PIPE PENETRATION BOOTS
- 2.4 ACCESSORY MATERIALS

SECTION 26 51 00 - INTERIOR LIGHTING

PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
- 2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS
- 2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS
- 2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS
- 2.5 EMERGENCY FLUORESCENT POWER UNIT
- 2.6 BALLASTS FOR HID LAMPS
- 2.7 EXIT SIGNS
- 2.8 EMERGENCY LIGHTING UNITS
- 2.9 FLUORESCENT LAMPS
- 2.10 HID LAMPS
- 2.11 LIGHTING FIXTURE SUPPORT COMPONENTS
- 2.12 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

Part 3 - Execution is the next portion of a specifications section to edit. It too follows a standard sequence according to *CSI SectionFormat*:

- Examination
- Preparation
- Erection/Installation/Application/Construction
- Repair/Restoration
- Field Quality Control
- Adjusting
- Cleaning
- Demonstration
- Schedules

Again, not all of these article headings are used in Part 3 of a section. See [Exhibit 17-3](#) for examples.

[Exhibit 17-3](#) Sample article headings, Part 3 - Execution.

SAMPLE ARTICLE HEADINGS, PART 3 - EXECUTION

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 3 - EXECUTION

- 3.1 EXAMINATION
- 3.2 INSTALLATION
- 3.3 FIELD QUALITY CONTROL
- 3.4 REPAIRS AND PROTECTION

SECTION 07 71 00 - ROOF SPECIALTIES

PART 3 - EXECUTION

- 3.1 EXAMINATION
- 3.2 INSTALLATION, GENERAL
- 3.3 REGLETS AND COUNTERFLASHING INSTALLATION
- 3.4 PARAPET COPING INSTALLATION
- 3.5 PIPE PENETRATION BOOTS INSTALLATION
- 3.6 CLEANING AND PROTECTION

SECTION 26 51 00 - INTERIOR LIGHTING

PART 3 - EXECUTION

- 3.1 INSTALLATION
- 3.4 FIELD QUALITY CONTROL

Part 1 - General is the last portion of the section to edit. It too follows a standard sequence, but it not necessarily intuitive. *CSI SectionFormat* lists standard article titles as follows:

- Summary
- References
- Definitions
- System Description
- Submittals
- Quality Assurance
- Delivery, Storage and Handling
- Project/site Conditions
- Sequencing
- Scheduling
- Warranty
- System Start-Up/Owner's Instructions/Commissioning
- Maintenance

It is easy to get carried away with Part 1 in a section and forget the use of Division 01 - General Requirements. Requirements get repeated in Part 1 that are specified in Division 01. Of course, this assumes that there is a substantial Division 1 containing these requirements in general terms. Specific requirements, such as specific ambient temperature and humidity criteria for storage of products, should be specified in Part 1 of the applicable section. Specific extended warranty requirements should also be specified in Part 1.

Also, not all articles of Part 1 are necessary or even suitable for all sections. Articles such as References and System Description can be troublesome. ASTM and ANSI standards, which should be well known in the industry, do not need to be listed unless there is a policy to list in detail all references included in the section. Describing the system in Part 1 may be redundant to information in Part 2 and unnecessary. If Part 2 only specifies components of a system or assembly, then the Part 1 description is helpful and should be included. When the Part 1 description describes specific products rather than a general description of the system or assembly, it should be omitted or rewritten and Part 2 used instead.

The Summary article at the beginning of the section can be confirmed or written when the section editing is completed. The list of contents (“Section Includes”) should not be a description of subcontract scope or trade jurisdictions. Cross references to other sections (“Related Sections”) should only list those sections where there is a direct link, such as Section 09 91 00 - Field Painting for field finishing of products in the subject section.

Specifications Checklists

Specifications checklists are very helpful for identifying what needs to be specified. They prompt specifiers and designers to make decisions. They can also become cumbersome to develop and maintain. Specifications checklists should be kept simple. Perhaps the checklist can be as simple as an annotated list of the office master guide specifications, with basic product types listed. For example, Section 09 29 00 - Gypsum Board could list:

- Regular (nonrated) gypsum board, 1/2-inch thick
- Fire-rated (Type X) gypsum board, 5/8-inch thick
- Flexible gypsum board (curved wall surfaces)
- Sag-resistant gypsum board (ceilings)
- Special fire-resistant gypsum board, 1/2-inch thick
- Mold-resistant gypsum board
- Abuse-resistant (impact-resistant) gypsum board
- Unfaced gypsum board (for damp interior)

Detailed guides to product selections and decisions are better if embedded in the master guide specifications. Editing notes and optional text in the master guide specifications, addressed when the specifier is focusing on micro rather than macro matters, are appropriate in the master guide specification. Otherwise, developing and maintaining the checklist becomes too cumbersome, resulting in an incomplete or erroneous list.

Specifications editing and word processing computer programs are discussed further in Chapter 19.

Study Questions

1. True or false? Building materials of long-standing require reevaluation when used in new circumstances.
2. True or False? A new material may be acceptable if the manufacturer provides laboratory test results demonstrating compliance with specified requirements.
3. An attribute is:
 - a. A test method
 - b. An inherent characteristic
 - c. Neither
4. True or False? Traditional building materials require little or no analysis when used in familiar situations.
5. True or False? A manufacturer's product data sheet with test results is sufficient to warrant specification of the product.
6. True or False? A new product with performance descriptions in a manufacturer's marketing material is a guarantee of its suitability.
7. True or False? A quarried stone can be used in all geographic locations.
8. True or False? Reference standards used by a manufacturer to test a new product are a good basis for evaluating the product.
9. When two or three materials are joined together in a detail in an exterior application, it is best to analyze the detail for:
 - a. Galvanic interaction
 - b. Chemical interaction
 - c. Differential thermal movement
 - d. All of the above
10. When utilizing a new product, it is best to know whether there are:
 - a. Approved installing contractors.
 - b. Fully trained mechanics
 - c. Any special precautions and limitations to be followed
 - d. All of the above

Chapter 18

Master Guide Specifications

Specification Guides and Intact Masters

Construction specifications are written by architects, engineers, and paraprofessional technical writers (“spec writers”) who have various levels of experience, knowledge, and writing ability. Product manufacturers also write construction specifications of high to low quality. To compensate, master guide specifications are developed by competent specifiers that are both technically accurate and correctly follow established principles of construction specifications writing.

Specification Guides

Aids have been developed for specifiers to use while producing project-specific construction specifications. Reed Construction Data (www.reedconstructiondata.com) publishes Spec-Data, documents in a standardized format originally developed by CSI for the U.S. construction market and BuildSelect Product Data for the Canadian market. Spec-Data presents construction information in a 10-part format: product name, manufacturer contact data, product description, technical data, installation recommendations, product availability and costs, warranty, maintenance, technical services, and filing systems. BuildSelect Product Data also follows a 10-part format. Both are organized according to CSI *MasterFormat*. Contact Reed Construction Data for additional information.

Architectural Computer Services, Inc. (ARCOM), publishes Evaluations documents that accompany MasterSpec® master guide specifications. The Evaluations range from fundamental information about construction products to evaluation and selection guidelines. Some building product manufacturers also publish summary documents of technical attributes of building products.

Altogether, these types of documents are known as “specifications guides.” They guide the specifier's editing of a separate specification section document. The separate document is an outline of the section with some fundamental and typical technical information plus bracketed blanks in which the specifier writes specific descriptions, numerical values, and other attributes and requirements. CSRF's SpecText® is typically written in this manner.

Intact Masters

Another approach is to include technical information and editing instructions embedded in the specification master. These types of masters are known as “intact masters.” Intact masters have optional text set off by brackets, which are predetermined to be likely choices for the specifier. Some bracketed blanks are usually included for the specifier to add custom text, as for the specification guides discussed above. The text is usually comprehensive, and the editing process is deductive (edit-by-delete) rather than additive. ARCOM's MasterSpec is typically written in this manner.

Public agency master guide specifications, such as the Unified Facilities Guide Specifications (UFGS), are typically written as intact masters, with complete text written using descriptive and reference standard methods of specifying. Little or no proprietary product information is included, and bracketed blanks for user-written text is minimized. Again, the intent is to edit-by-delete.

Public Agency Master Guide Specifications

U.S. Federal Agency Master Guide Specifications

Public agencies have long recognized the value of master guide specifications. Guide specifications and master specifications have long been associated with U.S. federal agencies. The U.S. Army Corps of Engineers (COE) and the Naval Facilities Engineering Command (NAVFAC) were early developers of master specifications. Other federal agencies, such as the General Services Administration (GSA), the Veterans Administration (VA), and the National Aeronautics and Space Administration (NASA), also have developed extensive libraries of master specifications. These are necessary in order to maintain consistency in construction quality and procedures for the billions of dollars of construction performed annually by the federal government. It should be noted that these agencies have a culture that highly values conformity, and they have financial assets and personnel to develop and maintain these masters.

Except for public works (general engineering) construction for infrastructure works, state and local agencies have not developed master specifications. Those infrastructure specifications that have been developed rarely follow CSI formats and construction specifications writing procedures. Public agencies are changing, however, and many are developing sets of standard specifications for buildings and some general engineering construction. Some of these are in the form of Outline Specifications, with enough information to describe product requirements but not complete enough for bidding and construction documents. Other public agencies,

such as large metropolitan public school districts and state general services administration agencies, as well as private organizations, such as universities and medical systems, have developed sets of full-length master specifications that are expected to be used almost verbatim. These agencies and organizations have recognized the value of master guide specifications to produce consistent and higher-quality construction specifications.

Federal agencies no longer publish agency-specific master guide specifications. They have moved to the UFGS, a very comprehensive library of standard specifications. These specifications require use of a special word processing program, SpecsIntact. Refer to the discussion below of SpecsIntact for additional commentary on UFGS and SpecsIntact.

Canadian National Master Specifications

In Canada, there are two major national master specifications systems for public and private construction. For Government of Canada organizations, there are the National Master Specifications (NMS). For other organizations, there are CSC Master Specifications, which are part of Construction Specifications Canada's TEK-AID program of technical guides and master specifications. These specifications also rely upon standardization to ensure quality. For more information on these Canadian masters, contact:

Construction Specifications Canada (CSC)

120 Carlton Street, Suite 312

Toronto, Ontario, Canada M5A 4K2

416/777-2198

www.csc-dcc.ca

Commercial Master Guide Specifications

Beginning in the mid-1960s, large architecture and engineering firms recognized the value of master guide specifications and began to develop their own sets of these masters. These were based on the firms' own standards and practices. Developments in document production, especially computer-based word processing programs, enabled firms to record specifications decisions and criteria in standard documents: the office master specifications.

The AIA recognized the value of master guide specifications for architects and developed MasterSpec. Based on annual subscriptions, MasterSpec has grown to several libraries of specifications for various design disciplines. Also, MasterSpec versions have been developed in full-length, short language and outline versions. ARCOM has taken over development and marketing of MasterSpec®, under license from AIA.

CSI similarly developed master guide specifications through the Construction Sciences Research Foundation (CSRF). Now independent of CSI, CSRF continues to develop and market SpecText (full-length), SpecText II (abbreviated version) and Outline specifications.

MasterSpec® and SpecText both offer comprehensive sets of master guide specifications. Each offers specifications in printed form and as electronic files in Microsoft Word and Corel WordPerfect word processing file formats. Each also formats its specifications to use add-in editing enhancements to both word processing programs. These tools should not be confused with true computer-assisted specifications programs, discussed in Chapter 19.

The quality of these commercial master guide specifications is high. They conform well to CSI recommended formats and specifications writing principles. Both MasterSpec® and SpecText include substantial numbers of sections suitable for engineering firms in Division 21 - Fire Suppression, Division 22 - Plumbing, Division 23 - Heating, Ventilating and Air Conditioning, Division 26 - Electrical, Division 27 - Communications, Division 28 - Electronic Safety and Security, and for site construction in Divisions 31 to 33 that are suitable for engineering firms.

The primary purpose of commercial guide specifications is not to provide an editing draft for project-specific specifications. This might be a surprise, but the primary purpose is to develop office master guide specifications. Commercial guide specifications, such as MasterSpec® and SpecText, are starting points for editing into master guide specifications that are customized for the standard principles and practices of a specific architecture or engineering firm.

ARCOM *MasterSpec*®

The AIA has recognized the value of master guide specifications for architects. Since 1969, AIA has published, first through its Production System for Architects and Engineers and now under license through ARCOM, the comprehensive library of master guide specifications called MasterSpec®. These specifications conform to CSI formats and writing conventions and cover the full 49 divisions of CSI MasterFormat.

Based on annual subscriptions, MasterSpec® has grown to several libraries of specifications for various design disciplines. Also, MasterSpec® versions have been developed in full-length, short language, and outline versions. Each section is extensively researched, and names of manufacturers and products are included. A full-time staff of professional architects and engineers produces and updates MasterSpec® on a regular basis. MasterSpec® includes an extensive peer review process, and there is also a MasterSpec® advisory review board made up of full-time in-house and independent specification writers.

MasterSpec® includes Evaluation, Drawing Coordination, and Specifications Coordination documents for each section. These are substantial documents and

useful resources for product selection and production of well-integrated documents.

MasterSpec® is an intact specification system. Except for a small number of exemplary paragraphs and schedules that must be written by the specifier, the specifier edits the section by deleting optional text and filling in numerical or specific data such as colors and finishes. This is sufficient for most commercial and industrial projects. For publicly funded projects and institutional projects requiring code-compliance information, the specifier needs to edit the text to suit the requirements of authorities having jurisdiction.

In addition to full-length MasterSpec®, ARCOM has developed and published short-form and outline versions of MasterSpec. MasterSpec Small Project, an abridged version, is published for projects that are modest in size, scope, and complexity. Projects that can use these master specifications include simple residential, commercial, retail, and institutional projects. MasterSpec® Outline, designed to generate preliminary specifications to be used during the schematic and design development stages of a project, is also published.

MasterSpec® is available by annual subscription in several word processing software formats in nine practice-specific libraries:

- Architectural/Structural/Civil (A/S/C)
- Structural/Civil (S/C)
- Mechanical/Electrical (M/E)
- Electrical
- Landscape Architecture
- Interiors Construction
- Roofing
- Security & Detention
- General Requirements

MasterSpec® subscriptions also include Masterworks enhancements to Microsoft Word and Corel WordPerfect word processing software. For an additional subscription fee, ARCOM publishes Linx, an automated specifications editing program for initial editing of specifications sections. These programs are discussed in more detail in Chapter 19. For more information, contact:

ARCOM, Inc.
332 E. 500th Street
Salt Lake City, UT 84111
801/521-9162 or 800/424-5080
www.arcomnet.com

CSRF SpecText

In 1967, CSI created the nonprofit CSRF, whose mission is to support and develop the programs recommended by the Stanford Research Institute in the Automated Specifications Study (CSI Document STD-1). In 1978, CSRF first published SpecText® Master Guide Specifications, a library of Divisions 1-16 specification guides written in conformance to CSI *SectionFormat*, *PageFormat* and the CSI *Manual of Practice*. Now an independent organization from CSI, CSRF continues to develop and market three versions: SpecText®, the SpecText® II abridged version, and SpecText® Outline specifications.

SpecText is published in printed form and in word processing file formats. Editing instructions are embedded in the text, and an edit-by-delete process is used. However, there are many bracketed blanks to fill in since SpecText is written using the descriptive and reference standard methods of specifying. For this reason, SpecText is more like a specification guide. Proprietary product information and specific attributes of products must be added by the specifier. Drawing coordination information is provided for each section, but there are no product selection guides or discussion beyond embedded notes within the unedited section text.

SpecText II is an abridged version of SpecText composed of approximately one-third of the full SpecText titles. CSRF says that SpecText II is designed for less complex projects such as light commercial, multifamily residential, and low-rise buildings and requires less editing than SpecText.

Included with a SpecText subscription is Editspec, CSRF's enhancements to Microsoft Word and Corel WordPerfect. This program is discussed in more detail in Chapter 19.

SpecText is available in several libraries or groups of sections according to design disciplines:

- SpecText Facility & Building
- SpecText Architectural/Structural/Civil
- Mechanical/Electrical
- SpecText Mechanical
- SpecText Electrical
- SpecText Site/Civil
- SpecText Environmental
- SpecText Environmental Engineering Add-Ons
- SpecText II Facility & Building
- SpecText II Architectural/Structural/Civil
- SpecText II Mechanical/Electrical

- SpecText II Site/Civil
- Outline™ Facility & Building
- Outline Architectural/Structural/Civil
- Outline Mechanical/Electrical
- Outline Site/Civil

SpecText library subscriptions, in addition to the specification guides (sections), include:

- SpecText Speller
- SpecText Glossary of Terms
- SpecText User's Manual
- SpecText Glossary of Terms User's Manual
- Series 0 Documents
- Drawing Coordination Considerations (DCCs for SpecText Divisions 2–14)
- Automated, Combined SpecText and SpecText II Tables of Contents
- Editspec Section-Editing Tools with instructions

For further information, contact:

CSRF Support Center
P.O. Box 926
Bel Air, MD 21014
410/838-7525 or 877/SPECTXT (773-2898)
www.spectext.com

Manu-Spec

Another library of commercially produced construction specifications is Manu-Spec, produced and distributed through First Source. Originally developed and distributed by CSI, Manu-Spec and the companion Spec-Data programs of manufacturer-produced product data and specifications are now owned by Reed Construction Data. These specifications closely follow the format of SpecText but are proprietary specifications written generally in proprietary method of specifying. For further information, contact:

Reed Construction Data
30 Technology Parkway South, Suite 100
Norcross, GA 30092
770/417-4000 or 800/906-3406

Other Manufacturer (Proprietary) Specifications

ARCAT produces and distributes through its website proprietary specifications that are well written, finely tuned by the manufacturers, and conform to CSI formats and writing principles. These specifications may be obtained at no charge. And while manufacturer's specifications necessarily include proprietary information, the options in the specifications are typically closely coordinated with the features of the products actually available. The strength of the manufacturer's specifications is in their list of available options, contrasted with the weakness of commercial guide specifications, which potentially allow for a combination of features not available from a specific manufacturer. For further information, contact:

ARCAT, Inc.
1077 Bridgeport Avenue
Shelton, CT 06484
203/929-9444
www.ARCAT.com

Sources of manufacturer (proprietary) specifications may be identified from 4specs.com, a comprehensive but simple online source frequented by full-time in-house and independent specifications writers. The website provides links to building product manufacturers' websites and is developing means to identify which manufacturers offer example and master guide specifications. For further information, contact www.4specs.com.

SpecsIntact

As stated above, most federal government specifications are based on the Unified Facilities Guide Specifications. These specifications are written using a tagging mark-up system, known as SGML, developed in the 1960s by NASA for its large construction programs. Known as SpecsIntact, these were intact master specifications ("Specifications-Kept-Intact"), as discussed above.

After several changes of program and major revisions of text, a major revamping of SpecsIntact was done in 1985, with conversion of the documents from mainframe computer to personal computer (PC)-based operation. The PC-based word processing program was used to edit SpecsIntact master guide specifications and featured many advance features, such as computer generation of reports (required submittals, required tests and inspections, and lists of reference standards).

In 1988, SpecsIntact text and word processing program were issued on the CCB CD-ROM disk by the National Institute for Building Sciences (NIBS). The SpecsIntact word processing program was adopted by the Federal Construction

Council Committee on Federal Construction Guide Specifications (FCGS) as the standard automated system for the executive departments of the federal government. Construction specifications of the COE, NAVFAC, and the VA were rewritten to conform to NASA's document format so the SpecsIntact word processing program could be used. Now with standardization of the master specifications of these three agencies plus the GSA into the Unified Federal Guide Specifications, the SpecsIntact word processing program has taken on greater significance.

The SpecsIntact word processing program has continued to develop. It enables the specifier to delete and add text, move text, search and replace text, change case in text (uppercase/lowercase), check references, add missing referenced sections, check spelling, and prepare quality assurance reports. It also allows the specifier to generate reports, as previously, and now the specifier may export the edited section in the widely used Microsoft Word format for further editing and publication using Word.

With standardization of all federal agencies on UFGS, specifiers producing construction specifications for federal projects must acquire and learn the SpecsIntact program or engage an independent specifications consultant who is expert in its use. There is no option; project specifications and SpecsIntact-generated reports must be delivered to the contracting officer in electronic format usable by the SpecsIntact program. For additional information, contact <http://si.ksc.nasa.gov/specsintact>.

Abbreviated Specifications

Master specifications are long. MasterSpec and SpecText have developed into long documents, but out of a need for completeness rather than wordiness. This is a result of the increasing complexity of construction technology and highly competitive contracting. The trend is expected to continue.

PCs with powerful word processing software have made it easy to produce large quantities of text. Even the abridged versions of MasterSpec and SpecText are voluminous for some projects. Chapter 21 addresses the use of outline specifications, which are suitable for the design development phase of a project, and shortform specifications, which are not merely abridged versions of full-length specifications but are a different style of specification that is a fraction of the length of full-length specifications but nevertheless suitable for use for bidding and construction contract documents.

Office Master Guide Specifications

Office master guide specifications differ from commercial and public agency master guide specifications. Typically, they begin with commercial master guide specifications and then are edited to suit the requirements of an architectural or

engineering firm. This is a process like pre-editing the specifications to avoid repetitive changes in the commercial master guide specifications. Considerations such as the following are addressed, and the text is edited accordingly:

- Typical geographic locations of projects
- Typical building code requirements and references for projects
- Typical product selections (PART 2 of sections)
- Typical construction contract administration requirements (PART 1 of sections)
- Typical product installation requirements (PART 3 of sections)
- Typical construction contract administration requirements (PART 1 of sections)
- Level of detail of specifications sections (e.g., use of broad-scope, medium-scope and narrow-scope sections; refer to Chapter 17)
- Level of detail within typical sections (refer to Chapter 17)

This list of tasks seems simple, but it requires substantial time and effort to accomplish for each section used in the office master guide specifications. Nevertheless, the tasks are necessary. Imagine having to go through each of these tasks, making the same revisions to a commercial master guide specification for each project. This is why office master guide specifications are essential.

The greatest challenge for office master guide specifications is maintenance of the masters. Products, standards, and practices constantly change. As each project is completed, something is learned and the office master guide specifications should be updated. This can be accomplished with word processing programs by opening multiple documents and copying text from one to the other. To facilitate this, the documents can be compared with the software, and differences can be highlighted to make the updating process more thorough and expedient.

When a series of similar projects are undertaken, such as a multiphase remodeling project in a hospital or a series of modernization projects at several schools, “submasters” or prototype specifications should be created from the office master guide specifications. This advances the pre-editing process by incorporating specific requirements of the Owner into the specifications. For example, manufacturer and series of corner guards in a hospital or markerboards in a school can be incorporated that will appear in all projects of the building program. This means maintaining another set of masters, but in the long run time is saved and profitability is enhanced. Quality assurance in design and documentation is also increased.

Because it takes so much effort to develop and maintain office master guide specifications, it is essential to subscribe to a commercial master guide specification library. The commercial masters may serve as the basis of the office

masters or they may be used only as a reference resource. Because the commercial masters are updated periodically, the work of updating the office masters is reduced. By using the compare function of word processing software, the updating process can be expedited.

This discussion appears to be most appropriate for medium-sized or large firms, with extensive office master guide specifications, that produce several Project Manuals per month or even per week. In fact, the benefits of office master guide specifications are perhaps even more significant for small firms and firms producing few Project Manuals per month. The difference is the amount of office overhead budget devoted to developing and maintaining the office master guide specifications.

The need for quality in the specifications is the same, whether the office is large or small. By using commercial master guide specifications, even a small firm can produce specifications comparable in quality to those of a large firm. If the office overhead budget is too small to develop and maintain office master guide specifications, then the services of an independent specifications consultant should be considered. A resource for identifying these consultants is Specifications Consultants in Independent Practice at www.scip.com.

Study Questions

1. True or False? Because computers have the ability to store and retrieve specifications, specifications from past projects are now more suitable for re-use on new projects.
2. True or False? Publication of “guide specifications” has eliminated the need to develop office-specific “master specifications.”
3. True or False? Master specifications published by building product manufacturers do not require editing to eliminate exclusionary and contractually inappropriate text.
4. SpecText is a series of “guide specifications” published and available from:
 - a. AIA
 - b. NIBS
 - c. CSRF
 - d. CSI
5. MasterSpec is a series of “guide specifications” published and available from:
 - a. AIA
 - b. CSI
 - c. CSRF

d. ARCOM

6. An agency that provides one of the largest sources of technical information in the building industry is:

a. ASTM

b. CSI

c. AIA

d. NIBS

7. Automated specifications format conversion from Unifomat to MasterFormat/SectionFormat is available from:

a. ARCOM

b. ARCAT

c. BSD

d. CSRF

8. Automated production of construction specifications for federal projects is available through which program?

a. SpecsIntact

b. SweetSpec

c. MasterSpec

d. SpecLink

9. Automated construction specifications are available from all except:

a. ARCOM

b. CSI

c. BSD

d. ARCAT

10. True or False? Master texts are so complete that knowledge of construction technology and construction contracts is no longer necessary.

Chapter 19

Computer-Assisted Specifications

Introduction

What was most burdensome to the specifier before the advent of the computer was the specifier's inability to cope with the onrush of new building technologies after World War II. There were both a proliferation of new building materials and, simultaneously, the development of new construction techniques. However, it was the development of word processing on the computer, the mainframe at first and then the personal computer (PC), plus the development of master specifications systems, that have kept the specifier from being completely overwhelmed.

The development of the PC and its software continues. A book such as this can only present a brief history and some suggestions of what the future of computer-assisted specifications might be. This book is essentially a primer on the principles of specifications writing, which are relatively timeless, whereas the technological developments of computers for design and construction occur on a daily basis.

The First four Decades of Automation

In the early 1960s, paper tape–driven typewriters and then typewriters with small magnetic memory devices began to help specifiers cope with the increased text needed to specify more complex buildings. Throughout the 1960s, the cost of memory typewriters came down and the capabilities of the machines improved. Not only construction specifications but also office correspondence benefited. With the advent of xerographic office copiers, the drudgery of typing messy, hard-to-correct stencils and mimeos was eliminated. Computers made it easier to assemble the rapidly thickening books of specifications and other construction contract documents. It became less necessary to cut up the last book of specifications or to compile longhand text to meet the next project deadline.

At the same time, the first uses of computers to store, alter, and print out text were being made by NASA, and some large engineering firms were already using computers for calculations. By 1965, IBM had developed Datatext, which could be used by anyone wishing to do simple text assembly. Then dozens of architectural and engineering firms and many computer service bureaus filed away enormous

blocks of retrievable construction specifications text, most of it arranged by the Divisions and Sections of CSI MasterFormat™. About 40 such batch processing services, many also providing specifications master text, were in operation at the beginning of the 1970s.

Altering text, whether it was generated inside the office or outside, was not always easy. The specifier was often separated from the host computer by data entry people and by remote processing, which came either from a central computer room serving the whole office or from an express-linked service bureau. If a large computer was used, the specifications generally had to be batch processed to fit in with other demands on the computer.

Two equipment advances in the 1970s began to change the picture: timesharing and the word processor. Starting in 1969, the first timeshare program with construction specification text was made available to architects and engineers: Pacific International's PIC system. It was now possible to control one's own master text and to edit it by using simple commands in one's own office, even if the mainframe processor was located the width of the continent away.

In 1972, CSI formed the nonprofit Construction Sciences Research Foundation (CSRF), contracting first with PIC and then with Bowne Information Services, to develop Comspec. Comspec could operate with homegrown or acquired master text, and it allowed interactive editing and printing at the same terminal.

By the second half of the 1970s, the first true word processors—the Laniers, Wangs, and Xeroxes—had evolved from mere memory typewriters. These word processors were actually small, limited-purpose minicomputers. They were usually standalones that could do the interactive editing and printing on demand that the timeshare systems provided at greater cost. Word processors, along with timesharing, brought the specifying process back to the specifier's workstation. This allowed flexibility in fine-tuning new and retrieved text to the needs of the project at hand.

As PCs (microcomputers) advanced in power to eclipse minicomputer-based word processors in offices, and as word processing software for PCs came to have document production capabilities that only a few experts could harness, construction specifications production for medium-sized to large design offices was almost exclusively PC-based. With high-speed laser printers and even inkjet printers that eclipse early laser printers for speed, PC-based word processing for construction specifications is usual and customary practice for architects and engineers.

To illustrate, consider the evolution of practice among one group of specifiers. Using the history of the 40 or so members of Specifications Consultants in Independent Practice (SCIP) as an indicator, a rough measure of change from 1970 to 1975 can be made. In this period the number of these specification consultants using memory typewriters grew from 2 to 10, and 1 adopted the computer for production. Another survey of SCIP, which had grown to 80-plus members in the

early 1990s, found about 70 percent using PC-based word processing programs for specifications production; the remainder used a variety of equipment and procedures that included typical electric typewriters and a few proprietary typewriter-like word processors. The proportion of SCIP members who edited text themselves directly on a PC using word processing software, rather than doing mark-ups of printed text for a clerical person to transcribe using a PC-based word processing program, went from about 50 percent in the early 1990s to close to 90 percent at the end of the decade. Now virtually all produce specifications using PCs and most are connected to office networks and the Internet.

Transforming the Specification Process

Seven transformations having to do with specifications were underway simultaneously in the 1960s and 1970s and continue today. Each feeds the others and makes the others possible or necessary:

- 1. The Hardware Transformation:** Commercially available equipment evolved from the punched paper tape typewriter and the vacuum tube computer to the desktop word processors and large, fast mainframes. Mainframes gave way to minicomputers and then microcomputers (PCs) that have proliferated in large and small offices. Instantaneous access to vast amounts of technical information through the Internet has been made possible by high-speed telecommunications. Production of voluminous documents has been assisted by high-speed laser printers that are affordable for even home-based offices.
- 2. The Format Transformation.** Good practice was distilled into the CSI way of organizing text and ideas, from the whole Project Manual down to the subparagraph. New formats have developed to assist recording of information at early phases of project design.
- 3. The Master Text Transformation.** Government agencies, large and small design firms, consultants, and text-writing organizations started to develop master text that was well researched, organized, and coordinated. These texts were comprehensive and usable, with intelligent editing, by design professionals. Strict adherence to document and computer file formats enable semi-automated production of specifications using the two major word processing computer programs.
- 4. The Technology and Information Transformation.** Manufacturers continued what they had started in the 1950s, making new structural systems, claddings, waterproofings, coatings, finishes, and methods of environmental control available to designers by way of technical literature and hundreds of trained sales-engineering representatives. Availability of information through the Internet on a 24/7/365 basis

greatly expedites specifications production. E-mail assists communication by eliminating “telephone tag,” and “frequently asked question” (FAQ) files quickly answer inquiries without intervention by product representatives.

5. The Responsibility Transformation. Owners and contractors no longer accept the designer as nearly perfect in matters of technology and document preparation. Architects and engineers have had to learn to give clear, complete instructions without resorting to subjective and risk-shifting clauses or trusting that builders will provide what the architect/engineer had forgotten. The current emphasis on design-build rather than design-bid-build shifts and blurs design and construction responsibilities, without substantial understanding of the consequences.

6. The Accountability Transformation. Design professionals, including specifiers, have come to realize that they live in an increasingly litigious climate. Many specifiers have become quality assurance specialists for their offices in addition to specifications producers. They have learned to select and write with concern for immediate and distant consequences.

7. The Education Transformation. The practical education of architects, engineers, construction managers, and contractors in specifications and construction technology has generally left the university campus. The initiative in professional development has been taken over by design firms, manufacturers, community colleges, and providers of continuing education programs—often with the support of local CSI chapters.

When these seven transformations were underway in the 1960s and 1970s, there was a remarkable unity in the methods of specification production. Large and medium-sized architectural and engineering offices adopted new hardware, new formats, and new texts. Some small offices advanced with them, but most lagged due to the cost of computerization of clerical tasks. Ultimately, by the early 1980s, most practices had adapted to computerization, primarily with CAD and office correspondence production, but also with document production for construction specifications. Integration of CAD and construction specifications production was seriously discussed, and futuristic pronouncements were made about the imminent connection of drawings and specifications.

From the 1980s on, the picture of computerization in architectural and engineering firms becomes broader, more diverse, and faster moving. Accounting fully embraced PC-based spreadsheet programs. CAD became widely available and rapidly developed so that, at the beginning of the twenty-first century, manual drafting is almost a lost art. Even professional licensing examinations require proficiency in CAD. Virtually all workstations in architectural and engineering firms have PCs, the vast majority of them are networked within the office (local area network or LAN), and all but the unenlightened are connected to the World Wide Web or the Internet for access to unlimited information and instant

communication.

Technological advances in computers for architects and engineers have exceeded the advances of technology in text creation and modification of construction specifications. In the late 1980s, Corbel developed SuperSpec™, a combination online (through slow modem connections) and mail/courier service for computer-assisted specifications. SuperSpec was based on the specifier's making decisions about the text, recorded on a printed checklist or in a PC-based program, which were sent to SuperSpec's home office for downloading into Corbel's large, high-speed mainframe computer and high-speed reproduction equipment designed for preparation of custom documents for the pension and insurance industries. The Internet had not yet taken hold, and modem connections were pitifully slow by current standards. In the early 1990s, Corbel ceased to provide computer-assisted construction specifications services.

A program competing with SuperSpec, called SweetSpec, was offered in the late 1980s by McGraw-Hill/Sweets. Originally developed by Heery International, a large Atlanta-based A/E firm, SweetSpec was a PC-based, question-and-answer format program that assisted specifiers in producing customized specifications based on SweetSpec's fixed text. The specifier went through a checklist for each section, and the computer worked through a decision tree to eliminate text that was not applicable. This edit-by-delete process yielded a construction specification that was not completely satisfactory and was difficult to modify further using the specifier's PC-based word processing program. SweetSpec was taken over by ARCOM and renamed MasterSpec Q&A, but it was discontinued in the early 1990s.

The federal government, through NASA, developed computer-assisted text production for construction specifications with the program Specs-Intact, discussed in Chapter 18. SpecsIntact was highly proprietary and required substantial training to use. Eventually adopted for the U.S. Army Corps of Engineers and the Naval Facilities Engineering Command for production of construction specifications, and now the basis for production of most federal government construction specifications under the Unified Facilities Guide Specifications (UFGS) program, SpecsIntact is not a true computer-assisted specifications program because its automation features are used only for generation of reports and other documents from the edited specifications text. Text creation is not computer-assisted.

Today, true computerized specifications, first introduced in the mid-1990s, are beginning to evolve into not only useful but perhaps essential tools for production of construction specifications. The remainder of this chapter, along with the discussion in Chapter 18 of master guide specifications, addresses the many elements of the still developing practice of computer-assisted specification writing.

Word Processing Software

Software programs for creating and editing text are commonly used for correspondence and other business documents. Word processing programs have evolved with capabilities to produce complex documents that include graphics, automated links to numerical data, and publishing capabilities in printed and electronic forms. Virtually all architectural and engineering offices use PC-based word processing software. However, their use for construction specifications and other sophisticated documents requires training that most firms do not provide. Many full-time specifiers have tapped their power but the automation and linking capabilities of contemporary word processing programs is not generally utilized in specifications production.

When put to use, word processing software such as the leading programs, Microsoft Word and Corel WordPerfect, in the hands of a technically savvy specifier trained in their use, enables one or a few persons to produce voluminous documents expediently. Briefly stated, commercially available text-editing software:

1. Allows call-up of master text previous project specifications, section by section, quickly and accurately.
2. Provides easy editing of characters, words, paragraphs, and larger blocks of text. Text can be deleted, modified, moved, duplicated, and added to with ease. Automated checking of grammar and spelling are features of the more powerful programs.
3. Provides for variable spacing, indenting, margin control, tabulating, replacing, and justifying. Sophisticated document formats are possible.
4. Permits headings and footings to be added automatically to pages, along with automatic page numbering within each section.
5. Stores edited text quickly and compactly for easy retrieval.

By using special formatting and text editing features, it is possible to:

1. Renumbers paragraphs automatically.
2. Allows embedded editing notes that either print or disappear.
3. Allows alternative page formats (indentation, spacing, paragraph identifiers),
4. Generates lists of submittals and tests.

File-naming conventions should allow documents to sort correctly in computer directories based on the preference of the firm. This will allow doc or pdf files to be sent electronically to the printer, where copies are made and distributed. The most common approach is to create a directory for each project, and within the directory to include the file number, name and date, for example, 099000_Painting_2009OCT30.doc. A similar approach would be 099000-PaintingRev2.doc. For directories where the project name is the key to sorting the files, a name such as OFFICEA-099000rev1.doc would be suitable.

Text-editing programs for master guide specifications, published by ARCOM (Masterworks for MasterSpec), CSRF (EditSpec for SpecText), and SpecsIntact enhance word processing programs for specific tasks in construction specifications production. These programs are discussed further below.

Computers and Peripheral Equipment

Except in large offices, mainframes and minicomputers are not used for word processing. PCs have taken over written document production. They have increasingly sophisticated performance characteristics, especially in architectural and engineering firms where graphics-capable PCs are the rule rather than the exception. Graphics-capable PCs easily handle word processing operations. PCs not only in commercial offices but in the micro-business environment of home-based specifications consulting are commonly networked. File sharing and printer sharing is affordable and the standard. Outmoded PCs are not trashed but continue in service as networked backups to new equipment.

Specific recommendations for computers and related peripheral equipment cannot be made. Technology advances too quickly. What can be safely recommended is the following:

1. **Central Processing Unit (CPU):** The CPU should be the fastest processor with the largest amount of usable memory and hard drive storage that can be afforded. Word processing software puts only modest demands on the CPU, but there are other considerations. Product information and professional development resources are becoming more video oriented, with heavy demands on the CPU and video processor if quick, steady video presentations are played.
2. **Graphics:** As just mentioned, video graphics demands are becoming heavy for everyone. Distance learning programs and downloaded product presentations require large screen monitors. Flat panel liquid crystal display (LCD) monitors are superseding cathode ray tube (CRT) displays. LCD monitors are flicker-free and have high color saturation. For size, the largest that the budget can bear is recommended. This enables multiple windows to be open for drag-and-drop copying and editing. Video processors require less capability for word processing than for computer-based gaming, so cost savings are possible.
3. **Storage:** Disk drives for reading and writing files include the infrequently used 3.5-inch floppy disk drive and a hard disk drive measured in hundreds of gigabytes. Networked computers require less storage capacity on individual workstations but huge capacity on the host. Recordable and rewritable digital video disks (DVDs) are taking over from compact disk (CD) drives. New storage technologies, including

transportable random-access memory (RAM) storage devices, are now common and affordable.

4. Printers: Architectural and engineering firms that produce only a few Project Manuals per month or only a few sections for Project Manuals assembled by others can use inkjet printers that output at least 12 pages per minute. Laser printers are the standard otherwise, and printers dedicated to specifications production should be as fast as the budget allows, with large paper capacities. The rush at the end of specifications production means that the printer cannot be too fast. Color inkjet and laser printers should be considered, but reproduction costs for multiple copies of color-enhanced Project Manuals also need to be considered. Duplex (2-sided) printing can result in reproduction cost savings.

5. Telecommunications: High-speed Internet connection at the specifier's workstation is essential. Since most architectural and engineering firms transmit large CAD files using high-speed connections, it should not be expensive to include this capability in the specifier's computer. Even home-based specifications consultants usually have high-speed cable modem or Digital Subscriber Line (DSL) connections.

Word Processing Enhancements for Specifications

ARCOM for MasterSpec and CSRF for SpecText have developed and market enhancements to Microsoft Word and Corel WordPerfect. For federal agency projects using UFGS, the NASA-developed SpecsIntact program does some similar functions. These programs use the computer to execute repetitive tasks, do global formatting, and generate reports on the content of the Project Manual. These should not be confused with knowledge-based specifications programs such as Linx by ARCOM and SpecLink+ by Building Systems Design, discussed later in this chapter.

Masterworks

Published by ARCOM for use with MasterSpec master guide specifications, Masterworks is an add-in to the user's word processing program (Microsoft Word or Corel WordPerfect), purchased separately. Masterworks allows the specifier to do the following:

- Automatically select and edit paragraphs and specification options within a specifications section.
- Easily delete paragraphs and subordinate paragraphs within a specifications

section.

- Change styles, fonts, margins, paragraph numbering, and other document formatting options from mouse-driven menus within a specifications section.
- Globally perform the above formatting tasks on all sections in the Project Manual, including custom page headers and footers.
- Apply different paragraph numbering schemes or locate and modify unique search strings in a list of files.
- Select between metric and English units of measure for all sections at once.
- Create basic and detailed tables of contents.
- Assemble all sections into a single document and wizards to produce an index and automatically generate project reports. It can choose from either instance reports (that pinpoint specifications containing a particular requirement) or detail reports (that list text from all files associated with a particular subject) for submittals, extra stock and materials, warranties, commissioning, field quality control, and maintenance service.
- From within Masterworks using drag-and-drop functionality, create new project folders and copy, move, rename, and delete files.
- Masterworks, in conjunction with Microsoft Word software, will convert batches of Word files to Adobe Acrobat Portable Document Format (PDF). This function is not available in Masterworks for Corel WordPerfect, but WordPerfect allows individual files to be published in (converted to) PDF.

For further information, contact:

ARCOM, Inc.

332 E. 500th Street

Salt Lake City, UT 84111

801/521-9162 or 800/424-5080

www.arcomnet.com

EditSpec

Published by CSRF for use with SpecText master guide specifications, EditSpec is a collection of section-editing tools and supplementary documents. EditSpec is included with a subscription to SpecText and works with the user's word processing program (Microsoft Word or Corel WordPerfect for Windows), purchased separately. EditSpec offers the following functions:

- Create headers/footers in selected or all sections
- Insert and delete specifier's notes
- Insert project notes

- Insert [OR] statement
- Insert units of measure
- Accept inch-pound measurements
- Accept metric measurements
- Delete selected paragraphs
- Find and edit bracketed choices
- Delete brackets and fill-in-the-blanks
- Mass macro applicator

For further information, contact:

Construction Sciences Research Foundation, Inc.

The CSRF Support Center

P.O. Box 926

Bel Air, MD 21014-0926

410/838-7525 or 877/SPECTXT (773-2898)

www.spectext.com

Knowledge-Based, Computer-Assisted Specifications

As discussed above, there have been several attempts to harness the power of the computer to interact with a large database of knowledge about construction specifications and products. Bowne Information Systems' Conspec, Corbel's SuperSpec, McGraw-Hill/Sweet's SweetSpec, and ARCOM's MasterSpec Q&A all attempted and failed to produce knowledge-based, computer-assisted specifications product programs. These programs were visionary, but their cost and the limitations of users' PCs and computer-to-computer communications doomed them.

In most knowledge-based specifying systems, the master text is not seen by the person answering the questions. The clerical aspects of text editing are not the concern, only the end product. As a result, the master is always resident in unaltered form, and it can be updated without affecting project-specific specifications if and when the specifier chooses.

The technical content of knowledge-based specifications programs is written by very knowledgeable specifiers. This knowledge base is an impressive resource but it is not a substitute for the specifier's knowledge. It is an aid that requires the specifier to be knowledgeable about construction specifications principles and practices and construction technology. A session with a demonstration version of a

knowledge-based specifications program will make this apparent.

The greatest advantage of knowledge-based specifications programs is productivity when a knowledgeable user is combined with a comprehensive, well-prepared, up-to-date knowledge (data) base. One consideration in choosing a knowledge-based specifications program is its supplementary documentation of products and product selection. The more substantial these supplements are, the more fully the specifier will understand the editing options and the greater the satisfaction with the completed specifications.

Pressure to integrate production of drawings, specifications, cost estimates, and planchecking continues to build. Several organizations are pursuing the development of an all-encompassing computer program that will create drawings, specifications, and related documents based on parametric decisions of the architect or engineer. This search has been going on for over 30 years. Perhaps if the power of PCs becomes sufficient, if high-speed Internet telecommunications becomes adequate, if links between the very different software of CAD, specifications, and other information are created in usable form, and if architects, engineers, and specifiers are sufficiently trained to use the program, the long-promised, all-encompassing computer-assisted design (CADD) program will become a reality.

SpecLink+®

In 1994, Building Systems Design (BSD) of Atlanta, Georgia, developed SpecLink, a new specifications-intelligent linked system that relied on a fully integrated relational database rather than word processing files for its fundamental data structure. In addition to a master file containing hundreds of specification sections, the database included thousands of links between sections that multiply the productivity of the specifier. Instead of editing master specifications for a specific project by deleting unwanted or inappropriate text from the master, the user of SpecLink selected only text that was needed. As text selections were made, in any order, the links built into the database automatically included related text and excluded incompatible options, whether in the same section or in a related one. Only text that was selected either by the specifier or automatically by the program was assembled into the project specification.

SpecLink continued to develop, and the current program, SpecLink+, is enhanced to run under 32-bit PC-based operating systems rather than the 16-bit original version. Presently, the SpecLink+ database contains over 700 master specification sections and over 110,000 data links. The best way to understand SpecLink+ is to contact the publisher and obtain a demonstration version of the program.

A major criticism of SpecLink+ is that a current subscription is required to access past projects. BSD's response is that SpecLink+-produced text may be exported as Microsoft Word-compatible Rich Text Format (RTF) documents. In

fact, many users export files in this manner for final editing and formatting, although SpecLink+ includes extensive capabilities for section paragraph numbering and page formatting.

For further information, contact:

Building Systems Design, Inc.
3520 Piedmont Road NE, Suite 415
Atlanta, GA 30305
888/BSD-SOFT (888/273-7638)
www.bssoftlink.com

Linx

Linx is an add-on to MasterSpec published by ARCOM for the AIA. There is a separate subscription fee for Linx. Linx works with the full-length version of MasterSpec.

ARCOM describes the use of Linx as the first major step in producing project-specific construction specifications. Basic product selections and basic editing decisions are made in Linx. When completed, the Linx-generated files are exported to the specifier's word processing software, which should include the Masterworks add-in software, for final editing and publication. This is different from SpecLink+, where the entire specifications production and publication process is performed.

Linx optimizes the edit-by-delete structure of MasterSpec with a question-and-answer, criteria-based approach to editing. As the specifier answers questions, irrelevant specification text is eliminated. When a specification element is removed, Linx automatically marks for deletion that element's subordinate text within the section. Linx also knows where structural and semantic links occur in any particular specification paragraph. It targets scattered requirements related to the choices made by the specifier and marks those for deletion as well. When the editing is completed, all text selected for deletion is marked as strike-through text, and the specifier reviews the section prior to actual text deletion.

Linx-edited sections are saved and further edited by the specifier using the global and section text-specific tools of Masterwork. Since the resulting files are in Microsoft Word or Corel WordPerfect, there is no need to use a proprietary software editor, as required by SpecLink+. Access to archived files also is not dependent upon having a current subscription to the program since the files are in word processing file format.

For further information, contact:

ARCOM, Inc.
332 E. 500th Street
Salt Lake City, UT 84111

Precautions

A major problem associated with computer-assisted specifications is that novices are being required to use the programs to produce project-specific specifications with little training in the program and virtually no formal knowledge of the principles and procedures for construction specifications writing. Unlike online medical libraries and legal case law libraries, where only trained doctors and lawyers search the data to arrive at solutions and make decisions, computer-assisted specifications allow anyone to edit them.

Those who interact with the computer-assisted specifications program should be well versed in construction contracts, bidding requirements, building products, materials standards, products evaluation and selection, and the principles and procedures of construction specifications writing before being allowed to use the program. Attending training sessions conducted by the software publisher is also very important and, despite its substantial cost, could be offset by rapid attainment of productivity and avoidance of costly errors.

Specifiers Property Sets (SPie)

A 2009 advance in the attempt to link information valuable to specifiers (property sets) with information in building information models (BIM) includes a list of 425 specification sections and an 8500 line spreadsheet which can be linked to objects in a BIM model, now available at the government website for the Whole Building Design Guide, www.wbdg.org.

The Specifiers Property Information Exchange (SPie) Project brings together software manufacturers, product manufacturers, trade associations, professional associations, and project stakeholders to define a series of open information exchanges that improve construction document consistency, reduce product discovery and procurement costs, and automatically capture construction handover data.

Specifiers property sets are organized according to CSI MasterFormat section titles and numbers, and contain specification information developed in architectural and engineering firms during the design phase of a construction project. Common uses are for outline specifications and preliminary project descriptions in text documents; and assembly codes and type properties in building information modeling (BIM) data structures.

The Specifiers Property Information Exchange (SPie) was initially developed by Specifications Consultants in Independent Practice (SCIP) and Mark Kalin in

cooperation with the Construction Specifications Institute (CSI) and Roger Grant, and advanced by Bill East of the US Army Corps of Engineers and Deke Smith of the National Institute of Building Sciences and building SMART.

- Organization of Data in the SPie Spreadsheet:
- Line Number - Sequential Line Numbering
- MasterFormat Number; CSI/CSC MasterFormat 2004
- Uniformal Number; CSI/CSC UniFormat II (ASTM E1557)
- Section Name, CSI/CSC MasterFormat 2004 Section Name
- Property Name, OmniClass Table 49
- Property Value, Specifiers Property

The following is a list of the primary OmniClass Table 49 Properties Included in SPie (plus product specific properties):

- Property - Property Definition
- Application - Intended function or use of product
- Sustainability - Environmental attribute applicable to the product
- Accessibility - Applicable regulations for physical access
- Reference Standard - Applicable industry standards for performance
- Code Performance - Applicable code requirements
- Warranty - Manufacturer's or installer's guarantee
- Manufacturers - Product producer or source
- Materials - Primary materials
- Type - Product specific types
- Grade - Product specific grades
- Sizes - Primary size or shape of product
- Thickness - Primary thickness of product
- Color - Primary color of product
- Finish - Primary finish of product
- Method of Operation - Primary method of operation
- Installation - Installation type or requirements

Study Questions

1. True or False? Modern personal computers and sophisticated word processing programs enable project specifications to be produced by

clerical staff without a trained specifications writer.

2. True or False? Commercial guide specifications as files in a contemporary word program may be used to expediently produce project-specific specifications without resorting to office master specifications or previous project experiences.

3. Automated commercial guide specification programs are available from which of the following?

- a.** ARCOM, MasterSpec Linx
- b.** BSD SpecLink
- c.** ARCOM SpecWizard
- d.** All of the above

4. True or False? Computer-assisted specifications programs encompass all conceivable subjects for construction specifications.

5. True or False? Contemporary word processing software has the ability to generate specifications in sophisticated page formats.

6. Word processing programs for construction specifications should provide which of the following features?

- a.** Automatically number specification Section Parts, Articles, and Paragraphs
- b.** Automatically apply page headers and footers
- c.** Check spelling
- d.** Store documents on electronic media
- e.** All of the above

7. True or False? Knowledge-based specifications systems operate in an interactive mode by question and response.

8. True or False? A high-speed printer is necessary for producing Project Manuals.

9. True or False? More frequently, construction specifications are delivered as Adobe Acrobat electronic format files that eliminate the need to print construction specifications.

10. True or False? CD-ROMs are the preferred medium for exchanging documents as electronic files.

Chapter 20

Preliminary Project Description

UniFormat®

CSI/CSC *MasterFormat*® organizes construction information according to construction requirements, products, and activities. See Chapter 3 for detailed discussion of *MasterFormat*.

MasterFormat is a format for standard organization of construction specifications and other bidding and construction contract documents in the Project Manual. *MasterFormat* is also used for organizing detailed cost estimates, for filing of product information and other technical data, for identifying drawing objects, and for presenting construction market data. These uses occur during Design Development, Contract Documents production, bidding, and construction. Prior to Design Development, *MasterFormat* is cumbersome and overly detailed for schematic design and the early portion of design development.

Recognizing the shortcomings of *MasterFormat* and looking to models of construction information organization outside of North America, the AIA in the early 1970s developed for the General Services Administration (GSA) of the federal government a classification system for construction based on building and site elements. The resulting document was titled *UniFormat* and was primarily intended to standardize estimates and facilitate cost analysis and cost control. *UniFormat* has been used by federal agencies and by R.S. Means Co. in their Means Assemblies Cost Data for these purposes.

In 1988, ASTM Building Economics Subcommittee E06.81 formed a task group that included the GSA, CSI, R.S. Means, and the U.S. Department of Defense Tri-Services Committee. This task group had the responsibility to update *UniFormat* and have it formally approved as an ASTM standard.

The task group developed and updated *UniFormat*, and CSI published it as an “Interim” version for “trial use and comment.” It was included in the 1992 edition of the *CSI Manual of Practice*. Meanwhile, the National Institute of Standards and Technology (NIST) developed an alternative version, titled *UniFormat II*, which was also published in the first half of 1992. The two formats were similar but not identical.

ASTM balloted and accepted *UniFormat II* as the basis for the formal standard.

In late 1992, ASTM published ASTM E 1557, titled Standard Classification for Building Elements and Related Sitework: *UniFormat II*. This standard has subsequently been updated and, at the time of this writing, is designated ASTM E 1557-02. An abstract of this standard may be found online at www.astm.org, search for “ASTM E 1557.”

UniFormat II added elements and expanded descriptions of many existing elements, making it suitable not only for cost analysis and control but also for project management and reporting at all stages of building lifecycle planning, programming, design, construction, operations, and disposal.

The working group, including representatives from CSI, the American Association of Cost Engineers, the American Society of Professional Estimators, GSA, the Naval Facilities Engineering Command, the U.S. Air Force, and the U.S. Army Corps of Engineers, continued development of *UniFormat II*, and ASTM published the result as ASTM E 1557-97. This standard has been revised and reissued as ASTM E 1557-02.

The *UniFormat II* working group determined the following:

- A need existed for a formally established classification system based on building systems and assemblies.
- The classification system should be based on UniFormat.
- The classification system should be expanded to encompass all types of construction rather than limited to building construction.
- The classification system should be coordinated with MasterFormat.

In 1999, a proposed update of *UniFormat II* was published by NIST as NISTIR 6389, which included expansion of the classifications to a fourth level. This document, dated 1999, is available for download and printing at www.uniformat.com/6389.pdf. Verify that it is current since the comparable ASTM E 1557 was updated in 2002.

In 1995, CSI and CSC began revising *UniFormat* to align it with ASTM E 1557 and to coordinate *UniFormat* with the 1995 edition of *MasterFormat*. In 1998, CSI/CSC formally published their version of *UniFormat*, which had the following changes:

- Collected titles that were not physical building parts were relocated near the beginning of the document, with appropriate titles such as “Project Description.”
- The format was revised to allow its use for classifying information necessary to solicit proposals and to contract for design-build projects.
- Category D “Services” and Category E “Equipment and Furnishings” were reorganized to reflect more of a systems approach, with generic functional

categories.

- The title of Category F was changed from “Other Building Construction” to “Special Construction and Demolition.”

The CSI/CSC version, *UniFormat*, and the ASTM E 1557 version, *UniFormat II*, have the same numbering scheme, and titles from Level One through Level Three. However, the CSI/CSC version added a Level Four for greater detail, added Level One “Project Description” category, and added category Z - “General.”

In 1999, NIST published a proposed revision to *UniFormat II* that expanded to Level Four and added category Z - General. Readers should obtain current copies of CSI/CSC *UniFormat*, ASTM E 1557, and the NIST document and study the commentaries for instructions for their use for production of project-specific documents.

Level One and Level Two categories of *UniFormat* are:

Project Description

10 PROJECT DESCRIPTION

20 PROPOSAL, BIDDING AND CONTRACTING

30 COST SUMMARY

A Substructure

A10 FOUNDATIONS

A20 BASEMENT CONSTRUCTION

B Shell

B10 SUPERSTRUCTURE

B20 EXTERIOR ENCLOSURE

B30 ROOFING

C Interiors

C10 INTERIOR CONSTRUCTION

c20 STAIRS

C30 INTERIOR FINISHES

D Services

D10 CONVEYING

D20 PLUMBING

D30 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

D40 FIRE PROTECTION

D50 ELECTRICAL

E Equipment and Furnishings

E10 EQUIPMENT

E20 FURNISHINGS

F Special Construction and Demolition

F10 SPECIAL CONSTRUCTION

F20 SELECTIVE DEMOLITION

G Building Sitework

G10 SITE PREPARATION

G20 SITE IMPROVEMENTS

G30 SITE CIVIL/MECHANICAL UTILITIES

G40 SITE ELECTRICAL UTILITIES

G90 OTHER SITE CONSTRUCTION

Z General

Z10 GENERAL REQUIREMENTS

Z20 CONTINGENCIES

Obtain a copy of *UniFormat* from CSI that contains a “Master List of Numbers, Titles, Explanations and Related MasterFormat Numbers” for Level Three and Level Four headings, as well as an “Application Guide” and “Key Word Index.” Contact www.csinet.org.

Preliminary Project Description

According to the CSI Manual of Practice (1996), the “Fundamentals and Formats” module FF/180, a Preliminary Project Description (PPD) is prepared to describe the scope and relationships of major project elements and is organized in terms of building systems and site components. PPDs are usually prepared during the initial design phases of a project. According to AIA Document B141, Standard Form of

Agreement between Owner and Architect, the two phases of initial design are the “Schematic Design Phase” and the “Design Development Phase.” According to EJCDC Document E-500, Standard Form of Agreement Between Owner & Engineer for Professional Services, these phases are the “Study and Report Phase” and the “Preliminary Design Phase.” For consistency and brevity, the AIA terminology will be used in this discussion.

The purpose of the PPD, when first conceived, was preliminary cost estimating at the Schematic Design phase, when drawings were conceptual or did not exist. This purpose has grown. The PPD is now used to convey to the owner and architect or engineer knowledge of the various components and systems proposed for the project. PPDs accompany Requests for Proposal (RFPs) for design-build projects. *UniFormat* is used as the format for PPDs.

PPDs are particularly beneficial as a design management tool because they cause each design discipline to conceptualize baseline building systems early in the design process. Although the descriptions are provided in general or simple terms to suit the preliminary nature of the design, information can be communicated effectively to all involved in the project. PPDs enable more realistic scope descriptions and result in more adequate budgets for the project than mere square foot estimates based on mythical similar buildings in the general region. It is hoped that the result will be more accurate costing due to fewer unknowns, therefore reducing the need for large contingencies and allowances and the probability of cost overruns.

In preparing the PPD, the design team should think through the requirements of the project and document decisions and design criteria in broad terms. Refinements and changes can be made during development of the design as more information becomes available, design issues are resolved, and cost data is applied. A PPD may include both performance criteria and product descriptions, depending on the development of the design and the state of design decisions. It should provide information necessary for preparation of preliminary cost estimates, time schedules, and initial value engineering studies.

Following *UniFormat*, the PPD should be organized to describe groups of construction systems, assemblies, and components in a logical sequence from the ground up and from the outside in. The PPD should include proposed design solutions and decisions made or to be made, and it should serve as a master guide for the project from which subsequent project documentation will flow. Documentation through Schematic Design and most of the way through Design Development should:

- Reflect the building program in physical terms by providing preliminary descriptions of building products, assemblies, and systems, including prospective design solutions
- State the architect/engineer's understanding of the project delivery method

(e.g., single prime contract, multiple prime contracts, construction management, design-build, design-bid-build, and phased construction), including considerations for the General Conditions of the Contract and construction contract administration

- Describe alternative products, assemblies, and systems that meet both the design criteria and budget constraints
- Document the basis for time schedules
- Document the basis for construction costs
- Aid the design process by documenting design decisions made and to be made, including responsibilities for decisions by project team members
- Provide a reference point on which subsequent decisions and phases of the project will be based, including the owner's formal acceptance and approval of the Schematic Design

There are two principal methods for defining building systems:

- System Descriptions: List and describe products, assemblies, and systems, including restrictions and possible alternatives that meet the design criteria
- Performance Criteria: List and describe the project as a system of components rather than actual products, with supplementary descriptions and including all pertinent criteria so that unsuitable systems can be readily identified and eliminated from consideration

Each of the PPD elements should be expanded as more information becomes available through the design development and value engineering processes. For example, a floor system under consideration in the B10 Superstructure element might be described as a 2-hour fire-rated, composite steel beam, steel deck, and concrete slab system in 20-feet by 25-feet (6100 mm by 7600 mm) bay dimensions, capable of supporting a 75 psf (3.6 kPa) live load. With that information, a preliminary cost estimate for the proposed system and alternative systems could be developed for budget and value engineering purposes. The systems best suited to the design and to the project budget could then be identified and the PPD validated for the described system or the PPD could be modified to reflect an alternative system better suited for the project.

The floor system described above includes products from several different *MasterFormat* divisions that are combined under a PPD heading. This reflects the fact that the PPD describes systems rather than products typically categorized in the divisions of *MasterFormat*. The floor system example includes the following items from *MasterFormat*:

- Reinforced portland cement concrete: Division 03

- Composite steel beams and steel decking: Division 05
- Sprayed fire-resistive material: Division 07

Many products will be identified under several PPD headings. Portland cement concrete for foundations, slabs-on-grade, paving, drainage structures, and light standard bases will be identified in the applicable PPD headings. Refer to the *UniFormat* “Application Guide” that describes this process further and the “Master List of Numbers, Titles, Explanations and Related MasterFormat Numbers” that cross-references *UniFormat* Level Three and Level Four headings with MasterFormat section numbers and titles.

A major benefit of performing an economic analysis based on an elemental framework instead of on a product-based classification is the reduction in time and costs for evaluating alternatives at an early stage in the design process. This should encourage more analyses of initial and life cycle costs and should optimize design and cost decisions for building elements. Refer to narratives in the NISTIR 6389, referenced above.

See Appendix C - Sample Preliminary Project Description.

Computer-Assisted PPDS

Building Systems Design (BSD) has produced a computer-based program to produce PPDs and proposal documents related to design-build project delivery. The program, titled PerSpective®, uses the same software engine as BSD's computer-assisted specifications program, SpecLink+. This means that the program is PC-based and runs on top of a customized database program. It produces documents in *UniFormat*.

Three types of documents are produced by PerSpective:

- Building Design Criteria: An owner's RFP
- Proposed Performance Specifications: A designer-builder's proposal (response to RFP)
- Instructions for Construction: Short, descriptive specifications of proposed construction

PerSpective, according to BSD, includes the following features to expedite production of PPDs at the schematic design and design development phases of the design:

- Global switch to set the function of the document (Owner's RFP, Design-Builder's Proposal, or Instructions for Construction)

- Reuse of previous projects without danger of omission
- Global page formatting, one setting for all headers and footers, margins, and the like
- Automatic paragraph renumbering
- Edit-by-select rather than edit-by-delete—no data actually disappears
- Internal links to coordinate related text and prevent contradictions between elements
- Easy comparison of two project files
- Notes to editor with explanations of issues
- Seamless, automatic updating of reference standards without loss of user edits

For a detailed description of PerSpective, download a portion of the User Manual, titled “Chapter 2 - Using PerSpective® Effectively,” from the list of monographs associated with PerSpective on the BSD website: www.bsdsftlink.com.

Study Questions

1. True or False? Preliminary Project Descriptions (PPDs) are produced during the Design Development phase of a construction project.
2. True or False? A Preliminary Project Description (PPD) is prepared to describe the scope and relationships of major project elements and is organized in terms of building systems and site components.
3. True or False? PPDs are particularly beneficial as a design management tool because they cause each design discipline to conceptualize baseline building systems early in the design process.
4. True or False? PPDs are organized according *UniFormat*, using the PPD should be organized to describe groups of construction systems, assemblies, and components in a logical sequence from the ground up and from the outside in.
5. True or False? *UniFormat* organizes a building according to 27 categories.
6. True or False? There are two competing versions of *UniFormat*.
7. True or False? PPDs are well suited for developing preliminary cost estimates.
8. True or False? PPDs organized according to *UniFormat* easily convert to the 49 Divisions of *CSI MasterFormat*.
9. Which of the following are true characteristics of a PPD?
 - a. Describe alternative products, assemblies, and systems that meet both

the design criteria and budget constraints

b. Document the basis for time schedules

c. Document the basis for construction costs

d. Aid the design process by documenting design decisions made and to be made, including responsibilities for decisions by project team members

e. All of the above

10. True or False? *PerSpective* is a computer-assisted specifications program published by Building Systems Design, Inc. (BSD) that automates the production of PPDs following *Uni-Format*.

Chapter 21

Outline and Shortform Specifications

Outline Versus Shortform Specifications

Outline specifications are useful for describing the intent of the design during the Design Development (DD) phase of a project. This is similar in purpose to the Preliminary Project Description (PPD) discussed in the preceding Chapter. However, as with PPDs, outline specifications are not suitable for use as construction contract documents. This is what most distinguishes outline specifications from shortform specifications. Shortform specifications have sufficient information to bid and construct a project. Outline specifications do not.

Outline Specifications

Design Development (Outline) Specifications

After the project design has progressed from the Schematic Design phase to the Design Development phase, outline specifications become very useful and may often be required by the agreement between the owner and the architect or engineer. AIA Document *B141 Owner-Architect Agreement* requires “drawings and other documents to fix and describe the size and character of the project as to architectural, structural, mechanical and electrical systems, materials, and such other elements as may be appropriate,” along with adjustments to the preliminary cost estimate. EJCDC Document *C-700* requires production of final design criteria, preliminary drawings, outline specifications, and written descriptions of the project, along with a revised estimate of the probable project cost. Outline specifications can meet the requirement for written descriptions.

Outline specifications aid in the design process and may be the basis for refined cost estimates, product and equipment schedules, and value engineering studies. They also may serve as a checklist for the project team when it selects products and methods during the Design Development phase. They are a means of communication among members of the project team and between the design professionals, the owner, and the construction manager.

Outline specifications help create a controlled decision-making process and encourage clarity in those decisions since they must be committed to concise written statements. Well-prepared outline specifications establish the understandings of the design team at the conclusion of Design Development.

Preliminary Project Description (PPD) Versus Outline Specifications

As stated above, PPDs and outline specifications have separate and distinct functions. The PPD, together with the preliminary design drawings at the Schematic Design (SD) or early Design Development (DD) phase of a project, define the components and systems proposed for the project. Both PPDs and outline specifications help the owner and the design team reach a more complete understanding of the project. The PPD serves as a basis for discussing building and site systems early in the life of the project but is based on design criteria that is not fully developed.

The PPD is organized in terms of building systems and site components. Outline specifications take information from the PPD and revise the format into the divisions of CSI *MasterFormat*. Information about building systems and site components is gathered from various PPD “elements” and expanded into Sections that describe particular Work Results, as discussed in Chapter 3 regarding *MasterFormat*.

Outline specifications aid in the design process and help form the basis for revised cost estimates and schedules. As the design process continues, they become the basis for preparation of the construction specifications during the Construction Documents phase of the project. Outline specifications serve the project team by recording design decisions for product and system selections in a format similar to the one that will be used in the Project Manual, which will be used for procuring and constructing the project. Properly developed outline specifications establish criteria for the final Contract Documents specifications. They also help to eliminate fragmented decision making, which can affect previous decisions and cause unnecessary changes and extra costs.

Outline specifications briefly list materials, manufactured products, finishes, and methods to be used for the project. Their primary purpose is to provide information that establishes the quality of products, identifies unusual fabrication and installation requirements, and presents exceptional quality assurance measures, such as mock-ups and field inspections and tests. Outline specifications should provide descriptions of the design for use in preparing more accurate estimates of probable construction cost. Typically included in outline specifications are:

- Requirements for specified and acceptable manufacturers, materials,

manufactured units, equipment, components, and accessories

- Unusual requirements for material mixes, fabrications, and finishes
- Unusual requirements for preparation, installation, erection, and application of products
- Unusual general requirements for Part 1 - General of the section, such as submittals, samples, mock-ups, preconstruction conferences, special warranties, extra stock, and maintenance materials. Unusual requirements for qualifications for manufacturers, fabricators, or installers may also be included
- Other requirements that may have a significant impact on quality, cost, or construction sequencing and duration

Owners vary considerably in their familiarity with and understanding of building elements, products, and standards. Outline specifications help the owner overcome this difficulty. They also serve a variety of purposes for other entities, including lenders, estimators, construction managers, and code officials.

Outline specifications are more than a table of contents for the specifications to be produced during the Contract Documents phase. They are a record of decisions about specific materials, equipment, systems, methods, manufacturers, and special fabrication requirements. Outline specifications are not construction documents. Their preliminary and incomplete nature makes them unsuitable for use as biddable, constructible construction documents.

Outline specifications should accomplish the following:

- Encourage and record product selection decisions early in the documentation process
- Assist accurate estimating of probable construction costs for budget management
- Assist in preparation and updating of preliminary construction schedules by clarifying the scope of products and special construction requirements early in the documentation process
- Assist the owner in understanding what materials and systems are proposed
- Coordinate construction documentation of various design disciplines
- Provide an outline for preparation of the Project Manual, including construction specifications

General installation procedures, such as references to manufacturers' instructions, are not necessary in the outline specifications. However, identification of specific installation methods such as "gravel-surfaced 4-ply built-up asphalt roofing" or "thinset ceramic mosaic tile on anti-fracture membrane" are important because they

have a direct relationship to quality levels and costs, compared to more or less costly alternative products of greater or lesser quality.

Information in the outline specifications should be sufficient for the user of these specifications along with the Design Development drawings to determine the types of products and their general locations on the project. Finish, door, and equipment schedules may be included on the drawings or in the outline specifications to indicate where various products will be used.

During the Design Development (DD) phase, the architect or engineer should request the owner's instructions for bidding, bonds, and insurance, General Conditions of the Contract, and construction contract administration requirements. If available, the outline specifications should include this requested information plus an abbreviated Division 1 - General Requirements. This will record the understanding of contract arrangements and provide an opportunity for the owner to review and confirm or request changes before production time is spent developing the final bidding and contract documents.

If it is intended to be used, Section 01 11 00 - Summary of the Project should be edited in order to summarize the project and general scope of the work under the contract. It should also address the following items as applicable:

- Separate or multiple contracts
- Future work
- Coordination for fast-track and multiple prime contract requirements
- Phased construction
- Owner and contractor use of new and existing facilities
- Allowances, alternates bids, and unit prices
- Project scheduling
- Applicable codes
- Materials-testing responsibility
- Owner-furnished, contractor-installed items
- Code search reports, zoning requirements, fire protection reports, and other specific information that may be required for inclusion as appendices in outline specifications prepared for use by planning authorities or other public entities
- Access restrictions and security requirements
- Environmental restrictions and requirements

Outline Specifications Format

MasterFormat section numbers and titles are used for the outline specifications,

typically using the section number and title from the level intended for the Contract Documents specifications. The three-part *SectionFormat* is not necessary for outline specifications, but listing the information in paragraphs following the same sequence and titles of the three-part contract documents specifications simplifies production during the contract documents phase.

See Appendix D for sample outline specifications.

Outline Specifications for Design Standards

A developing use for outline specifications is communication of design standards. Rather than produce and maintain full-length construction specifications, public agencies and corporations are producing outline specifications that incorporate basic information about products, installation, and quality assurance. These are furnished to architects and engineers performing design services for the owner.

Shortform Specifications

Introduction to Shortform Specifications

“Less is more” is a familiar saying to architects. It is attributed to Ludwig Mies Van Der Rohe (1886–1969), an architect noted for his strong influence on American architecture, particularly the minimalistic “modern” style. To paraphrase his point in regard to construction specifications, reducing the specifications may yield more easily understood documents, with essential requirements uncluttered by superfluous text, resulting in better bids and lower construction costs.

Another American, Mark Twain, once wrote, “I didn't have time to write a short letter, so I wrote a long one instead.” The point, applied to construction specifications, is that it takes effort and time to write concisely, perhaps more than the customary manner found in “longform” specifications. An informal survey of independent specifications consultants at a national meeting resulted in a consensus that “shortform” specifications take just about as long to produce as longform specifications. Whittling down a longform specification section and revising its language and specifications methods to transform it into a shortform specification actually takes more time than editing the longform specification for a typical project.

Shortform specifications attract great interest when they are presented, especially from those who do not appreciate highly detailed documents with very specific requirements for quality assurance and a well-brewed alphabet soup of ASTM, ANSI, AWI, ASHRAE, BHMA, SDI, and TNCA reference standards. One of the hindrances to producing true construction specifications for light construction and simple projects is the burdensome nature of typical specifications. Project

architects and engineers for these projects are unfamiliar and uncomfortable with “book specs” and prefer to get by with drawing notes and a sheet or two of “general notes” to satisfy plancheckers and supposedly fend off construction problems. The idea of more manageable specifications—shortform specifications—is very attractive for industrial shell buildings, commercial office interiors, residential, renovation, and other projects of limited scope and with less aggressive bidding and construction scenarios.

Credit should be given to the late Ben John Small, AIA, FCSI, for development of the concept of shortform specifications. He was an author, lecturer, and expert construction specifications writer in New York. His expertise is honored in the annual Ben John Small Memorial Award given each year by CSI to a professional member who has attained special proficiency and outstanding stature as a practicing specifications writer.

Another longtime advocate and expert in shortform specifications, and 1971 recipient of the Ben John Small Memorial Award, is Herman R. Hoyer, PE, Hon. CSI. In his 40-plus years of practice as a construction specifications writer, Mr. Hoyer regularly used shortform specifications for construction contract specifications. He demonstrated conclusively that shortform specifications can be used not only for residential and light-commercial construction but for some heavier commercial and institutional construction as well.

Mr. Hoyer developed a successful set of shortform standard specifications for the San Francisco Bay Area Rapid Transit District (BART) that included not only architectural specifications but also an extensive list of site, rail transit, plumbing, mechanical, and electrical specifications. He proved that even public works construction can be contracted, under certain conditions, using shortform specifications.

In the simplest terms, shortform specifications are specifications reduced to the shortest length possible without reducing their effectiveness and without sacrificing any essential ingredients. They can even be shortened sufficiently to be reproduced in the construction contract drawings as “sheet specs.” Unlike the outline specifications discussed previously in this chapter, shortform specifications are intended to be legally enforceable construction contract specifications.

The conclusion: Commercial and institutional construction, and simple residential construction, can likewise use shortform specifications—if the specifier knows how to write them and if the requirements of the project are suitable.

What is not appreciated generally—and this is where the quote from Mark Twain applies—is that it takes more than merely abridging or condensing a longform specification to create a shortform specification. Abridging a longform specification section invariably leads to omitting important elements or getting into dilemmas over what is important and unimportant.

In many ways, this is similar to the problems faced by NASA when the disasters

of the space shuttles Challenger and Columbia occurred and when two Mars exploration missions failed. NASA had adopted the concept of “faster, better, cheaper” for its programs. A saying developed: “You can have only two. Which are you willing to give up?” Shortform specifications, to the uninitiated, hold similar promises but they also include a great risk of problems during construction, although certainly not of the same magnitude as NASA's.

Shortform Specifications Writing

Shortform specifications writing requires application of all the specification writing principles and procedures discussed in earlier chapters. Shortform specifications need to be written as such, and not merely as condensed longform or conventional specifications. This is why shortform specifications are discussed here, at the end of this book: shortform specifications writing requires knowledge of how to write construction specifications.

Shortform specifications writing needs to be approached with a single-minded purpose: make the specifications as concise as possible. This requires deviations from CSI formats and some recommended specifications writing procedures. However, it generally means choosing methods of specifying and applying other specifications writing procedures in optimum ways that reduce the amount of text.

Shortform specifications require fervent application of a basic specification writing principle: “Say it once and in the most appropriate location.” Conciseness and clarity need to guide the writing process for shortform specifications.

Formats for Shortform Specifications

Contrary to recommended practices for typical master specifications, which advocate pre-editing specifications by using more narrowly focused specifications (narrow-scope specifications), shortform specifications should combine specifications information into what CSI MasterFormat calls Level Two or broad-scope sections. This is done to avoid repeating information. For example, rather than having separate, narrow-scope sections such as Section 08 14 16 - Flush Wood Veneer Doors, Section 08 14 23.16 - Plastic Laminate-Clad Wood Doors, and Section 08 14 33 - Stile and Rail Wood Doors, use broad-scope Section 08 14 00 - Wood Doors.

In Division 21 - Fire Suppression, Division 22 - Plumbing, Division 23 - Heating, Ventilating and Air Conditioning, Division 26 - Electrical, make use of “Common Work Results” sections at the beginning of each division to specify products that are used generally or throughout the division. This eliminates repetition and is generally recommended for these divisions when writing conventional, longform specifications.

Another example is Division 4 - Masonry, where a “Common Work Results”

could be used if there are several types of masonry that truly use similar setting mortar, grout, and accessories. A misuse of the concept would be contrived “Common Work Results” for a division such as Division 10 - Specialties, where commonality does not exist. Just because *MasterFormat* lists a “Common Work Result” section, it does not mean the section should be used. It is up to the specifier's judgment.

Within a shortform specification section, the level of detail should be kept as broad as possible. If a high level of detail is required, then the use of shortform specifications should be questioned. Under article headings, shortform specifications should have only one or two paragraph levels.

Methods of Specifying for Shortform Specifications

Refer to Chapter 6 for a discussion of the four methods of specifying.

Some methods of specifying are more conducive to concise text than others. The reference standard specifying method is particularly useful, as is the proprietary method. The descriptive specifying method requires extensive text to adequately specify products and installation and is generally not helpful. The performance specifying method can be used for shortform specifications under some conditions.

The reference standard method is a concise way of specifying. For example, specifying wall tile installation as “Wall Tile Installation: TCNA Handbook Method W243” incorporates by reference a huge amount of information regarding materials and procedures. Specifying “Wood Doors: AWI/AWMAC Architectural Woodwork Quality Standards, Section 1300, Custom Grade, Medium Density Overlay, particleboard core” is equivalent to a half-page of detailed description. Specifying “Conductor Heads: SMACNA Architectural Sheet Metal Manual Figure 1-25F, 16 oz. (.55 mm) copper” not only incorporates by reference fabrication and installation information but can eliminate a detail on the drawings. However, the specifier must know the standard and must specify required options under the standard.

The proprietary specifying method is also a concise way of specifying. For example, “Built-Up Asphalt Roofing: Manville Specification 4GNC” incorporates a dozen pages of small type from the manufacturer's catalog plus at least a half dozen ASTM reference standards. “Surface Metallic Raceways: Wiremold 4000 System with factory-formed fittings and ivory polyester topcoat over ivory primer, capable of being field-painted” provides enough information for pricing (bidding) and purchasing the required products.

The performance specifying method can result in very lengthy specifications for products and systems. It requires substantial text to specify required performance characteristics and the methods for validating that required performance is achieved. However, specifying performance in general terms can be concise. For example, temporary construction can be specified by the performance method:

“Temporary Connections and Fees: Contractor shall arrange for services and pay all fees and service charges for temporary power, water, sewer, gas and other utility services necessary for the Work.”

The descriptive method of specifying is generally unsuitable as the primary method of specifying in shortform specifications. However, as a supplement to other methods, descriptions are appropriate if the information does not duplicate what is included in the referenced standard or the manufacturer's product data. The above examples for “wood doors” and “surface metallic raceway” include descriptive text in addition to the reference standard and the manufacturer's product name.

Language for Shortform Specifications

Refer to Chapter 14 for a discussion of specifications language.

The specifications should include, in the General or Supplementary Conditions of the Contract located in Division 00 introductory documents to the Project Manual or in Division 01, Section 01 42 00 - References, an explanation of language used in the Specifications (see [Exhibit 21-1](#)).

[Exhibit 21-1](#) Sample explanation of specifications language.

SPECIFICATIONS LANGUAGE

Specifications are written in a modified brief style consistent with clarity. In general, the words “the,” “shall,” “will,” and “all” are not used. Where such words as “perform,” “provide,” “install,” “erect,” “furnish,” “connect,” “test,” or words of similar meaning are used, it shall be understood that such words include the meaning of the phrase “The Contractor shall.” The requirements indicated and specified apply to all Work of the same kind, class and type, even though the word “all” is not stated.

Frequently, Specifications are written using “streamlining” as recommended in the *CSI Project Resource Manual*. Streamlining employs a colon (:) as a symbol for the words “shall be,” “shall have,” “shall conform with (or to),” or words of similar meaning appropriate to the context of the statement. For example, “Portland Cement: ASTM C 150, Type I” means the same as “Portland cement shall conform to ASTM C 150, Type I.”

Similarly, terms and phrases used in the specifications should be defined in the Supplementary Conditions of the Contract to expand on the definitions in a typical document such as *AIA A201 - General Conditions of the Contract for Construction* or the terms and phrases should be specified in Division 01 in Section 01 42 00 - References or Section 01 42 16 - Definitions. Defined terms may substitute for several other words and clarify the intent of the Specifications. See Appendix B and Division 01, Section 01 42 00 - References, for example text.

Although use of these terms seems initially to result in small reductions in text quantity, the savings add up and become substantial. Streamlined writing is the most effective way to reduce the quantity of text in construction specifications. In order for concise shortform specifications to be achieved, careful attention must be paid to the details of language and terminology.

Location of Information for Shortform Specifications

An obvious way to reduce the text in specifications is to put the information on the drawings. This does not mean substituting lengthy descriptions in the legends of keynotes or producing several sheets of General Notes to substitute for Division 01 - General Requirements. It means carefully using schedules and legends on the drawings that list information about products rather than sentences and paragraphs in the specifications that explain the information.

A finish materials schedule can identify the manufacturer, brand name, pattern, and color of products. Presented in tabular form, the information is very concise, especially when products come in multiple colors. This is very appropriate when the specifications are written using the proprietary method, where product options are very limited or prohibited. Similarly, door schedules, door hardware schedules, paint schedules, equipment schedules, and fixture schedules all may contain, within the schedule or in a related legend, sufficient information so that the specifications can simply refer to the manufacturer, catalog number, series, pattern, and color “as indicated on the Drawings.”

Division 01 specifies general requirements applicable to all Division 02 through 49 sections of the specifications. Applying the principle “Say it only once,” Division 01 should include sufficient information so that what would normally be included in PART 1 - General of a longform specification section can be deleted except in extraordinary cases. By their very nature, projects using shortform specifications should not have administrative and quality assurance requirements. It is critical that Division 01 be well prepared and balances the need for brevity and completeness.

In Division 02 through 49 sections, cross references to Division 01 should be avoided. Understand that the specifications are written as from the Owner to the Contractor. Considerations for subcontractors, trades, and product suppliers should not be included, especially for shortform specifications. Since the Contractor has read and should be familiar with the contents of Division 01, specifying submittals in a Division 02 through 49 section does not require the statement “Makes submittals as specified in Section 01 33 00 - Submittal Procedures.”

To reduce the size of Division 01, rely upon the General Conditions of the Contract and the Instructions to Bidders. Review AIA A201 - *General Conditions of the Contract for Construction* in Appendix E or review EJCDC C-700 - *Standard General Conditions of the Construction Contract* in Appendix F. Obtain copies of either AIA A701 - *Instructions to Bidders* or EJCDC C-200 *Guide to Preparation of Instructions to Bidders* and review these documents as well. It is apparent that many requirements typically specified in Division 1 are covered in these other contract documents. However, Division 01 amplifies and supplements what is included in these standard documents. The project-specific Supplementary Conditions of the Contract and the Supplementary Instructions to Bidders may be more appropriate locations for amplifying and supplementing information. Remember, shortform specifications are most appropriate for uncomplicated

projects where extraordinary requirements are unnecessary.

For example, Paragraph 3.12 of *AIA A201 - General Conditions of the Contract for Construction* is titled “Shop Drawings, Product Data, and Samples,” and it includes 10 subparagraphs containing considerable information on the submission and review of shop drawings, product data, and samples. Also in *AIA A201* is Subparagraph 4.2.7, a rather long paragraph dealing with the architect's review and approval of shop drawings, product data, and samples. So, unless the architect determines that requirements for sheet sizes of shop drawings, the number of copies to be submitted, and other procedural matters need to be specified, a Division 01 section on submittals for shop drawings, product data, and samples can be omitted.

Applications for Shortform Specifications

By their abbreviated nature, shortform specifications are appropriate for smaller, limited-scope, and less complex projects. The character of the project needs to be carefully considered.

A small project may have complex requirements for products, such as the reconstruction of a toilet room in a university classroom building. This project could require substantial dust and noise control provisions and could have relatively complicated temporary water, ventilation, power, and lighting requirements. In addition to requiring carefully controlled, selective demolition and carefully explained requirements for salvage and reuse of products, this small project could involve relatively small quantities of products such as light structural steel framing (overhead support for toilet partitions), concrete floor patching, waterproofing under ceramic tile flooring, tile, tile backing board for walls, and impact-resistant gypsum board for ceilings. Finishes on floors and walls would be included, as well as painting of gypsum board walls and ceilings. Countertops, toilet partitions, toilet room accessories, signage, custom wall mirrors, and joint sealers would need to be specified. Modifications and renewal of the plumbing systems and alterations to the fire sprinkler system could be required, as well as upgrades and replacements of electrical outlets and lighting. The quality requirements and the contracting method may mean that the specifications are just as substantial as those for a new building. In fact, due to the probable lack of sophistication of the general contractor, the need for comprehensive specifications may be greater.

It is possible that a large warehouse shell building, without office interior construction, could be contracted with shortform specifications. The quantity of work may be immense, but its simplicity makes the project conducive to shortform specifications. However, if the quantities of some materials, such as roofing, are great, small factors can be subject to multiplying effects that have significant cost impacts. In such cases, blend shortform and longform specifications. Specify as appropriate to the project requirements.

Another project scenario where shortform specifications may work well is when construction is performed by the owner's own workforce. Modifications to and construction of new interior tenant space improvements may require minimal documentation. There may be “building standard products” that are stockpiled in a warehouse. The project manager and the construction superintendent may be very familiar with the products to be used. However, if portions of the work are subcontracted, documentation will be needed for the subcontracts, including specifications. In such cases, the directions of the project manager should be followed.

The persons in charge of a project may want construction specifications but do not want to be burdened by specific requirements. A project with a construction manager who wants the contract documents to only be sufficient to get a building permit is a candidate for shortform specifications. Code compliance needs to be demonstrated in the drawings and specifications. Beyond that, it becomes a matter of professional judgment for the architect or engineer and a business decision on whether to furnish greater or lesser detail in the contract documents.

Taking this further, design-build projects are candidates for shortform specifications. Remembering that shortform specifications are legally enforceable construction contract documents, while outline specifications are not, it can be argued that specifications presented in shortform format rather than in the abbreviated three-part format of outline specifications are more appropriate.

Shortform Specifications Masters

Contrary to the *Project Resource Manual - CSI Manual of Practice*, it is not recommended to simply abridge a three-part master guide specification into a shortform specification version. That is, using a common master for shortform and longform specifications is not recommended. There are so many differences, as described above, between shortform and longform specifications that editing notes would not be adequate to describe all the necessary changes. Instead, office master shortform guide specifications should be developed if an office intends to produce shortform specifications.

Because longform specifications require writing methods that are not conducive to shortform specifications, such as the wordy descriptive method, condensing a longform specification requires virtual translation in many cases. The descriptive text would need to be winnowed out, leaving text based on reference standard and proprietary methods.

It would be a daunting task to convert office master guide specifications, which have been developed for competitively bid institutional projects, into shortform specifications for privately funded commercial projects where the general contractor is selected directly by the owner and not by competitive bidding. Creative architects and engineers who know word processing programs might

consider developing “macro” programs to run inside the word processing program to eliminate unsuitable text. Alternatively, a specifier might develop a color scheme for text in the office master guide specification that would be automatically deleted for shortform specifications. These methods may work, but the work of developing and maintaining such master specifications would be prohibitive for all but large offices—and large offices tend not to do projects conducive to shortform specifications.

Shortform specifications should be based on shortform guide specifications. They should be developed using all of the recommendations above and the following, including:

- Develop a concise but substantial set of Division 01 specifications that reflects the requirements of a construction contract suitable for shortform specifications.
- Use industry-standard Instructions to Bidders (based on AIA *A701* or EJCDC *C-200*).
- Use industry-standard General Conditions of the Contract (based on AIA *A201* or EJCDC *C-700*) and develop office standard supplementary conditions of the contract conducive to concise specifications in Division 01 - General Requirements.
- Minimize descriptive text and write or rewrite using reference standard and proprietary methods of specifying. Utilize the performance method of specifying only when appropriate and suitable for shortform specifications.
- Use schedules and tables on the drawings and in the specifications to list rather than describe products. Make it clear on the drawings where various products occur so that descriptions are not needed in the specifications. Coordinate this with keynotes and other notations on the drawings.

Commercially Available Shortform Master Guide Specifications

Shortform master guide specifications are available from several commercial sources. These are typically abridged versions of longform specifications and retain the three-part format of CSI *SectionFormat*. If the above recommendations are followed, they need to be condensed, starting with elimination of the three-part format and use of the recommended article headings.

Commercially produced shortform master guide specifications should be scrutinized, both for what is included and what is not addressed. Shortform specifications need to include what is necessary to bid and construct the project, albeit in abbreviated form. If commercially produced specifications are written

using descriptive text, the descriptions should be used as a guide to identify appropriate reference standards that cover the described attributes or to identify suitable proprietary products to specify.

Determine the level of detail represented in commercially produced shortform guide specifications. Edit the text to keep the level of detail simple. Consider the typical types of projects for which the shortform specifications will be used. Edit and adapt the text to be suitable.

Some resources for commercially produced shortform construction specifications are:

Master Shortform Specifications, 8th ed.

Kalin Associates
1121 Washington Street
Newton, MA 02465
617/964-5477 or 800/565-2546
www.kalinassociates.com

Easyspec: Construction Specifications, 2nd ed.

BNi Building News
www.buildersbook.com

Library of Specifications Sections, 6th ed.

Hans W. Meier (Builder's Book, Inc.)
www.buildersbook.com

Shortform specifications may be produced using BSDs SpecLink+ by making limited selections from the available text for each section. Contact:

Building Systems Design, Inc. (BSD)
3520 Piedmont Road NE, Suite 415
Atlanta, GA 30305
404/365-8900 or 888/273-7638
www.bsdssoftlink.com

ARCOM offers a “Short Language Version” of their master guide specifications, MasterSpec. This should not be confused with shortform specifications. It uses CSI's three-Part *SectionFormat* and addresses matters that are typically excluded from shortform specifications, as discussed above.

CSRF has published an abridged version of *SpecText*, called *SpecText II*®. *SpecText II*'s broad-scope sections compare in length with *SpecText*'s narrow-scope sections, yet the information in each paragraph is concise. Balance is maintained so that important subjects get greater attention than accessory materials and fine points of installation. No PART 1 text takes up more than 10 percent of any section. Division 01 is reduced to three concise broad-scope sections. *SpecText II*

is a concise abridged library of master guide specifications but not true shortform specifications, as discussed herein.

Conclusion

Shortform specifications require knowledgeable, creative, and diligent use of the principles and practices of construction specifications writing, with the primary goal of minimizing the amount of text published in the Project Manual. Rather than being inferior construction specifications, shortform specifications can demonstrate the caliber of the specifier's writing ability. Shortform specifications embody the cardinal specifications writing principles that the text be “clear, correct, complete, and concise” and that the specifications “say it only once.”

Study Questions

1. True or False? Outline specifications are suitable for use as construction contract documents.
2. True or False? Preliminary Project Descriptions (PPDs) are organized according to CSI MasterFormat.
3. Section 01 11 00 - Summary of the Work should include all the following except:
 - a. Separate or multiple contracts
 - b. Phased construction requirements
 - c. Applicable codes
 - d. Responsibility for payment for temporary utilities
4. True or False? Short-Form Specifications are suitable for use as construction contract documents.
5. True or False? Short-Form Specifications are organized according to CSI MasterFormat.
6. True or False? Division 01 specifies general requirements applicable to all Division 02 through 49 sections of the specifications.
7. True or False? During the Design Development phase, the architect should request the owner's instructions for bidding, bonds, and insurance.
8. Short-Form Specifications may include all of the following except:
 - a. A reference to AIA A201 General Requirements
 - b. Public bidding requirements
 - c. Submittal and product requirements for each section
 - d. UniFormat numbering and organization
9. True or False? Master specifications are only suitable for large offices.

10. True or False? Full-length master specifications can be easily converted to short-form master specifications.

Chapter 22

Green Specs/LEED Specs

Sustainable Design

It is clear that the construction industry has embraced sustainable design, a principle that recognizes resources are finite, and that intelligent design and construction can mitigate the impact of buildings on the environment. Recent statistics estimate that over 70 percent of the electricity generated in the United States is used for buildings, that over 14 percent of that energy is lost through poorly performing building envelopes, and that a single 150,000-square-foot commercial office building consumes over 54 million gallons of water, generates 19 million pounds of carbon dioxide, and discards 375,000 pounds of waste annually. In response to our need to improve the built environment, over 100,000 architects, designers, and contractors have sought certification under the USGBC LEED program (Leadership in Energy and Environmental Design), and over 5,000 buildings have been registered for certification.

Drawings and specifications play a critical role in delivering sustainable design to the project as constructed, and the role of the specification writer is clear. Both product selection and specification writing are essential components of the process of incorporating sustainable design in the built environment. And while product attributes such as recycled content and biodegradability are important, product performance, service life, and the production methods of their manufacturers are even more critical. For additional discussion, refer to the section “Sustainable Design and Construction” in Chapter 16.

Leed Specifications

Many owners are requiring that their projects attain LEED Certification from the U.S. Green Building Council (USGBC). USGBC offers registration in several categories and at several levels in each category. Active programs include LEED for new construction, existing buildings, commercial interiors, schools, core and shell, retail, homes, and neighborhood development. Depending on the number of credits earned during the design and construction of the project, certification is earned at the certified, silver, gold, or platinum level.

While many owner-architect contracts include targeting LEED certification in various forms, the American Institute of Architects has recently released AIA-B214 - Standard Form of Architects Services for LEED Certification. The document states that the architect's services include conducting a pre-design workshop where the LEED rating system will be reviewed and LEED points will be targeted, preparing a LEED Certification Plan, monitoring the LEED Certification process, providing LEED specifications for inclusion in the Contract Documents, and preparing a LEED Certification Report detailing the LEED rating the project achieved. However, the document does not guarantee the project will achieve LEED certification, as the actions of parties other than the architect are involved in final certification.

Regardless of the type of agreement, the design team works toward LEED certification at each phase of the design project, with the specification writer generally taking the following actions:

- Schematic Design Phase: Review the LEED scorecard for the project to determine which credits have been selected, and which specification sections will require products with particular attributes.
- Design Development Phase: Work with project designers to select products that meet LEED criteria, and the strategy to attain those credits in the specifications. Evaluate preliminary construction cost estimates to identify materials which may contribute to LEED regional material and recycled content credits. Confirm which credits will be achieved in the design phase, and which must be achieved during the construction phase.
- Construction Documents Phase: Include the LEED scorecard in the project manual, indicating exactly which credits are targeted. Match the credits in the scorecard with the requirements in the specifications. Resolve credits that had been listed in the “maybe” column of the LEED scorecard to “yes” or “no” before issuing for bid. Begin to enter data into the LEED online program.
- Bid and Award Phase: Confirm the construction team has experience with LEED projects and identify those responsible for tracking progress toward credits monthly.
- Construction Administration Phase: Monitor progress toward credits using the LEED online program, review submittals for individual products and systems, and evaluate progress for credits such as construction waste management, recycled content, and regional materials closely. Evaluate substitutions for their impact on LEED credits. Check progress against the LEED scorecard to ensure the level of certification sought can be achieved.

LEED Language in Specifications

One approach to specification writing for a LEED project does not use LEED language in individual specification sections, relying on product selection alone to specify LEED requirements. A second approach puts all LEED requirements in Division 01, with references to individual sections. Experience with numerous LEED projects has shown that these two approaches do not work well. Achieving LEED certification is a team effort, and the owner, architect, and contractor must all participate. The contractor, subcontractors, and product suppliers need precise specifications and requirements for submittals in order to achieve credits.

As some subcontractors do not have access to Division 00 and Division 01 documents during bidding, good practice suggests including a paragraph similar to the following in Part 1 of each specification section: Sustainable Design Intent - Comply with project requirements intended to achieve sustainable design, measured and documented according to the LEED Green Building Rating System, of the U.S. Green Building Council. Refer to Section 01 81 13 - Sustainable Design Requirements for certification level and certification requirements.

The submittals paragraph in Part 1 of each specification section should also include LEED submittal language based on the particular credit, similar to the following sample: LEED Submittal LEED Credit MR 4.1 and Credit MR 4.2: Indicate percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

Each specification section should also include language on construction waste management similar to the following: Waste Management: Comply with the requirements of Section 01 74 19 - Construction Waste Management and Disposal, for removal and disposal of construction debris and waste.

MasterFormat and LEED

Typically there are five key sections in Division 01 - General Requirements for LEED compliance. These sections apply to all specification sections.

- Section 01 33 00 - Submittal Procedures
- Section 01 74 19 - Construction Waste Management and Disposal
- Section 01 81 13 - Sustainable Design Requirements
- Section 01 81 19 - Indoor Air Quality Requirements
- Section 01 91 00 - Commissioning

For specifications in MasterFormat Divisions 02–49, the specification writer and design team need to develop a strategy for achieving each LEED credit. The following list of credits is followed by the specification sections most typically associated with that credit. The list of sections is based on recent experience with

LEED projects and is not exhaustive. For example, listing the signage section as having impact on LEED certification for recycled content is not of much value. Signage may be fabricated with components that have recycled content, but the value of signage compared to the value of all products in the project is too small to make a difference in which credits are achieved. This highlights the difference between green specs and LEED specs—recycled content is desirable but not mandatory, and the durability of the signage is certainly more important than its recycled content. The following LEED credits impact the MasterFormat sections as listed, in accordance with USGBC LEED 2009 credits, www.usgbc.org.

Sustainable Sites, Prerequisite 1, Construction Activity Pollution Prevention:

- Section 01 50 00 - Temporary Facilities and Controls.
- Section 31 10 00 - Site Clearing
- Section 31 20 00 - Earth Moving
- Section 31 23 19 - Dewatering
- Section 31 25 00 - Erosion and Sedimentation Controls

Sustainable Sites, Credit 4.2, Alternative Transportation, Bicycle Storage and Changing Rooms:

- Section 12 93 13 - Bicycle Racks

Sustainable Sites, Credits 6.1, Stormwater Management, Quantity Control

- Section 33 30 00 - Sanitary Sewerage Utilities
- Section 33 40 00 - Storm Drainage Utilities

Sustainable Sites, Credit 7.1, Heat Island Effect, Non-Roof:

- Section 32 12 16 - Asphalt Paving
- Section 32 12 43 - Porous Flexible Paving
- Section 32 13 13 - Concrete Paving
- Section 32 14 00 - Unit Paving
- Section 32 18 00 - Athletic and Recreational Surfacing
- Section 32 30 00 - Site Improvements
- Section 32 90 00 - Planting

Sustainable Sites, Credit 7.2, Heat Island Effect, Roof:

- Section 07 31 00 - Shingles and Shakes
- Section 07 32 00 - Roof Tiles
- Section 07 41 00 - Roof Panels
- Section 07 51 00 - Built-Up Bituminous Roofing
- Section 07 52 00 - Modified Bituminous Membrane Roofing
- Section 07 53 00 - Elastomeric Membrane Roofing
- Section 07 54 00 - Thermoplastic Membrane Roofing
- Section 07 56 00 - Fluid-Applied Roofing
- Section 07 61 00 - Sheet Metal Roofing

Sustainable Sites, Credit 8, Light Pollution Reduction:

- Section 26 51 00 - Interior Lighting
- Section 26 56 00 - Exterior Lighting

Water Efficiency, Credit 1, Water Efficient Landscaping:

- Section 32 80 00 - Irrigation
- Section 32 90 00 - Planting

Water Efficiency, Credit 3, Water Use Reduction:

- Section 22 40 00 - Plumbing Fixtures

Energy and Atmosphere, Prerequisite 1, Fundamental Commissioning of Building Energy Systems

- Section 01 91 00 - Commissioning
- Division 23 - Heating Ventilating and Air Conditioning
- Division 25 - Integrated Automation

Energy and Atmosphere, Prerequisite 3, Fundamental Refrigerant Management:

- Division 23 - Heating Ventilating and Air Conditioning

Energy and Atmosphere, Credit 1, Optimize Energy Performance:

- Division 23 - Heating Ventilating and Air Conditioning
- Division 25 - Integrated Automation

- Division 26 - Electrical

Energy and Atmosphere, Credit 2, On-Site Renewable Energy:

- Section 23 56 00 - Solar Energy Heating Equipment
- Section 26 32 23 - Wind Energy Equipment
- Section 48 14 13 - Solar Energy Collectors

Energy and Atmosphere, Credit 3, Enhanced Commissioning:

- Section 01 91 00 - Commissioning
- Division 23 - Heating Ventilating and Air Conditioning
- Division 25 - Integrated Automation

Energy and Atmosphere, Credit 4, Enhanced Refrigerant Management:

- Division 23 - Heating Ventilating and Air Conditioning

Energy and Atmosphere, Credit 5, Measurement and Verification:

- Division 23 - Heating Ventilating and Air Conditioning
- Division 25 - Integrated Automation
- Division 26 - Electrical

Materials and Resources, Credit 2, Construction Waste Management:

- Section 017419 - Construction Waste Management and Disposal

Materials and Resources, Credit 3, Materials Reuse:

- Section 02 41 00 - Demolition
- Section 04 20 00 - Unit Masonry
- Section 04 42 00 - Exterior Stone Cladding
- Section 06 13 00 - Heavy Timber
- Section 06 40 23 - Interior Architectural Woodwork
- Section 09 64 00 - Wood Flooring

Materials and Resources, Credit 4, Recycled Content: The regional material credit and recycled content credit are only for products in specifications in CSI

Divisions 02 through 10. Individual sections should be targeted using the LEED online tool and the cost estimate, and the requirement for specific percentages avoided in other sections.

- Section 03 30 00 - Cast-In-Place Concrete
- Section 03 41 00 - Plant-Precast Structural Concrete
- Section 03 45 00 - Precast Architectural Concrete
- Section 04 20 00 - Unit Masonry
- Section 05 12 00 - Structural Steel Framing
- Section 05 21 00 - Steel Joist Framing
- Section 05 31 00 - Steel Deck
- Section 05 40 00 - Cold-Formed Metal Framing
- Section 06 40 23 - Interior Architectural Woodwork
- Section 07 41 00 - Roof Panels
- Section 07 42 00 - Wall Panels
- Section 08 11 13 - Hollow Metal Doors and Frames
- Section 08 14 00 - Wood Doors
- Section 08 41 13 - Aluminum Entrances and Storefronts
- Section 08 44 00 - Curtain Wall and Glazed Assemblies
- Section 09 21 16 - Gypsum Board Assemblies
- Section 09 30 00 - Tiling
- Section 09 51 00 - Acoustical Ceilings
- Section 09 65 00 - Resilient Flooring
- Section 09 66 00 - Terrazzo Flooring
- Section 09 68 13 - Tile Carpeting
- Section 09 68 16 - Sheet Carpeting

Materials and Resources, Credits 5, Regional Materials: The regional material credit and recycled content credit are only for products in specifications in CSI Divisions 02 through 10. Individual sections should be targeted, and a blanket requirement for regional materials is counterproductive and will limit bidding.

- Section 03 30 00 - Cast-In-Place Concrete
- Section 03 41 00 - Plant-Precast Structural Concrete
- Section 03 45 00 - Precast Architectural Concrete
- Section 04 20 00 - Unit Masonry
- Section 04 42 00 - Exterior Stone Cladding
- Section 05 12 00 - Structural Steel Framing

- Section 05 21 00 - Steel Joist Framing
- Section 05 31 00 - Steel Deck
- Section 06 40 23 - Interior Architectural Woodwork

Materials and Resources, Credit 6, Rapidly Renewable Materials: This credit is rarely achieved based on the value of the item compared to the value of the products in the building.

- Section 06 40 23 - Interior Architectural Woodwork
- Section 09 64 00 - Wood Flooring
- Section 09 62 29 - Cork Flooring

Materials and Resources, Credit 7, Certified Wood: The goal is 50 percent of the wood by value be FSC certified; if, for example, the wood doors are more than 50 percent of the value of the wood on the project, then requiring that all wood doors be FSC certification is sufficient to earn the credit, and the FSC requirement would not be included in the other sections.

- Section 06 10 00 - Rough Carpentry
- Section 06 13 00 - Heavy Timber
- Section 06 17 53 - Shop-Fabricated Wood Trusses
- Section 06 18 00 - Glued-Laminated Construction
- Section 06 20 13 - Exterior Finish Carpentry
- Section 06 40 23 - Interior Architectural Woodwork
- Section 08 14 00 - Wood Doors
- Section 08 52 00 - Wood Windows
- Section 08 61 00 - Roof Windows
- Section 09 64 00 - Wood Flooring

Indoor Environmental Quality, Credit 1, Outdoor Air Delivery Monitoring:

- Division 23 - Heating Ventilating and Air Conditioning

Indoor Environmental Quality, Credits 3.1 and 3.2, Construction Indoor Air Quality Management Plan:

- Section 01 81 19 - Indoor Air Quality Requirements

Indoor Environmental Quality, Credit 4.1, Low-Emitting Materials, Adhesives

and Sealants:

- Section 06 10 00 - Rough Carpentry
- Section 06 40 23 - Interior Architectural Woodwork
- Section 07 84 00 - Firestopping
- Section 07 92 00 - Joint Sealants
- Section 09 21 16 - Gypsum Board Assemblies
- Section 09 30 00 - Tiling
- Section 09 51 00 - Acoustical Ceilings
- Section 09 62 00 - Specialty Flooring
- Section 09 64 00 - Wood Flooring
- Section 09 65 00 - Resilient Flooring
- Section 09 65 13 - Resilient Base and Accessories
- Section 09 67 00 - Fluid-Applied Flooring
- Section 09 68 13 - Tile Carpeting
- Section 09 68 16 - Sheet Carpeting
- Section 09 70 00 - Wall Finishes

Indoor Environmental Quality, Credit 4.2, Low-Emitting Materials, Paints and Coatings:

- Section 09 91 00 - Painting
- Section 09 93 00 - Staining and Transparent Finishing
- Section 09 96 00 - High-Performance Coatings

Indoor Environmental Quality, Credit 4.3, Low-Emitting Materials, Flooring Systems:

- Section 09 30 00 - Tiling
- Section 09 63 00 - Masonry Flooring
- Section 09 64 00 - Wood Flooring
- Section 09 65 00 - Resilient Flooring
- Section 09 65 13 - Resilient Base and Accessories
- Section 09 66 00 - Terrazzo Flooring
- Section 09 67 00 - Fluid-Applied Flooring
- Section 09 68 13 - Tile Carpeting
- Section 09 68 16 - Sheet Carpeting

Indoor Environmental Quality, Credit 4.4, Low-Emitting Materials, Composite Wood and Agrifiber Products:

- Section 06 10 00 - Rough Carpentry
- Section 06 40 23 - Interior Architectural Woodwork
- Section 08 14 00 - Wood Doors

Indoor Environmental Quality, Credit 4.5, Low-Emitting Materials, Furniture and Furnishings (schools only):

- Section 12 56 33 - Classroom Furniture

Indoor Environmental Quality, Credit 4.6, Low-Emitting Materials, Ceiling and Wall Systems (schools only):

- Section 07 21 00 - Thermal Insulation
- Section 09 21 16 - Gypsum Board Assemblies
- Section 09 51 00 - Acoustical Ceilings
- Section 09 70 00 - Wall Finishes

Innovation in Design, Credit 1, Exemplary Performance: There are four innovation credits available, but you may submit for up to six innovation credits hoping to achieve four. There is no real need to guess, as you can review the Credit Interpretation Reports (CIR) on the USGBC website to determine which innovation credits have been accepted for other projects. Frequently achieved exemplary performance is achieved for the following credits:

- Materials and Resources, Credit 2, Construction Waste Management.
- Materials and Resources, Credit 7, Certified Wood

Regional Priority, Credit 1, for credits (depending on zip code) including the following:

- Sustainable sites, heat-island effect, non-roof
- Sustainable sites, heat-island effect, roof

LEED and Engineering Specifications

Frequently, project engineers need assistance with developing language for the

LEED requirements that pertain to the plumbing, fire protection, mechanical, and electrical specifications. For LEED 2009, typical language is provided below which belongs in Part 1 of each affected specification section. In addition, the acceptable limits of specific volatile organic compounds (VOC) are included with the products in Part 2 of the specification sections, when we know which products are specified. Consider the following sample paragraphs:

LEED Requirements: VOC properties of adhesives, sealants, sealant primers, and paints specified in this Section shall not exceed the limits specified following. In accordance with Division 1 of the specifications, submit manufacturer's published literature indicating VOC content in grams per liter.

Adhesives and Sealants: Materials used inside the exterior weatherproofing system must not exceed the following requirements. **Adhesives, Sealants, and Sealant Primers:** South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements in effect on July 1, 2005, and rule amendment date January 7, 2005. **Aerosol Adhesives:** Green Seal Standard for Commercial Adhesives GS-36, requirements in effect on October 19, 2000.

Paints: Paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) must not exceed the VOC limits and must not include any of the chemical components limited or restricted by the following standards: **Architectural Paints, Coatings and Primers:** Green Seal GS-11, Paints, First Edition May 20, 1993 for applications on walls and ceilings. **Anti-Corrosive and Anti-Rust Paints:** Green Seal Standard GS-03, Anti-Corrosive Paints, Second Edition, January 7, 1997 for applications on ferrous metal substrates. **Clear Wood Finishes, Floor Coatings, Stains, and Shellacs:** South Coast Air Quality Management District (SCAQMD) Rule #1113, Architectural Coatings, rules in effect on January 1, 2004, for applications on wood materials and for floor finishes.

Green Products

What makes one product greener than another? At some level all products are green, and determining the greenest product in a category depends on your point of view. But green to greener is easy to determine.

- Product is more energy-efficient than similar products.
- Product is more water-efficient than similar products.
- Product is more durable or requires less maintenance than similar products.
- Product performs better than similar products.
- Product contains pre-consumer recycled content.
- Product contains post-consumer recycled content.

- Product has been salvaged and reconditioned from previous use.
- Products are recyclable or biodegradable after use.
- Product has received green third-party certification or approval.
- Product has been evaluated in life-cycle assessment (LCS) tools.
- Manufacturer can provide sustainability data in ASTM E2129 format.

Who certifies a product green? Government agencies, non-governmental standards agencies, proprietary rating systems, even self-declarations by product manufacturers. Refer to the list later in this section. One message is clear: if you want LEED certification, you must comply with their requirements.

Green Project Master Specifications

Several high-profile projects have established green master specifications, as LEED and green are different at many levels. One large project included sustainability requirements in the specifications in the following Division 01 sections:

- Section 00 32 00 - Sustainability and the Project
- Section 00 32 50 - Supply Chain Sustainability Code of Conduct
- Section 01 35 30 - Construction Environmental Management Plan
- Section 01 35 43 - Environmental Procedures
- Section 01 61 05 - Restricted Materials
- Section 01 62 00 - Product Selection and Evaluation
- Section 01 74 18 - Construction Waste Management Program
- Section 01 74 19 - Site Specific Waste Management Plan
- Section 01 81 14 - Sustainability Key Performance Indicators
- Section 01 81 15 - Sustainability Summary for Specifications
- Section 01 81 16 - Sustainability Management System
- Section 01 81 17 - Sustainability Definitions

General: The following are the general requirements for submittals for the project that support the sustainability goals:

Environmental Submittals: Material safety data sheets (MSDS) or equivalent for all products. Volatile organic compound (VOC) values for field-applied adhesives, sealants, paints, and coatings applied within the building envelope; for VOC values use metric units in grams/liter less water.

Restricted Materials List Certification: In the event that restricted materials are

proposed for use, submit documentation indicating the type and amount of restricted materials, and the reason they cannot be eliminated. Prior approval is required before materials containing restricted materials are shipped to the project.

Sustainably Sourced Materials: Rating of materials as listed in the Green Guide to Specification from BRE Global ratings; www.thegreenguide.org.uk.

Recyclability: Identify recyclable materials and value. Claims by suppliers for recyclability shall be verifiable and based on ISO 14021 Standard for Environmental Labels and Declarations.

Recycled Content: Indicate percentage of pre-consumer and post-consumer recycled content per unit of product. Indicate relative value of recycled content product to total value of product included in project. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight. If recycled content product is part of an assembly, indicate relative value of recycled content product to total value of assembly.

Regionally Sourced Materials: For sourcing locations, indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site. For manufacturing locations indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site. For product value indicate value of product containing local/regional materials; include materials cost only. For product components value indicate where product components are sourced or manufactured in separate locations, provide location information for each component; indicate the percentage by weight of each component per unit of product.

Letter of Certification for Sustainable Forestry: Provide letter of certification signed by lumber supplier. Indicate compliance with Forest Stewardship Council (FSC) “Principles for Natural Forest Management” and identify certifying organization. Submit FSC certification numbers; identify each certified product on a line-item basis. Submit copies of invoices bearing the FSC certification numbers. Provide chain-of-custody documentation for all certified wood products.

Resources

How do you get to green? Many suggest simply copying a previous exemplar project, others promote general education, others suggest incentives or channeling investment. One suggestion is binding regulation, as voluntary compliance may be too slow a path. Some projects seek USGBC LEED certification, others seek LEED certifiability. Mark Kalin's experience with over 160 LEED projects is that the real results come with real documentation for certification. Here are the most important ways to make green choices for your projects:

- Getting to green by common sense and high performance

- Life cycle cost evaluations
- Regional manufacturing
- Low-emitting materials to EPA guidelines
- High recycled content, synthetics
- Manufacturer's recycling guarantees
- Insulation
- Solar tracking window treatment
- Commissioning of building systems
- Commissioning of building envelope
- On site materials management
- 90 percent construction waste management
- SMACNA indoor air quality during construction

Federal Green Guide for Specifiers

The U.S. EPA has partnered with the Federal Environmental Executive and the Whole Building Design Guide (www.wbdg.org) to provide model green construction specification language to be used to supplement full project specs and to green guide specifications. The stated purpose of the specs are to help federal agencies meet their project-specific environmental goals and mandates including the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding; EPA's Final Guidance on Environmentally Preferable Purchasing; Greening of Government Executive Orders; EPA's Comprehensive Procurement Guidelines for recovered content; USDA's Biobased Purchasing Program; ENERGY STAR & DOE Federal Energy Management Program (FEMP) Product Efficiency Recommendations; Energy Policy Act of 2005; ASTM, LEED, Green Globes, and other rating systems and standards; and other “best practices” as determined via industry and public comment.

While some of the language seems philosophical from a strict specifier's view, it's a great tool and worth a look, especially for Division 1 sections. One caveat is to be careful with the submittals you ask the contractor for in your specs—better to specify green products and get what you want rather than ask the contractor to report the environmental characteristics of products for no purpose. Files are available in Word or PDF format; you can download them all at once if you prefer. Current contents include more than 70 sections at fedgreenspecs.wbdg.org.

Green Product Evaluation Software

Both architects and contractors interested in conservation and thrift can benefit from the latest updates to an innovative software package released by the National

Institute of Standards and Technology (NIST). BEES 4.0, the new version of NIST's software tool for selecting environmentally preferred, cost-effective building products, updates data on more than 200 products and adds 30 new products for review. It also offers users the option of a new set of consensus weights for scoring the environmental impact of individual building products. BEES 4.0 (Building for Environmental and Economic Sustainability version 4) measures both the environmental and economic performance of building products with life-cycle assessment techniques developed respectively by the International Organization of Standardization (ISO) and ASTM International. With BEES a user can ascertain, for instance, the environmental impact of a product at any stage of its existence—raw material acquisition, manufacture, transportation, installation, use, and recycling and waste management.

The environmental ramifications of the product at each of these stages is provided for each of 12 categories: global warming, acidification, eutrophication, fossil fuel depletion, indoor air quality, habitat alteration, human health, ecological toxicity, ozone depletion, smog, criteria air pollutants, and water intake. The new consensus weight option, developed by a panel of building product manufacturers, green building designers, and environmental assessment experts, allows users to evaluate environmental impacts considering short-, medium-, and long-term effects. Comprehensive economic performance data are similarly available for the costs of initial investment, replacement, operation, maintenance and repair, and disposal. Environmental and economic performances are combined into an overall performance measure using the ASTM standard for Multi-Attribute Decision Analysis.

For the entire BEES analysis, building products are defined and classified according to the ASTM standard classification for building elements known as UNIFORMAT II. BEES 4.0 includes a number of new non-biobased products, including carpeting from several manufacturers who agree to purchase carbon credits to offset the product's life-cycle greenhouse gas emissions. These and other products, such as biobased carpets, roof coatings, building maintenance products, and fertilizers that qualify for a government “green” preferential purchase program, could increase builder participation in the nation's green building drive. The U.S. Department of Agriculture Chief Economist's Office of Energy Policy and New Uses supported NIST's BEES research on biobased products.

For more information on BEES 4.0, which can be downloaded for free, visit www.bfrl.nist.gov/oe/software/bees.html. BEES 4.0 runs on Windows 95 and beyond on personal computers with at least 60 MB of available disk space. A printer must be installed. Download your free copy of BEES at the address above. If you prefer a free BEES 4.0 compact disc and printed manual, place your order through the EPA Pollution Prevention Information Clearinghouse by calling (202) 566-0799 or e-mailing ppic@epa.gov. Note that most of the products listed in the software are generic types, such as generic fly ash, generic plywood sheathing,

generic stucco, and generic aluminum siding, although some specific products from manufacturers are included.

Sustainable Standards and Certifications

Many reliable programs promote sustainable standards and certifications. Some of the most active are:

Green California, www.green.ca.gov/EPP

Massachusetts Initiatives, www.mass.gov/envir

Energy Star, www.energystar.gov

EPA Water Sense, www.epa.gov/watersense

USDA BioPreferred, www.biobased.oce.usda.gov

Greenguard, www.greenguard.org

Green Seal, www.greenseal.org

CRI Green Label Plus, www.carpet-rug.org

MBDC, www.mbdc.com/certified

SCS Floorscore, www.scscertified.com

SCS Indoor Advantage, www.scscertified.com

SCS Sustainable Choice, www.scscertified.com

IDA Dark Sky Approved, www.darksky.org

Bird Safe, www.birdsandbuildings.com

Sustainable Governmental Programs

Nearly every country has started a sustainable design program for their governmental buildings. Active programs include:

Energy Modeling/Statistics, www.eia.doe.gov

BREEAM - United Kingdom, www.bream.org

EU Flower, ec.europa.eu/environment/ecolabel

Nordic Swan, Scandinavia, www.svanen.nu

Blue Angel, Germany, ecolabelling.org/ecolabel/blue-angel

Environmental Choice/Ecologo, Canada, www.environmentalchoice.com

Online Green Resources

Free online resources provide a quick way to research a topic and educate yourself on options. Consult the following websites for some of the best resources online:

US Green Building Council, www.usgbc.org

Environmental Building News, www.buildinggreen.com

Whole Building Design Guide, www.wbdg.org

ARCAT Green, www.arcat.com

RS Means Costs, www.rsmeans.com

Building Detailing, www.pacerepresentatives.com

Building Science, www.buildingscience.com

Air Barrier Association, www.airbarrier.org

CSI GreenFormat, www.greenformat.com

Green Standards

Measurement and verification for green attributes is essential to be able to compare between products, and to ensure that manufacturer's claims are accurate. The depth of standards already available is remarkable:

ASTM International, www.astm.org

- ASTM C 518-04 - Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM C 1371-04 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
- ASTM C 1549-04 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
- ASTM D 6400-04 - Standard Specification for Compostable Plastics
- ASTM D 6868-03 - Standard Specification for Biodegradable Plastics Used as Coatings on Paper and Other Compostable Substrates
- ASTM D 7081-05 - Standard Specification for Non-Floating Biodegradable Plastics in the Marine Environment
- ASTM E 408-71 (1996) - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
- ASTM E 903-96 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- ASTM E 1980-01 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

California Section 01350 - Special Environmental Requirements (emissions testing requirements), State of California, www.ciwmb.ca.gov/greenbuilding/specs/

California Proposition 65 Chemicals - Office of Environmental Health Hazard Assessment (OEHHA) - List of Chemicals known by California

EPA to cause cancer,
www.oehha.ca.gov/prop65/prop65_list/newlist.html

Carpet and Rug Institute (CRI), www.carpet-rug.org; CRI Green Label Plus Testing Program (Carpet and carpet adhesive); CRI Green Label Testing Program (Carpet pad)

Center for Resource Solutions (CRS) - Green-e product certification requirements (for renewable energy), www.green-e.org

Energy Policy Act (EPA) of 1992 (water fixture maximum flow rates)

Environmental Protection Agency (EPA), www.epa.gov

- EPA Comprehensive Procurement Guide, www.epa.gov/oswer/non-hw/procure/products.htm
- EPA Energy Star Rating System, www.energystar.gov/products
- EPA National VOC Emission Standard, www.epa.gov/epp/pubs/envlab/volatile.pdf
- EPA Priority PBT List, www.epa.gov/pbt/pubs/cheminfo.htm

FloorScore, www.scscertified.com/iaq/floorscore.html

Testing program certified by SCS for the Resilient Floor Covering Institute to comply with the VOC emissions criteria of the California 01350 emissions standard.

Forest Stewardship Council's Principles and Criteria (FSC), www.fscus.org

Greenguard Environmental Institute, www.greenguard.org; Greenguard Certification Standards for Low Emitting Products for the Indoor Environment; Greenguard Product Emission Standard for Children and Schools

Green Seal, www.greenseal.org

- GC-03 - Anti-Corrosive Paints, www.greenseal.org/certification/standards/anti-corrosivepaints.cfm
- GC-09 - Residential Central Air Conditioning Systems, www.greenseal.org/certification/standards/residential-ac-central.cfm
- GC-12 - Occupancy Sensors, www.greenseal.org/certification/standards/occupancysensors.cfm
- GC-13 - Split-Ductless Air-Source Heat Pumps (GC-13), www.greenseal.org/certification/standards/splitductless_heatpumps.cfm
- GC-15 - Residential Central Air Source Heat Pumps, www.greenseal.org/certification/standards/residential-ac-heatpumps.cfm
- GS-05 - Compact Fluorescent Lamps,

- www.greenseal.org/certification/standards/
- GS-11 – Paints, www.greenseal.org/certification/standards/paints.cfm
 - GS-13 - Windows (GS-13), www.greenseal.org/certification/standards/windows.cfm
 - GS-14 - Window Films (GS-14), www.greenseal.org/certification/standards/windowfilms.cfm
 - GS-31 - Electric Chillers, www.greenseal.org/certification/standards/electricchillers.cfm
 - GS-32 - Photovoltaic Modules, www.greenseal.org/certification/standards/
 - GS-36 - Commercial Adhesives, October 19, 2000, www.greenseal.org/certification/standards/commercialadhesives.cfm
 - GS-37 - Industrial and Institutional Cleaners: Green Seal Environmental Standard for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes, www.greenseal.org/certification/standards/gs37.pdf
 - GS-40 - Industrial and Institutional Floor Care Products: Finishes and Compatible Strippers Used for Industrial and Institutional Purposes, www.greenseal.org/certification/standards/gs40.pdf
 - GS-43 - Recycled-Content Latex Paint, August 1, 2006

International Dark-Sky Association (IDA), www.darksky.org/ida/ida_2/index.html

International Organization for Standardization (ISO), www.iso.org

- ISO 14001:1996 - Environmental Management Systems - Specification with Guidance for Use
- ISO 14021:1999 - Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labeling)
- ISO 14024:1999 - Environmental Labels and Declarations - Type I Environmental Labeling - Principles and Procedures
- ISO 14025:2006 - Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
- ISO 14040:2006 - Environmental Management - Life Cycle Assessment - Principles and Framework

National Fenestration Rating Council (NFRC), www.nfrc.org

- NFRC 100-04 - Procedure for Determining Fenestration Product Thermal Properties
- NFRC 200-04 - Procedure for Determining Fenestration Product Solar

Heat Gain Coefficients at Normal Incidence

- NFRC 300-04 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products
- NFRC 400-04 - Procedure for Determining Fenestration Product Air Leakage
- NFRC 500-04 - Procedure for Determining Fenestration Product Condensation Resistance Values

SmartWood, www.rainforest-alliance.org/programs/forestry/smartwood/
Soil Association, www.soilassociation.org/forestry
South Coast Air Quality Management District (SCAQMD),
www.aqmd.gov/rules

- South Coast Rule #1113, Architectural Coatings, www.aqmd.gov/rules
- South Coast Rule #1168, October 3, 2003, Adhesive/Sealant VOC Limits, www.aqmd.gov/rules/reg/reg11/r1168.pdf

Sustainable Attributes Verification and Evaluation™ Program (SAVE™) created by ICC Evaluation Service (ICC-ES) to provide reliable information about claims made by manufacturers of sustainable products

- EG101 – Evaluation Guideline For Determination Of Recycled Content Of Materials
- EG102 – Evaluation Guideline For Determination Of Biobased Material Content
- EG103 – Evaluation Guideline For Determination Of Solar Reflectance, Thermal Emittance And Solar Reflective Index Of Roof Covering Materials
- EG104 – Evaluation Guideline For Determination Of Regionally Extracted, Harvested Or Manufactured Materials Or Products
- EG105 – Evaluation Guideline For Determination Of Volatile Organic Compound (Voc) Content And Emissions Of Adhesives And Sealants
- EG106 – Evaluation Guideline For Determination Of Volatile Organic Compound (Voc) Content And Emissions Of Paints And Coatings
- EG107 – Evaluation Guideline For Determination Of Volatile Organic Compound (Voc) Content And Emissions Of Floor Covering Products
- EG108 – Evaluation Guideline For Determination Of Formaldehyde Emissions Of Composite Wood And Engineered Wood Products
- EG109 – Evaluation Guideline For Determination Of Certified Wood And Certified Wood Content In Products

Study Questions

1. The USGBC LEED acronym stands for which of the following?
 - a. Leading Edge Energy Design
 - b. Leadership in Environmental and Energy Design
 - c. Leadership in Energy and Environmental Design
 - d. Not an acronym, refers to the city of LEED in England
2. USGBC LEED provides the following types of certifications except:
 - a. LEED-NC, new construction
 - b. LEED-CI, commercial interiors
 - c. LEED-EB, existing buildings
 - d. LEED-PC, product certification
3. True or False? AIA B214 - Standard Form of Architects Services for LEED Certification states that the architect guarantees that the project will receive LEED certification.
4. True or False? Including LEED requirements only in Division 01 - General Requirements is the most typical way to include LEED requirements in specifications.
5. True or False? Including the LEED scorecard in the Project Manual is important, indicating yes, no, or maybe for credits to be achieved during construction.
6. To achieve the LEED credit for certified wood, the best approach is:
 - a. Require all wood materials be FSC certified
 - b. Use a minimum amount of wood, and require FSC certification
 - c. Specify the 50 percent minimum for FSC certification for all high-dollar-value wood products.
 - d. Specify 100 percent FSC compliance for selected high-dollar-value wood products only.
7. LEED 2009 Regional Priority Credits are awarded based on which of the following?
 - a. Achieving credits based on the zip code of the project
 - b. Achieving exemplary performance in 5 or more credits
 - c. Reaching 95 percent for construction waste management
 - d. Attempting certification for projects in flood zones
8. Green projects may include custom requirements in specifications for

which of the following?

- a. Sustainability requirements for suppliers in the supply chain
- b. Project-specific key performance indicators
- c. A list of restricted materials not to be used on the project
- d. All of the above

9. Excellent online resources for sustainable design include:

- a. www.buildinggreen.com
- b. www.buildingscience.com
- c. www.arcat.com
- d. All of the above

10. True or False? More than 70 model green guide specifications produced by the EPA are available on the Whole Building Design Guide website, www.wbdg.org.

Chapter 23

Building Information Modeling

Changing Specification Practice

Throughout time, specifications have been an integral part of the construction process. Specifications document the products, processes, and procedures necessary to create an element found in the built environment, be it a building, a tower, or a bridge. The role of the specifier entails not only the creation of construction documents, but the act of selecting the appropriate products and systems for a given set of circumstances. The sheer number of product and system possibilities makes the concept of specifications a critical element within the design and construction process. This intuition makes replacing the specifier through data included in Building Information Modeling (BIM) programs impossible for the foreseeable future.

A specifier is responsible for determining which products and systems to implement into a project, and should be able to convey not only which components are used, but why they were chosen. In most cases, there are several options available for any given product or system. Some solutions are better than others based on the location of the project, environmental conditions, local building codes, available options, and performance. Deciding which product to use is largely determined by weighing the performance and cost benefit of each product and determining the most effective option for the owner.

Building Information Modeling opens a new door that can allow a specifier to qualify products side by side and determine which meet the criteria necessary to select it. The ability for BIM to allow this to happen is contingent upon not only the data actually being in the model, but the attributes having a consistent naming convention and a standardized set of formats that can be used to organize the information. Currently, CSI MasterFormat™ and UniFormat™ are the two most common methods for organizing construction information, but do not organize information at a level deep enough to consider the attributes necessary for product selection and qualification. The Omniclass tables can potentially fill this void. Specifically, the *Properties*, *Materials*, and *Products* tables can have the most benefit to the specifier, as they can effectively categorize the products, materials, and attributes associated with the Work that is being performed on a project.

Standards and Formats for BIM

A BIM project is a database not just of information about spaces and dimensions, but of attributed information about actual elements and systems. Unlike traditional CAD designed projects, BIM projects have a unique ability to carry information about the products and systems implemented in the project. Provided the data is available, the model can know everything from the composition of each type of wall, to the exact type and performance of windows to be installed, down to specific physical properties of paints and coatings. The database can be as small or as large as necessary for the project at hand, or for their specific workflow process. When information that categorizes actual products based on performance and physical characteristics is added, it allows for powerful model analysis and exporting of information to streamline final documentation. Having information available in the model is a benefit to all parties involved.

Standards and formats are what drive the ability for the data to be useful outside of the BIM project file. If the data is not organized in such a way that it can be later retrieved, then it has little use to the specification, construction, or project management teams. Using standards and formats that already exist will allow information to be used at the project level, but do not allow for qualification of products and systems at their basic product and material levels. Leveraging new and different formats is necessary in accomplishing this.

MasterFormat for BIM

Because it is the most widely used format in common practice, and is built in to most BIM software, MasterFormat is the most common method of organizing building information. MasterFormat allows the design team to keep track of the Work Results of the project and organize it in such a fashion that the specifier can automatically know which sections are necessary for the project manual. After all elements are placed within a BIM, a report can be run that organizes the data based on its MasterFormat number. This can simplify the creation of the project manual considerably by providing the specifier with a single report carrying all of the products that require documentation for each given section.

Because MasterFormat organizes based on “Work Result,” certain elements are more difficult to consider and organize within a BIM project. Building systems such as walls, floor/ceiling construction, and roof systems are excellent examples of this. Within a BIM, these types of components are placed as a whole, not as their individual parts, so an 8” Metal Framed wall with interior and exterior wall sheathing, air barrier, interior paint, and EIFS will have information in several MasterFormat sections. It is important to be able to view these components both as a whole and as their individual components so categorizing both as a system and as materials is essential.

UniFormat for BIM

UniFormat groups information in terms of their element classification, be it a wall, a window, a chair, or an HVAC system. Components are grouped together as they are installed. It is most widely used as a cost estimation tool, and allows quick square foot costing as well as specific information applicable to different options of materials and components. Tagging BIM components with UniFormat codes allows for the information to be leveraged by the contractor and owner after the model is completed, and the data is made available.

Components are grouped together in UniFormat to create a single element necessary to provide a complete unit. A window may require flashing tape and fasteners to install and a cavity wall may require several components from the framing and sheathing materials, moisture barrier, and flashings to the exterior wall covering and grout. For costing purposes, these components can be bundled together in a package that considers everything required to provide that element.

Omniclass for BIM

Omniclass is a series of tables used for classifying information. While UniFormat and MasterFormat are two of the tables found in the series, the information found in other tables reaches a much deeper level. This level of detail is important in order not just to classify, but to quantify and qualify specific elements, systems, and processes involved with construction. The tables apply to different aspects of the BIM based on the level of information in the model, and are a very effective method of categorizing complex components that contain multiple products and materials. Walls, roofs, floors, and ceilings are common examples. The following are the Omniclass tables existing at the time of publication.

- Table 11 - Construction Entities by Function
- Table 12 - Construction Entities by Form
- Table 13 - Spaces by Function
- Table 14 - Spaces by Form
- **Table 21 - Elements (UniFormat)**
- **Table 22 - Work Results (MasterFormat)**
- **Table 23 - Products**
- Table 31 - Phases
- Table 32 - Services
- Table 33 - Disciplines
- Table 34 - Organizational Roles
- Table 35 - Tools

- Table 36 - Information
- **Table 41 - Materials**
- **Table 49 - Properties**

Omniclass Table 23 - Products is the most commonly used table, and effectively organizes not by work result or element, but by actual product being installed. In terms of BIM, it is a tremendously effective way to find and organize products to make the model very searchable. It organizes products into logical categories, and as with similar formats, is hierarchical, making it easy to navigate.

23-30 10 00 - Doors

23-30 10 11 - Door Components

23-30 10 11 11 - Door Frames

23-30 10 11 14 - Door

23-30 10 11 17 - Preassembled Door and Frame Units

23-30 10 11 21 - Fanlights

23-30 10 11 24 - Door Sections

23-30 10 11 24 11 - Structural Door Sections

23-30 10 11 24 14 - Door Cladding Sections

23-30 10 11 27 - Door Linings and Boards

23-30 10 11 31 - Door Renovation Sets

23-30 10 11 34 - Door Accessories

23-30 10 11 34 11 - Peep Holes

23-30 10 11 34 14 - Buffers and Stops

23-30 10 11 34 17 - Mail Openings and Slots

23-30 10 11 34 21 - Door Louvers and Lights

23-30 10 14 - Passage Doors by Material

23-30 10 14 11 - Metal Passage Doors

- 23-30 10 14 14 - Wood Passage Doors
- 23-30 10 14 17 - Plastic Passage Doors
- 23-30 10 14 21 - Composite Passage Doors
- 23-30 10 14 24 - Glazed Passage Doors
- 23-30 10 14 27 - All-Glass Passage Doors
- 23-30 10 17 - Doors and Grills by Method of Operation
 - 23-30 10 17 11 - Sliding Doors
 - 23-30 10 17 14 - Sliding Grills
 - 23-30 10 17 17 - Folding Doors and Grilles
 - 23-30 10 17 17 11 - Accordion Folding Doors
 - 23-30 10 17 17 14 - Accordion Folding Grilles
 - 23-30 10 17 17 17 - Folding Fire Doors
 - 23-30 10 17 17 21 - Panel Folding Doors
 - 23-30 10 17 17 24 - Bifold Doors
 - 23-30 10 17 21 - Revolving Doors
 - 23-30 10 17 24 - Balanced Doors
 - 23-30 10 17 27 - Coiling Doors
 - 23-30 10 17 27 11 - Overhead Coiling
 - 23-30 10 17 27 14 - Side Coiling
 - 23-30 10 17 31 - Vertical Lift Doors
 - 23-30 10 17 31 11 - Multi-Leaf Vertical Lift Doors
 - 23-30 10 17 31 14 - Telescoping Vertical Lift Doors

23-30 10 17 34 - Telescopic Stacking Doors

23-30 10 17 37 - Overhead Doors

23-30 10 17 37 11 - Single-Panel Overhead Doors

23-30 10 17 37 14 - Sectional Overhead Doors

23-30 10 21 - Special Function Doors

23-30 10 21 11 - Fire Doors

23-30 10 21 11 11 - Rolling Fire Doors

23-30 10 21 11 14 - Fire Shutters

23-30 10 21 11 17 - Swinging Fire Doors

23-30 10 21 11 21 - Temperature Rate of Rise Fire Doors

23-30 10 21 14 - Security Doors

23-30 10 21 17 - Controlled Environment Doors

23-30 10 21 17 11 - Cold Storage Doors

23-30 10 21 17 14 - Sound Control Doors

23-30 10 21 17 17 - Radiation Protection Doors

23-30 10 21 17 17 11 - Electromagnetic Shielding Doors

23-30 10 21 17 17 14 - RF Shielding Doors

23-30 10 21 17 17 17 - BO Shielding Doors

23-30 10 21 17 17 21 - Radio Frequency Protection Doors

23-30 10 21 17 17 24 - X-Ray Protection Doors

23-30 10 21 17 17 27 - Nuclear Radiation Protection Doors

23-30 10 21 17 17 31 - High Energy Magnetic Pulse Protection
Doors

23-30 10 21 21 - Detention Doors

23-30 10 21 24 - Hanger Doors

23-30 10 21 27 - Lightproof Doors

23-30 10 21 27 11 - Revolving Darkroom Door

23-30 10 21 31 - Traffic Doors

23-30 10 21 31 11 - Flexible Traffic Doors

23-30 10 21 31 14 - Flexible Strip Doors

23-30 10 21 31 17 - Rigid Panel Traffic Doors

23-30 10 21 31 21 - Rapid Opening Doors

23-30 10 21 34 - Industrial Doors

23-30 10 21 37 - Pressure-Resistant Doors

23-30 10 21 37 11 - Airtight Doors

23-30 10 21 37 14 - Blast-Resistant Doors

23-30 10 21 37 17 - Watertight Doors

23-30 10 24 - Other Doors

23-30 10 24 11 - Storm Doors

23-30 10 24 14 - Screen Doors

23-30 10 24 17 - Other Special Purpose Doors

23-30 10 27 - Access Doors and Panels

23-30 10 27 11 - Trap Doors

23-30 10 27 14 - Access Panels

23-30 10 27 17 - Access Doors

23-30 10 27 21 - Floor Hatches

23-30 10 27 24 - Roof Hatches

23-30 10 27 27 - Security Hatches

23-30 20 00 - Windows

23-30 20 11 - Window Components

23-30 20 11 11 - Window Sections

23-30 20 11 14 - Window Linings and Boards

23-30 20 11 17 - Window Vents

23-30 20 14 - Windows by Material

23-30 20 14 11 - Metal Windows

23-30 20 14 14 - Wood Windows

23-30 20 14 17 - Plastic Windows

23-30 20 14 21 - Composite Windows

23-30 20 17 - Windows by Method of Opening

23-30 20 17 11 - Fixed Windows

23-30 20 17 14 - Sliding Windows

23-30 20 17 14 11 - Vertical Sliding Windows

23-30 20 17 14 14 - Horizontal Sliding Windows

23-30 20 17 17 - Hung Windows

23-30 20 17 17 11 - Single-Hung Windows

23-30 20 17 17 14 - Double-Hung Windows

23-30 20 17 17 17 - Triple-Hung Windows

23-30 20 17 21 - Swinging Windows

23-30 20 17 21 11 - Awning Windows

23-30 20 17 21 14 - Casement Windows

23-30 20 17 21 17 - Projected Windows

23-30 20 17 21 21 - Vertical Pivoted Windows

23-30 20 17 21 24 - Jalousie Windows

23-30 20 17 21 27 - Jal-Awning Windows

23-30 20 21 - Other Windows

23-30 20 21 11 - Projecting Windows

23-30 20 21 11 11 - Bay Windows

23-30 20 21 11 11 11 - Angled Bay Windows

23-30 20 21 11 11 14 - Box Bay Windows

23-30 20 21 11 14 - Bow Windows

23-30 20 21 11 17 - Garden Windows

23-30 20 21 14 - Roof Windows

23-30 20 21 17 - Pavement Lights

23-30 20 21 17 11 - Glass Masonry Units

23-30 20 24 - Special Purpose Windows

23-30 20 24 11 - Detention Windows

23-30 20 24 14 - Pass Windows

23-30 20 24 17 - Controlled Environment Windows

23-30 20 24 17 11 - Sound Control Windows

23-30 20 24 17 14 - Radiation Protection Windows

23-30 20 24 17 14 11 - Electromagnetic Shielding Windows

23-30 20 24 17 14 14 - RF Shielding Windows

23-30 20 24 17 14 17 - BO Shielding Windows

23-30 20 24 17 14 21 - Radio Frequency Protection Windows

23-30 20 24 17 14 24 - X-Ray Protection Windows

23-30 20 24 17 14 27 - Nuclear Radiation Protection Windows

23-30 20 24 17 14 31 - High Energy Magnetic Pulse Protection Windows

23-30 20 24 21 - Security Windows

23-30 30 00 - Skylights

23-30 30 11 - Skylight Components

23-30 30 11 11 - Skylight Hardware

23-30 30 14 - Unit Skylights

23-30 30 14 11 - Domed Unit Skylights

23-30 30 14 14 - Pyramidal Unit Skylights

23-30 30 14 17 - Vaulted Unit Skylights

23-30 30 17 - Metal-Framed Skylights

23-30 30 17 11 - Domed Metal-Framed Skylights

23-30 30 17 14 - Motorized Metal-Framed Skylights

23-30 30 17 17 - Pyramidal Metal-Framed Skylights

23-30 30 17 21 - Ridge Metal-Framed Skylights

23-30 30 17 24 - Vaulted Metal-Framed Skylights

23-30 30 21 - Lantern Lights

23-30 30 24 - Tubular Skylights

23-30 40 00 - Hardware for Openings

23-30 40 11 - Hardware for Doors

23-30 40 11 11 - Rotation, Pivoting Door Gear

23-30 40 11 14 - Sliding Door Gear

23-30 40 11 17 - Combined Movement Door Gear

23-30 40 11 21 - Door Guiding Hardware

23-30 40 11 24 - Door Holding Hardware

23-30 40 11 24 11 - Door Hold Open Hardware

23-30 40 11 27 - Door Closing Hardware

23-30 40 11 27 11 - Door Closers

23-30 40 11 27 11 11 - Floor Door Closers

23-30 40 11 27 11 14 - Surface Door Closers

23-30 40 11 27 11 17 - Concealed Overhead Door Closers

23-30 40 11 31 - Door Locking Hardware

23-30 40 11 34 - Automatic Door Controls and Operators

23-30 40 11 34 11 - Card Key Door Locking Hardware

23-30 40 11 34 14 - Electrical Door Locking Control

23-30 40 11 34 17 - Electromagnetic Door Holders

23-30 40 14 - Hardware for Windows

23-30 40 14 11 - Sliding Window Gear

23-30 40 14 11 11 - Horizontal Sliding Window Gear
23-30 40 14 11 14 - Vertical Sliding Window Gear
23-30 40 14 11 17 - Sliding Projecting Window Gear
23-30 40 14 14 - Horizontal Pivoting Window Gear
23-30 40 14 17 - Window Tilt and Turn Gear
23-30 40 14 21 - Louver Gear
23-30 40 14 24 - Automatic Window Equipment
23-30 40 14 27 - Window Locks
23-30 40 14 31 - Window Lifts
23-30 40 14 34 - Window Operators
23-30 40 17 - Specialties for Openings
 23-30 40 17 11 - Door Specialties
 23-30 40 17 14 - Window Specialties
23-30 40 21 - Mechanical Fasteners for Openings
23-30 40 24 - Hinges and Pivots
 23-30 40 24 11 - Hinges
 23-30 40 24 14 - Pivots
23-30 40 27 - Locks and Latches
 23-30 40 27 11 - Mortise
 23-30 40 27 14 - Cylindrical Latch
 23-30 40 27 17 - Lock Cylinders
 23-30 40 27 21 - Deadbolts
23-30 40 31 - Handles, Knobs, Levers, and Security Bars

23-30 40 31 11 - Security Devices

23-30 40 34 - Weatherstripping and Seals

23-30 40 34 11 - Door Weatherstripping and Seals

23-30 40 34 14 - Thresholds

23-30 40 34 17 - Window Weatherstripping and Seals

23-30 40 99 - Other Openings Hardware

23-30 40 99 11 - Door Stops

23-30 50 00 - Glazing

23-30 50 11 - Glass Glazing

23-30 50 11 11 - Bent Glass

23-30 50 11 14 - Chemically-Strengthened Glass

23-30 50 11 17 - Coated Glass

23-30 50 11 21 - Composite Glass

23-30 50 11 24 - Decorative Glass

23-30 50 11 27 - Fire-Rated Glass

23-30 50 11 31 - Float Glass

23-30 50 11 34 - Heat-Strengthened Glass

23-30 50 11 37 - Impact Resistant Glass

23-30 50 11 41 - Insulating Glass

23-30 50 11 44 - Laminated Glass

23-30 50 11 47 - Low-Emissivity Glass

23-30 50 11 51 - Mirrored Glass

- 23-30 50 11 54 - Rolled Glass
- 23-30 50 11 57 - Spandrel Glass
- 23-30 50 11 61 - Tempered Glass
- 23-30 50 11 64 - Wired Glass
- 23-30 50 14 - Plastic Glazing
 - 23-30 50 14 11 - Ballistics-Resistant Plastic Glazing
 - 23-30 50 14 14 - Decorative Plastic Glazing
 - 23-30 50 14 17 - Insulating Plastic Glazing
 - 23-30 50 14 21 - Translucent Plastic Glazing
 - 23-30 50 14 24 - Transparent Plastic Glazing
 - 23-30 50 14 27 - Mirrored Plastic Glazing
- 23-30 50 17 - Glazing by Special Function
 - 23-30 50 17 11 - Security Glazing
 - 23-30 50 17 14 - Ballistics-Resistant Glass Glazing
 - 23-30 50 17 17 - Pressure-Resistant Glazing
 - 23-30 50 17 21 - Hurricane-Resistant Glazing
 - 23-30 50 17 24 - Radiation-Resistant Glazing
 - 23-30 50 17 27 - Transparent Mirrored Glazing
 - 23-30 50 17 31 - Cable Suspended Glazing
- 23-30 50 21 - Glazing Components
 - 23-30 50 21 11 - Glazing Frames
 - 23-30 50 21 14 - Glazing Sections

23-30 50 21 17 - Mechanical Glazing Fasteners

23-30 50 24 - Glazing Accessories

23-30 50 24 11 - Glazing Beads

23-30 50 24 14 - Condensation Channels

23-30 50 24 17 - Glazing Sealants and Tapes

23-30 50 24 21 - Glazing Gaskets

23-30 50 24 24 - Glazing Leading Material

23-30 50 27 - Protective Films by Performance

23-30 50 27 11 - Solar Control Films

23-30 50 27 14 - Safety Films

23-30 50 27 17 - Security Films

23-30 50 31 - Glazing Sections, Blocks

23-30 50 31 11 - U Sections

23-30 50 31 14 - Glass Masonry Units

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Table 41 - Materials provides a level of detail within the model by which a specific category of material can be found and qualified. This is especially important for projects where LEED is a consideration. Any given material may be found in several locations in a project and often a part of many work results, so the most effective way to find it is to search the model by material. Because a BIM database does not know that cherry and pine are both types of wood, a classification structure is necessary to allow this to happen. Table 49 affords us such ability. We can quickly find all of a specific material found on a project such as wood, aluminum, concrete, or steel and search its attributes for its qualifications and classifications, regardless of where in the project it is found.

Table 49 - Properties can become an essential element to a BIM, as it creates a taxonomy related to the identification, performance, and usage of building elements. A computer is not intuitive enough to understand that U-Factor, U Value, U-Value,

and U_Value are all referencing the same attribute. BIM relies on the unification of terms to allow data to be accurately searchable. Without this unification, data in the model can be lost, causing data modeling errors and incorrect cost predictions when values are totaled in the model.

At time of publishing of this book, Table 49 was in the midst of a restructuring to accommodate new technological advancements and prepare it for implementation into BIM projects.

Organizing BIM Data

The specifier has the opportunity to become the keeper of information within a project. They can act not only as the individual who inserts the information into the model, but as one who leverages it for model analysis, updates it as actual products are determined, organizes it into tabular outputs such as schedules, and ultimately converts it to a text specification. While the information contained in all three parts of a specification is not contained in the BIM component, it is appropriate to contain the information relevant to the products within the model. This allows the component to serve two purposes. The first is to allow active product selection and analysis, and the second is to contain the information necessary to create the Part 2 “Products” section of a construction specification.

BIM data is found at all levels of the project, from raw materials to the geographic location of the project. The information is organized using a series of standard tables, and is hierarchical, thus scalable to suit the project requirements. While usually not practical, the hierarchy can start with the organization of materials into solids, liquids, or gases. Typically the information is categorized beginning with basic furnished materials such as “Cherry Wood,” “Type X Gypsum Sheathing,” or “Type III Roofing Asphalt.”

Element and work result are used together to classify information and are not mutually exclusive or inclusive. Element B2010.05 41 00 - *Exterior Metal Framed Wall Construction* considers the framing and sheathing, but not the insulation or finishes. Work Result 05 41 00 - *Structural Metal Stud Framing* considers only the framing members. This can make classifying the wall within a BIM a bit confusing. Because every component involved with the wall from the interior finish to the exterior finish is placed as a single unit, multiple methods of organization must be implemented in order to categorize each material. Organizing information beginning at the material level, followed by the furnished material, element/work result, and project levels allows data to be found quickly and easily. Depending on the scope and size of a project, additional levels of detail can be added to organize the information.

- Project (Result)

- Element (Component)
- Work Result (Finished Product or System)
 - Furnished Material (Building Material)
 - Material (Raw Material)

With this type of hierarchy, a material can be tied to a component that is used for a specific work result or within a specific element. Gypsum sheathing may be used on either a ceiling or a wall; one product, two work results, two elements. For costing purposes, to find the amount of gypsum sheathing on a project, one can query the square foot area based on the material rather than the element. For specification purposes, you can sort the information based on work result to find which sections gypsum sheathing is found in.

At each level, projects, elements, work results, and materials carry applicable information. Just as a specifier understands where to look in a specification for the information, a clear understanding of where to look for information within a model is essential. When looking for thermal performance information about the insulation within a wall cavity, the insulation material carries the data, not the wall. If you are looking for the thermal value of the entire wall system, the wall carries it. When looking for the location of the wall in relation to other walls and spaces, the project carries it.

Here are some examples of a hierarchy at various levels of detail using one or more Omniclass tables:

Material Organization

Material: Cherry Wood, S4S, Polyurethane Finish

- Material Class: Wood - Omniclass 41-30 30 14
 - Type: Cherry - Omniclass 41-30 30 14 11 14 21
 - Surfacing - S4S - Omniclass Table 49 - *Properties*
 - Finish: Polyurethane - Omniclass Table 49 - *Properties*
 - Certification: FSC Certified - Omniclass Table 49 - *Properties*

Material: Roofing Asphalt, Type III

- Material Class: Bituminous Minerals - Omniclass 41-30 10 21
 - Type: Asphalt - Omniclass 41-30 10 21 11 11

- Classification: Type III - Omniclass Table 49 - *Properties*
- EVT: 375F - Omniclass Table 49 - *Properties*

Material: Interior Latex Paint, Eggshell Finish, White

- Material Class: Applied Coatings - Omniclass 23-35 90 00
 - Type: Latex Paint - Omniclass 23-35 90 11 11 14
 - Finish: Eggshell - Omniclass 23-20 10 11 17
 - Color: White - Omniclass Table 49 - *Properties*

Element Organization

Element: B2020.08 51 13 - Aluminum Windows

- Component 1: 36x48 Aluminum Casement Window, White - MasterFormat 08 51 13
 - Usage: Window - Omniclass 23-30 20 00
 - Type: Casement - Omniclass 23-30 20 17 21 14
 - Width: 36" - Omniclass Table 49 - *Properties*
 - Height: 48" - Omniclass Table 49 - *Properties*
 - Finish: White - Omniclass Table 49 - *Properties*
 - Operation: Outswing - Omniclass Table 49 - *Properties*
 - Handing: LH - Omniclass Table 49 - *Properties*
 - Glazing: Insulated, Tempered - Omniclass Table 49 - *Properties*
 - SHGC: .30 - Omniclass Table 49 - *Properties*
 - U-Value: .30 - Omniclass Table 49 - *Properties*
- Component 2: 24x36 Aluminum Double Hung Window, White - MasterFormat 08 51 13
 - Usage: Window - Omniclass 23-30 20 00
 - Type: Double Hung - Omniclass 23-30 20 17 17 14
 - Width: 24" - Omniclass Table 49 - *Properties*
 - Height: 36" - Omniclass Table 49 - *Properties*
 - Finish: White - Omniclass Table 49 - *Properties*
 - Operation: Outswing - Omniclass Table 49 - *Properties*
 - Glazing: Insulated, Laminated - Omniclass Table 49 - *Properties*
 - SHGC: .33 - Omniclass Table 49 - *Properties*

- U-Value: .33 - Omniclass Table 49 - *Properties*
- Component 3: 6" Butyl Window Flashing - MasterFormat 07 25 00
 - Usage: Window Installation Accessory - Omniclass 23-35 05 17
 - Type: Flexible Flashing - Omniclass 23-35 05 17 21
 - Width: 6" - Omniclass Table 49 - *Properties*
 - Attachment: Self-Adhering - Omniclass Table 49 - *Properties*

Element: B3010.07 54 00 - Thermoplastic Membrane Roofing

- Component 1: .045" TPO Roofing Membrane, White - MasterFormat 07 54 00
 - Usage: Roof Covering - Omniclass 23-35 20 21 11 14
 - Type: TPO - Omniclass 23-35 20 21 11 14 17
 - Thickness: 0.045" - Omniclass Table 49 - *Properties*
 - Width: 120" - Omniclass Table 49 - *Properties*
 - Finish: White
- Component 2: Synthetic, Water Based, Low VOC TPO Adhesive - MasterFormat 07 54 00
 - Usage: Adhesive - Omniclass 23-20 40 17
 - Type: Water Based - Omniclass 23-20 40 17 14
 - VOC: < 250 g/l - Omniclass Table 49 - *Properties*
- Component 3: Insulation Fasteners and Plates - MasterFormat 07 22 16
 - Usage: Mechanical Fasteners - Omniclass 23-20 40 11
 - Type: Insulation Screws - Omniclass 23-20 40 11 14 24
- Component 4: 3" Rigid Polyisocyanurate Roof Insulation - MasterFormat 07 22 16
 - Usage: Thermal Insulation - Omniclass 23-20 50 24
 - Type: Polyisocyanurate - Omniclass 23-20 50 24 24
 - Thickness: 3" - Omniclass Table 49 - *Properties*
 - Thermal Resistance: R-8.1 - Omniclass Table 49 - *Properties*
 - Compressive Strength: 25psi - Omniclass Table 49 - *Properties*

Element: C3010.06 46 00 - Wall Trim and Decoration

- Component 1: 1"x4" Colonial Window Moldings - Cherry Wood, S4S, Polyurethane Finish - MasterFormat 06 46 13

- Usage: Window Molding - Omniclass 23-35 10 34 17
- Type: Cherry - Omniclass 41-30 30 14 11 14 21
- Breadth: 1" - Omniclass Table 49 - *Properties*
- Depth: 4" - Omniclass Table 49 - *Properties*
- Pattern: Colonial - Omniclass Table 49 - *Properties*
- Surfacing: S4S - Omniclass Table 49 - *Properties*
- Finish: Polyurethane - Omniclass Table 49 - *Properties*
- Component 2: 1"x2" Fluted Chair rail - Cherry Wood, S4S, Polyurethane Finish - MasterFormat 06 46 13
 - Usage: Chair Rail - Omniclass 23-35 10 34 17
 - Type: Cherry - Omniclass 41-30 30 14 11 14 21
 - Depth: 1" - Omniclass Table 49 - *Properties*
 - Height: 2" - Omniclass Table 49 - *Properties*
 - Pattern: Fluted - Omniclass Table 49 - *Properties*
 - Surfacing: S4S - Omniclass Table 49 - *Properties*
 - Finish: Polyurethane - Omniclass Table 49 - *Properties*
- Component 3: 5/4"x6" Base Moldings - Pine Wood, S4S, Prime Painted - MasterFormat 06 46 19
 - Usage: Base Molding - Omniclass 23-35 10 34 17
 - Type: Pine - Omniclass 41-30 30 14 11 11 11
 - Depth: 1 1/4" - Omniclass Table 49 - *Properties*
 - Height: 6" - Omniclass Table 49 - *Properties*
 - Pattern: Shaker - Omniclass Table 49 - *Properties*
 - Surfacing: S4S - Omniclass Table 49 - *Properties*
 - Finish: Prime Painted - Omniclass Table 49 - *Properties*

* * *

Work Result Organization

Work Result: 06 46 13 - Wood Window Casings

- Component 1: 1"x4" Colonial Window Moldings - Cherry Wood, S4S, Polyurethane Finish
 - Usage: Window Molding - Omniclass 23-35 10 34 17
 - Type: Cherry - Omniclass 41-30 30 14 11 14 21
 - Breadth: 1" - Omniclass Table 49 - *Properties*

- Depth: 4" - Omniclass Table 49 - *Properties*
- Pattern: Colonial - Omniclass Table 49 - *Properties*
- Surfacing: S4S - Omniclass Table 49 - *Properties*
- Finish: Polyurethane - Omniclass Table 49 - *Properties*

Work Result: 06 46 19 - Wood Base Moldings

- Component 3: 5/4"x6" Base Moldings - Pine Wood, S4S, Prime Painted
 - Usage: Base Molding - Omniclass 23-35 10 34 17
 - Type: Pine - Omniclass 41-30 30 14 11 11 11
 - Depth: 1 1/4" - Omniclass Table 49 - *Properties*
 - Height: 6" - Omniclass Table 49 - *Properties*
 - Pattern: Shaker - Omniclass Table 49 - *Properties*
 - Surfacing: S4S - Omniclass Table 49 - *Properties*
 - Finish: Prime Painted - Omniclass Table 49 - *Properties*

Work Result: 06 46 23 - Wood Chair Rails

- Component 2: 1"x2" Fluted Chair rail - Cherry Wood, S4S, Polyurethane Finish - MasterFormat 06 46 13
 - Usage: Chair Rail - Omniclass 23-35 10 34 17
 - Type: Cherry - Omniclass 41-30 30 14 11 14 21
 - Depth: 1" - Omniclass Table 49 - *Properties*
 - Height: 2" - Omniclass Table 49 - *Properties*
 - Pattern: Fluted - Omniclass Table 49 - *Properties*
 - Surfacing: S4S - Omniclass Table 49 - *Properties*
 - Finish: Polyurethane - Omniclass Table 49 - *Properties*

Work Result: 07 22 16 - Roof Board Insulation

- Component 1: 3" Rigid Polyisocyanurate Roof Insulation
 - Usage: Roof Insulation - Omniclass 23-20 50 24
 - Type: Polyisocyanurate - Omniclass 23-20 50 24 24
 - Thickness: 3" - Omniclass Table 49 - *Properties*
 - Thermal Resistance: R-8.1 - Omniclass Table 49 - *Properties*

- Compressive Strength: 25psi - Omniclass Table 49 - *Properties*
- Component 2: Insulation Fasteners and Plates
 - Usage: Mechanical Fasteners - Omniclass 23-20 40 11
 - Type: Roof Insulation Screws - Omniclass 23-20 40 11 14 24

Work Result: 07 25 00 - Weather Barriers

- Component 1: 6" Butyl Window Flashing
 - Usage: Window Installation Accessory - Omniclass 23-35 05 17
 - Type: Flexible Flashing - Omniclass 23-35 05 17 21
 - Width: 6" - Omniclass Table 49 - *Properties*
 - Attachment: Self-Adhering - Omniclass Table 49 - *Properties*

Work Result: 07 54 00 - Thermoplastic Membrane Roofing

- Component 1: .045" TPO Roofing Membrane, White
 - Usage: Roof Covering - Omniclass 23-35 20 21 11 14
 - Type: TPO - Omniclass 23-35 20 21 11 14 17
 - Thickness: 0.045" - Omniclass Table 49 - *Properties*
 - Width: 120" - Omniclass Table 49 - *Properties*
 - Finish: White
- Component 2: Synthetic, Water Based, Low VOC TPO Adhesive
 - Usage: Adhesive - Omniclass 23-20 40 17
 - Type: Water Based - Omniclass 23-20 40 17 14
 - VOC: < 250 g/l - Omniclass Table 49 - *Properties*

Work Result: 08 51 13 - Aluminum Windows

- Component 1: 36x48 Aluminum Casement Window, White
 - Usage: Window - Omniclass 23-30 20 00
 - Type: Casement - Omniclass 23-30 20 17 21 14
 - Width: 36" - Omniclass Table 49 - *Properties*
 - Height: 48" - Omniclass Table 49 - *Properties*

- Finish: White - Omniclass Table 49 - *Properties*
- Operation: Outswing - Omniclass Table 49 - *Properties*
- Handing: LH - Omniclass Table 49 - *Properties*
- Glazing: Insulated, Tempered - Omniclass Table 49 - *Properties*
- SHGC: .30 - Omniclass Table 49 - *Properties*
- U-Value: .30 - Omniclass Table 49 - *Properties*
- Component 2: 24x36 Aluminum Double Hung Window, White
 - Usage: Window - Omniclass 23-30 20 00
 - Type: Double Hung - Omniclass 23-30 20 17 17 14
 - Width: 24" - Omniclass Table 49 - *Properties*
 - Height: 36" - Omniclass Table 49 - *Properties*
 - Finish: White - Omniclass Table 49 - *Properties*
 - Operation: Outswing - Omniclass Table 49 - *Properties*
 - Glazing: Insulated, Laminated - Omniclass Table 49 - *Properties*
 - SHGC: .33 - Omniclass Table 49 - *Properties*
 - U-Value: .33 - Omniclass Table 49 - *Properties*

Now that the information has been classified and categorized, what does it all mean? The information can be organized and exported from a BIM based on UniFormat, MasterFormat, or Omniclass code, depending on who needs the information. The cost estimator may want a list of everything in the model categorized by UniFormat code. The final information for the project manual can be leveraged by organizing the information by MasterFormat code, and a series of model queries can be performed based on Omniclass codes.

For LEED certification, if someone wanted to find how much FSC certified wood was on the project, they could query the model based on Omniclass 41-30 30 14 - Wood and filter it by its Property - *Certification: FSC Certified*, so only the FSC materials are counted.

For VOC levels for paints and coatings when performing indoor air quality studies, the information can be found under Omniclass 23-35 90 00 - Applied Coatings, filtered by location, and sorted by VOC levels and covered areas.

The Evolving Role of the Specifier

Specifiers have an opportunity to increase their role and add responsibilities to their current charges within a project. On the surface, it seems as though the only task that a specifier performs is that of the *Spec Writer*, where in actuality they have the responsibility of ensuring that the correct type of component is used under certain circumstances. In the current process, the main responsibility of the specifier is to provide a project manual to the architect as their deliverable. On a

BIM project, the specifier has an opportunity to assist in product selection and implementation early in the project, allowing the architect and engineer more resources and time to develop a project from an aesthetic perspective and analyze the model based on design and performance requirements.

Allowing the specifier direct access to a project during conception provides them the ability to view and modify components that have already been placed in a model as well as proactively select the correct products before they are brought into a project. Product selection can be a tricky undertaking, as the selection of a component can affect the adjacent and surrounding components. Selecting and analyzing a product before placing in a model can save a considerable amount of time performing trial-and-error product selection scenarios. For instance, while the selection of a fire extinguisher cabinet may seem trivial and simplistic, the choice of a recessed, semi-recessed, or flush model based on location and wall depth are crucial. The type of window used in a project is based on many factors that must be considered. Location within a building can affect the type of glass used; the codes governing a building's performance can affect the structural ratings and energy performance; operation method (awning, casement, double hung, etc.) can be affected by life safety considerations and owner preference.

Having a single individual who can maintain responsibility for this type of product selection on demand can streamline the architect's workflow. Morphing the specifier into a project information and product knowledge consultant creates a single point of responsibility for the information that they are already responsible for in the form of the project manual. Having this individual managing the information inside of a Building Information Model ensures homogenized, consistent information that is correct, consistent, and congruent. There is an assumption that drawings and specifications are supposed to complement one another. Since BIM connects construction drawings and project specifications to create a single project entity, that line becomes blurred to some degree. When information is placed in a BIM model, it becomes a data set that can be leveraged during the Construction Documentation phase. Ensuring early on that this data is correct simplifies creation of the project manual and minimizes inconsistencies and errors.

The Ever-Evolving Specification

Construction specifications are integral to the construction practice. As long as there are projects that need to be built, specifications will exist in some form. The role of the specification is to provide written documentation and affirmation of the exact processes required to complete a project. They provide the general information, product data, and installation requirements for various tasks that are performed during a project. While it is *possible* for all of this information to be embedded into BIM components, it is not *practical*. Elements of a specification that

have no bearing on the graphical or analytical aspect of the components are better linked or associated with the model, rather than actually a part of the model itself. Most of the information found in the individual elements of a BIM are found within Part 2 - *Products* in any given specification section.

Specifications are structured in a commonly accepted three-part format, defining the General Requirements, Product Requirements, and Execution Requirements. The information is detailed but concise, and ultimately is used as a contract document between a project owner and the contractor or contractors responsible for completing the project. Since the specification outlines the scope of work to be performed, it is an essential element in affirming that the work that was performed was in fact what was requested. This system of checks and balances minimizes the risk for conflicts or discrepancies, and clarifies any information that would be too cumbersome or detailed to add to drawing sheets.

Drawing sheets carry enough information to convey what an element of a building is, its size, and its relationship to adjacent elements. It typically does not go into detail about why an element was selected, the performance aspects of the element, or where the element comes from. For instance, a detail showing the connection between a roof and a wall carries the general information about the type of wall, the different layers of the roof structure, and the dimensions associated with the connection. It will likely omit information on who manufactures the roof, specifics on the roof's performance, how long the roof is warranted, how to store the roofing materials prior to installation, installation procedures, and other information too detailed to add to drawing sheets.

All of this information complementing the information on drawing sheets needs to be stored in some form for easy access and retrieval. Regardless of whether the information is stored in a database or in a document, it needs to be easily understood in a consistent format, thus making the construction specification document an important and relevant document, regardless of whether the project is designed using a BIM platform, a CAD platform, or a drawing board.

BIM has two main parts to it: graphics and information. It is the responsibility of the Architect to ensure the graphics are correct and appropriate for construction, and the role of the specifier to ensure the project information is correct on the behalf of the Architect. It seems only natural then to place the responsibility of BIM-based project information management in the hands of the specifier. Over the years, the tools of the specifier have improved, beginning with the pen, moving to the typewriter, followed by the word processor. Once again, the specifier is experiencing a process improvement that inevitably leads them to the *database*.

Databases house the salient parts of a specification for easy and repetitive retrieval while maintaining the consistency of the final delivered specification. The "Office Master" is the most common example of this. Most specifiers and architects offices have guide specifications that are used over and over in order to simplify the task of specification writing. This is a rudimentary but effective method of

making a database of project information for reuse. The shortcoming of the office master is that it needs constant maintenance as products, building codes, and design requirements change over the years.

ARCAT SpecWizard, BSD SpecLink, and other similar online “guide specification” libraries allow for the simplified creation of project manuals on an individual basis, by providing ready-to-use formatted specifications that can easily be implemented into projects based on either required performance values, industry standards, or actual products. The most appropriate type to use is dependent upon the project delivery method used on a given project. These online libraries are paving the way for integration of information from a BIM with the project manual by providing a single database where product information is stored. Where a specification and BIM object are sourced from the same location and driven by the same database, there is a level of consistency not easily attainable by other means.

The possibility exists to create a short-form or outline specification, a long-form specification, and a BIM component all using the same set of tools. Rather than a printed document being the only deliverable of a specifier, consider just how critical the responsibility of selecting the most appropriate component for a given project is. If the ability to review and select products and systems for a project extended to formatting a BIM component based on the required performance and appearance characteristics, the final project documentation and specification would be simplified considerably.

The concept of a specification is to provide documentation of specific elements of a project. It expands upon *what* is selected to explain *why* it is used. If you think of a specification in terms of what it is designed to do, much of it is broken into pairs of *Attribute* and *Value*, where the *attribute* is the “what” and the *value* is the “why.” This is the baseline concept for creating a specification from a database. Some examples of attribute and value pairs are:

- Color: Green
- Length: 12 inches
- R-Value: 19
- Tensile Strength: 1000 ksi
- Warranty: Ten (10) Years

While not all aspects of a specification can be broken into these pairs, it can encompass most if not all of the critical aspects of product selection and implementation. The balance of the specification can be formatted through development of a pre-formatted guide specification that would act as a form into which the data would be filled.

Changing the Specifier's Workflow

With wholesale changes to the design and construction process come changes to the specifier's workflow. Changes should be looked at in terms of short-term pain for long-term gain. Those who take the plunge into learning a new technology can position themselves as unique in their ability to provide a service that few specifiers can offer: the ability to provide BIM-integrated specification services. Historically, a specifier has held responsibility only during the Construction Documentation (CD) phase of a project. An enhanced role of information and documentation consultant throughout the project lifecycle can translate into additional responsibilities and increased revenue.

Certain tasks need to be performed, whether by the specifier or by a different party in order to get the BIM from concept to facilities management while providing a model useful to the Architect, Contractor, Facility Manager, and Owner. In terms of the specifier, we can break down the project into two categories where they may potentially add substantial value to the overall success of the project: *Prior-to-Bid Solicitation* and *Post-Bid Solicitation*.

Prior-to-Bid Solicitation

Having the information necessary to determine which specific products will meet the design criteria is essential in allowing model analysis to be performed during the design phase. Just as the aerospace industry creates digital prototypes of aircraft prior to construction, the building industry is beginning to see the same capabilities. In order to analyze a project as a whole, whether for cost estimation, performance analysis, code compliance, or structural integrity, the information about every component needs to be correct and available. On a large scale, this can be a considerable amount of information to maintain, so the individual or individuals with the most knowledge and expertise on products and systems should be responsible for providing and maintaining the information. In addition to product knowledge, the ability to organize and categorize information effectively is essential. The specifier is basic both of these areas, thus making them the ideal person for this undertaking.

During the design phase, the specifier can enhance their role to that of a consultant to the design team, or *Knowledge Manager*, responsible for the BIM data. In order to streamline the overall design process, the specifier can assist in specific areas, based on timeline. When the specifier interviews an architect in order to determine the preliminary project description, they get a sense of what the project scope and requirements are. During this interview, the specifier can determine the types of elements that need to be implemented in a project, the requirements that the owner may have and the performance qualifications necessary for the products that are to be ultimately to be used. The information gathered

should be enough to begin creating an outline specification and formatting BIM elements that can be implemented into a project. Either by creating generic, or using manufacturer-supplied BIM components, the specifier can enter the attributes and values that are critical for the success of the elements in a given project prior to or as they are being modeled into the project.

Based on the information gathered from the interview, the specifier may choose to create an outline specification, which is functionally a working document from which a final “long-form” specification section may be derived. As a project becomes more developed, the outline specification becomes more specific, allowing the outline to morph into the final specification by the time all project information has been attained and implemented. As the information about elements is received, decisions are made about specific components, and actual products are selected, the specifier may update the BIM components on their end, and provide an updated set for the architect to amend the project.

Prior to bid especially, the graphics and information in a BIM project are constantly changing as more design choices are made. As such, the attributed information surrounding the changes must change as well. A qualified specifier can update the model throughout the project in order to maintain the most current information and allow accurate analysis of the BIM. Model analysis is only as accurate as the data provided. In order to accurately portray how much energy a building will consume, actual components need to be considered. Devices, fixtures, and fittings used in the project all have varying performance characteristics depending on the manufacturer.

Long-form specifications can be created based on the information provided throughout the entire design process and exported from the BIM. Leveraging the accumulated information saves a considerable amount of time in research and organization. Another method that can be even more efficient is to develop outline specification that can be scaled and amended as the project progresses with more information, thus a working document with rolling changes. The final document would eventually carry all of the final information, and with a few small revisions, can be organized into a final project manual.

While the specifier is probably not proficient in the use of a BIM platform, there is an opportunity for them to add value to the project prior to bid. Whether they choose to either become proficient, or hire a proficient individual in their firm to act as a BIM data modeler, value is added to the overall project. The concept is not for the specifier actually to create the graphics associated with the product or system in question, but to be capable enough to manipulate an existing BIM object to suit the needs of the project.

Post-Bid Solicitation

Active specification and product analysis

The information included in the BIM can streamline bid review by allowing active specification and product analysis. During bid review, a copy of the model can be used as a “control” from which competitive bidders can be analyzed for their suitability in the project. The data from the bidder's models can be compared with the control data line by line to quickly weed out inferior or otherwise unsuitable products. In addition to the design team's ability to select products based on the model data, a contractor can use the same process to select subcontractors based on the products they are proposing, costs for the work, and amount of time allotted for the project.

The ability to analyze bids this way can minimize both the time and effort required to process bids. In addition, there is a potential to allow bidding to happen in a rolling fashion, rather than all at once on “fast-track” projects where portions of the work are bid and performed at different times. The specifier can become involved during bid review by preparing the information about actual products from competitive manufacturers’ products and prepare apples-to-apples product comparisons.

[Table 23.1](#) shows that the important aspects of the windows for the project are appropriate U Value and Solar Heat Gain Coefficient (SHGC), High Velocity Hurricane Zone (HVHZ) approval, and a maximum cost of \$400.00.

[Table 23.1](#) Product Comparison - Windows

Manufacturer	Element	U Value	SHGC	HVHZ Approved	Cost
Basis of Design	30x46 Casement Window	.30	.30	Yes	\$400.00
Manufacturer A	30x46 Casement Window	.27	.30	No	\$355.00
Manufacturer B	30x46 Casement Window	.35	.46	No	\$265.00
Manufacturer C	30x46 Casement Window	.27	.29	Yes	\$410.00
Manufacturer D	30x46 Casement Window	.30	.30	Yes	\$380.00

The *Basis of Design* carries the required values, and as manufacturers provide their information either in the form of data that the design team enters themselves, or by providing BIM components representing not just the graphics of their products, but the associated data necessary to make accurate product comparisons, in this case U Value, SHGC, HVHZ. Cost is typically a value-added independent of the component, since prices change constantly based on raw material and fuel prices, and can vary by location. Cost information is best attained at the time of bidding and entered during specific comparisons after all design criteria has been considered.

- Manufacturer A has an Acceptable U Value and SHGC, but is not HVHZ approved.
- Manufacturer B has inferior U Value and SHGC, and is not HVHZ approved.
- Manufacturer C has acceptable U Value and SHGC, and is approved for

HVHZ

- Manufacturer D has acceptable U Value and SHGC, and is approved for HVHZ

Based on design criteria, manufacturers C and D should be considered for supplying products as they meet all design criteria. Adding cost information to the products and closer analysis of the data reveals that Manufacturer C is slightly more expensive than the requirement, but also has better performance. Manufacturer D has acceptable values in all categories. Choosing between Manufacturers C and D can be further analyzed by looking at the model as a whole, and calculating the potential energy savings of the more efficient windows against the price differential between products.

The use of a BIM to analyze this type of specification information allows for a considerable amount of time saved as well as the ability to look at performance aspects of the building as a whole to study the impact that a single product may have on the entire project.

Element Updating

Once all of the bids have been awarded and products have been selected, an optional service of updating the model is a potential for further involvement. Even after the design is completed, all bids are awarded, and construction is underway, the project will likely receive change orders and alternate products. As changes are made and products are substituted, the specifier can analyze these product changes, affirm their conformance with design criteria and intent, and again, prepare models for the design team to amend the model with.

While this level of post design detail may provide no benefit to the specifier or design team, the owner may be willing to pay a premium to receive an *As-Built* model of their project for future analysis. An As-Built model can allow a facility manager to schedule maintenance and replacement based on product lifecycle and recommendations from the product manufacturers. It can also allow for budgeting of the same considerations. A BIM that carries all of the actual information about an entire building from the dimensions and locations to the performance and usage characteristics to the lifespan and cost information of every component is tantamount to a digital owner's manual of the entire project.

Conclusions

Since BIM is very much in its infancy, most architects are only scratching the surface of its capabilities. It is primarily being used as a 3D modeling tool that speeds up the design process, but the data that can be captured and manipulated is not being used. Much of this is due to a disconnect between BIM and the specifier.

Currently, the specifier holds no role in the development of a BIM model, and is “left out” of any integrated project coordination that may occur. By bringing the specifier into the BIM model, and allowing them to specify systems and products for the project, that data that is missed within the project can be provided and maintained by the specifier for the design team, contractors, facility managers, and owners. Essentially, the specifier has the opportunity to take on an additional role that will benefit not just the design professionals, but anyone who may step foot in the finished building.

Currently, during the design process, BIM projects are often developed with generic products and systems rather than the manufacturer-specific components that carry data about an individual product's performance, lifecycle, impact, and efficiency. It is too cost- and time-prohibitive to require a design professional to update an entire project with manufacturer-specific components after the design has been completed. If the specifier has the opportunity to specify through the BIM model in real time, products and systems can be specified earlier in the design phase and potentially streamline the bidding process by setting available and visible performance standards in real time.

First and foremost, the specifier needs to understand what BIM means to the built environment and the benefits BIM brings to their business and current workflow. Once the concepts of what it is designed for, and more importantly what it is capable of doing, are understood, there is every reason to embrace this technological advance and make the leap into the brave new world of Building Information Modeling.

Study Questions

1. BIM information can be classified from which of the following?
 - a. MasterFormat
 - b. UniFormat
 - c. Omniclass
 - d. All of the above
 - e. None of the above
2. True or False? CSI MasterFormat is one of the Omniclass Tables.
3. In order to act as the *Knowledge Manager* for BIM projects, an individual *must* be able to perform which of the following tasks?
 - a. Develop BIM graphics and organize data
 - b. Select products and organize data
 - c. Select products and develop BIM graphics
 - d. Be an expert in using BIM software
4. True or False? Every listing in Omniclass Table 23 - *Products* has a

single corresponding MasterFormat section.

5. BIM data comes primarily from which part of a specification section?

- a.** Part 1 - General
- b.** Part 2 - Products
- c.** Part 3 - Execution
- d.** BIM data comes from all of the parts equally.

6. True or False? The BIM model never changes after bids are solicited.

7. Which of the following is an example of an attribute/value pair?

- a.** Product carries a 10 year warranty against product defect.
- b.** Ten (10)-year warranty
- c.** Warranty: Ten (10) Years
- d.** 10 = Warranty Duration

8. True or False? All of the information necessary to write a spec is found inside of a BIM component.

9. The easiest way to find all of the aluminum in a BIM is to query the model based on:

- a.** MasterFormat
- b.** Omniclass Table 23 - Products
- c.** UniFormat
- d.** Omniclass Table 41 - Materials

10. True or False? There is no need for a specifier on a BIM project.

Appendix A

Project Manual Checklist

Foreword

The checklist following this introduction is an example of an office standard Project Manual Checklist. It contains information for the project in general and identifies information needed specifically for bidding and construction. It is a reminder of the many products and systems that may be included in the Project.

The example checklist is extensive but not comprehensive. It should be used as a starting point. Each office or individual user must add to, delete from, or otherwise change the list according to typical projects of the office or user. Also, consider applicable codes, ordinances, and standards of public authorities having jurisdiction, environmental factors of the project location, the contracting method, and design standards and practices of the architect or engineer.

Expand on information from the sample when preparing the office standard Project Manual Checklist. Extract information from typical sections in the specifications, especially Division 01 sections. For sections in Divisions 02 through 49, develop checklists for basic information for each section.

Although the checklist is intended for use during the Construction Documents (CD) phase of a project, many items should be identified and disseminated during the Design Development (DD) phase. It is suggested that the document be used by the project architect or project engineer from the time DD drawings and outline specifications are started, with information added as the design progresses and design decisions are made.

Use of the Project Manual Checklist

Place a check mark at all items that apply to the project or underline items required for the project. Fill in blanks where information is required. Where no information is required, leave the spaces blank or the items unmarked.

At blank spaces, fill in additional information covering the particular item, such as the manufacturer's name, catalog page numbers, types, sizes, and other data.

List special materials, features, details, or other data that need to be noted in the specifications. List the names of equipment or other items required by the owner or

as required to match existing items.

Project Manual Checklist

Project Title: _____

Project Identification Nos.

Owner:: _____

Architect): _____

Project Address/Location: _____

Project Manual Due Dates:

Preliminary Draft: _____

Plancheck Submission: _____

Plancheck Sign-Off: _____

Bid Sets Issued: _____

Construction Contract Set: _____

_____ Attach copy of Project Directory to Project Manual Checklist, with names of contacts, telephone numbers and e-mail addresses.

_____ Incorporate firm names, addresses and telephone numbers on Project Manual Title Page.

_____ Review project scope with Architect and prepare preliminary Table of Contents of Project Manual. (Use Outline Specifications from DD phase, if available)

_____ Bidding and Contract Requirements:

_____ Issue to Owner, *AIA G612 - Owner's Instructions Regarding the Construction Contract, Insurance and Bonds, and Bidding Procedures*

_____ Receive and incorporate information from completed *AIA G612*

_____ Regulatory Requirements:

_____ Applicable Codes:

Building Code: _____

Plumbing Code: _____

Mechanical Code: _____

Electrical Code: _____

Fire Code: _____

_____ Industrial Safety Regulations: _____

_____ Accessibility Regulations: _____

_____ Air Quality Regulations: _____

_____ Bidding Documents (if applicable): According to completed *AIA G612*. Bidding Documents (if applicable): According to completed

_____ Prepare (Invitation to Bid) (Advertisement for Bids).

_____ Prepare Contractor's Qualifications procedures and forms (if applicable)

_____ Prepare Instructions to Bidders (*AIA A701*) (Other) and, if applicable, Supplementary Instructions to Bidders.

_____ Prepare Bid Form: Comply with instructions from (Owner) (Construction Manager)

_____ Bid Information:

Date: _____

Time: _____

Location: _____

_____ Coordinate and incorporate Allowances, Unit Prices and [Alternate] [Alternative] Bids.

_____ Prepare and attach additional forms and certifications

_____ Prepare documents for "Information Available to (Bidders) (Contractor)"

_____ Geotechnical Data: Incorporate geotechnical data in Document 00 31 32 - Geotechnical Data.

Prepared by: _____

Report title: _____

Dated: _____

Supplements: _____

Dated: _____

_____ Site Survey: Incorporate information into Document 00 31 21 - Survey Information.

Prepared by: _____

Survey title: _____

Dated: _____

_____ Other information available to Bidders (identify, such as hazardous materials reports and project record drawings for existing construction)

_____ Prepare Bid Form Attachments:

_____ Schedule of Values

_____ Subcontractors List

_____ Contract Documents: According to completed *AIA G612*.

_____ Obtain authorized copies of General Conditions of the Contract

(_____ *AIA A201*) (_____ Other)

_____ Prepare Supplementary Conditions of the Contract, according to instructions by Owner, Owner's legal counsel, Owner's insurance counsel and (if applicable) Construction Manager.

_____ Obtain and incorporate applicable insurance, certification and other forms as required by (Owner) (Construction Manager).

_____ Obtain copy of Owner-produced custom General Conditions of the Contract. Include Owner-produced custom Supplementary Conditions of the Contract, if applicable.

Construction Specifications by Consultants:

_____ Civil (Site Construction) Specifications:

_____ Engineer uses Engineer's masters and produces hardcopy specifications.

_____ Engineer edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Engineer for editing.

_____ Incorporate spec edits from Engineer.

_____ Landscape Specifications:

_____ Landscape Architect uses Landscape Architect's masters and produces hardcopy specifications.

_____ Landscape Architect uses specifier's masters; hardcopy by specifier.

_____ Draft specifications to Landscape Architect for editing.

_____ Incorporate spec edits from Landscape Architect.

_____ Structural Engineering Specifications:

_____ Engineer uses Engineer's masters and produces hardcopy specifications.

_____ Engineer edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Engineer for editing.

_____ Incorporate spec edits from Engineer.

Specifications by specialty consultants (food service equipment, elevator, audio/visual, theater,

materials handling, process equipment, etc. Add additional design disciplines as necessary).

_____ Door Hardware Specifications:

_____ Consultant uses Consultant's masters and produces hardcopy specifications.

_____ Consultant edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Consultant for editing.

_____ Incorporate spec edits from Consultant.

_____ [_____] Specifications:

_____ Consultant uses Consultant's masters and produces hardcopy specifications.

_____ Consultant edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Consultant for editing.

_____ Incorporate spec edits from Consultant.

_____ [_____] Specifications:

_____ Consultant uses Consultant's masters and produces hardcopy specifications.

_____ Consultant edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Consultant for editing.

_____ Incorporate spec edits from Consultant.

_____ [_____] Specifications:

_____ Consultant uses Consultant's masters and produces hardcopy specifications.

_____ Consultant edits specifier's masters; hardcopy by specifier.

_____ Draft specifications to Consultant for editing.

_____ Incorporate spec edits from Consultant.

_____ Plumbing Specifications:

_____ Mechanical Engineer uses Engineer's masters and produces hardcopy specifications.

_____ Specifications received from consultant.

_____ Make ready for reproduction.

_____ Fire Protection (Sprinklers) Specifications:

_____ Mechanical Engineer uses Engineer's masters and produces hardcopy specifications.

_____ Specifications received from consultant.

_____ Make ready for reproduction.

_____ HVAC Specifications:
_____ Mechanical Engineer uses Engineer's masters and produces hardcopy specifications.
_____ Specifications received from consultant.
_____ Make ready for reproduction.

_____ Electrical Power and Lighting Specifications:
_____ Electrical Engineer uses Engineer's masters and produces hardcopy specifications.
_____ Specifications received from consultant.
_____ Make ready for reproduction.

_____ Fire Detection and Alarm System Specifications:
_____ Electrical Engineer uses Engineer's masters and produces hardcopy specifications.
_____ Specifications received from consultant.
_____ Make ready for reproduction.

_____ Telecommunications Specifications:
_____ Telecommunications Consultant uses Consultant's masters and produces hardcopy specifications.
_____ Specifications received from consultant.
_____ Make ready for reproduction.

Construction Specifications Production

_____ Edit Division 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

_____ General:

_____ Review Procurement (Bidding) procedures with Architect and (Owner) (Construction Manager), according to completed *AIA G612, Owner's Instructions Regarding the Construction Contract, Insurance and Bonds, and Bidding Procedures*.

_____ Review Agreement Form and Conditions of the Contract with Architect and (Owner) (Construction Manager).

_____ Document 00 01 00 - PROJECT MANUAL TITLE PAGES: Edit with Architect. Include room for professional registration stamps if separate document is not required. Confirm requirements of Authority Having Jurisdiction (AHJ)

_____ Document 00 01 10 - TABLE OF CONTENTS: Generate after specifications are edited. Include (Owner-produced) (Construction Manager-produced) documents.

_____ Document 00 01 00 - INVITATION TO BIDDERS: Edit with Architect and (Owner) (CM).

_____ Invitation to Bidders produced and issued by:

_____ Architect

_____ (Owner) (Construction Manager)

_____ Omit Invitation to Bidders. Bidding procedures by directly-selected General Contractor.

_____ Document 0 0 21 13 - INSTRUCTIONS TO BIDDERS

_____ Obtain *AIA A701 - Instructions to Bidders* for inclusion in Project Manual.

_____ Include custom Instructions to Bidders prepared by (Owner) (Construction Manager).

_____ Omit Instructions to Bidders. Bidding procedures by directly-selected General Contractor.

_____ Document 00 22 13 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

_____ Prepare modifications and supplements to *AIA A701 - Instructions to Bidders*. Edit with Architect and (Owner) (Construction Manager).

_____ Omit Supplementary Instructions to Bidders. Custom Instructions to Bidders are used.

_____ Omit Supplementary Instructions to Bidders. Bidding procedures by directly-selected General Contractor.

_____ Document 00 25 13 - PRE-BID CONFERENCE: Edit with Architect and (Owner) (CM).

_____ Document 00 31 32 - GEOTECHNICAL DATA: Edit by Architect. Identify Geotechnical Report and supplements.

_____ Document 00 41 00 - BID FORM:

_____ Edit with Architect and (Owner) (CM).

_____ Bid Form prepared by (Owner) (CM).

_____ Omit Bid Form. Bidding procedures by directly-selected General Contractor.

_____ Document 00 41 66 - SCHEDULE OF VALUES: Edit with (Architect) (Owner) (CM).

_____ Document 00 41 69 - SUBCONTRACTORS LIST: Edit with (Architect) (Owner) (CM).

_____ Document 00 52 00 - AGREEMENT FORM:

_____ Include AIA form. Edit with (Architect) (Owner) (CM).

_____ *A101-2007 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum.*

_____ *A102-2007 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price.*

_____ *A103-2007 Standard Form of Agreement Between Owner and Contractor where the basis of payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price.*

_____ Include custom Agreement Form prepared by (Owner) (CM).

_____ Edit form to suit project requirements with Architect (Owner) (CM).

_____ Document 00 72 00 - GENERAL CONDITIONS OF THE CONTRACT: Edit with Architect and (Owner) (CM).

_____ Use *AIA A201 - General Conditions of the Contract for Construction.*

_____ Obtain authorized copies of *AIA A201.*

_____ Use Custom General Conditions of the Contract produced by (Owner) (CM).

_____ Document 00 73 00 - SUPPLEMENTARY CONDITIONS OF THE CONTRACT:

_____ Edit with Architect and (Owner) (CM).

_____ Use custom Supplementary Conditions of the Contract produced by (Owner) (CM).

_____ Omit Supplementary Conditions of the Contract. Custom General Conditions are used.

_____ Edit Division 01 - GENERAL REQUIREMENTS:

_____ General:

_____ Review with (Owner) (Construction Manager).

_____ Coordinate Division 01 Specifications with Bidding Requirements.

_____ Coordinate Division 01 Specifications with Conditions of the Contract.

_____ Section 01 11 00 - SUMMARY OF THE PROJECT: Edit with Architect and (Owner) (CM); issue to Project Team for information and comments.

_____ Section 01 21 00 - ALLOWANCE PROCEDURES: Edit with Architect and (Owner) (CM). Identify allowances.

_____ Section 01 23 00 - ALTERNATE BID PROCEDURES: Edit with Architect and (Owner) (CM). Identify alternate bids.

_____ Section 01 26 00 - CONTRACT MODIFICATION PROCEDURES: Edit with Architect and (Owner) (CM).

_____ Section 01 26 13 - REQUESTS FOR INTERPRETATION (RFI): Edit with Architect and (Owner) (CM).

_____ Section 01 29 73 - SCHEDULE OF VALUES: Edit with Architect and (Owner) (CM).

_____ Section 01 29 76 - PROGRESS PAYMENT PROCEDURES: Edit with Architect and (Owner) (CM).

_____ Section 01 31 00 - PROJECT MANAGEMENT AND COORDINATION: Edit with Architect and (Owner) (CM).

_____ Section 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION: Edit with Architect and (Owner) (CM).

_____ Section 01 33 00 - SUBMITTAL PROCEDURES: Edit with Architect and (Owner) (CM).

_____ Section 01 33 29.13 - SUSTAINABLE DESIGN REQUIREMENTS (LEED): Edit with Architect, LEED AP and (Owner) (CM).

_____ Section 01 35 13 - SPECIAL PROJECT PROCEDURES: Edit with Architect and (Owner) (CM).

_____ Section 01 41 00 - REGULATORY REQUIREMENTS: Edit with Architect and (Owner) (CM).

_____ Section 01 42 00 - REFERENCES: Edit with Architect.

_____ Section 01 45 00 - QUALITY CONTROL: Edit with Architect and (Owner) (CM).

_____ Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS: Edit with Architect and (Owner) (CM).

_____ Section 01 60 00 - PRODUCT REQUIREMENTS: Edit with Architect and (Owner) (CM).

_____ Section 01 77 00 - CONTRACT CLOSEOUT PROCEDURES: Edit with Architect and (Owner) (CM).

_____ Section 01 78 23 - OPERATION AND MAINTENANCE DATA: Edit with Architect and (Owner) (CM).

_____ Section 01 78 26 - PRODUCT WARRANTIES AND BONDS: Edit with Architect and (Owner) (CM).

_____ Section 01 78 29 - PROJECT RECORD DOCUMENTS: Edit with Architect and (Owner) (CM).

_____ Section 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS: Edit with Architect and (Owner) (CM).

_____ Section 01 92 16 - DEMONSTRATION AND TRAINING: Edit with Architect and (Owner) (CM).

_____ Edit Division 02 - EXISTING CONDITIONS:

_____ Section 02 41 13 - SELECTIVE SITE DEMOLITION: Edit with Architect and Civil Engineer.

_____ Section 02 41 16 - STRUCTURE DEMOLITION: Edit with Architect and Owner.

_____ Section 02 41 19 - SELECTIVE STRUCTURE DEMOLITION: Edit with Architect. Selected portions of building to be demolished.

_____ Section 02 42 00 - REMOVAL AND SALVAGE OF CONSTRUCTION MATERIALS: Edit with Architect and Owner.

_____ Section 02 43 13 - STRUCTURE RELOCATION: Edit with Architect and Owner.

_____ Edit Division 03 - CONCRETE:

_____ Section 03 11 11 - CAST-IN-PLACE CONCRETE FORMING: Edit with Architect and Structural Engineer.

_____ Section 03 20 00 - CONCRETE REINFORCING: Edit with Architect and Structural Engineer.

_____ Section 03 31 10 - CAST-IN-PLACE CONCRETE: Edit with Architect and Structural Engineer.

_____ Section 03 37 13 - SHOTCRETE: Edit with Architect and Structural Engineer.

_____ Section 03 47 13 - TILT-UP CONCRETE: Edit with Architect and Structural Engineer.

_____ Section 03 53 00 - PORTLAND CEMENT CONCRETE TOPPING: Edit with Architect.

_____ Section 03 54 13 - GYPSUM CEMENT UNDERLAYMENT: Edit with Architect.

_____ Edit Division 04 - MASONRY:

_____ Section 04 21 13 - BRICK MASONRY: Edit with Architect.

_____ Section 04 22 11 - REINFORCED CONCRETE UNIT MASONRY: Edit with Architect and Structural Engineer.

_____ Section 04 23 00 - GLASS UNIT MASONRY: Edit with Architect.

_____ Section 04 57 00 - MASONRY FIREPLACES: Edit with Architect.

_____ Section 04 42 26 - SIMULATED STONE CLADDING: Edit with Architect.

_____ Edit Division 05 - METALS:

_____ Section 05 05 13 - SHOP-APPLIED COATINGS FOR METAL: Edit with Architect. Coordinate with aluminum windows, glazed aluminum framing, aluminum sun shades, aluminum louvers and other aluminum components to be coated (painted).

_____ Section 05 05 26 - ANCHORING AND FASTENING: Edit with Architect and Structural Engineer. Expansion anchors, grouting and other fasteners to building substrates.

_____ Section 05 12 00 - STRUCTURAL STEEL FRAMING: Edit with Architect and Structural Engineer.

_____ Section 05 21 00 - STEEL JOIST FRAMING: Edit with Architect and Structural Engineer.

_____ Section 05 31 00 - STEEL DECKING: Edit with Architect and Structural Engineer.

_____ Section 05 41 00 - COLD-FORMED STRUCTURAL METAL FRAMING: Edit with Architect and Structural Engineer. Includes joists from C-shape cold-formed steel.

_____ Section 05 51 13 - METAL PAN STAIRS: Edit with Architect and Structural Engineer.

_____ Section 05 52 13 - PIPE AND TUBE RAILINGS: Edit with Architect.

_____ Section 05 73 00 - DECORATIVE METAL RAILINGS: Edit with Architect.

_____ Edit Division 06 - WOOD, PLASTICS AND COMPOSITES:

_____ Section 06 10 13 - WOOD FRAMING AND SHEATHING: Edit with Architect and Structural Engineer.

_____ Section 06 10 16 - WOOD BACKING, BLOCKING AND CURBING: Edit with Architect. Non-load bearing wood members, including nailers, furring, cants and crickets.

_____ Section 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY: Edit with Architect. Section is for minor rough carpentry construction.

_____ Section 06 17 83 - WOOD I-JOISTS: Edit with Architect and Structural

Engineer.

_____ Section 06 18 13 - GLUE LAMINATED BEAMS: Edit with Architect and Structural Engineer.

_____ Section 06 20 23 - INTERIOR FINISH CARPENTRY: Edit with Architect and, if applicable, Interior Designer.

_____ Section 06 41 00 - ARCHITECTURAL WOOD CASEWORK: Edit with Architect and, if applicable, Interior Designer.

_____ Section 06 61 16 - SOLID SURFACING FABRICATIONS: Edit with Architect and, if applicable, Interior Designer.

_____ Section 06 64 13 - FIBER-REINFORCED PLASTIC (FRP) WALL PANELING: Edit with Architect.

_____ Edit Division 07 - THERMAL AND MOISTURE PROTECTION:

_____ Section 07 01 51 - ROOFING RESTORATION AND REPAIR: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 11 13 - BITUMINOUS DAMPPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 13 52 - MODIFIED BITUMINOUS SHEET WATERPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 14 16 - COLD FLUID-APPLIED WATERPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 14 18 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 16 16 - CRYSTALLINE WATERPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 17 00 - BENTONITE WATERPROOFING: Edit with Architect and, if applicable, Waterproofing Consultant.

_____ Section 07 18 00 - TRAFFIC COATING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 19 00 - WATER REPELLENTS: Edit with Architect. Coordinate with anti-graffiti coatings.

_____ Section 07 21 00 - BUILDING THERMAL INSULATION: Edit with Architect.

_____ Section 07 26 00 - VAPOR RETARDERS: Edit with Architect. Under slab vapor retarder. Address sand layer above or below membrane; coordinate with geotechnical report, structural drawings and moisture vapor emission concern.

_____ Section 07 27 00 - AIR BARRIER: Edit with Architect.

_____ Section 07 31 13 - ASPHALT SHINGLES: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 32 13 - CLAY TILE ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 32 16 - CONCRETE TILE ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 41 63 - MANUFACTURED METAL ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 46 13 - METAL SIDING: Edit with Architect.

_____ Section 07 51 13 - BUILT-UP ASPHALT ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 52 16 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 51 26.13 - COLD PROCESS BUILT-UP ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 54 00 - THERMOPLASTIC MEMBRANE ROOFING: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 62 00 - SHEET METAL FLASHING AND TRIM: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 71 00 - ROOF SPECIALTIES: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 72 13 - ROOF ACCESSORIES: Edit with Architect and, if applicable, Roofing Consultant.

_____ Section 07 81 00 - APPLIED FIREPROOFING: Edit with Architect.

_____ Section 07 84 13 - PENETRATION FIRESTOPPING: Edit with Architect.

_____ Section 07 92 00 - JOINT SEALANTS: Edit with Architect and, if applicable, Waterproofing Consultant. Edit with Curtain Wall Consultant, if applicable.

_____ Section 07 95 13 - EXPANSION JOINT COVER ASSEMBLIES: Edit with Architect.

_____ Edit Division 08 - OPENINGS:

_____ Section 08 01 51.13 - STEEL WINDOWS RENOVATION: Edit with Architect.

_____ Section 08 11 13 - STEEL DOORS AND FRAMES: Edit with Architect.

_____ Section 08 12 16 - ALUMINUM FRAMES: Edit with Architect. Interior aluminum door, transom, sidelight and borrowed lights. Not exterior glazed aluminum storefront framing.

_____ Section 08 14 16 - FLUSH WOOD DOORS: Edit with Architect.

_____ Section 08 14 33 - STILE AND RAIL WOOD DOORS: Edit with Architect.

_____ Section 08 31 00 - ACCESS DOORS AND PANELS: Edit with Architect.

_____ Section 08 33 13 - COILING COUNTER DOORS: Edit with Architect.

_____ Section 08 33 23 - OVERHEAD COILING DOORS: Edit with Architect.

_____ Section 08 33 26 - COILING GRILLES: Edit with Architect.

_____ Section 08 36 16 - SECTIONAL OVERHEAD DOORS: Edit with Architect.

_____ Section 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS: Edit with Architect.

_____ Section 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS: Edit with Architect.

_____ Section 08 51 13 - ALUMINUM WINDOWS: Edit with Architect.

_____ Section 08 51 23 - STEEL WINDOWS: Edit with Architect.

_____ Section 08 56 19 - PASS WINDOWS: Edit with Architect.

_____ Section 08 62 13 - DOMED UNIT SKYLIGHTS: Edit with Architect.

_____ Section 08 63 00 - METAL-FRAMED SKYLIGHTS: Edit with Architect.

_____ Section 08 71 00 - DOOR HARDWARE: Edit with Architect and Door Hardware Consultant.

_____ Door Hardware Consultant produce Door Hardware Sets.

_____ Door Hardware Consultant edit text (product selections).

_____ Architect review hardware selections with Owner.

_____ Section 08 71 23 - AUTOMATIC GATE OPERATORS: Edit with Architect. Review with Owner for operational criteria.

_____ Section 08 81 00 - GLASS GLAZING: Edit with Architect.

_____ Section 08 83 00 - MIRRORS: Edit with Architect.

_____ Section 08 84 00 - PLASTIC GLAZING: Edit with Architect.

_____ Section 08 91 00 - LOUVERS: Edit with Architect.

_____ Edit Division 09 - FINISHES:

_____ Section 09 21 16.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES: Edit with Architect.

_____ Section 09 22 16 - NON-LOAD BEARING METAL FRAMING: Edit with Architect.

_____ Section 09 22 26 - SUSPENDED METAL FRAMING AND FURRING: Edit with Architect.

_____ Section 09 23 00 - GYPSUM PLASTERING: Edit with Architect.

_____ Section 09 24 00 - PORTLAND CEMENT PLASTERING: Edit with Architect.

_____ Section 09 25 13 - ACRYLIC PLASTERING: Edit with Architect.

_____ Section 09 26 23 - GRAFFITI-RESISTANT COATINGS: Edit with Architect.

_____ Section 09 28 13 - CEMENTITIOUS BACKING BOARDS: Edit with Architect. Coordinate with Section 09 30 13 - Ceramic Tiling.

_____ Section 09 28 23 - GYPSUM SHEATHING: Edit with Architect.

_____ Section 09 29 00 - GYPSUM BOARD: Edit with Architect. Coordinate finishing with Section 09 91 00 - Field Painting.

_____ Section 09 30 13 - CERAMIC TILING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 30 16 - QUARRY TILING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 51 13 - ACOUSTICAL PANEL CEILINGS: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 51 23 - ACOUSTICAL TILE CEILINGS: Edit with Architect and, if applicable, Interior Designer. Use Section 09 51 13 for acoustical units greater than 12" x 12".

_____ Section 09 64 29 - WOOD STRIP AND PLANK FLOORING: Edit with Architect and, if applicable, Interior Designer. For direct application over concrete and wood subfloor; no resilient furring or pads.

_____ Section 09 64 53 - RESILIENT WOOD FLOORING ASSEMBLIES: Edit with Architect. For gymnasium and dance studios.

_____ Section 09 65 13 - RESILIENT BASE AND ACCESSORIES: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 65 16 - RESILIENT SHEET FLOORING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 65 16.14 - LINOLEUM SHEET FLOORING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 65 19 - RESILIENT TILE FLOORING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 65 19.14 - LINOLEUM TILE FLOORING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 68 13 - TILE CARPETING: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 68 16 - SHEET CARPET: Edit with Architect and, if applicable, Interior Designer.

_____ Section 09 81 00 - ACOUSTICAL INSULATION: Edit with Architect. Unfaced batt insulation in wall cavities.

_____ Section 09 84 11 - ACOUSTICAL SURFACE TREATMENT: Edit with Architect. Acoustical panels and fabric-covered acoustical insulation applied to walls

and ceilings.

_____ Section 09 91 00 - FIELD PAINTING: Edit with Architect. Confirm VOC and odor restrictions.

_____ Section 09 96 35 - CHEMICAL-RESISTANT COATINGS: Edit with Architect.

_____ Section 09 96 43 - FIRE-RETARDANT COATINGS: Edit with Architect.

_____ Section 09 96 46 - INTUMESCENT COATINGS: Edit with Architect.

_____ Section 09 96 55 - POLYURETHANE FLOOR COATING: Edit with Architect. For equipment rooms and sanitary storerooms

_____ Section 09 97 16 - COATINGS FOR EXTERIOR STEEL: Edit with Architect. Two-component urethane coating on exterior steel doors and frames, structural steel framing and steel decking.

_____ Edit Division 10 - SPECIALTIES:

_____ Section 10 11 11 - VISUAL DISPLAY BOARDS: Edit with Architect.

_____ Section 10 11 26 - TACKABLE WALL PANELS: Edit with Architect.

_____ Section 10 14 11 - SIGNAGE: Edit with Architect.

_____ Section 10 14 53 - PARKING AND TRAFFIC CONTROL SIGNAGE: Edit with Architect.

_____ Section 10 21 13 - TOILET PARTITIONS: Edit with Architect.

_____ Section 10 22 26 - OPERABLE PARTITIONS: Edit with Architect.

_____ Section 10 28 11 - TOILET AND SHOWER ACCESSORIES: Edit with Architect.

_____ Section 10 31 00 - MANUFACTURED FIREPLACES: Edit with Architect. Prefabricated metal fireplaces.

_____ Section 10 31 13 - MANUFACTURED FIREPLACE CHIMNEYS: Edit with Architect.

_____ Section 10 44 00 - FIRE PROTECTION SPECIALTIES: Edit with Architect.

_____ Section 10 51 13 - METAL LOCKERS: Edit with Architect.

_____ Section 10 51 16 - WOOD LOCKERS: Edit with Architect.

_____ Section 10 51 23 - PLASTIC-LAMINATE-CLAD LOCKERS: Edit with Architect.

_____ Section 10 55 23 - MAIL BOXES: Edit with Architect.

_____ Section 10 56 13 - METAL STORAGE SHELVING: Edit with Architect.

_____ Section 10 57 23 - CLOSET AND UTILITY SHELVING: Edit with Architect.

_____ Section 10 75 00 - FLAGPOLES: Edit with Architect.

_____ Edit Division 11 - EQUIPMENT:

_____ Section 11 13 00 - LOADING DOCK EQUIPMENT: Edit with Architect and Owner.

_____ Section 11 24 23 - WINDOW WASHING SYSTEMS: Edit with Architect and Owner.

_____ Section 11 31 00 - RESIDENTIAL APPLIANCES: Edit with Architect.

_____ Section 11 40 00 - FOOD SERVICE EQUIPMENT: Produced by Food Service Consultant.

_____ Section 11 52 13 - PROJECTION SCREENS: Edit with Architect.

_____ Section 11 52 23 - PROJECTOR CEILING MOUNT: Edit with Architect.

_____ Section 11 53 00 - LABORATORY FIXTURES AND EQUIPMENT: Edit with Architect.

_____ Section 11 66 23 - GYMNASIUM EQUIPMENT: Edit with Architect.

_____ Section 11 68 13 - PLAYGROUND EQUIPMENT: Edit with Architect.

_____ Section 11 68 33 - ATHLETIC FIELD EQUIPMENT: Edit with Architect and Landscape Architect.

_____ Section 11 82 26 - WASTE COMPACTORS AND DESTRUCTORS: Edit with Architect.

_____ Section 11 91 13 - BAPTISTERIES: Edit with Architect and Owner.

_____ Edit Division 12 - FURNISHINGS:

_____ Section 12 17 00 - ART GLASS: Edit with Architect and, if applicable, Interior Designer.

_____ 12 21 00 - WINDOW BLINDS: Edit with Architect. Edit with Architect and, if applicable, Interior Designer.

_____ Section 12 23 13 - INTERIOR WINDOW SHUTTERS: Edit with Architect and, if applicable, Interior Designer.

_____ Section 12 24 00 - WINDOW SHADES: Edit with Architect and, if applicable, Interior Designer.

_____ Section 12 35 53 - LABORATORY CASEWORK: Edit with Architect.

_____ Section 12 36 53 - LABORATORY COUNTERTOPS: Edit with Architect. Typically include in Section 12 35 53 - Laboratory Casework, if used.

_____ Section 12 48 13 - ENTRANCE FLOOR MATS AND FRAMES: Edit with Architect.

_____ Section 12 59 00 - SYSTEMS FURNITURE: Edit with Architect and, if applicable, Interior Designer.

_____ Section 12 66 00 - TELESCOPING STANDS: Edit with Architect. "Interior bleachers" at gymnasium, tv studio and "Black Box" classroom.

_____ Section 12 93 00 - SITE FURNISHINGS: Edit with Architect and Landscape Architect.

_____ Edit Division 13 - SPECIAL CONSTRUCTION:

_____ Section 13 11 00 - SWIMMING POOLS: Produced by Pool Consultant.

_____ Section 13 12 00 - FOUNTAINS: Produced by Fountain Consultant.

_____ Section 13 47 13 - TENNIS COURT CONSTRUCTION: Edit with Architect. Includes concrete slab on grade, tennis court surfacing and lines, chain link fencing and gates, windscreen, net standards, net and lighting.

_____ Section 13 31 00 - FABRIC STRUCTURES: Edit with Architect.

_____ Section 13 34 16 - GRANDSTANDS AND BLEACHERS: Edit with Architect.

_____ Section 13 34 00 - FABRICATED ENGINEERED STRUCTURES: Edit with Architect. Control booths.

_____ Section 13 49 00 - RADIATION PROTECTION: Edit with Architect and

Radiology Physicist.

_____ Edit Division 14 - CONVEYING SYSTEMS:

_____ Section 14 21 00 - ELECTRIC TRACTION ELEVATORS: Edit with Architect and, if applicable, Elevator Consultant. Consult with Interior Designer, if applicable, for custom hoistway entrances and car interior.

_____ Section 14 24 00 - HYDRAULIC ELEVATORS: Edit with Architect and, if applicable, Elevator Consultant. Consult with Interior Designer, if applicable, for custom hoistway entrances and car interior.

_____ Section 14 25 00 - MACHINE ROOMLESS ELEVATORS: Edit with Architect and, if applicable, Elevator Consultant. Consult with Interior Designer, if applicable, for custom hoistway entrances and car interior.

_____ Section 14 42 00 - WHEELCHAIR LIFTS: Edit with Architect and, if applicable, Elevator Consultant.

_____ Section 14 91 33 - LAUNDRY AND LINEN CHUTES: Edit with Architect.

_____ Section 14 91 82 - TRASH CHUTES: Edit with Architect.

Divisions 15 through 20: Not Used

_____ Edit Division 21 - FIRE SUPPRESSION:

_____ Section 21 05 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION: Produced by Mechanical Engineer.

_____ Section 21 10 00 - WATER-BASED FIRE-SUPPRESSION SYSTEMS: Produced by Mechanical Engineer.

_____ Edit Division 22 - PLUMBING:

_____ Section 22 05 00 - COMMON WORK RESULTS FOR PLUMBING: Produced by Mechanical Engineer. Includes expansion fittings and loops for plumbing, meters and gages for plumbing piping, general-duty valves for plumbing piping, hangers and supports for plumbing piping and equipment, vibration and seismic controls for plumbing piping and equipment and identification for plumbing piping and equipment.

_____ Section 22 07 00 - PLUMBING INSULATION: Produced by Mechanical Engineer.

_____ Section 22 11 00 - FACILITY WATER DISTRIBUTION: Produced by Mechanical Engineer. Includes domestic water piping, domestic water piping specialties and domestic water pumps.

_____ Section 22 13 00 - FACILITY SANITARY SEWERAGE: Produced by Mechanical Engineer. Includes sanitary waste and vent piping, sanitary waste piping specialties, sanitary waste interceptors, and facility packaged sewage pumping stations.

_____ Section 22 14 00 - FACILITY STORM DRAINAGE: Produced by Mechanical

Engineer. Includes facility storm drainage piping, storm drainage piping specialties, and sump pumps.

_____ Section 22 33 00 - ELECTRIC DOMESTIC WATER HEATERS: Produced by Mechanical Engineer.

_____ Section 22 34 00 - FUEL-FIRED DOMESTIC WATER HEATERS: Produced by Mechanical Engineer.

_____ Section 22 40 00 - PLUMBING FIXTURES: Produced by Mechanical Engineer.

_____ Section 22 45 00 - EMERGENCY PLUMBING FIXTURES: Produced by Mechanical Engineer.

_____ Section 22 47 00 - DRINKING FOUNTAINS AND WATER COOLERS: Produced by Mechanical Engineer.

_____ Section 22 51 00 - SWIMMING POOL PLUMBING: Produced by Pool Consultant.

_____ Edit Division 23 - HEATING VENTILATING AND AIR CONDITIONING:

_____ Section 23 05 00 - COMMON WORK RESULTS FOR HVAC: Produced by Mechanical Engineer. Includes common motor requirements for HVAC equipment, expansion fittings and loops for HVAC, meters and gages for HVAC piping, general-duty valves for HVAC piping, hangers and supports for HVAC piping and equipment, vibration and seismic controls for HVAC piping and equipment, and identification for HVAC piping and equipment.

_____ 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC: Produced by Mechanical Engineer.

_____ Section 23 07 00 - HVAC INSULATION: Produced by Mechanical Engineer.

_____ Section 23 08 00 - COMMISSIONING OF HVAC: Produced by Mechanical Engineer.

_____ Section 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC: Produced by Mechanical Engineer.

_____ Section 23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS: Produced by Mechanical Engineer.

_____ Section 23 11 23 - FACILITY NATURAL-GAS PIPING: Produced by Mechanical Engineer.

_____ Section 23 21 00 - HYDRONIC PIPING AND PUMPS: Produced by

Mechanical Engineer.

_____ Section 23 22 00 - STEAM AND CONDENSATE PIPING AND PUMPS: Produced by Mechanical Engineer.

_____ Section 23 23 00 - REFRIGERANT PIPING: Produced by Mechanical Engineer.

_____ Section 23 25 00 - HVAC WATER TREATMENT: Produced by Mechanical Engineer.

_____ Section 23 31 00 - HVAC DUCTS AND CASINGS: Produced by Mechanical Engineer. Includes metal ducts, non-metallic ducts and HVAC casings.

_____ Section 23 33 00 - AIR DUCT ACCESSORIES: Produced by Mechanical Engineer.

_____ Section 23 34 00 - HVAC FANS: Produced by Mechanical Engineer. Includes axial fans, centrifugal fans, power ventilators and air curtains.

_____ Section 23 36 00 - AIR TERMINAL UNITS: Produced by Mechanical Engineer. Includes constant-air-volume and variable-air-volume fans.

_____ Section 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES: Produced by Mechanical Engineer.

_____ Section 23 37 23 - HVAC GRAVITY VENTILATORS: Produced by Mechanical Engineer.

_____ Section 23 38 13 - COMMERCIAL KITCHEN HOODS: Produced by Mechanical Engineer.

_____ Section 23 41 00 - PARTICULATE AIR FILTRATION: Produced by Mechanical Engineer.

_____ Section 23 51 00 - BREECHINGS, CHIMNEYS, AND STACKS: Produced by Mechanical Engineer. Includes draft control devices, fabricated stacks, gas vents and insulated sectional chimneys.

_____ Section 23 52 00 - HEATING BOILERS: Produced by Mechanical Engineer. Includes condensing boilers, cast-iron boilers, water-tube boilers and fire tube boilers.

_____ Section 23 53 13 - BOILER FEEDWATER PUMPS: Produced by Mechanical Engineer.

_____ Section 23 54 00 - FURNACES: Produced by Mechanical Engineer.

_____ Section 23 55 00 - FUEL-FIRED HEATERS: Produced by Mechanical Engineer. Includes fuel-fired duct heaters, gas-fired radiant heaters and fuel-fired unit heaters.

_____ Section 23 57 00 - HEAT EXCHANGERS FOR HVAC: Produced by Mechanical Engineer.

_____ Section 23 62 00 - PACKAGED COMPRESSOR AND CONDENSER UNITS: Produced by Mechanical Engineer.

_____ Section 23 63 00 - REFRIGERANT CONDENSERS: Produced by Mechanical Engineer. Includes air-cooled condensers, water-cooled condensers and evaporative refrigerant condensers.

_____ Section 23 64 00 - PACKAGED WATER CHILLERS: Produced by Mechanical Engineer. Includes direct-fired absorption water chillers, indirect-fired absorption water chillers, centrifugal water chillers, reciprocating water chillers, scroll water chillers and rotary-screw water chillers.

_____ Section 23 65 00 - COOLING TOWERS: Produced by Mechanical Engineer.

_____ Section 23 73 00 - INDOOR CENTRAL STATION AIR-HANDLING UNITS: Produced by Mechanical Engineer.

_____ Section 23 74 00 - PACKAGED, OUTDOOR HVAC EQUIPMENT: Produced by Mechanical Engineer.

_____ Section 23 81 13 - PACKAGED TERMINAL AIR-CONDITIONERS: Produced by Mechanical Engineer.

_____ Section 23 81 19 - SELF-CONTAINED AIR-CONDITIONERS: Produced by Mechanical Engineer.

_____ Section 23 81 23 - COMPUTER-ROOM AIR-CONDITIONERS: Produced by Mechanical Engineer.

_____ Section 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS: Produced by Mechanical Engineer.

_____ Section 23 81 46 - WATER-SOURCE UNITARY HEAT PUMPS: Produced by Mechanical Engineer.

_____ Section 23 82 16 - AIR COILS: Produced by Mechanical Engineer.

_____ Section 23 82 19 - FAN COIL UNITS: Produced by Mechanical Engineer.

_____ Section 23 82 23 - UNIT VENTILATORS: Produced by Mechanical Engineer.

_____ Section 23 82 39 - UNIT HEATERS: Produced by Mechanical Engineer.

_____ Section 23 84 00 - HUMIDITY CONTROL EQUIPMENT: Produced by Mechanical Engineer.

Divisions 24 and 25: Not Used

_____ Edit Division 26 - ELECTRICAL:

_____ Section 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL: Produced by Electrical Engineer. Includes electrical power conductors and cables, grounding and bonding, raceways and boxes, cable trays, underfloor raceways, underground ducts and raceways, and identification for electrical systems.

_____ Section 26 09 23 - LIGHTING CONTROL DEVICES: Produced by Electrical Engineer.

_____ Section 26 22 00 - LOW VOLTAGE TRANSFORMERS: Produced by Electrical Engineer.

_____ Section 26 23 00 - LOW VOLTAGE SWITCHGEAR: Produced by Electrical Engineer.

_____ Section 26 24 00 - SWITCHBOARDS AND PANELBOARDS: Produced by Electrical Engineer.

_____ Section 26 32 13 - ENGINE GENERATORS: Produced by Electrical Engineer.

_____ Section 26 36 00 - TRANSFER SWITCHES: Produced by Electrical Engineer.

_____ Section 26 51 00 - INTERIOR LIGHTING: Produced by Electrical Engineer; fixture (luminaire) selections by Architect.

_____ Section 26 52 00 - EMERGENCY LIGHTING: Produced by Electrical Engineer.

_____ Section 26 55 61 - THEATRICAL LIGHTING: Produced by Theater Consultant.

_____ Section 26 56 00 - EXTERIOR LIGHTING: Produced by Electrical Engineer; fixture (luminaire) selections by Architect.

_____ Edit Division 27 - COMMUNICATIONS:

_____ Section 27 05 00 - COMMON WORK RESULTS FOR COMMUNICATIONS: Produced by Electrical Engineer.

_____ Section 27 13 00 - COMMUNICATIONS CABLING AND BACKBONE:
Produced by Electrical Engineer.

_____ Section 27 31 16 - TELEPHONE SYSTEMS: Produced by Electrical Engineer.

_____ Section 27 41 33 - MASTER ANTENNA TELEVISION SYSTEMS:
Produced by Electrical Engineer.

_____ Section 27 51 16 - PUBLIC ADDRESS AND MASS NOTIFICATION
SYSTEMS: Produced by Electrical Engineer.

_____ Section 27 51 17 - AUTONOMOUS P.A. SYSTEMS: Produced by Electrical
Engineer.

_____ Section 27 52 25 - ASSISTIVE LISTENING SYSTEM: Produced by
Electrical Engineer.

_____ Section 27 53 13 - CLOCK SYSTEMS: Produced by Electrical Engineer.

_____ Edit Division 28 - ELECTRONIC SAFETY AND SECURITY:

_____ Section 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY
AND SECURITY: Produced by Security Consultant.

_____ Section 28 13 00 - ACCESS CONTROL: Produced by Security Consultant.

_____ Section 28 16 00 - INTRUSION DETECTION: Produced by Security
Consultant.

_____ Section 28 23 00 - VIDEO SURVEILLANCE: Produced by Security
Consultant.

_____ Section 28 31 11 - FIRE ALARM SYSTEMS: Produced by Electrical Engineer
and coordinated with Sections produced by Mechanical Engineer.

Divisions 29 and 30: Not Used

_____ Edit Division 31 - EARTHWORK: Edit with Architect and Civil Engineer.

_____ Section 31 10 00 - SITE CLEARING: Edit with Architect.

_____ Section 31 13 33 - TREE PROTECTION AND TRIMMING: Edit with
Landscape Architect.

_____ Section 31 20 00 - EARTH MOVING: Edit with Civil Engineer.

_____ Section 31 40 00 - SHORING AND UNDERPINNING: Edit with Civil
Engineer and Structural Engineer.

_____ Section 31 62 00 - DRIVEN PILES: Edit with Structural Engineer.

_____ Section 31 63 00 - BORED PILES: Edit with Structural Engineer.

_____ Edit Division 32 - EXTERIOR IMPROVEMENTS:

_____ Section 32 12 11 - ASPHALTIC CONCRETE PAVING: Edit with Civil Engineer.

_____ Section 32 12 36 - SURFACE SEALING OF ASPHALT PAVING: Edit with Architect.

_____ Section 32 13 22 - PORTLAND CEMENT CONCRETE PAVING: Edit with Civil Engineer and Landscape Architect.

_____ Section 32 14 13 - PRECAST CONCRETE UNIT PAVING: Edit with Landscape Architect.

_____ Section 32 12 43 - POROUS UNIT PAVING: Edit with Landscape Architect.

_____ Section 32 15 40 - CRUSHED STONE SURFACING: Edit with Landscape Architect.

_____ Section 32 15 46 - BALLFIELD INFIELD SURFACING: Edit with Landscape Architect.

_____ Section 32 17 23 - PAVEMENT MARKINGS: Edit with Landscape Architect.

_____ Section 32 17 26 - TACTILE WARNINGS: Edit with Landscape Architect.

_____ Section 32 18 33 - SYNTHETIC TURF SURFACING: Edit with Landscape Architect.

_____ Section 32 18 16.13 - PLAYGROUND PROTECTIVE SURFACING: Edit with Landscape Architect.

_____ Section 32 18 23.33 - SYNTHETIC RUNNING TRACK SURFACING: Edit with Landscape Architect.

_____ Section 32 31 13 - CHAIN LINK FENCING: Edit with Architect and Landscape Architect.

_____ Section 32 31 19 - ORNAMENTAL FENCES AND GATES: Edit with Architect and Landscape Architect.

_____ Section 32 32 14 - CAST-IN-PLACE CONCRETE SITE WALLS: Edit with Landscape Architect.

_____ Section 32 84 00 - PLANTING IRRIGATION: Edit with Landscape Architect and Irrigation Consultant.

_____ Section 32 91 00 - PLANTING PREPARATION: Edit with Landscape Architect.

_____ Section 32 82 00 - TURF AND GRASSES: Edit with Landscape Architect.

_____ Section 32 93 00 - LANDSCAPE PLANTING: Edit with Landscape Architect.

_____ Section 32 93 90 - LANDSCAPE MAINTENANCE: Edit with Landscape Architect.

_____ Section 32 94 53 - WIRE MESH TRELLIAGE: Edit with Landscape Architect.

_____ Edit Division 33 - UTILITIES:

_____ Section 33 10 11 - WATER SERVICE SYSTEM: Edit with Civil Engineer.

_____ Section 33 31 11 - SANITARY SEWERAGE SYSTEM: Edit with Civil Engineer.

_____ Section 33 40 03 - STORM DRAINAGE SYSTEM: Edit with Civil Engineer.

_____ Section 33 61 13 - UNDERGROUND HYDRONIC ENERGY DISTRIBUTION: Produced by Mechanical Engineer.

_____ Section 33 63 13 - UNDERGROUND STEAM AND CONDENSATE DISTRIBUTION PIPING: Produced by Mechanical Engineer.

Divisions 34 through 49: Not Used

END OF CHECKLIST

Appendix B

Sample Division 01 - General Requirements

Introduction

Following this introduction are example specification sections for Division 01 - General Requirements. They are shortform specifications, typically, consistent with the discussion in Chapter 21. The content suits the requirement for substantial Division 01 when working with shortform specifications, especially the “say it once” principle of specifications writing.

Note how these shortform specifications present an alternative to the CSI's 3-PART *SectionFormat*, in the interest of saving text and space. Being concise, they are easily read and the PART headings are not necessary for organization of information, especially for Division 01 sections, which frequently do not include Materials and Execution requirements of Part 2 and Part 3.

These specifications should not be thoughtlessly copied. They must be reviewed and edited to suit the professional judgment of the responsible design professional. Adapt the text to the project's requirements, including bidding requirements and requirements of the Conditions of the Contract (General Conditions plus Supplementary Conditions).

While some might find these shortform specifications more voluminous (substantial) than desired for brevity, it should be recalled that shortform specifications are suitable for contract documents, as contrasted with a PPD (Appendix C) or outline specifications (Appendix D). Savings in the volume of text in sections in Divisions 02 through 49 should result if Division 01 is properly used. Repetition of requirements should be eliminated. Note, by comparison, there are often 25 Division 01 “longform” specifications used for heavy commercial and institutional projects, numbering frequently to 200 pages.

Example Shortform Division 01:

Section 01 10 00 - Summary

A. THE PROJECT

1. Project Title: BRADBURY BUILDING, SUITE 230 IMPROVEMENTS (MJK Architects Project No. 09-121).
2. The Project: Tenant space improvements in existing office building for law firm.
3. Project Location: 2957 South Northbrook St., Sioux City, IA, as shown approximately on the Vicinity Map in the Drawings.

B. WORK INCLUDED IN THE CONTRACT

1. The Work: Construction and related services for Work indicated on Contract Drawings and in Contract Specifications. Refer to Drawings for building and site data and additional general information concerning the Work. The Work includes but is not limited to:

- a. Selective demolition of interior finishes, partitions, ceilings, doors and door frames.
- b. New interior non-load-bearing framing, finishes, custom casework, doors and door frames, glazing, specialties and equipment.
- c. Reconfiguration and extension of plumbing, HVAC and electrical power, lighting and signal systems.
- d. Residential foodservice equipment at office break room.
- e. Reconfiguration of wet-pipe fire sprinkler system, provided on design/build basis, to suit the requirements of reconfigured tenant space.
- f. Coordination of work being performed by others under separate contracts with the Owner, described in Article below titled "CONCURRENT WORK UNDER SEPARATE CONTRACTS."

2. Additional Information Available to Contractor: Project record drawings and specifications for building shell construction are available for review at the office of the Architect.

C. OWNER-FURNISHED PRODUCTS

1. Owner may furnish, for installation by Contractor, products which

are identified on the Drawings and in the Specifications as OFCI (Owner-Furnished/Contractor-Installed).

2. Work under the Contract shall include all provisions necessary to fully incorporate such products into the Work, including, as necessary, fasteners, backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, and field finishing.

3. Work under Separate Contracts: Owner will award separate contracts for products and installation for the following work and other work as may be indicated on Drawings as NIC (Not in Contract). Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing. Provide necessary backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection.

a. Private branch exchange (PBX) telephone system.

b. Local area network (LAN).

c. Cable television antenna system.

d. Office furniture system.

e. Office furnishings, in addition to furniture system.

f. Office equipment.

D. PERMITS, LICENSES AND FEES

1. Permits: For Work included in the Contract, Contractor will obtain all permits from authorities having jurisdiction and from serving utility companies and agencies.

2. Licenses: Contractor shall obtain and pay all licenses associated with construction activities, such as business licenses, contractors' licenses and vehicle and equipment licenses. All costs for licenses shall be included in the Contract Sum.

3. Assessments: Costs of assessments and connection fees shall not be included in the Contract Sum. Owner will pay all assessments

and utility service connection fees.

4. Test and Inspection Fees: Contractor shall pay all fees charged by authorities having jurisdiction and from serving utility companies and agencies, for tests and inspections conducted by those authorities, companies and agencies. Owner will reimburse Contractor for actual amount of such fees, without mark-up.

E. CONTRACTOR'S USE OF SITE AND PREMISES

1. Contractor's Use of the Premises: During the construction period, Contractor shall have full use of the tenant space and designated site areas for storage and staging, as directed by building manager.

a. Contractor's use of the tenant space shall be limited only by Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the Project, in accordance with the Conditions of the Contract.

b. Contractor's use of surrounding areas shall be subject to approval and direction of the building manager, including maintenance of passageways, dust and debris control, and noise control.

2. Project Area: Future Suite 230, consisting of current Suites 230, 240 and 250. Use of other areas is subject to advanced approval of building manager.

3. Emergency Access: Provide pathways, drives, gates, directional signage and other provisions as required by authorities having jurisdiction, for emergency access to Project area(s).

4. Emergency Egress: Maintain all pathways, exitways, exit doors, drives, gates and other means of egress during construction, as required by authorities having jurisdiction.

5. Utility Outages and Shutdowns: Schedule utility outages and shutdowns to times and dates acceptable to other tenants, unless otherwise directed. Provide 48 hours notice of all utility outages and shutdowns. Provide minimum 48 hours notice to the Owner of all utility outages and shutdowns. Duration of outages and shutdowns shall not hinder normal activities on other tenants except as acceptable to building manager.

F. OWNER'S USE OF SITE AND PREMISES

1. Owner's Use of Site and Premises: Owner (tenant) reserves the right to occupy and to place and install equipment and furnishings in tenant space prior to Substantial Completion, provided that such occupancy does not interfere with completion of the Work within the Contract Time. Such partial occupancy by Owner shall not constitute acceptance of the total Work.

End of Section 01 10 00

Section 01 21 00 - Allowance Procedures

A. ALLOWANCE PROCEDURES

1. Allowance amounts below are for materials only. Include all other costs including installation in Contract Sum.
2. Coordinate allowances with requirements for related and adjacent Work.
3. Notify Owner and Architect of date when final decision on allowance items is required to avoid delays in the Work.
4. Furnish certification that quantities of products purchased are the actual quantities needed with reasonable allowance for cutting or installation losses, tolerances, mixing waste and similar margins.
5. Submit invoices or delivery slips to indicate actual quantities of materials delivered and costs. Indicate amounts of applicable trade discounts.

B. ALLOWANCES

1. Lump Sum Allowances:
 - a. Custom hardwood casework in Law Library: \$28,000.
 - b. Custom conference table: \$53,000.
2. Unit Cost Allowances:

- a. Carpet: \$39 per square yard, material only. Installation by direct glue-down method shall be included in Contract Sum.

End of Section 01 21 00

Section 01 23 00 - Alternate Bid Procedures

A. ALTERNATE BID PROCEDURES

1. List price for each alternate in Bid Form. Include cost of modifications to other work to accommodate alternate. Include related costs such as overhead and profit.
2. Owner will determine which alternates are selected for inclusion in the Contract.
3. Alternates are described briefly in this Section. The Contract Documents define the requirements for alternates.
4. Coordinate alternates with related Work to ensure that Work affected by each selected alternate is properly accomplished.

B. ALTERNATE BID ITEMS

1. Alternate Bid No. 1 - Flush Wood Doors Veneer
 - a. Base Bid condition: Provide interior flush wood veneer doors with plain-sliced white oak, bookmatched and balanced, factory-finished with cherry stain and clear catalyzed varnish.
 - b. Alternate Bid condition: Provide interior flush wood veneer doors with quarter-slice cherry, bookmatched and balanced, factory-finished with clear catalyzed varnish.
2. Alternate Bid No. 2 - Music/Paging System
 - a. Base Bid condition: Omit music/paging system but provide rough-in for future installation for system indicated on Electrical Drawings.
 - b. Alternate Bid condition: Provide music/paging system as

indicated on Electrical Drawings.

End of Section 01 23 00

Section 01 26 00 - Contract Modification Procedures

A. CONTRACT MODIFICATION PROCEDURES

1. Minor Changes in the Work: Architect will issue Architect's Supplemental Instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710 - Architect's Supplemental Instructions.

2. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

a. Proposal Requests are for information only. Do not consider them instructions either to stop Work in progress or to execute the proposed change.

b. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

1. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

2. Indicate taxes, delivery charges, equipment rental, and amounts of trade discounts.

3. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish

times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

3. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

a. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

b. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

c. Indicate taxes, delivery charges, equipment rental, and amounts of trade discounts.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Comply with requirements in Section 01 60 00 - Product Requirements if the proposed change requires substitution of one product or system for product or system specified.

4. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

5. Allowance Adjustment: Base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. Allow for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

a. Include installation costs only where indicated as part of the allowance.

b. Prepare explanation and documentation to substantiate

distribution of overhead costs and other margins claimed.

c. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

6. Submit claims for increased costs because of a change in the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 10 working days of receipt of the Change Order or Construction Change Directive authorizing Work to proceed. Owner may reject claims submitted later than 10 working days after such authorization.

7. Change Order Procedures: On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

8. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

a. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

b. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

End of Section 01 26 00

Section 01 26 13 - Requests for Interpretation (RFI)

A. DEFINITIONS

1. Request for Interpretation: A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.

B. CONTRACTOR'S REQUESTS FOR INTERPRETATION (RFIs)

1. Contractor's Requests for Interpretation (RFIs): Should Contractor be unable to determine from the Contract Documents the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of Work is described differently at more than one place in the Contract Documents; the Contractor shall request that the Architect make an interpretation of the requirements of the Contract Documents to resolve such matters. Contractor shall comply with procedures specified herein to make Requests for Interpretation (RFIs).

2. Submission of RFIs: RFIs shall be prepared and submitted on a form provided by Architect.

a. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after copying by xerographic process.

b. Each RFI shall be given a discrete, consecutive number.

c. Each page of the RFI and each attachment to the RFI shall bear the University's project name, project number, date, RFI number, and a descriptive title.

d. Contractor shall sign all RFIs attesting to good faith effort to determine from the Contract Documents the information requested for interpretation. Frivolous RFIs shall be subject to reimbursement from Contractor to Owner for fees charged by Architect, Architect's consultants and other design professionals engaged by the Owner.

3. Subcontractor-Initiated and Supplier-Initiated RFIs: RFIs from subcontractors and material suppliers shall be submitted through, be reviewed by and be attached to an RFI prepared, signed, and

submitted by Contractor. RFIs submitted directly by subcontractors or material suppliers will be returned unanswered to the Contractor.

a. Contractor shall review all subcontractor- and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing and layout of the Work.

b. RFIs submitted to request clarification of issues related to means, methods, techniques and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without interpretation. Such issues are solely the Contractor's responsibility.

c. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

4. Requested Information: Contractor shall carefully study the Contract Documents to ensure that information sufficient for interpretation of requirements of the Contract Documents is not included. RFIs that request interpretation of requirements clearly indicated in the Contract Documents will be returned without interpretation.

a. In all cases in which RFIs are issued to request clarification of issues related to means, methods, techniques and sequences of construction, for example, pipe and duct routing, clearances, specific locations of Work shown diagrammatically, apparent interferences and similar items, the Contractor shall furnish all information required for the Architect to analyze and/or understand the circumstances causing the RFI and prepare a clarification or direction as to how the Contractor shall proceed.

b. If information included with this type of RFI by the Contractor is insufficient, the RFI will be returned unanswered.

5. Unacceptable Uses for RFIs: RFIs shall not be used for the following purposes:

a. To request approval of submittals (use procedure specified in Section 01 33 00 - Submittal Procedures).

b. To request approval of substitutions (refer to Section 01 60 00 - Product Requirements).

c. To request changes that only involve change in Contract Time and Contract Sum (comply with provisions of the Contract General Conditions, as discussed in detail during pre-construction meeting).

d. To request different methods of performing Work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Contract General Conditions).

6. Disputed Requirements: In the event that the Contractor believes that a clarification by the Architect results in additional cost or time, Contractor shall not proceed with the Work indicated by the RFI until authorized to proceed by the Owner and Architect and claims, if any, are resolved in accordance with provisions in the General Conditions of the Contract.

7. RFI Log: Contractor shall prepare and maintain a log of RFIs, and at any time requested by the Architect, the Contractor shall furnish copies of the log showing all outstanding RFIs.

8. Review Time: Architect will return RFIs to Contractor within 10 working days of receipt. RFIs received after 12:00 noon shall be considered received on the next regular working day for the purpose of establishing the start of the 10-day response period.

End of Section 01 26 13

Section 01 29 76 - Progress Payment Procedures

A. SCHEDULE OF VALUES

1. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

2. Submit Schedule of Values in duplicate within 15 days after date

of Owner-Contractor Agreement.

3. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization.

4. Include in each line item the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

5. Include separately from each line item a direct proportional amount of Contractor's overhead and profit.

6. Revise schedule to list approved Change Orders, with each Application for Payment.

B. APPLICATIONS FOR PROGRESS PAYMENTS

1. Payment Period: Submit at intervals stipulated in the Agreement.

2. Present required information in typewritten form.

3. Form: AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.

4. For each item, provide a column for listing each of the following:

a. Item Number.

b. Description of Work.

c. Scheduled Values.

d. Previous Applications.

e. Work in Place and Stored Materials under this Application.

f. Authorized Change Orders.

g. Total Completed and Stored to Date of Application.

h. Percentage Complete.

i. Remainder to be Accomplished.

j. Retainage.

5. Execute certification by signature of authorized officer.

6. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.

7. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

8. Submit three copies of each Application for Payment. Include the following with the application:

a. Transmittal letter in format conforming to example furnished by Architect.

b. Construction progress schedule, revised and current as specified in Section 01 32 00 - Construction Progress Documentation.

c. Partial release of liens covering Work on previous Application for Payment.

9. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

C. APPLICATION FOR FINAL PAYMENT

1. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

2. Application for Final Payment will not be considered until the following have been accomplished:

a. All closeout procedures specified in Section 01 77 00 - Contract Closeout Procedures.

- b. Delivery of keys to Owner.
- c. Delivery of warranty and guaranty documentation.
- d. Completion of demonstration and training of Owner's personnel.
- e. Completion of all items on Correction List ("Punch List").

End of Section 01 29 76

Section 01 31 00 - Project Management and Coordination

A. COORDINATION

1. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

a. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

b. Coordinate installation of different components with work by Owner under separate contracts to ensure maximum accessibility for required maintenance, service, and repair.

c. Make adequate provisions to accommodate items scheduled for later installation under the Contract and for future work that may be noted.

d. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

2. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- a.** Schedule of Values.
- b.** Construction Progress Schedule.
- c.** Requests for Interpretation (RFIs).
- d.** Requests for substitution.
- e.** Submittals: Shop drawings, product data, and samples.
- f.** Test and inspection reports.
- g.** Design-build drawings, product data, calculations, and permits.
- h.** Manufacturer's instructions and field reports.
- i.** Contract closeout activities.

3. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

B. PROJECT MEETINGS

1. Project Meetings, General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

- a.** Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
- b.** Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
- c.** Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone

concerned, including Owner and Architect, within 2 working days of the meeting.

2. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 10 working days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

a. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

b. Agenda: Discuss items of significance that could affect progress, including the following:

1. Preliminary construction schedule.
2. Phasing.
3. Critical sequencing of Work under the Contract and work under separate contracts by Owner.
4. Designation of responsible personnel.
5. Procedures for processing field decisions and Change Orders.
6. Procedures for processing Applications for Payment.
7. Distribution of the Contract Documents.
8. Submittal procedures.
9. Preparation of Record Documents.
10. Use of the premises.
11. Responsibility for temporary facilities and controls.

12. Parking availability.

13. Office, work, and storage areas.

14. Security.

15. Progress cleaning.

16. Working hours.

3. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

a. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

b. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review present and future needs of each entity present, including the following:

a. Interface requirements.

b. Sequence of operations.

- c. Status of submittals.
- d. Deliveries.
- e. Off-site fabrication.
- f. Access.
- g. Site utilization.
- h. Temporary facilities and controls.
- i. Work hours.
- j. Progress cleaning.
- k. Quality and work standards.
- l. Change Orders.
- m. Documentation of information for payment requests.

c. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

d. Schedule Updating: Revise Construction Progress Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

End of Section 01 31 00

Section 01 32 00 - Construction Progress Documentation

A. CONSTRUCTION PROGRESS SCHEDULE

1. Format: Bar chart. Include listings in chronological order

according to the start date for each activity.

- a. Identify each activity with the applicable Specification Section Number.
- b. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- c. Identify work of separate stages and other logically grouped activities.
- d. Include conferences and meetings in schedule.
- e. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- f. Provide separate schedule of submittal dates for shop drawings, product data, samples, and Owner-furnished products, products identified under Allowances and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- g. Indicate delivery dates for Owner-furnished products.
- h. Coordinate content with Schedule of Values specified in Section 01 29 00 - Progress Payment Procedures.
- i. Provide legend for symbols and abbreviations used.

2. Schedule Size: Maximum 22 × 17 inches (560 × 432 mm) or width required.

- a. Sheets shall fold neatly to multiple of 8-1/2 × 11 inches (216 × 280 mm) for filing.
- b. Scale and spacing in content shall allow for notations and revisions.

B. REVIEW AND EVALUATION OF SCHEDULE

1. Review: Participate in joint review and evaluation of schedule with Architect at each submittal.

2. Evaluate project status to determine Work behind schedule and Work ahead of schedule.
3. After review, revise schedule as necessary as result of review, and resubmit within 5 working days.

C. UPDATING CONSTRUCTION PROGRESS SCHEDULE

1. Maintain schedules to record actual start and finish dates of completed activities.
2. Indicate progress of each activity to date of revision, with projected completion date of each activity.
3. Annotate diagrams to graphically depict current status of Work.
4. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
5. Indicate changes required to maintain date of Substantial Completion.
6. Submit reports required to support recommended changes.
7. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect, including the effects of changes on schedules of separate contractors.

D. DISTRIBUTION OF SCHEDULE

1. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
2. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

End of Section 01 32 00

Section 01 33 00 - Submittal Procedures

A. SUBMITTALS FOR REVIEW BY ARCHITECT

1. Submit the following for review when specified in Specifications Sections:

- a. Product data.
- b. Shop drawings.
- c. Samples for selection.
- d. Samples for verification.

2. Make submittals to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

3. Samples will be reviewed only for aesthetic, color, or finish selection.

4. After review, provide copies and distribute submittals as specified below.

B. SUBMITTALS FOR INFORMATION

1. When the following are specified in individual sections, submit them for information:

- a. Design data.
- b. Certificates.
- c. Test reports.
- d. Inspection reports.
- e. Manufacturer's instructions.
- f. Manufacturer's field reports.
- g. Other types specified.

2. Submittals for information shall be made for Architect's knowledge as Contract administrator or for Owner. No review action will be taken.

C. SUBMITTALS FOR PROJECT CLOSEOUT

1. Submit the following at Contract Closeout when specified in Specifications Sections:

- a.** Project record documents.
- b.** Operation and maintenance data.
- c.** Warranties.
- d.** Bonds.
- e.** Permits.
- f.** Other types if specified.

D. ADMINISTRATIVE REQUIREMENTS

1. Submission: Transmit each submittal with Letter of Transmittal, AIA Document G810, or other form containing substantially the same information, as acceptable to Architect.

- a.** Deliver submittals to Architect at Architect's business address.
- b.** Schedule submittals to expedite the Project and coordinate submission of related items.

2. Submittal Preparation: Sequentially number each submittal on the Transmittal Form. Provide space for Contractor and Architect review stamps. Revise submittals with original number and a sequential alphabetic suffix. Identify:

- a.** Project.
- b.** Contractor, Subcontractor and supplier, as applicable.
- c.** Pertinent Drawing and detail number, and Specification Section and Title, as appropriate, on each copy.
- d.** Variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

- e. When revised for resubmission, identify all changes made since previous submission.
- 3. Contractor's Review:** Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information are in accordance with the requirements of the Work and Contract Documents.
- 4. Architect's Action:** Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- a. Architect will review each submittal, make marks to indicate corrections or modifications required, and return it.
 - b. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
 - c. For each submittal for review, allow 10 working days excluding delivery time to and from the Contractor.
- 5. Distribution:** Architect will transmit reviewed submittals to Contractor for further action. Submittals with completed review actions shall be distributed by Contractor as appropriate.
- 6. Unsolicited Submittals:** If not required by Contract Documents or requested by Architect, unsolicited submittals will not be recognized or processed, and will be returned to Contractor unreviewed.
- 7. Documents for Review:**
- a. Small size sheets, not larger than 8-1/2 × 11 inches (215 × 280 mm): Submit one copy; the Contractor shall make copies for construction as from original returned by the Architect.
 - b. Larger sheets, not larger than 36 × 48 inches (910 × 1220 mm): Submit one reproducible transparency.
- 8. Documents for Information:** Submit two copies.
- 9. Documents for Contract Closeout:** Make one reproduction of

submittal originally reviewed. Submit one extra of submittals for information.

10. Samples: Submit the number specified in individual Specification Sections, one of which will be retained by Architect.

a. After review, produce duplicates.

b. Retained samples will not be returned to Contractor unless specifically so specified.

End of Section 01 33 00

Section 01 41 00 - Regulatory Requirements

A. AUTHORITY AND PRECEDENCE OF CODES, ORDINANCES AND STANDARDS

1. Authority: All codes, ordinances and standards referenced in the Drawings and Specifications shall have the full force and effect as though printed in their entirety in the Specifications.

2. Precedence:

a. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.

b. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, the Drawings and Specifications shall take precedence so long as such increase is legal.

c. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.

B. APPLICABLE CODES, LAWS AND ORDINANCES

1. Applicable Codes, Laws and Ordinances:

a. Performance of the Work shall be governed by all applicable laws, ordinances, rules and regulations of Federal, State and local governmental agencies and jurisdictions having authority over the Project.

b. Performance of the Work shall meet or exceed the minimum requirements of the series of Codes published by the International Code Council (ICC) and the National Electrical Code (NEC), as adopted and interpreted by local authorities having jurisdiction.

c. Performance of the Work shall be accomplished in conformance with all rules and regulations of public utilities, utility districts and other agencies serving the facility.

d. Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the execution date of the Agreement.

2. Date of Codes, Laws and Ordinances: The applicable edition of all codes shall be that adopted at the time of issuance of permits by the jurisdiction having authority and shall include all modifications and additions adopted by that jurisdiction. The applicable date of laws and ordinances shall be that of the date of performance of the Work.

End of Section 01 41 00

Section 01 42 00 - References

A. USE OF REFERENCES

1. References: The Drawings and Specifications contain references

to various standards, standard specifications, codes, practices and requirements for products, execution, tests and inspections. These reference standards are published and issued by the agencies, associations, organizations and societies listed in this Section or identified in individual product specification Sections.

a. Wherever term “Agency” occurs in Standard Specifications, it shall be understood to mean the term used for Owner for purposes of the Contract.

b. Wherever term “Engineer” occurs in Standard Specifications, it shall be understood to mean Architect for purposes of the Contract.

c. Standard Specifications shall be as amended and adopted by the jurisdiction in which the Project is located.

d. Where reference is made to Standard Details, such reference shall be to the Standard Details accompanying the Standard Specifications, as amended and adopted by the jurisdiction in which the Project is located.

2. Relationship to Drawings and Specifications: Such references are incorporated into and made a part of the Drawings and Specifications to the extent applicable.

3. Referenced Grades Classes and Types: Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified on the Drawings or in the Specifications, provide the highest, best and greatest of the alternatives or options for the intended use and prevailing conditions.

4. ASTM and ANSI References: Specifications and Standards of ASTM International (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision or amendment.

5. Copies of Reference Standards:

a. Reference standards are not furnished with the Drawings and Specifications because it is presumed that the Contractor,

subcontractors, manufacturers, suppliers, trades and crafts are familiar with these generally recognized standards of the construction industry.

b. Copies of reference standards may be obtained from publishing sources.

6. Edition Date of References:

a. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of the permit issued by authorities having jurisdiction.

b. All amendments, changes, errata and supplements as of the effective date shall be included.

7. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

a. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.

8. Jobsite Copies: Contractor shall obtain and maintain at the Project site copies of referenced codes and standards identified on the Drawings and in the Specifications in order to properly execute the Work, including:

a. Local and State Building Codes: As referenced in Section 01 41 00 - Regulatory Requirements.

b. Safety Codes: Occupational Safety and Health Act (OSHA)

regulations and State industrial safety laws and regulations, to extent applicable to the Work.

c. General Standards:

1. Building Code material, testing and installation standards.
2. Underwriters Laboratories, Inc. (UL) Building Products Listing.
3. Factory Mutual Research Organization (FM) Approval Guide.
4. ASTM International (ASTM) Standards in Building Codes.
5. American National Standards Institute (ANSI) standards.

d. Fire and Life Safety Standards: All referenced standards pertaining to fire rated construction and exiting.

e. Common Materials Standards: American Concrete Institute (ACI), American Institute of Steel Construction (AISC), American Welding Society (AWS), Gypsum Association (GA), National Fire Protection Association (NFPA), Tile Council of North America (TCNA) and Architectural Woodwork Institute (AWI) standards to the extent referenced within the Contract Specifications.

f. Research Reports: ICC Evaluation Service, Inc. (ICC-ES), Evaluation Reports, for products not in conformance to prescribed requirements stated in applicable Building Code.

g. Product Listings: Approval documentation, indicating approval of authorities having jurisdiction for use of product within the applicable jurisdiction.

B. DEFINITIONS OF TERMS

1. Basic Contract Definitions: Words and terms governing the Work are defined in the Conditions of the Contract, as referenced in the Agreement.

2. Words and Terms Used on Drawings and in Specifications: Additional words and terms may be used in the Drawings and Specifications and are defined as follows:

- a. “And/or”:** If used, shall mean that either or both of the items so joined are required.
- b. “Applicable”:** As appropriate for the particular condition, circumstance or situation.
- c. “Approve(d)”:** Approval action shall be limited to the duties and responsibilities of the party giving approval, as stated in the [General] Conditions of the Contract. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval shall not relieve the Contractor from responsibility to fulfill Contract requirements.
- d. “Directed”:** Limited to duties and responsibilities of the Owner or Architect as stated in the Conditions of the Contract, meaning as instructed by the Owner or Architect, in writing, regarding matters other than the means, methods, techniques, sequences and procedures of construction. Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “required,” and “permitted” mean “directed by the Owner,” “directed by the Architect,” “requested by the Owner,” and similar phrases. No implied meaning shall be interpreted to extend the responsibility of the Owner, Architect or other responsible design professional into the Contractor's supervision of construction.
- e. “Equal” or “Equivalent”:** As determined by Architect or other responsible design professional as being equivalent, considering such attributes as durability, finish, function, suitability, quality, utility, performance and aesthetic features.
- f. “Furnish”:** Means “supply and deliver, to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.”
- g. “Indicated”:** The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar

requirements in the Contract Documents. Terms such as “shown,” “noted,” “scheduled,” and “specified” are used to help the reader locate the reference. There is no limitation on location.

h. “Install”: Describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

i. “Installer”:

1. “Installer” refers to the Contractor or an entity engaged by the Contractor, such as an employee, subcontractor or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

2. “Experienced Installer”: The term “experienced,” when used with “installer,” means having a minimum of 5 previous Projects similar in size to this Project, knowing the precautions necessary to perform the Work, and being familiar with requirements of authorities having jurisdiction over the Work.

j. “Jobsite”: Same as “Site.”

k. “Necessary”: With due considerations of the conditions of the Project and as determined in the professional judgment of the responsible design professional as being necessary for performance of the Work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences and procedures of construction.

l. “Noted”: Same as “Indicated.”

m. “Per”: Same as “in accordance with,” “according to” or “in compliance with.”

n. “Products”: Material, system or equipment.

- o.** “Project Site”: Same as “Site.”
- p.** “Proper”: As determined by the Architect or other responsible design professional as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, which are solely the Contractor's responsibility to determine.
- q.** “Provide”: Means “furnish and install, complete and ready for the intended use.”
- r.** “Regulation”: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work.
- s.** “Required”: Necessary for performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, such as:
1. Regulatory requirements of authorities having jurisdiction.
 2. Requirements of referenced standards.
 3. Requirements generally recognized as accepted construction practices of the locale.
 4. Notes, schedules and graphic representations on the Drawings.
 5. Requirements specified or referenced in the Specifications.
 6. Duties and responsibilities stated in the Bidding and Contract Requirements.
- t.** “Scheduled”: Same as “Indicated.”
- u.** “Selected”: As selected by the Architect or other responsible design professional from the full selection of the manufacturer's products, unless specifically limited in the

Contract Documents to a particular quality, color, texture or price range.

v. “Shown”: Same as “Indicated.”

w. “Site”: Same as “Site of the Work” or “Project Site”; the area or areas or spaces occupied by the Project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.

x. “Supply”: See “Furnish.”

y. “Testing and Inspection Agency”: An independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests.

z. “Testing Laboratory” or “Testing Laboratories”: Same as “Testing and Inspection Agency.”

C. ABBREVIATIONS, ACRONYMS, NAMES AND TERMS, GENERAL

1. Abbreviations, Acronyms, Names and Terms: Where acronyms, abbreviations, names and terms are used in the Drawings, Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards-generating organization, Authority Having Jurisdiction (AHJ) or other applicable entity.

a. Refer to the Conditions of the Contract, referenced in the Agreement and located elsewhere in the Contract Documents, for definitions of Contract terms.

2. Abbreviations, General: The following are commonly used abbreviations which may be found on the Drawings or in the Specifications:

AC or ac Alternating current or air conditioning (depending upon context)

AMP or amp Ampere

C	Celsius
CFM or cfm	Cubic feet per minute
CM or cm	Centimeter
CY or cy	Cubic yard
DC or dc	Direct current
DEG or deg	Degrees
F	Fahrenheit
FPM or fpm	Feet per minute
FPS or fps	Feet per second
FT or ft	Foot or feet
Gal or gal	Gallons
GPM or gpm	Gallons per minute
IN or in	Inch or inches
Kip or kip	Thousand pounds
KSF or ksf	Thousand pounds per square foot
KSI or ksi	Thousand pounds per square inch
KV or kv	Kilovolt
KVA or kva	Kilovolt amperes
KW or kw	Kilowatt
KWH or kwh	Kilowatt hour
LBF or lbf	Pounds force
LF or lf	Lineal foot
M or m	Meter
MM or mm	Millimeter
MPH or mph	Miles per hour
PCF or pcf	Pounds per cubic foot
PSF or psf	Pounds per square foot
PSI or psi	Pounds per square inch
PSY or psy	Per square yard
SF or sf	Square foot
SY or sy	Square yard
V or v	Volts

3. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in the Encyclopedia of Associations or in the National Trade and Professional Associations Directory of the United States, identified below.

a. Encyclopedia of Associations, online directory by Thomson Gale, accessible through many public libraries.

b. National Trade and Professional Associations of the United States, Columbia Books, Inc. (Annapolis Junction, MD, 2004)

4. Undefined Abbreviations, Acronyms, Names and Terms: Words and terms not otherwise specifically defined in this Section, in the Instructions to Bidders, in the Conditions of the Contract, on the Drawings or elsewhere in the Specifications shall be as customarily defined by trade or industry practice, by reference standard and by specialty dictionaries such as the following:

- a. Dictionary of Architecture and Construction, 4th Edition (Cyril M. Harris, McGraw-Hill Professional, 2005) ISBN: 0-0714523-7-0.

End of Section 01 42 00

Section 01 45 00 - Quality Control

A. REGULATORY REQUIREMENTS FOR TESTING AND INSPECTION

1. Building Code Requirements: Comply with requirements for testing and inspections of applicable Codes, including additional requirements for testing and inspection, as adopted and interpreted by local authorities having jurisdiction.
2. Requirements of Fire Regulations: Comply with testing and inspection requirements of State Fire Marshal and local Fire Marshal having jurisdiction.

B. QUALITY OF THE WORK

1. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.
2. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements.
3. Protection of Existing and Completed Work: Contractor shall take all measures necessary to preserve and protect existing and completed Work free from damage, deterioration, soiling and

staining, until acceptance of the Work by Owner.

4. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

5. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgment by the manufacturer that such deviations are acceptable and appropriate for the Project.

C. CONTRACTOR'S QUALITY CONTROL

1. Contractor's Quality Control: Contractor shall ensure that products, services, workmanship and site conditions comply with requirements of the Drawings and Specifications by coordinating, supervising, testing and inspecting the Work and by utilizing only suitably qualified personnel.

2. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Drawings and Specifications, including, by reference, all Codes, laws, rules, regulations and standards. When no quality basis is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the Project for projects of this type.

3. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.

4. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements.

5. Protection of Existing and Completed Work: Take all measures necessary to preserve and protect existing and completed Work free from damage, deterioration, soiling and staining, until Acceptance by the Owner.

6. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

7. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgment by the manufacturer that such deviations are acceptable and appropriate for the Project.

8. Verification of Quality: Work shall be subject to verification of quality by Owner or Architect in accordance with provisions of the Conditions of the Contract.

D. INSPECTIONS AND TESTS BY AUTHORITIES HAVING JURISDICTION

1. Inspections and Tests by Authorities Having Jurisdiction: Contractor shall cause all tests and inspections required by authorities having jurisdiction to be made for Work under this

Contract, including those by the Building Department, Public Works Department, Fire Department, Health Department and similar agencies.

E. INSPECTIONS AND TESTS BY SERVING UTILITIES

1. Inspections and Tests by Serving Utilities: Contractor shall cause all tests and inspections required by serving utilities to be made for Work under the Contract.

F. INSPECTIONS AND TESTS BY MANUFACTURER'S REPRESENTATIVES

1. Inspections and Tests by Manufacturer's Representatives: Contractor shall cause all specified tests and inspections to be conducted by materials or systems manufacturers. Additionally, all tests and inspections required by materials or systems manufacturers as conditions of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum.

End of Section 01 45 00

Section 01 50 00 - Temporary Facilities and Controls

A. TEMPORARY UTILITIES

1. Temporary Utilities, General: Coordinate with building manager for points of connection, protection and payment of service charges.

a. Provide temporary electrical power, lighting, water, heating and cooling, and ventilation as necessary for proper performance of the Work.

b. Existing facilities may not be used unless approved by building manager.

c. New permanent facilities may be used once permanent account is established with serving utility.

2. Temporary Electrical Power:

a. Cost of Energy: Reimbursed by Contractor to building owner.

b. Connection(s): Existing power service at location(s) as directed by building manager.

1. Do not disrupt service to occupied tenant spaces and common areas except at dates and times approved by building manager.

2. Exercise measures to conserve energy.

3. Provide separate metering and reimburse Owner for cost of energy used.

c. Provide temporary electric feeder from existing building electrical service.

d. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as necessary.

e. Provide over-current and ground-fault protection.

f. Permanent convenience receptacles may be utilized during construction.

3. Temporary Lighting for Construction Purposes:

a. Provide and maintain temporary lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft (21 watt/sq m).

b. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.

c. Provide and maintain 0.25 watt/sq ft (2.7 watt/sq m) H.I.D. lighting to interior work areas after dark for security purposes.

d. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

e. Maintain lighting and provide routine repairs and lamp replacement.

f. Permanent building lighting may be utilized during construction if cleaned and relamped at Contract Closeout.

4. Temporary Heating, Ventilating and Air Conditioning:

a. Cost of Energy: Reimbursed by Contractor to building owner.

b. Temporary Heating: Provide portable heaters as necessary to maintain suitable conditions for construction operations.

1. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in all areas.

2. Existing HVAC system may be used for heating if authorized by building manager.

a. Exercise measures to conserve energy.

b. Enclose building prior to activating temporary heat.

c. Prior to operation of permanent HVAC system for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

B. Temporary Cooling:

a. Cost of Energy: Reimbursed by Contractor to building owner.

b. Temporary Cooling: Provide cooling devices and cooling as needed to maintain suitable conditions for construction operations.

1. Maintain maximum ambient temperature of 80 degrees F (26 degrees C) in areas where construction is in progress, unless indicated otherwise in Specifications.

2. Existing HVAC system may be used for temporary cooling if authorized by building manager.

a. Exercise measures to conserve energy.

b. Enclose building prior to activating temporary heat.

c. Prior to operation of permanent HVAC system for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Replace filters prior to Contract Closeout.

C. Temporary Ventilation:

a. Cost of Energy: Reimbursed by Contractor to building owner.

b. Temporary Ventilation: Provide portable fans. Use permanent HVAC system as authorized by building manager.

1. Prior to operation of permanent HVAC system for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Replace filters prior to Contract Closeout.

c. Permanent Ventilation: Extend and supplement HVAC system with temporary fan units as necessary to maintain clean air for construction operations and to expedite curing and drying.

5. Temporary Water Service:

a. Cost of Water Used: Reimbursed by Contractor to building owner.

b. Temporary Water: Provide and maintain suitable quality water service for construction operations at time of construction mobilization. Provide water as necessary at exterior and interior locations.

1. Connect to existing water source.

2. Extend branch piping with outlets located so that water is available by hoses with threaded connections.
3. Exercise measures to conserve water.
4. Provide separate metering and reimburse building owner for cost of water used.

6. Telephone Service

a. Jobsite Telephone Service: Provide, maintain and pay for telephone service to Contractor's field staff, including cellular telephones to project manager and field superintendent.

1. Facsimile service: Provide on-site fax machine.
2. E-mail service: Provide on-site e-mail capability.

7. Temporary Sanitary Facilities:

a. Temporary Toilets: Provide and maintain portable chemical toilets, located as approved by building manager. Provide at time of project mobilization. Remove temporary toilets prior to Contract Closeout.

b. Existing Toilet Facilities: Use of existing toilet rooms is not permitted.

D. TEMPORARY BARRIERS, ENCLOSURES AND PASSAGEWAYS

1. Temporary Barriers, General: Provide temporary fencing, barriers and guardrails as necessary to provide for public safety, to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

a. Refer to temporary fencing and phasing plan in the Drawings. Comply with requirements indicated.

b. Note requirements for continued occupancy and use of existing buildings and site areas during construction.

c. Comply with requirements of applicable Building Code and

authorities having jurisdiction, including industrial safety regulations.

d. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways and other access routes for firefighting.

e. Paint temporary barriers and enclosures with appropriate colors, graphics and warning signs to inform personnel and public of possible hazard.

f. Where appropriate and necessary, provide warning lighting, including flashing red or amber lights.

2. Temporary Chain Link Fencing:

a. Portable Chain Link Fencing: Minimum 2-inches (50-mm) 9-gage, galvanized steel, chain link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8 inches (60-mm-) OD line posts and 2-7/8 inches (73-mm-) OD corner and pull posts, with 1-5/8 inches (42-mm-) OD top and bottom rails.

1. Provide concrete or galvanized steel bases for supporting posts.

2. Provide protective barriers at bases to prevent tripping by pedestrians.

b. Windscreen on Chain Link Fencing: For screening of construction activities from view using closed mesh weave windscreen material.

3. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

4. Covered Passageways: Erect structurally adequate, protective, covered walkways for passage of persons along adjacent passageways.

a. Coordinate installation details with Owner's requirements for continuing operations in adjoining facilities.

- b.** Review design and details with Architect.
- c.** Comply with applicable regulations of authorities having jurisdiction.
- d.** Construct covered walkways using scaffold or shoring framing.
- e.** Provide wood-plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
- f.** Extend back wall beyond the structure to complete enclosure fence.
- g.** Paint and maintain in a manner as directed by Architect.

5. Temporary Closures: Provide temporary closures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weathertight enclosure for building exterior.

- a.** Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate closures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects such as mold.
- b.** Vertical openings: Close openings of 25 sq ft (2.3 sq m) or less with plywood or similar materials.
- c.** Horizontal openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
- d.** Install tarpaulins securely using wood framing and other suitable materials.
- e.** Where temporary wood or plywood enclosure exceeds 100 sq ft (9.2 sq m) in area, use fire-retardant-treated material for framing and main sheathing.

6. Temporary Partitions: Erect and maintain temporary partitions and temporary closures to limit dust and dirt migration, including migration into existing facilities, to separate areas from fumes and noise and to maintain fire-rated separations.

a. Dust barriers: Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch (100-mm) studs, 2 layers of 3-mil (0.07-mm) polyethylene sheets, inside and outside temporary enclosure.

1. Overlap and tape full length of joints.

2. Include 5/8-inch thick gypsum board at temporary partitions serving as noise barrier.

3. Insulate partitions to minimize noise transmission to adjacent occupied areas.

4. Seal joints and perimeter of temporary partitions.

b. Dust barrier passages: Where passage through dust barrier is necessary, provide gasketed doors or heavy plastic sheets that effectively prevent air passage.

1. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches (1219 mm) between doors.

2. Maintain water-dampened foot mats in vestibule where passage leads to existing occupied spaces.

3. Equip doors with security locks.

c. Fire-rated temporary partitions: Maintain fire-rated separations, including corridor walls and occupancy separations, by construction of stud partitions with gypsum board faces.

1. Construction details shall comply with recognized time-rated fire-resistive construction. Typically, 1-hour rated partitions shall be 2x4 wood studs at 16 inches on center or 3-1/2 inch metal studs at 16 inches on center, with 5/8-inch thick Type X gypsum board at both faces,

with joints filled, taped and topped.

2. Seal partition perimeters with acceptable fire stopping and smoke seal materials.

3. Construct fire-rated temporary partitions whenever existing time-rate fire-resistive construction is removed for 12 hours or more.

7. HVAC Protection: Provide dust barriers at HVAC return grilles and air inlets to prevent spread of dust and clogging of filters.

8. Temporary Floor Protection: Protect existing floors from soiling and damage.

a. Cover floor with 2 layers of 3-mil (0.07-mm) polyethylene sheets, extending sheets 18 inches (460 mm) up the side walls.

b. Cover polyethylene sheets with 3/4-inch (19-mm) fire-retardant treated plywood.

c. Provide floor mats to clean dust from shoes.

9. Landscape Barriers: Provide barriers around trees and plants designated to remain.

a. Locate barriers as directed outside of drip lines of trees and plants.

b. Protect entire area under trees against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

c. Contractor shall pay all costs to restore trees and plants within barriers that are damaged by construction activities. Restoration shall include replacement with plant materials of equal quality and size. Costs shall include all fines, if any, levied by authorities having jurisdiction.

10. Guardrails: Provide guardrails along tops of embankments and excavations. Along public walkways and areas accessible by the public, adjoining excavations, provide guardrails in addition to fencing.

a. Guardrails shall be substantially and durably constructed of lumber, firmly anchored by posts embedded in concrete, and complying with Code requirements for temporary barriers.

b. Guardrails shall comply with dimensional requirements and accommodate loads as prescribed by applicable Building Code for permanent guardrails.

11. Security Closures: Provide temporary closures of openings in exterior surfaces to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

12. Weather Closures: Provide temporary weather-tight closures at exterior openings to prevent intrusion of water, to create acceptable working conditions, to protect completed Work and to maintain temporary heating, cooling and ventilation. Provide access doors with self-closing hardware and locks.

13. Temporary Access, Passage and Exit Ways: Construct temporary stairs, ramps and covered walkways, with related doors, gates, closures, guardrails, handrails, lighting and protective devices, to maintain access and exit ways to existing facilities to remain operational.

a. Design and location of temporary construction shall be by Contractor, subject to review by Architect and authorities having jurisdiction.

b. Provide temporary lighting, illuminated interior exit signage, nonilluminated directional and instructional signage, and temporary security alarms for temporary exits and exit passageways.

c. Temporary measures shall suit and connect to existing building systems.

E. SECURITY

1. Security, General: Provide security and facilities to protect Work, existing facilities and Owner's operations from unauthorized entry, vandalism and theft.

a. Protect Work, existing premises and Owner's operations from theft, vandalism and unauthorized entry.

b. Initiate program in coordination with Owner's existing security system at project mobilization.

c. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

2. Security Program:

a. Protect Work, existing premises and Owner's operations from theft, vandalism and unauthorized entry.

b. Initiate program in coordination with Owner's existing security system at project mobilization.

c. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

3. Entry Control:

a. Restrict entrance of persons and vehicles into Project site and existing facilities.

b. Allow entrance only to authorized persons with proper identification.

c. Maintain log of workers and visitors, make available to Owner on request.

d. Owner will control entrance of persons and vehicles related to Owner's operations.

e. Contractor shall control entrance of persons and vehicles related to Owner's operations.

f. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

4. Personnel Identification: Provide identification badge to each person authorized to enter premises. Include on badge person's photograph, name, assigned number, expiration date and employer. Require return of badges at expiration of person's employment on the Work.

5. Coordination: Coordinate with security programs of Owner and building manager.

F. VEHICULAR ACCESS AND PARKING

1. Coordination:

- a.** Coordinate haul routes with authorities having jurisdiction.
- b.** Provide and maintain access to fire hydrants, free of obstructions.
- c.** Coordinate designated construction parking areas with building manager. Restrict on-site parking to designated area. Parking on adjacent public thoroughfares shall be subject to approval of public safety authorities having jurisdiction.
- d.** Parking adjacent to building entrances will be designated for construction use prior to 8 a.m. and after 6 p.m. for unloading and loading of construction products.

2. Construction Parking:

- a.** Use designated areas of existing parking lot only, as approved by building manager.
- b.** Do not allow heavy vehicles or construction equipment in parking areas except drive lanes constructed for load fire apparatus and garbage collection vehicles.
- c.** Arrange for temporary parking areas to accommodate use of construction personnel.
- d.** When site space is not adequate, use off-site parking.

3. Construction Parking Control:

- a.** Control vehicular parking to prevent interference with traffic and parking by building tenants and access by emergency vehicles.
- b.** Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.

c. Provide parking authorization signage for windshields of construction vehicles and worker's personal vehicles parked on site.

4. Restoration of Parking Lot: At completion of construction, clean and restore paving to equal or better condition to that at start of construction.

a. Apply pavement seal coat if necessary to restore asphaltic concrete paving.

b. Repaint parking and traffic control markings damaged by construction traffic and other construction-related activities.

G. WASTE MANAGEMENT

1. Waste Removal: Provide waste removal facilities and services as required to maintain the site and existing facilities in clean and orderly condition.

a. Provide containers with lids. Dispose of waste off-site periodically.

b. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

2. Waste Management: Separate and dispose of construction waste in compliance with waste management regulations of authorities having jurisdiction.

H. FIELD OFFICES

1. Contractor's Field Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.

a. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

b. Locate offices minimum distance of 30 feet (10 m) from existing building, at location in existing parking lot assigned by building manager.

I. PROTECTION OF INSTALLED WORK

1. Protection of Installed Work, General: Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

2. Protective Coverings: Provide protective coverings at walls, projections, jambs, sills and soffits of openings as necessary to prevent damage from construction activities, such as coatings applications, and as necessary to prevent other than normal atmospheric soiling.

3. Interior Traffic Protection:

a. Protect finished floors, stairs and other surfaces from traffic, soiling, wear and marring.

b. Provide temporary covers of plywood, reinforced kraft paper or temporary rugs and mats, as necessary. Temporary covers shall not slip or tear under normal use.

c. Prohibit traffic and storage on waterproofed and roofed surfaces and on landscaped areas.

d. Protect newly fine graded, seeded and planted areas with barriers and flags to designate such areas as closed to pedestrian and vehicular traffic.

J. REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

1. Removal of Temporary Facilities and Controls:

a. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion review.

b. Remove underground installations to a minimum depth of 2 ft (600 mm). Grade site as indicated.

c. Clean and repair damage caused by installation or use of temporary facilities and controls.

d. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to condition equal to or better than at commencement of construction.

End of Section 01 50 00

Section 01 60 00 - Product Requirements

A. GENERAL PRODUCT REQUIREMENTS

1. Products, General: Items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock, including materials, equipment, assemblies, fabrications and systems.

a. Named Products: Items identified by manufacturer's product name, including make or model designations indicated in the manufacturer's published product data.

b. Materials: Products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.

c. Equipment: A product with operating parts, whether motorized or manually operated, that requires connections such as wiring or piping.

2. Specific Product Requirements: Refer to requirements of Section 01 45 00 - Quality Control and individual Specifications Sections in Divisions 02 through 49 for specific requirements for products.

3. Minimum Requirements: Specified requirements for products are minimum requirements. Refer to general requirements for quality of the Work specified in Section 01 45 00 - Quality Control and elsewhere herein.

4. Product Selection: Provide products that fully comply with the Contract Documents, and are undamaged and unused at installation. Comply with additional requirements specified herein in Article titled "PRODUCT OPTIONS."

5. Standard Products: Where specific products are not specified, provide standard products of types and kinds that are suitable for the intended purposes and that are usually and customarily used on

similar projects under similar conditions. Products shall be as selected by Contractor and subject to review and acceptance by Architect.

6. Product Completeness: Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect. Comply with additional requirements specified herein in Article titled "SYSTEM COMPLETENESS."

7. Code Compliance: All products, other than commodity products prescribed by Code, shall be governed by current ICC Evaluation Service, Inc. (ICC ES) Evaluation Report, as interpreted and required by Authority Having Jurisdiction (AHJ). Refer to additional requirements specified in Section 01 41 00 - Regulatory Requirements.

8. Interchangeability: To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same product and interchangeable throughout the Work. When options are specified for the selection of any of two or more products, the product selected shall be compatible with products previously selected.

9. Product Nameplates and Instructions:

a. Except for required Code-compliance labels and operating and safety instructions, locate nameplates on inconspicuous, accessible surfaces. Do not attach manufacturer's identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.

b. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as the following example:

1. Name of manufacturer

2. Name of product

3. Model and serial number

4. Capacity

5. Operating and Power Characteristics

6. Labels of Tested Compliance with Codes and Standards

c. Refer to additional requirements specified in Division 23 - HVAC and Division 26 - Electrical.

d. For each item of service-connected or power-operated equipment, provide operating and safety instructions, permanently affixed and of durable construction, with legible machine lettering. Comply with all applicable requirements of authorities having jurisdiction and listing agencies.

B. PRODUCT OPTIONS

1. Products Specified by Description: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that has the specified attributes and otherwise complies with specified requirements.

2. Products Specified by Performance Requirements: Where Specifications require compliance with performance requirements, provide product(s) that comply and are recommended by the manufacturer for the intended application. Verification of manufacturer's recommendations may be by product literature or by certification of performance from manufacturer.

3. Products Specified by Reference to Standards: Where Specifications require compliance with a standard, provided product shall fully comply with the standard specified. Refer to general requirements specified in Section 01 42 00 - References regarding compliance with referenced standards, standard specifications, codes, practices and requirements for products.

4. Products Specified by Identification of Manufacturer and Product Name or Number:

a. "Specified Manufacturer": Provide the specified product(s) of the specified manufacturer.

1. If only one manufacturer is specified, without

“acceptable manufacturers” being identified, provide only the specified product(s) of the specified manufacturer.

2. If the phrase “or equal” is stated or reference is made to the “or equal provision,” products of other manufacturers may be provided if such products are equivalent to the specified product(s) of the specified manufacturer. Equivalence shall be demonstrated by submission of information in compliance with requirements specified herein under the Article titled “SUBSTITUTIONS.”

b. “Acceptable Manufacturers”: Product(s) of the named manufacturers, if equivalent to the specified product(s) of the specified manufacturer, will be acceptable in accordance with the requirements specified herein in the Article titled “SUBSTITUTIONS,” except considerations regarding changes in Contract Time and Contract Sum will be waived if no increase in Contract Time or Contract Sum results from use of such equivalent products.

c. Unnamed manufacturers: Products of unnamed manufacturers will be acceptable only as follows:

1. Unless specifically stated that substitutions will not be accepted or considered, the phrase “or equal” shall be assumed to be included in the description of specified product(s). Equivalent products of unnamed manufacturers will be accepted in accordance with the “or equal” provision specified herein, below.

2. If provided, products of unnamed manufacturers shall be subject to the requirements specified herein in the Article titled “SUBSTITUTIONS.”

d. Quality basis: Specified product(s) of the specified manufacturer shall serve as the basis by which products of named acceptable manufacturers and products of unnamed manufacturers will be evaluated. Where characteristics of the specified product are described, where performance characteristics are identified or where reference is made to industry standards, such characteristics are specified to facilitate evaluation of products by identifying the most

significant attributes of the specified product(s).

5. Products Specified by Combination of Methods: Where products are specified by a combination of attributes, including manufacturer's name, product brand name, product catalog or identification number, industry reference standard, or description of product characteristics, provide products conforming to all specified attributes.

6. "Or Equal" Provision: Where the phrase "or equal" or the phrase "or approved equal" is included, product(s) of unnamed manufacturer(s) may be provided as specified above in subparagraph titled "Unnamed manufacturers."

a. The requirements specified herein in the Article titled "SUBSTITUTIONS" shall apply to products provided under the "or equal" provision except, if the proposed product(s) are determined to be equivalent to the specified product(s) of the specified manufacturer, the requirement specified for substitutions to result in a net reduction in Contract Time or Contract Sum will be waived.

b. Use of product(s) under the "or equal" provision shall not result in any delay in completion of the Work, including completion of portions of the Work for use by Owner or for work under separate contract by Owner.

c. Use of product(s) under the "or equal" provision shall not result in change in Contract Sum and Contract Time. Should additional costs be incurred, including costs for re-design and for fees for plancheck review and permit, costs shall be paid by Contractor with no change in Contract Sum and Contract Time.

d. Use of product(s) under the "or equal" provision shall not require substantial change in the intent of the design, in the opinion of the Architect. The intent of the design shall include functional performance and aesthetic qualities.

1. Should changes in dimensions, configurations, locations and interfaces between products be necessary due to use of other than the specified products of the specified manufacturer, such changes shall be made by the

Contractor, subject to review by the Architect, at no change in Contract Sum and Contract Time.

e. The determination of equivalence will be made by the Architect and such determination shall be final.

7. Visual Matching: Where Specifications require matching a sample, the decision by the Architect on whether a proposed product matches shall be final. Where no product visually matches but the product complies with other requirements, comply with provisions for substitutions for selection of a matching product in another category.

8. Selection of Products: Where requirements include the phrase “as selected from manufacturer's standard colors, patterns and textures” or a similar phrase, selections of products will be made by indicated party or, if not indicated, by the Architect. The Architect will select color, pattern and texture from the product line of submitted manufacturer if all other specified provisions are met.

C. SUBSTITUTIONS

1. Substitutions: Requests by Contractor to deviate from specified requirements for products, materials, equipment and methods, or to provide products other than those specified, shall be considered requests for substitutions except under the following conditions:

a. Substitutions are requested during the bidding period and accepted prior to execution of the Contract. Acceptance shall be in the form of written Addendum to the Bidding documents or revision to the Drawings or Specifications for use as Construction Contract Documents.

b. Changes in products, materials, equipment and methods of construction are directed by the Owner or Architect.

c. Contractor options for provision of products and construction methods are specifically stated in the Contract Documents.

d. Change in products, materials, equipment and methods of construction is required for compliance with Codes, ordinances, regulations, orders and standards of authorities having jurisdiction.

2. Substitution Provisions: Refer to substitution provisions of the Bidding and Contract Requirements, in addition to the requirements specified herein. Provisions for consideration and acceptance of substitutions shall be as follows:

a. Documentation: Substitutions will not be considered if they are indicated or implied on shop drawings, product data or sample submittals. All requests for substitution shall be by separate written request from Contractor. Contractor shall utilize Substitution Request form provided by Owner.

b. Cost and Time Considerations: Substitutions will not be considered unless a net reduction in Contract Sum or Contract Time results to the Owner's benefit, including redesign costs, life cycle costs, plancheck and permit fees, changes in related Work and overall performance of building systems.

c. Design Revision: Substitutions will not be considered if acceptance will require substantial revision of the Contract Documents or will substantially change the intent of the design, in the opinion of the Architect. The intent of the design shall include functional performance and aesthetic qualities.

d. Data: It shall be the responsibility of the Contractor to provide adequate data demonstrating the merits of the proposed substitution, including cost data and information regarding changes in related Work.

e. Determination by Architect: Architect will determine the acceptability of proposed substitutions and will notify Contractor, in writing within a reasonable time, of acceptance or rejection. The determination by the Architect regarding functional performance and aesthetic quality shall be final.

f. Non-Acceptance: If a proposed substitution is not accepted, Contractor shall immediately provide the specified product.

g. Substitution Limitation: Only one request for substitution will be considered for each product.

3. Request for Substitution Process:

a. Contractor shall prepare a request for substitution and

submit the request to the Architect for review and acceptance. Submit a minimum of 4 copies. Form and other administrative requirements shall be as directed by the Architect.

b. Substitution requests shall included complete product data, including drawings and descriptions of products, fabrication details and installation procedures. Include samples where applicable or requested.

c. Substitution requests shall include appropriate product data for the specified product(s) of the specified manufacturer, suitable for use in comparison of characteristics of products.

1. Include a written, point-by-point comparison of characteristics of the proposed substitute product with those of the specified product.

2. Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the Work and to construction to be performed by the Owner and by others under separate contracts with Owner that will be necessary if the proposed substitution is accepted.

d. Substitution requests shall include a statement indicating the substitution's effect on the Construction Schedule. Indicate the effect of the proposed substitution on overall Contract Time and, as applicable, on completion of portions of the Work for use by Owner or for work under separate contracts by Owner.

e. Except as otherwise specified, substitution requests shall include detailed cost data, including a proposal for the net change, if any, in the Contract Sum.

f. Substitution requests shall include signed certification that the Contractor has reviewed the proposed substitution and has determined that the substitution is equivalent or superior in every respect to product requirements indicated or specified in the Contract Documents, and that the substitution is suited for and can perform the purpose or application of the specified product indicated or specified in the Contract Documents.

g. Substitution requests shall include a signed waiver by the

Contractor for change in the Contract Time or Contract Sum because of the following:

- 1.** Substitution fails to perform adequately.
- 2.** Substitution requires changes in other elements of the Work.
- 3.** Substitution causes problems in interfacing with other elements of the Work.
- 4.** Substitution is determined to be unacceptable by authorities having jurisdiction.

h. If, in the opinion of the Architect, the substitution request is incomplete or has insufficient data to enable a full and thorough review of the intended substitution, the substitution may be summarily refused and determined to be unacceptable.

4. Contract Document Revisions:

a. Should a Contractor-proposed substitution or alternative sequence or method of construction require revision of the Contract Drawings or Specifications, including revisions for the purposes of determining feasibility, scope or cost, or revisions for the purpose of obtaining review and approval by authorities having jurisdiction, revisions will be made by Architect or other consultant of Owner who is the responsible design professional, as approved in advance by Owner.

b. Services of Architect or other responsible design professional for researching and reporting on proposed substitutions or alternative sequence and method of construction shall be paid by Contractor when such activities are considered additional services to the design services contracts of the Owner with Architect or other responsible design professional.

c. Costs of services by Architect or other responsible design professional of the Owner shall be paid on a time and materials basis, based on current hourly fee schedules, with reproduction, long distance telephone and shipping costs reimbursable at cost plus usual and customary mark-up for

handling and billing.

d. Such fees shall be paid whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by Owner and a Change Order is executed.

e. Such fees shall be paid from Contractor's portion of savings if a net reduction in Contract Sum results. If fees exceed Contractor's portion of net reduction, Contractor shall pay all remaining fees unless otherwise agreed in advance by Owner.

f. Such fees owed shall be deducted from the amount owed Contractor on the Application for Payment next made following completion of revised Contract Drawings and Specifications or completion of research and other services. Owner will then pay Architect or other consultant of the Owner.

D. SYSTEM COMPLETENESS

1. System Completeness:

a. The Contract Drawings and Specifications are not intended to be comprehensive directions on how to produce the Work. Rather, the Drawings and Specifications describe the design intent for the completed Work.

b. It is intended that all equipment, systems and assemblies be complete and fully functional even though not fully described. Provide all products and operations necessary to achieve the design intent described in the Contract Documents.

c. Refer to related general requirements specified in Section 01 41 00 - Regulatory Requirements regarding compliance with minimum requirements of applicable codes, ordinances and standards.

2. Omissions and Misdescriptions: Contractor shall report to Architect immediately when elements essential to proper execution of the Work are discovered to be missing or misdescribed in the Drawings and Specifications or if the design intent is unclear.

a. Should an essential element be discovered as missing or misdescribed prior to receipt of Bids, an Addendum will be

issued so that all costs may be accounted for in the Contract Sum.

b. Should an obvious omission or misdescription of a necessary element be discovered and reported after execution of the Agreement, Contractor shall provide the element as though fully and correctly described, and a no-cost Change Order shall be executed.

c. Refer to related general requirements specified in Section 01 31 00 - Project Management and Coordination regarding construction interfacing and coordination.

E. TRANSPORTATION, DELIVERY AND HANDLING

1. Transportation, Delivery and Handling, General: Comply with manufacturer's instructions and recommendations for transportation, delivery and handling, in addition to the following.

2. Transportation: Transport products by methods to avoid product damage.

3. Delivery:

a. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft and other losses.

b. Deliver products in undamaged condition in manufacturer's original sealed container or packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

4. Handling:

a. Provide equipment and personnel to handle products by methods to prevent soiling, marring or other damage.

b. Promptly inspect products on delivery to ensure that products comply with contract documents, quantities are correct, and to ensure that products are undamaged and properly protected.

F. STORAGE AND PROTECTION

1. Storage and Protection, General: Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

a. Periodically inspect to ensure that products are undamaged and are maintained under required conditions.

b. Products damaged by improper storage or protection shall be removed and replaced with new products at no change in Contract Sum or Contract Time.

c. Store sensitive products in weathertight enclosures.

2. Inspection Provisions: Arrange storage to provide access for inspection and measurement of quantity or counting of units.

3. Structural Considerations: Store heavy materials away from the structure in a manner that will not endanger supporting construction.

4. Weather-Resistant Storage:

a. Store moisture-sensitive products above ground, under cover in a weathertight enclosure or covered with an impervious sheet covering. Provide adequate ventilation to avoid condensation.

b. Maintain storage within temperature and humidity ranges required by manufacturer's instructions.

c. For exterior storage of fabricated products, place products on raised blocks, pallets or other supports, above ground and in a manner to not create ponding or misdirection of runoff. Place products on sloped supports above ground.

d. Store loose granular materials on solid surfaces in a well-drained area. Prevent mixing with foreign matter.

5. Protection of Completed Work:

a. Provide barriers, substantial coverings and notices to protect installed Work from traffic and subsequent construction operations.

b. Remove protective measures when no longer required and prior to Substantial Completion review of the Work.

c. Comply with additional requirements specified in Section 01 50 00 - Temporary Facilities and Controls.

G. INSTALLATION OF PRODUCTS

1. Installation of Products:

a. Comply with manufacturer's instructions and recommendations for installation of products, except where more stringent requirements are specified, are necessary due to Project conditions or are required by authorities having jurisdiction.

b. Anchor each product securely in place, accurately located and aligned with other Work.

c. Clean exposed surfaces and provide protection to ensure freedom from damage and deterioration at time of Substantial Completion review. Refer to additional requirements specified in Section 01 74 11 - Cleaning Requirements.

End of Section 01 60 00

Section 01 74 11 - Cleaning Requirements

A. SUBMITTALS

1. Product List: Submit complete list of all cleaning agents and materials for Owner's review and approval.

2. Cleaning Procedures: Submit description of cleaning processes, agents and materials to be used for final cleaning of the Work. Processes and degree of cleanliness shall be as directed by Architect. All cleaning processes, agents and materials shall be subject to Architect's review and approval.

B. QUALITY ASSURANCE

1. Cleaning and Disposal Requirements, General: Conduct cleaning

and disposal operations in compliance with all applicable codes, ordinances and regulations, including waste management and environmental protection laws, rules and practices.

C. CLEANING MATERIALS

1. Cleaning Agents and Materials: Use only those cleaning agents and materials which will not create hazards to health or property and which will not damage or degrade surfaces.

a. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.

b. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.

D. CLEANING DURING CONSTRUCTION

1. Waste Management: Control accumulation of debris, waste materials and rubbish; periodically dispose of debris, waste and rubbish off-site in a legal manner.

2. Cleaning, General: Clean sidewalks, driveways and streets frequently to maintain public thoroughfares free of dust, debris and other contaminants.

3. Cleaning of Existing Facilities: Clean surfaces in existing buildings where alteration and renovation Work is being performed or where other construction activities have caused soiling and accumulation of dust and debris.

a. Clean dust and soiling from floor surfaces.

b. Clean dust from horizontal and vertical surfaces, including lighting fixtures.

c. Clean HVAC filters.

4. Parking Area Cleaning: Keep parking areas clear of construction debris, especially debris hazardous to vehicle tires.

5. Thoroughfare Clearing and Cleaning: Keep site accessways, parking areas and building access and exit facilities clear of mud, soiling and debris.

a. Remove mud, soil and debris and dispose of in a manner which will not be injurious to persons, property, plant materials and site.

b. Comply with runoff control requirements stated above and as required by authorities having jurisdiction.

6. Cleaning Frequency: At a minimum, clean Work areas daily.

7. Failure to Clean: Should cleaning by Contractor not be sufficient or acceptable to Architect, especially regarding paths of travel, Owner may engage cleaning service to perform cleaning and deduct costs for such cleaning from sums owed to Contractor.

E. CONTRACT COMPLETION REVIEW CLEANING, GENERAL

1. Contract Completion Review Cleaning, General: Execute a thorough cleaning prior to Contract Completion review by Architect. Complete final cleaning before submitting final Application for Payment. Employ professional building cleaners to thoroughly clean building.

F. INTERIOR CLEANING

1. Interior Cleaning:

a. Clean each surface or unit to the condition expected in a normal commercial building cleaning and maintenance program.

b. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and other foreign materials from all visible interior and exterior surfaces.

c. Remove dust from all horizontal surfaces not exposed to view, including light fixtures, ledges and plumbing fixtures.

d. Clean all horizontal surfaces to dust-free condition, including tops of door and window frames, tops of doors and interiors of cabinets and casework.

e. Owner will perform sanitary cleaning of food service, toilet and shower spaces, fixtures and equipment.

f. Remove waste and surplus materials, rubbish and temporary

construction facilities, utilities and controls.

2. Accessories and Fixtures Cleaning: Clean building accessories, including toilet partitions, fire extinguisher cabinets, lockers and toilet accessories, all plumbing fixtures and all lighting fixture lenses and trim.

3. Glass and Mirror Cleaning: Clean and polish all glass and mirrors as specified in Section 08 81 00 - Glass Glazing.

4. Metalwork: Clean and buff all metalwork to be free of soiling and fingerprints. Mirror finished metalwork shall be buffed to high luster.

5. Floor Cleaning:

a. Exposed concrete floors: Thoroughly sweep and wet mop floors in enclosed spaces. At parking areas and ramps, sweep and hose off floor surface.

b. Ceramic tile flooring: Thoroughly sweep and mop tile flooring. Comply with specific requirements of tile and installation materials manufacturers for cleaning materials.

c. Resilient flooring: Thoroughly sweep all resilient flooring. Damp wash and wax (as appropriate) all resilient flooring. Comply with specific requirements in applicable resilient flooring Sections and notes of the Drawings.

d. Carpet cleaning: Comply with accepted industry practices for cleaning commercial carpet, subject to review and acceptance by Architect. Vacuum, spot clean and generally clean carpet using commercial carpet cleaning solution, scrubbers and solution extraction-type vacuuming equipment.

6. Ventilation System Cleaning: Replace filters and clean heating and ventilating equipment used for temporary heating, cooling and ventilation.

G. EXTERIOR CLEANING

1. Building Exterior Cleaning: Clean exterior of adjacent facilities where construction activities have caused soiling and accumulation of dust and debris.

- a. Wash down exterior surfaces to remove dust.
- b. Clean exterior surfaces of mud and other soiling.
- c. Clean exterior side of windows, including window framing.

2. Site Cleaning: Broom clean exterior paved surfaces. Rake clean other surfaces of the grounds.

- a. Wash down and scrub where necessary all paving soiled as a result of construction activities. Thoroughly remove mortar droppings, paint splatters, stains and adhered soil.
- b. Remove from the site all construction waste, unused materials, excess soil and other debris resulting from the Work. Legally dispose of waste.

H. CLEANING INSPECTION

1. Cleaning Inspection: Prior to Final Payment or acceptance by Owner for partial occupancy or beneficial use of the premises, Contractor and Architect shall jointly conduct an inspection of interior and exterior surfaces to verify that entire Work is acceptably clean.

2. Inadequate Cleaning: Should final cleaning be inadequate, as determined by Architect, and Contractor fails to correct conditions, Owner may engage cleaning service under separate contract and deduct cost from Final Payment.

End of Section 01 74 11

Section 01 77 00 - Contract Closeout Procedures

A. COMPLETION REVIEWS

1. Correction (Punch) List: Contractor shall prepare and distribute a typewritten, comprehensive list of items to be completed and corrected (punch list) to make the Work ready for acceptance by the

Owner.

2. Substantial Completion Review: On a date mutually agreed by the Owner and Contractor, a meeting shall be conducted at the Project site to determine whether the Work is satisfactory and complete for filing a Notice of Completion (Substantial Completion).

a. Contractor shall provide 3 working days' notice to Owner for requested date of Substantial Completion meeting.

b. In addition to conducting a walk-through of the facility and reviewing the punch list, the purpose of the meeting shall include submission of warranties, guarantees and bonds to the Owner, submission of operation and maintenance data (manuals), provision of specified extra materials to the Owner, and submission of other Contract closeout documents and materials as required and if not already submitted.

c. Contractor shall correct the punch list and record additional items as may be identified during the walk-through, including notations of corrective actions to be taken.

d. Contractor shall retype the punch list and distribute it within 3 working days to those attending the meeting.

3. Final Completion Inspection: Submit a written request for final inspection for Acceptance of the Work and Contract closeout.

a. Upon receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.

b. Architect will prepare a final Certificate for Payment after satisfactory inspection or will notify Contractor of construction that requires completion or correction before Certificate will be issued.

B. CONTRACT CLOSEOUT

1. Closeout Actions: Before requesting Substantial Completion review and filing of Notice of Completion, complete the following.

2. Keying: Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

3. System Starting, Testing and Adjusting:

- a.** Complete startup testing and inspection.
- b.** Perform adjustments.
- c.** Balance HVAC system and submit balance report.

4. Temporary Facilities and Controls: Terminate and remove temporary facilities from Project site, along with mockups, construction tools and similar elements.

- a.** Advise Owner of changeover to permanent utilities.
- b.** Coordinate with Owner the establishment of permanent accounts and metering of utility services.

C. FINAL COMPLETION SUBMITTALS

1. Final Completion Submittals, General: Prior to final Application for Payment, complete and submit the following.

2. Agency Document Submittals: Submit to Owner all documents required by authorities having jurisdiction, including serving utilities and other agencies. Submit original versions of all permit cards, with final sign-off by inspectors. Submit all certifications of inspections and tests.

3. Project Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

- a.** Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
- b.** Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
- c.** Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

d. Identify and date each Record Drawing; include the designation “PROJECT RECORD DRAWING” in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

4. Project Record Specifications: Submit one copy of Project Manual, including Addenda and Contract Modifications. Mark copy to indicate actual products installed where installation varies from that indicated in Specifications, Addenda, and Contract Modifications.

a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

b. Mark copy with the proprietary name and model number of products, materials and equipment furnished, including substitutions and product options selected.

5. Operating and Maintenance Data Submittals: Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

a. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures and sequence of operations.

b. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.

c. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title “OPERATION AND MAINTENANCE MANUAL,” Project name and subject matter of contents.

6. Guaranty and Warranty Submittals: Submit written guaranties and warranties prior to Final Completion Inspection.

a. Organize warranty documents into an orderly sequence based on the Table of Contents of the Project Manual.

b. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11 inch paper.

7. Products Submittals: Submit to Owner all documents and products required by Specifications to be submitted, including the following:

a. Keys and keying schedule.

b. Tools, spare parts, extra materials and similar items, delivered to location designated by Owner. Label products with manufacturer's name and model number where applicable.

c. Test reports and certificates of compliance.

8. Certificates of Compliance and Test Report Submittals: Submit to Owner certificates and reports as specified and as required by authorities having jurisdiction, including the following:

a. Sterilization of water systems.

b. Sanitary sewer system tests.

c. Gas system tests.

d. Lighting, power and signal system tests.

e. Ventilation equipment and air balance tests.

f. Fire sprinkler system tests, if applicable.

g. Roofing inspections and tests, if applicable.

9. Lien and Bonding Company Releases: Submit to Owner evidence of satisfaction of encumbrances on Project by completion and

submission of The American Institute of Architects Forms G706 - Contractor's Affidavit of Payment of Debts and Claims, G706A - Contractor's Affidavit of Release of Liens, and (if applicable) G707 - Consent of Surety. Comply also with other requirements of Owner, as directed. Signatures shall be notarized.

10. Warranty Documents: Prepare and submit to Owner all warranties and bonds as specified in Section 01 78 26 - Product Warranties.

11. Insurance: Advise Owner of pending insurance changeover requirements.

12. Final Payment: Make final Application for Payment as specified in Section 01 29 76 - Progress Payment Procedures.

End of Section 01 77 00

End of Shortform Division 01

Appendix C

Sample Preliminary Project Description

Introduction

Following is a sample Preliminary Project Description (PPD) for a mythical project to construct the shell and core of a privately funded medical office building. This document represents project information at the end of the Schematic Design phase or early portion of the Design Development phase of the project.

The sample PPD does not include cross references to the construction specifications that *UniFormat*® (1998 edition) includes. Including additional specifications information, with appropriate *MasterFormat*® cross references, requires design information beyond what is available at the Schematic Design phase. The more comprehensive PPD, with *MasterFormat* references, is valuable for detailed estimates of probable construction costs and value engineering of various design options. However, it exceeds what is known about the design at the end of Schematic Design, when the drawings are sketchy and requirements are still to be determined.

Note: The technical content of the following PPD should not be used for actual projects. Select and verify products in compliance with actual project requirements, including applicable codes, regulations, and environmental and budgetary criteria.

Preliminary Project Description (PPD)

Project Description

10 Project Description

1010 Project Summary

1. Construct new two-story medical office building and interior core, approximately 15,300 sf, IBC Type V construction, 10'-8" floor to floor

height, 4' high parapets, interior ceiling height 9'-0", plus site development of vehicle parking, pedestrian paving, landscaping, site lighting and site amenities.

1020 Project Program

1. The Project shall comply with applicable Codes, ordinances, regulations and standards of the City of Columbus, OH, including the series of Codes published by the International Code Council (ICC).

a. Design and products shall comply with accessibility regulations adopted by State of Ohio.

b. Design and products shall comply with State of Ohio energy conservation laws and regulations.

c. Construction waste management shall comply with City of Columbus ordinances.

2. Construction product selections and execution shall be comparable to those of medical office buildings in suburban setting, with emphasis on low maintenance and an image of professionalism.

1040 Owner's Work

1. Under separate, concurrent contracts, Owner will construct tenant space improvements for dental, medical and laboratory occupants.

2. Under separate, concurrent contracts, Owner will contract for signage, graphics and artwork in common areas.

20 Proposal, Bidding and Contracting

2010 Delivery Method

1. Building shell and interior core construction will be constructed under a single prime contract. Contractor will be selected by competitive bidding by invited, prequalified General Contractors.

2. A Construction Manager has been engaged by the Owner and will act as the Owner's representative during pre-construction and construction activities.

3. The Construction Manager will administer the Contract for construction, with the Architect and the Architect's consultants acting in advisory roles.

2020 Qualifications Requirements

1. Prospective General Contractors will be invited by the Owner, through the Construction Manager, to submit Statements of Qualifications.

2. Prospective General Contractors will be prequalified by the Construction Manager and the Owner.

2040 Bid Requirements

1. Prequalified General Contractors will be invited by Owner, through the Construction Manager, to submit competitive bids on a date and at a time determined by the Construction Manager.
2. Instructions to Bidders will be prepared and issued by the Construction Manager.
3. Information available to Bidders includes:
 - a. Site survey.
 - b. Geotechnical investigation.

2050 Contracting Requirements

1. Agreement Form: AIA A101 - Standard Form of Agreement Between Owner and Contractor - Stipulated Sum 2008 edition.
2. General Conditions of the Contract: AIA A201 - General Conditions of the Contract for Construction 2008 edition.
3. Supplementary Conditions of the Contract: As developed by Construction Manager and Owner's legal and insurance counsels.

30 Cost Summary

3010 Elemental Cost Estimate

1. Project Budget: Initial budget is \$1,350,000, as of February 2009.

3020 Assumptions and Qualifications

1. Construction Schedule:
 - a. Assumed Notice to Proceed: September 10, 2009.
 - b. Assumed start of construction: October 1, 2009.
 - c. Assumed Contract closeout (shell and core construction): March 15, 2010.
2. Cost Escalation: Assumed to be 2.5% per year through February 31, 2009 and 3.6% per year from January 1, 2010 through March 31, 2010.
3. Qualifications: Delay of Notice to Proceed beyond November 1, 2009 will require re-estimate of probable construction cost.

3030 Allowances

1. Door hardware allowance: \$43,200.
2. Lobby floor tile: \$37,000.
3. Elevator cab interior: \$22,000.

3040 Alternates

1. Roofing: Built-up asphalt roofing system vs. reinforced thermoplastic olefin (TPO) single-ply roofing system.
2. HVAC Units: Products by Trane only.
3. Music/Paging System: Add for common areas.

A Substructure

A10 Foundations

A1010 Standard Foundations

1. Perimeter Wall Foundations: Continuous spread footings of steel reinforced portland cement concrete, extending 36" below frost line.
2. Column Foundations: Spread footings of steel reinforced portland cement concrete, extending 24" below finished floor.

A1030 Slabs on Grade

1. Aggregate Base: Crushed stone, 4" deep.
2. Vapor Retarder: Coextruded PVC sheet, complying with ASTM E 1745, Class A permeance and Class B puncture resistance, and 0.012 perms when tested according to ASTM E 96.
3. Concrete Floor Slab: Portland cement concrete, 4" thick with minimum #4 steel reinforcing bars at 16" on center each way, cured by sheet method only, with Floor flatness (FF) and floor levelness (FL) according to ACI 117, as follows:
 - a. Interior concrete slab on grade floors, to be covered by direct application of ceramic tile: Smooth trowel finish with light broom texture; FF35-FL25 SOV (Specified Overall Value)/FF24-FL16 MLV (Minimum Local Value).
 - b. Interior concrete slab on grade floors to receive adhesively applied or loosely laid floor covering: Smooth trowel finish; FF35-FL25 SOV/FF24-FL16 MLV.
 - c. Interior floors to remain exposed, in service areas and equipment rooms: Smooth trowel finish; FF35-FL25 SOV/FF24-FL16 MLV.

B Shell

B10 Superstructure

B1010 Floor Construction

1. Floor Structural Frame: Braced structural steel frame of steel columns and beams.
 - a. Typical wide flange members: ASTM A 572, Grade 50.
 - b. Wide flange members used in braced frame: ASTM A 992.
 - c. Other steel shapes, bars and plates: ASTM A 572, Grade 50.
2. Floor Deck: Composite concrete and steel decking, concrete mix design with $F'c = 3000$ psi, regular weight aggregate, with shear stud connectors and steel reinforcing of #4 bars at maximum 24" on centers, finishes as for concrete slabs-on-grade.

B1020 Roof Construction

1. Roof Structural Frame: Steel joists and joist-girders, complying with SJI Specifications, with columns of varying height to achieve primary roof drainage:
 - a. Typical steel roof joists: SJI - Open Web Steel Joists, K-Series.
 - b. Long-span steel roof joists: SJI - Longspan Steel Joists, LH-Series.
 - c. Joist girders: SJI - Joist Girders, G-Series.
2. Light Steel Framing: ASTM A 572, Grade 50 or ASTM A 36.
3. Roof Deck: Steel decking, hot-dipped galvanized.

B20 Exterior Closure

B2010 Exterior Walls

1. Exterior Wall Framing: Cold-formed, light gage steel studs, C-shape, galvanized finish, 6" wide, metal thickness as designed by manufacturer according to American Iron and Steel Institute (AISI) - Specification for the Design of Cold Formed Steel Structural Members, for L/240

deflection.

2. Exterior Wall Sheathing: Glass-mat gypsum sheathing board complying with ASTM C 79, 5/8" thick, non-rated, G-P DensGlass® Gold exterior gypsum sheathing, or equal.

3. Weather-Resistant Barriers:

a. Primary barrier: Typar® HouseWrap as manufactured by Reemay, Inc., complying with ASTM E 1677, Type I air retarder.

b. Secondary barrier: Rubberized sheet membrane flashing, suitable for above-grade temperatures, installed at parapet, wall openings and sloped and horizontal projections.

4. Sheet Metal Flashing and Trim: Hot-dipped galvanized, minimum.

5. Exterior Finish: Smooth finish plaster.

a. Base coats: Polymer-modified portland cement plaster.

b. Finish coat: Acrylic basecoat with fiberglass reinforcing mesh, sandable non-aggregate smooth portland cement coating and patching compound, and three-coat acrylic paint (epoxy primer + two coats finish).

6. Insulation: Fiberglass batt, friction-fit, R-19, Flexible, resilient, noncombustible blankets of mineral or glass fiber, with vapor-retarding kraft facing at concealed conditions and fire-resistant, foil-reinforced-kraft (FRK) facing exposed conditions.

7. Decorative Shapes: Proprietary plaster-coated expanded polystyrene foam shapes, adhered to plaster base coat with acrylic basecoat.

8. Plaster Control Joints, reveals and trim: Hot-dipped galvanized steel, minimum 0.0207" thick.

9. Wall Louvers: Extruded aluminum, drainable blades, nominal 6" deep, finish to match aluminum storefront framing, with insect screens.

B2020 Exterior Windows

1. Design Criteria: According to IBC for project location, framing members sized for net deflection not to exceed L/175 times span or maximum 3/4", and thermal expansion and contraction of 180 degrees F.

2. Windows: Aluminum storefront sections with operable sash, matching storefront.

3. Storefronts and Entrance Framing: Aluminum extrusions with thermal break, nominal 2" wide by 4-1/2" deep, for 1" insulating glass.

4. Finish: Polyvinylidene fluoride (PVDF) coating, PPG Duranar XL metallic finish to be selected, with clear top coat at doors.

- a. Primer: Minimum 03. mil (01. mil) dry film thickness.
 - b. Color coat: 1.0 mil (-0 mil, +01. mil) dry film thickness.
 - c. Top coat: 08. mil (-0 mil, +01. mil) dry film thickness.
5. Glass: Insulating glass units consisting of outboard light of gray tinted glass and interior light of low-E clear glass, 1" thick and using tempered safety glass where required by IBC.
6. Joint Sealers:
- a. Exterior: Single-component non-sag urethane sealant, ASTM C 834 Type S, Grade NS, Class 25.
 - b. Interior: Single-component, non-sag, mildew-resistant, acrylic-emulsion sealant, paintable.

B2030 Exterior Doors

1. Exterior Flush Doors: Comply with ANSI A250/SDI-100.
- a. Steel door frames: Formed steel (hollow metal), minimum 16 gage, galvanized with shop primer finish.
 - b. Steel doors: Flush steel, Level 2 and Physical Performance Level B (Heavy Duty), Model 1 Full Flush, 16 gage (0.053"/1.3 mm) (0.042"/1.0 mm) sheet steel faces. Provide louvered doors at Electrical and Mechanical rooms.
 - c. Steel doors and frames finish: Field-applied, two-component aliphatic urethane coating.
2. Aluminum Entrance Doors: Narrow stile design, with finish and glazing to match aluminum storefront and entrance framing.
- a. Hinges: Continuous aluminum.
 - b. Closers: Concealed overhead.
 - c. Exit devices: Von Duprin 99 Series.
 - d. Pulls: Offset 1" diameter stainless steel rod.
 - e. Locksets: Adams-Rite, with lock cylinder to match building keying.

- f. Finish: Match aluminum storefront framing, including clear topcoat.

B30 Roofing

B3010 Roof Construction

1. Roof Deck Insulation: Composite perlite and polyurethane foam insulation of varying thickness to achieve secondary roof drainage and crickets, minimum insulation thickness to achieve R-30 rating.
2. Roofing: single ply flexible membrane system of reinforced thermoplastic olefin (TPO), fully-adhered, light color, 60 mil thickness and reinforced (no primary liquefied plasticizers modifiers permitted).
 - a. Listing: UL Class A, Wind Uplift: I-90 minimum.
 - b. Total System Warranty: 15 year manufacturer's warranty, no dollar limit.
3. Parapet Copings: Factory-manufactured, formed aluminum with galvanized steel pans and anchoring system, aluminum finish to match aluminum-framed storefronts and windows.
4. Counterflashing: Recessed galvanized steel reglets and stainless steel counterflashing.

B3020 Roof Openings

1. Unit Skylights: Formed acrylic sheet on metal curb assembly, double dome, with outboard sheet of gray tinted acrylic and interior sheet of clear acrylic, sizes as indicated on the Drawings.
2. Roof Hatch: 36" square, thermal insulated, with integral curb, aluminum hatch and safety railings.

C Interiors

C10 Interior Construction

C1010 Partitions

1. Non-Load Bearing Metal Framing: Minimum 22 gage galvanized metal studs, 16" on center, 3-5/8" wide unless greater width required according to manufacturer's published tables for L/240 maximum

deflection.

- a. Provide deep leg bottom track.
- b. Provide flexible head track where studs extend from floor to underside of building framing or floor or roof decking.
- c. Provide 18 gage studs or doubled 22 gage studs at door openings.
- d. Provide proprietary backing plates for attachment of casework and accessories to partitions.

2. Gypsum Board: 5/8" Type X fire-resistive typically.

3. Acoustical Insulation: Acoustical batts, typical except where partition has cased opening.

4. Firestopping and Smoke Seals: Empty openings and openings containing cables, pipes, ducts, conduits and penetrating items through fire resistance rated walls and partitions, including voids around:

- a. Structural members.
- b. Pipes, conduits, cable trays, cables and wires.
- c. HVAC ductwork.

C1020 Interior Doors

1. Flush Wood Swinging Doors: Plain sliced white oak veneer, bookmatched and balanced, with cherry stain and clear varnish, factory-finished, reinforced for door hardware, edges to match face veneer, 1-3/4" thick.

- a. Non-rated: Particleboard core except laminated veneer lumber (LVL) where glazed opening exceeds 14" wide and 24" high.
- b. 20-minute fire-rated: Particleboard core.
- c. Fire-rated 45-minutes and greater: Mineral fiber core.
- d. Door hardware: Comply with applicable accessibility regulations.

1. Hinges: 3-knuckle design, plain bearing at non-rated doors and ballbearing at doors with closers.

2. Closers: Surface overhead, adjustable closing force, LCN

4040 series, parallel arm.

3. Exit devices: Von Duprin 99 Series.

4. Locksets: Schlage L9000 Series, backset 23/4", lever handle 17A design.

5. Keying: Schlage Primus patented keyway, with interchangeable cores, masterkeyed.

6. Metal finish: BHMA 613 oil-rubbed bronze, except BHMA 625 polished chrome in toilet rooms.

2. Access Doors: Rated and non-rated, galvanized steel typically except stainless steel in toilet rooms.

a. Frames: 16 gage.

b. Doors and panels: 14 gage.

3. Glazing:

a. Non-rated doors: Clear float glass, tempered.

b. Fire-rated doors: Proprietary fire-resistive glass, clear.

C1030 Fittings

1. Toilet Partitions: Solid plastic (HDPE polymer) panels, 10 percent recycled materials, marble finish, color to be selected, commercial-grade hardware, except hardware at accessible stalls shall comply with applicable wheelchair accessibility and handicapped persons' use requirements.

a. Toilet compartments: Floor-to-ceiling pilasters.

b. Urinal screens: Stainless steel post, floor to ceiling, continuous wall channel at wall anchorage.

2. Wall Protection: At all corridors.

a. Corner guards: Resilient plastic cover over aluminum retainer, from top of base to ceiling, at all corners. Provide custom covers for corners less than 90 deg.

b. Wall bumper/handrail assembly: Resilient plastic cover over aluminum support, handrail grip in compliance with applicable

handicapped use requirements.

c. Wall protection: Resilient plastic, impact- and abrasion-resistant, from top of base to underside of wall bumper/handrail assembly.

C20 Stairs

C2010 Stair Construction

1. Service Stairs: Pre-engineered, factory-manufactured steel stairs with concrete-filled metal pan treads and landings, with tubular steel handrails and guardrails.
2. Lobby Stairs: Ornamental steel stairs, custom fabricated, with grout-filled metal pan treads and landing, with glass-supported bronze railing.

C2020 Stair Finishes

1. Service Stair Finish: Factory-primed and field-painted semi-gloss finish on steel components; exposed concrete treads and landings with hardener/sealer.
2. Lobby Stair Finish: Treads and landing with ceramic tile finish to match Lobby floor, railing with powder-coated metallic paint finish, exposed stringers and landing framing clad with pre-formed aluminum panels with powder-coated paint finish to match railing.

C30 Interior Finishes

C3010 Wall Finishes

1. Lobby Walls:
 - a. Feature wall: Wood paneling, plain sliced white oak, bookmatched, cherry stain and clear varnish finish.
 - b. Other walls: Vinyl wallcovering to match typical corridors.
2. Corridor Walls: Vinyl wallcovering over prepared gypsum board, heavy weight, pattern and color to be selected.
3. Toilet Rooms: Glazed ceramic tile over portland cement tile backer board, floor to ceiling, tile size nominal 8", with 2" accent trim, thinset.
4. Mailroom and Service Stairs: Gypsum board with GA 214 Level 4 finish, one coat PVA sealer and two coats semi-gloss acrylic enamel paint.
5. Leasing Office: Gypsum board with GA 214 Level 5 finish, one coat

PVA sealer and two coats eggshell low-sheen acrylic enamel paint.

C3020 Floor Finishes

1. Lobby: Porcelain tile, matte finish nominal 18" square field tile with 3" × 3" and 2" × 6" polished accent tile, "medium" bed latex portland cement mortar set over anti-fracture sheet membrane on portland cement concrete slab on grade.
2. Toilet Rooms: Unglazed ceramic mosaic tile, 2" square field tile with 4" high ceramic mosaic base, portland cement mortar thinset on anti-fracture sheet membrane at slab-on-grade and set on CPE sheet waterproofing membrane
3. Corridors: Carpet, multi-level loop, manufacturer, series, pattern and color to be selected, heavy commercial grade, one color throughout, glue-down installation on prepared concrete slab, with resilient rubber base.
4. Leasing Office: Building tenant space standard carpet, cut pile, commercial grade, direct glue-down on prepared concrete slab, with resilient rubber base.
5. Mailroom: Vinyl composition tile, 12" square, white/gray heavy texture, with resilient rubber base and rubber reducer strips.

C3030 Ceiling Finishes

1. Lobby Ceiling: Linear metal acoustical ceiling, polished, tinted bronze finish, with matching light fixture trim and linear HVAC diffusers, nominal 4" wide metal strips with 1" gap and black acoustical insulation.
2. Corridors: Suspended T-bar grid ceiling, 9/16" bottom flange with 1/4" reveal, with 24" × 24" fine, non-directional acoustical panels with regressed edges for flush bottom with ceiling grid, white paint finish on grid and panels.
3. Leasing Office and Mailroom: Tenant space standard suspended T-bar grid ceiling, 9/16" bottom flange, with 24" × 24" fine, non-directional acoustical panels with regressed edges for flush bottom with ceiling grid, white paint finish on grid and panels.
4. Toilet Rooms: Suspended T-bar grid for direct attachment of gypsum board, with 1/2" proprietary Firecode C gypsum board, GA 214 Level 4 finish, one coat PVA sealer and two coats semi-gloss acrylic enamel paint.

D Services

D10 Conveying Systems

D1010 Elevators and Lifts

1. Hydraulic Passenger Elevator: Pre-engineered telescopic holeless design.

a. Performance:

1. Capacity: 4,500 pounds.
2. Landings served: 2.
3. Number of openings: 2, in line.
4. Travel distance: As indicated on the Drawings.
5. Speed: 100 feet per minute, full load, up.
6. Operation: Single Car Automatic.

b. Car design: Lightweight design, sheet steel walls with applied panels covered with custom hardwood veneer paneling and custom bronze handrails at sides and rear.

1. Car size: 5' – 8" wide by 7' – 9-1/2" deep, clear inside. Clear inside dimensions of car shall comply with all applicable wheelchair accessibility and medical emergency regulations.
2. Car inside height: 8' – 0"; clear from floor to underside of metal ceiling.
3. Car doors: Net opening 4' – 0" by 7' – 0", two-speed single slide opening, handing as indicated on the Drawings.
4. Car front: Satin bronze.
5. Ceiling: Metal panels, satin bronze.
6. Lighting: Custom recessed HID fixtures, mounted in metal ceiling.

c. Corridor hoistway frame and doors: Satin bronze.

d. Corridor fixtures: Premium grade, satin bronze.

e. Acoustical isolation and insulation: Mufflers and insulation on operating components, flexible connections on hydraulic and electrical piping, acoustical isolators at piping penetrations, acoustical insulation and resilient furring at gypsum board finishes.

D20 Plumbing Systems

D2010 Plumbing Fixtures

1. Fixture Types, Shell and Core Construction: Lavatories, water closets and urinals, Kohler as quality basis, white color typically, accessible design.

a. Water Closets: Vitreous china, siphon jet, wall-hung, water conserving 1.5 gallon type, with infrared sensor flush valve and open-front solid plastic seat.

b. Urinals: Vitreous china, wall-hung, siphon jet, water conserving 1 gallon, with infrared sensor flush valve.

c. Lavatories: Undercounter-mount, with infrared sensor 0.5 gpm flow-restricted faucet, hot and cold water.

d. Service sink: Floor sink with wall-mounted faucet with hose and nozzle.

e. Drinking fountains: Integral chiller units.

f. Hose bibbs: At building exterior, freeze-proof, and in mechanical room.

D2020 Domestic Water Distribution

1. System shall include water piping, fittings, valves, specialties and insulation.

a. Domestic water service: Metered service to building and fire system, extending from water main to 5' outside building.

1. Service piping: As required by serving utility.

2. Meter: By serving utility, paid by Contractor and reimbursed at no mark-up by Owner.

b. Building domestic water distribution: Through mains, risers and branches to plumbing fixtures and equipment, using copper piping throughout.

2. Circulation Pump: On domestic hot water system.

3. Hot Water Heater: Commercial-grade hot water heater with 200-gallon storage capacity, with heat exchanger for heating mediums from hot water boiler and rooftop solar panels.

D2030 Sanitary Waste

1. System includes waste and vent piping, fittings and connections.

a. Plumbing fixture drains by gravity through soil, waste and vent stacks, to 5' outside building.

b. Piping: Cast-iron no-hub on drain lines and ABS on vent lines, if permitted by Code.

D2040 Rain Water Drainage

1. Roof Drains: Cast iron, with sump and integral overflow, suitable for roofing type.

2. Roof Drainage Piping: No-hub cast iron, from roof to connection to site underground storm drain line. Overflow lines shall exit at planter or paving adjacent to building entrances for visibility.

D2060 Miscellaneous Piping Systems

1. Natural Gas System:

a. Service from site service connection 5' from building to mechanical rooms and rooftop HVAC units.

b. Tenant space service: Routed from mechanical room through both floors, for connection of branches to serve tenant spaces as necessary.

D30 Heating, Ventilating, and Air Conditioning Systems

D3010 Energy Supply

1. Flat Plate Solar Collectors: Rooftop mounted, for domestic hot water boosting, with heat exchanger tank, pumps and controls.

D3020 Heat Generation

1. Low Pressure Heating Hot Water Boiler: Capacity to suit domestic hot water and HVAC uses, natural gas-fired.

- a.** Domestic hot water heating by heat exchanger in hot water tank.
- b.** Boiler controls integrated with flat plate solar collectors and domestic hot water service.

2. Boiler flue: Commercial grade, triple-insulated, stainless steel with isolators, connectors and flue cap.

D3030 Refrigeration

1. Chilled Water System:

- a.** Packaged water-to-air heat pumps, rooftop mounted with vibration isolation.
- b.** Storage tank.
- c.** Chilled water system controls, to integrate with energy management and control system.

D3040 HVAC Distribution

1. Air Distribution System:

- a.** Air handling units: One serving each floor, drawing in and filtering outside air with electronic air cleaning device.
- b.** Sheet metal ductwork: Constructed to SMACNA standards, with thermal and acoustical insulation.
 - 1.** Provide fire dampers where ductwork passes through fire-rated construction.
 - 2.** Interconnect fire dampers with fire alarm system, to close dampers.
- c.** Air inlets: Return air grilles in T-bar acoustical panel ceilings and gypsum board ceilings.
- d.** Air outlets: Linear metal diffusers for Lobby ceiling and painted metal diffusers suitable for specified T-bar acoustical panel ceiling system.

2. Hydronic Distribution System: 2-pipe system hot water distribution system from hot water boiler to air terminal units.

3. Exhaust Fans: Serving toilet rooms, ducted to rooftop fans.

D3050 Terminal and Packaged Units

1. Terminal Heat Transfer Units: Fancoil units in Tenant spaces, with refrigerant coil for cooling and hydronic heating coil for space heating.

D3060 HVAC Controls

1. Pre-engineered control system for control of ventilation, heating and cooling and integrated with access control and lighting control.

D3080 HVAC Testing, Adjusting, and Balancing

1. Testing Agency: Independent testing agency engaged by Contractor and paid by Owner.
2. HVAC Controls: Checking and adjusting for proper operation.
3. Air Balancing: For Lobby, corridors and Leasing Office.

D40 Fire Protection Systems

D4010 Sprinkler System

1. Wet-Pipe Fire Sprinkler System: Design-build system complying with NFPA 13 and requirements of Fire authority having jurisdiction.
 - a. Locate riser and check station in Mechanical Room.
 - b. Provide recessed white sprinkler heads typically.
 - c. Provide exposed brass sprinkler heads in service areas and elevator hoistway.
 - d. Interconnect flow sensors with fire detection and alarm system.

D4020 Standpipes

1. Fire Protection Standpipe System: Located where required by Fire authority having jurisdiction, with capacity and connections according to standards of Fire Department.

D4030 Fire Protection Specialties

1. Fire Extinguisher Cabinets: Recessed cabinets with fire-rated tub, located where required by Fire authority having jurisdiction.
 - a. Cabinet door design: Solid face with "FIRE EXTINGUISHER" notation.
 - b. Fire extinguishers: Dry-chemical type typically and carbon dioxide type in equipment rooms; capacity and installation height

according to requirements of Fire authority.

D50 Electrical Systems

D5010 Electrical Service and Distribution

1. Electric Power: Comply with NFPA 70 (National Electrical Code) and requirements of serving electric utility.

a. New underground electric service from on-site transformer on concrete pad at site perimeter, by serving electric utility. Serving utility shall be responsible for medium voltage trenching, conduit and conductors.

b. New utility-owned meter and customer-owned switchgear in electric utility room.

c. Customer-owned main switchgear.

2. Distribution: Distribution panels, transformers, and subpanels within building. Line voltage to be determined.

3. Electric Branch Circuit Panelboards: In utility closets on each floor, to serve tenant spaces, with separate metering capability for each tenant space. Provide branch circuit panelboards for common areas, elevator, HVAC systems and exterior lighting.

4. Motor Control Centers: For HVAC equipment.

D5020 Lighting and Branch Wiring

1. Electric Branch Wiring: Comply with NFPA 70 (NEC), no aluminum conductors.

a. Provide commercial-grade wiring devices.

b. Provide isolated ground to each tenant space.

c. Provide electrical identification for all circuits and outlets.

2. Interior Lighting, Common Areas:

a. Lobby lighting: High-intensity discharge (HID), recessed in linear metal ceiling system plus HID display lighting for artwork.

b. Corridors: Recessed fluorescent luminaires in T-bar ceiling grid, 24" × 24", gold parabolic reflectors.

c. Mailroom and Leasing Office (building tenant space standard): 24" × 48" recessed fluorescent in T-bar ceiling grid, four-lamp, by-level switching in Leasing Office with occupancy sensors.

d. Emergency exit lighting: On battery system, for corridors and stairways, as required by Code, integrated in general lighting luminaires. Batteries shall be located above ceiling in corridors.

D5030 Communication and Security System

1. Fire Detection and Alarm System: Addressable system, integrated with building automation system and HVAC system, as required by Fire authority having jurisdiction.

a. Smoke detectors shall be as required by authority having jurisdiction, including smoke detectors in HVAC ductwork.

b. Connections to fire dampers and ductwork smoke detectors shall be included.

c. Comply with visual and audible alarm requirements of authority having jurisdiction.

2. Telephone System:

a. Service by serving telephone company, from street to terminal board in electric room, including high-speed data communications.

b. Telephone service to tenant spaces from electrical room to telephone terminal board at each floor; conduit with conductors routed to tenant spaces.

c. Telephone equipment not in contract (NIC).

3. High-Speed Data Communications: Provide separate open conduit with pull cord, from telecommunications terminal board.

4. Cable Television Service: From street to telecommunications terminal board, by serving utility. From terminal board to terminal board at each floor by Contractor, with coaxial cable to each tenant space for connection and equipment by tenant.

5. Public address and music system: Scope and performance characteristics to be determined.

E Equipment and Furnishings

E10 Equipment

E1090 Residential Equipment

- 1. Residential Kitchen Equipment:** For office break areas (Leasing Office only):
 - a.** Undercabinet microwave oven: General Electric, white-on-white, Profile series.
 - b.** Refrigerator: General Electric, white-on-white, Profile series, with icemaker and chilled water dispenser, nominal 27 cubic feet. Provide water filters under sink and serving sink faucet (cold water), hot water dispenser and refrigerator ice maker/chilled water storage.
 - c.** Hot water dispenser: Mounted in sink.
 - d.** Garbage disposer: In-Sink-Erator.

E20 Furnishings

E2010 Fixed Furnishings

- 1. Custom Plastic-Laminate Faced Casework:** For office break areas (Leasing Office only), AWI Custom Grade.
 - a.** Cabinets: Flush overlay design, solid color matte finish laminate as selected by Architect, polished chrome plated 4" wire pull, base cabinet height to suit accessibility regulations.
 - b.** Countertops: Solid surfacing countertop, 1-inch front edge, 4" back and side splashes, Avonite brand, pattern and color as selected by Architect.
- 2. Window Treatment:** Vertical blinds, all exterior windows, PVC vanes, perforated, color as selected by Architect, heavy commercial grade.

F Special Construction and Demolition

F10 Special Construction

F1040 Special Facilities

1. Koi Pond: Interior pool with natural stone surround, waterfall, filtration and circulation system and underwater lighting; custom-design to be determined. Plants and fish by Owner.

G Building Sitework

G10 Site Preparation

G1010 Site Clearing

1. Tree Relocation: Existing oak tree, transplanted to location indicated on Drawings, including temporary removal and storage on site during building and underground utility construction.
2. Clearing and grubbing of site to 24" below new finish grades.

G1020 Site Demolition and Relocations

1. Building Demolition: Existing storage buildings, including garage adjacent to existing residence, including removal of foundations, footings and concrete slabs on grade; removal of basement walls and concrete slabs on grade.
2. Structure Moving: Existing residence, under separate contract by Owner.
3. Paving: All existing asphaltic concrete paving, gravel surfacing, portland cement concrete sidewalks, curbs and gutters within property lines.
4. Utility Demolition: Removal of underground water, natural gas, sanitary sewer and storm drainage lines; removal of existing septic tank and leach field; removal of overhead electric power and telephone lines, including removal of all utility poles.
5. Earthwork: Overexcavate and recompact soil at building pad, drive lanes and parking areas, according to geotechnical report furnished by Owner's geotechnical engineering consultant.
 - a. Under pavement subject to vehicular traffic: 95% relative compaction.
 - b. Under pavement subject to pedestrian traffic: 90% relative compaction.

c. Under building footings, foundations and slabs on grade: 95% relative compaction.

d. Landscape areas: 90% relative compaction except top 12" scarified for planting.

6. Storm Water Pollution Protection: Develop and implement Storm Water Pollution Protection Plan as acceptable to authority having jurisdiction.

G20 Site Improvements

G2020 Parking Areas

1. Parking Lot Base Course: Granular base course, depth and material according to geotechnical report furnished by Owner's geotechnical engineering consultant.

2. Flexible Parking Lot Pavement: Asphaltic concrete paving, medium size aggregate with seal coat, complying with State Department of Transportation standards, with thickness of paving in drive lanes and at trash enclosure to suit loads of fire apparatus and garbage collection vehicle.

3. Decorative Concrete Paving: Imprinted ("stamped") integral color concrete at driveway entrance to parking lot.

4. Pavement Markings: Comply with State Department of Transportation standards for traffic control markings and City standard designs for parking stalls; provide wheelchair accessible stall markings according to requirements of Authority Having Jurisdiction (AHJ).

5. Parking and Traffic Control Signage: As required by authority having jurisdiction, complying with State Department of Transportation standards.

G2030 Pedestrian Paving

1. Walkway Paving, from Parking Areas to Building Entrances: Integral color concrete with medium abrasive blast finish and water repellent.

2. Walkway Paving, from Building Emergency Exits and Pedestrian Paving: Natural color concrete with medium broom texture and water repellent.

G2040 Site Development

1. Site Perimeter Fencing: Omit at street frontage, 8' high precast concrete planks with brick pilasters.

2. Monument Sign: Non-illuminated, brick base and ends, precast

concrete sign panel, design to be determined; sign illumination by ground-mounted HID fixtures, both sides.

G2050 Landscaping

1. Underground Irrigation System: For trees, plants and ground covers, commercial grade, with automatic controller.
2. Planting Area Preparation: Re-use stockpiled topsoil and add additional topsoil as necessary; fertilize planting soil according to agronomic report commissioning and paid by Contractor; provide anodized aluminum edging at planting area perimeter.
3. Specimen Tree: Transplant existing oak tree.
4. Trees, Shrubs and Ground Cover: New trees, shrubs and ground covers, species and sizes to be developed, with commercial-grade supports and accessories.
5. Landscape Maintenance: For 1 year from Contract closeout, including fertilizing, insect control, pruning and irrigation system maintenance and adjustments.

G30 Site Civil and Mechanical Utilities

G3010 Water Supply

1. Domestic Water Supply: By serving utility to water meter inside property line at street side of property. Service line from meter to building by Contractor. Owner will pay for utility charges, including connection fees.
2. Fire Protection Water Supply: By serving utility to point of connection of building fire sprinkler system. Owner will pay for utility charges, including connection fees.

G3020 Sanitary Sewer System

1. Sewer Main: From point of connection in street to building point of connection 5' outside of building foundation, by serving sanitary sewer agency. Owner will pay for utility charges, including connection fees. Include cleanouts in sanitary sewer lines.

G3030 Storm Sewer System

1. Storm Drain Main: From point of connection in street to point of connection to site storm drain point of connection 5' inside of property line, by serving storm sewer agency. Owner will pay for utility charges, including connection fees.
2. Onsite Storm Drainage: Underground RCP storm drain lines, precast concrete catch basins with galvanized steel gratings. Include connections for roof rainwater leader connections.

G40 Site Electric Utilities

G4010 Electrical Distribution

1. Transformer and Disconnect: By serving electric utility, on concrete pad at site perimeter.
2. Underground Electric Service Line: From transformer to building electrical room and meter.

G4020 Site Lighting System

1. Parking Lot Illumination: Pole mounted, cut-off high-pressure sodium, providing illumination according to City maximum allowable.
2. Exterior Building Illumination: For security, all sides of building, wall-mounted except ground-mounted on street side, HID luminaires.
3. Walkway Illumination: Precast concrete bollards with HID lamps.
4. Landscape Illumination: In-ground recessed HID luminaires, uplighting for trees.

Z General

Z10 General Requirements

Z1010 Administration

1. Project Management, Payment Procedures: To be determined and issued by Construction Manager.
 - a. Retainage: 10%.
 - b. Lien releases: Each month, covering previous month's application for payment.
2. Project Coordination:
 - a. Project Meetings:
 1. Weekly construction progress meetings.
 2. Monthly construction progress/payment application review meeting.
 3. Meeting administration by Construction Manager;

requirements to be determined.

3. Construction Progress Schedule: CPM schedule produced by Contractor, with degree of detail and administration according to directions of Construction Manager.
4. Design Submittals: For deferred approval and design-build elements, as directed by Construction Manager and according to requirements of authority having jurisdiction.
5. Contract Modifications: Procedures as directed by Construction Manager, in accordance to the Conditions of the Contract for:
 - a. Requests for Interpretation (RFIs).
 - b. Change Order Requests.
 - c. Requests for Proposal.
 - d. Change Orders.
 - e. Construction Change Directives.
 - f. Architect's Supplemental Instructions.
6. Construction Submittals: Requirements specified by Architect, consistent with General Conditions of the Contract.
 - a. Product data.
 - b. Shop drawings.
 - c. Calculations.
 - d. Certifications.
 - e. Installation Instructions.
 - f. Operation and maintenance data.
 - g. Extra materials and spare parts.
 - h. Warranties and guaranties.

Z1020 Quality Requirements

1. Quality Assurance and Control:

- a. Independent testing and inspection agency: Selected and paid by Owner.
- b. Regulatory requirements: Contractor's responsibilities for compliance with applicable Codes, ordinances and standards.
- c. Contractor's quality control: According to Conditions of the Contract.
- d. Field Mock-Ups: Exterior wall with window/storefront.

Z1030 Temporary Facilities and Controls

- 1. Temporary Utilities: By Contractor, with utility service charges included in Contract Sum.
 - a. Temporary water.
 - b. Temporary heating and ventilating.
 - c. Temporary power and lighting.
- 2. Field Offices: Separate mobile offices for Contractor and for Construction Manager/Testing Laboratory.
 - a. Contractor's office shall include conference space for 12 persons.
 - b. Construction Manager/Testing Laboratory office shall include furnishings, office equipment, consumables and cleaning service.
- 3. Temporary Barriers and Enclosures:
 - a. Make building weathertight as soon as practicable and maintain closures.
 - b. Secure site with temporary chainlink fencing with windscreen and gates.
- 4. Project Identification: Project sign according to design provided by Architect.

Z1040 Project Closeout

- 1. Requirements for Substantial Completion Review: "Punch List," according to instructions to be specified by Architect and Construction Manager.
- 2. Start-Up and Adjusting:

- a. Testing and inspection of building services:
 - 1. Domestic water, including sterilization.
 - 2. HVAC systems, including refrigerant, hot water and air systems.
 - 3. Electrical power: As required by authority having jurisdiction.
 - b. Elevator inspection: As required by authority having jurisdiction; ride shall be adjusted to satisfaction of Architect.
3. Final Completion Inspection:
- a. Inspections completed according to requirements of authority having jurisdiction.
 - b. “Punch List” (correction list) completion review.
4. Completion Submittals:
- a. Project record drawings.
 - b. Site survey.
 - c. Operation and maintenance instructions.
 - d. Warranties and guaranties.
 - e. Final keying of door hardware.
 - f. Spare parts and extra materials.
5. Final Payment: Requirements as specified by Architect and administered by Construction Manager.
- a. Procedures for final application for payment.
 - b. Filing of Notice of Completion with County recorder.
 - c. Requirements for lien releases.
 - d. Final payment and commencement of one-year Correction Period.

Z1050 Permits, Insurance and Bonds

1. Permits and Approvals:

a. Zoning, planning and design reviews and permits: By Owner and Architect.

b. Building permits: Obtained and paid by Contractor; reimbursed by Owner without mark-up.

2. Construction Insurance: Types and coverages to be provided by Owner through Construction Manager.

3. Bonds:

a. Faithful Performance Bond: 100% of Contract Sum.

b. Labor and Material Payment Bond: 100% of Contract Sum.

End of Document

Appendix D

Sample Outline Specifications

Introduction

Following is a sample set of Outline Specifications for a mythical school modernization project. These specifications have been prepared to demonstrate various levels of detail in Outline Specifications. Some sections have well-developed content, while others are merely generalized statements about what will be specified. Inconsistencies in writing style are intentionally included for the reader to identify and consider how improvement may be made.

Outline specifications are produced during the Design Development phase of a project. Several versions should be produced, if there is time, with information and greater detail added as the design develops. The more information is provided, the more accurate the estimates of probable construction cost should be. Also, with design decisions more clearly expressed prior to beginning the Contract Documents phase, the more efficient and consistent will be the production of the Contract Drawings and Contract Specifications.

Note: The technical content of these outline specifications should not be used for actual projects. Select and verify products in compliance with actual project requirements, including applicable codes, regulations, and environmental and budgetary criteria.

Outline Specifications

Fred Rogers Elementary School Modernization

Project Directory

Owner: Smallville Unified School District

Architect: PDQ Associates, LLC, Architecture - Interior Design -
Kitchenware

Civil Engineer: Doze, Digg and Phil, Inc., Civil Engineers

Landscape Architect: Green Side Up, Landscape Architecture

Structural Engineer: William F. Shaky & Associates, Inc., Structural
Engineers

Mechanical Engineer: Pypes and Dux, Consulting Engineers

Electrical Engineer: Sparks & Terror, Consulting Engineers

July 17, 2010

Division 00 - Bidding and Contract Requirements

00 21 00 - Instructions To Bidders

(Owner-produced document)

00 41 00 - Bid Form

(Owner-produced document)

00 52 00 - Agreement Form

(Owner-produced document)

00 72 00 - General Conditions Of The Contract

(Owner-produced document)

Division 01 - General Requirements

01 11 00 - Summary of the Project

A. Project Description:

1. Construction type.
2. Number of stories/buildings.
3. Floor area.

- B. Summary of Work under the Contract
- C. Summary of concurrent Work under separate contracts
- D. Owner-Furnished/Contractor-Installed (OFICI) products
- E. Obtaining and paying for permits, licenses and fees
- F. Construction sequence and schedule
- G. Use of Work area
 - 1. Contractor's use of Work area
 - 2. Owner's continued occupancy and use of existing facilities

01 23 00 - Alternate Bid Procedures

- A. Alternate Bid items to be determined. Preliminary list of Alternate Bids:
 - 1. Roofing:
 - a. Base Bid: Built-up asphalt roofing system; see Section 07 51 13.
 - b. Alternate Bid: Cold-applied built-up roofing system; see Section 07 51 26.

01 26 00 - Contract Modification Procedures

- A. Requirements for Requests for Interpretation (RFIs).
- B. Requests for Proposal (RFPs).
- C. Change Orders.
- D. Construction Change Directives.
- E. Architect's Supplemental Instructions.
- F. Reconciliation of Change Orders.

01 29 76 - Progress Payment Procedures

- A. Preparation and submission of Applications for Payment.
- B. Requirements for substantiating data.
- C. Final application for payment and Contract closeout.

01 31 00 - Project Management and Coordination

- A. Coordination responsibilities of Contractor.

B. Requirements and procedures for meetings.

01 32 00 - Construction Progress Documentation

A. Construction Progress Schedule: CPM schedule using Primavera software, version as directed by Construction Manager.

B. Submittals Schedule: Coordinated with construction progress schedule.

01 33 00 - Submittal Procedures

A. Product Submittals: Requirements for preparation, submission, review and filing for:

1. Product data.
2. Shop drawings.
3. Samples.
4. Certifications.

B. Test and Inspection Reports: Requirements during construction and at Contract Closeout.

01 41 00 - Regulatory Requirements

A. Authority and precedence of Codes, ordinances and standards.

B. Applicable Codes, laws, ordinances and regulations applicable to performance of Work under the Contract.

01 42 00 - References

A. Resources and application of reference standards.

B. Typical abbreviations.

C. Terminology and definitions.

01 45 00 - Quality Control

A. Regulatory requirements for tests and inspections.

B. Independent testing and inspection agency (Testing Laboratory), selection, payment and limitations on authority.

C. Contractor's responsibilities for quality control.

D. Observation of construction by Architect and other responsible design

professionals.

E. Summary of required inspections and tests.

01 50 00 - Temporary Facilities and Controls

A. Temporary Utilities and Services: Requirements for:

1. Heating and cooling during construction.
2. Ventilation during construction.
3. Temporary water service.
4. Temporary sanitary facilities.
5. Temporary power and lighting.
6. Temporary telephone service.

B. Temporary construction barriers, enclosures and passageways.

C. Runoff control, including Storm Water Pollution Protection Plan (SWPPP).

D. Field offices and storage sheds, including separate mobile offices for Contractor and for Construction Manager/Project Inspector.

E. Parking and traffic controls.

F. Work area security.

G. Removal of construction facilities and temporary controls, including restoration.

01 60 00 - Product Requirements

A. General requirements for quality, completeness and integration of products.

B. Requirements applicable to product options.

C. Requirements for product substitutions.

D. General requirements for delivery, storage and handling.

01 70 00 - Execution and Closeout Requirements

A. Execution Requirements: Requirements for application, erection and installation of products, including:

1. Examination.

2. Preparation.
3. Execution.
4. Cleaning.
5. Starting and adjusting.
6. Protection of completed Work.

- B. Progress cleaning.
- C. Contract closeout procedures.
- D. Operation and maintenance data.
- E. Product warranties and guaranties.
- F. Project record documents.

01 91 00 - Commissioning

- A. Requirements for preparation of Commissioning Plan.
- B. System performance evaluations.
- C. General requirements for testing, adjusting and balancing.

Division 02 - Existing Conditions

02 41 13 - Removals and Relocations

- A. Removal and salvage of designated existing products.
- B. Relocation and reinstallation of salvaged products.

02 41 16 - Selective Demolition

- A. Selective Demolition: Removal of portions of existing building, as indicated on Drawings, Including:
 1. Removal of building utility services, such as power and signal circuits and including capping and identification.
 2. Removal of designated building equipment and fixtures.
 3. Removal of designated walls, partitions and components, including cutting of new openings in existing construction for new doors, plumbing HVAC and electrical components.

4. Removal and protection of existing fixtures, materials and equipment items indicated as “salvage.”

B. Handling and disposal of removed materials, including recycling requirements.

Division 03 - Concrete

03 30 00 - Cast-in-Place Concrete

A. Formwork: With shoring, bracing and anchorage, designed by Contractor, comply with ACI 318.

1. Lumber: Douglas fir or douglas fir-larch, grade appropriate for intended use, sound and undamaged straight edges, solid knots.

B. Forming Materials: For form surfaces in contact with concrete at exposed conditions, comply with ACI 301.

1. Forms for exposed finish concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.

2. Forms for unexposed finish concrete: Plywood, lumber, metal or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit. When unexposed concrete is intended to receive waterproofing, provide forming materials as for exposed finish concrete.

3. Fillets for chamfered corners: Wood molding at plywood or lumber forms; rigid plastic at steel, fiberglass and plastic forms.

C. Reinforcing:

1. Reinforcing steel bars: ASTM 615, type and grade as noted on Structural Drawings.

2. Welded steel wire fabric: Not used. Provide reinforcing steel bars as concrete slabs-on-grade.

D. Concrete Materials:

1. Portland cement: ASTM C 150, Type I or Type II, gray color.

2. Aggregates: ASTM C 33

3. Admixtures: Comply with ASTM C 494.

a. Water-reducing admixture: ASTM C 494, Type A.

b. Accelerating or retarding admixtures: ASTM C 494 for Type C or Type B.

c. Plasticizer: Conform to ASTM C 494, Type F.

4. Bonding compound: Polyvinyl acetate, acrylic or styrene butadiene base. Provide polyvinyl acetate compound at interior locations only.

E. Concrete Mixes:

1. Cast-in-place concrete footings and foundations, $F_C = 3000$ psi at 28 days.

F. Cast-in-place retaining wall, $F_C = 3000$ psi at 28 days.

1. Concrete slab-on-grade floors at new building addition, $F_C = 4000$ psi at 28 days, ACI 117 tolerances:

G. Floor Slab Finishes:

1. Floated finishes: Depressions between high spots shall not exceed 1/4-inch under a 10-foot straightedge.

2. Troweled finishes: Achieve level surface plane so that depressions between high spots do not exceed 1/8-inch, using a 10-foot straightedge.

03 54 19 - Cementitious Underlayment

A. Cementitious Underlayment:

1. Self-leveling underlayment for floor slab surface restoration and leveling, ASTM C 349, 4100 psi in 28 days.

2. Surface patching and filling underlayment: Suitable from feather-edge to 1-inch thick, fast-setting.

3. Slab crack filler.

B. Manufacturers:

1. Specified manufacturer: Ardex, Inc., Coraopolis, PA (412/264-4240).

2. Acceptable manufacturers:

a. Sonneborn Building Products, Minneapolis, MN (612/835-3434 or 800/243-6739).

b. Dayton Superior Corp., Miamisburg, OH (513/866-0711 or 800/745-3700).

c. Symons Corp., Des Plaines, IL (708/298-3200 or 800/800-7966).

Division 04 - Masonry

04 22 11 - Reinforced Concrete Unit Masonry

A. Hollow Load Bearing Units: ASTM C 90, Grade N, Type I, two core type, modular sized to $6 \times 8 \times 16$, unless otherwise indicated on Drawings.

1. Weight Classification: Medium weight.

2. Face designs and colors:

a. Type 1: Smooth, Precision masonry units, gray color, for locations to receive applied finish.

b. Type 2: Split Face (S1S and SVSC), tan color to be selected.

c. Type 3: Smooth, Precision masonry unite, black color with honed surface one side and exposed ends.

d. Type 4: Smooth, Precision masonry units, color to match split-face units, with medium abrasive blast finish.

B. Reinforcing: ASTM A 615, yield grade as indicated on Drawings; deformed billet steel bars; plain finish.

C. Veneer Anchors: Fleming Masonry Anchoring System manufactured by Meadow Burke Products, Converse, TX (210/658-6883), consisting of formed steel anchor channel attached to structure and t-shaped steel anchors designed to engage a continuous wire embedded in veneer mortar joint. Anchoring system shall allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wall studs.

D. Mortar and Grout Materials:

1. Portland cement: ASTM C 150, Type as indicated on (Structural) Drawings.

a. Mortar, concealed conditions: Gray color.

b. Mortar, exposed conditions: Tinted color to match concrete masonry units.

2. Mortar materials:

a. Mortar aggregate: ASTM C 144, standard masonry type, clean, dry, protected against dampness, freezing, and foreign matter.

b. Hydrated lime: ASTM C 207, Type as indicated on Structural Drawings.

c. Premix mortar: ASTM C 387, using gray cement, Normal strength.

d. Quicklime: ASTM C 5, non-hydraulic type.

3. Grout materials:

a. Grout aggregate: ASTM C404.

b. Grout course aggregate: Maximum 3/8-inch size; 200 percent by volume.

c. Grout fine aggregate: Washed river sand; 225 percent by volume.

E. Mortar and Grout Mixes:

1. Combined compressive strength, masonry unit and mortar assembly: F'm as indicated on (Structural) Drawings. Strength shall

be verified by masonry prism tests.

2. Mortar compressive strength: As indicated on (Structural) Drawings.

3. Grout compressive strength: As indicated on (Structural) Drawings.

F. Adjustable Masonry-Veneer Anchors: Fleming Masonry Anchoring System manufactured by Meadow Burke Products, consisting of formed steel anchor channel attached to structure and t-shaped steel anchors designed to engage a continuous wire embedded in veneer mortar joint.

Division 05 - Metals

05 12 00 - Structural Steel Framing

A. Steel Shapes:

1. Typical wide flange members: ASTM A 572 for Grade 50.

2. Wide flange members used in braced frame: ASTM A 992.

3. Other steel shapes, bars and plates: ASTM A 36.

B. Structural Steel Pipe: ASTM A53, Grade B, Type E or S.

C. Structural Steel Tubing: ASTM A500, Grade B, $F_y = 46$ ksi.

D. Anchors and Fasteners:

1. Anchor bolts: ASTM A 307, Grade C.

2. Standard bolts: ASTM A 307, Grade A.

3. Plain washers: ASTM F 844 plain (flat) unhardened steel washers.

4. Nuts: ASTM A 563, Heavy Hex, Grade B, plain (non-zinc coated).

5. High-strength threaded fasteners: Heavy hex structural bolts, ASTM A 325, Type 1, Supplementary Requirements S.1, with threads included in shear plane and marked "A 325 T," unless otherwise noted on Contract Drawings.

a. Washers:

1. Hardened type: ASTM F 436, Type 1, style as required.
2. Direct tension load indicating type: ASTM F 959 Type 325 or Type 490.

b. Nuts: ASTM A 563, Heavy Hex, Grade C, plain (non-zinc coated).

E. Welding Materials: AWS D1.1, type as required for materials being welded. Provide electrodes as indicated on Structural Drawings.

F. Shop Primer: According to SSPC-PS Guide 7.00, Guide for Selecting One-Coat Shop Painting Systems, gray color at exposed members.

05 41 00 - Steel Decking

A. Materials:

1. Galvanized sheet steel: Zinc-coated (galvanized) steel sheet, ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating; structural quality.
2. Welding rods: AWS D1.1 and AWS D1.3, type as indicated on the Drawings.
3. Galvanizing repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780. Use cold galvanizing compound field touch-up, ZRC Zinc Rich Coating or equivalent.

B. Steel Roof Decking: Corrugated steel deck, fabricated from galvanized sheet steel, product, gage, depth and width as indicated on Structural Drawings. Comply with applicable ICC Evaluation Service, Inc. (ICC ES) Evaluation Report, current edition.

1. End laps: Flush, unless otherwise indicated on the Structural Drawings.
2. Side laps: Interlocking, unless otherwise indicated.

C. Minimum Structural Properties: As indicated on Drawings.

05 57 00 - Miscellaneous Metal Fabrications

- A. Light structural steel framing members and structural steel support members, with required bracing, welding and fasteners.
- B. Hot-Dipped Galvanizing: General requirements.
- C. Miscellaneous metal fabrications, including:
 - 1. Loose bearing and leveling plates.
 - 2. Steel angle nosings and thresholds.
 - 3. Rough hardware.
 - 4. Sleeves for penetrations through structural members and stud partitions.
 - 5. Fixed metal ladders (roof access ladders).
 - 6. Trash enclosure gates.
- D. General requirements for anchors and fasteners:
 - 1. Expansion anchors
 - 2. Powder-actuated driven fasteners.
 - 3. Grouting compounds.

Division 06 - Wood, Plastics and Composites

06 10 00 - Rough Carpentry

- A. Lumber for Framing: Softwood lumber, manufactured in compliance with PS 20 - American Softwood Lumber Standard and according to WCLIB or WWPA grading standards as applicable, nominal dimensions indicated.
 - 1. Sill plates: Pressure preservative treated, douglas fir, No. 1 grade or better.
 - 2. Studs: No. 1 grade, douglas fir or douglas fir-larch.
 - 3. Posts:
 - a. 4-inches thick, 4-inches wide: No. 1 grade, douglas fir or

douglas fir-larch.

b. 4-inches thick, 6-inches and wider: Select Structural douglas fir.

4. Ceiling and roof joists:

a. 2- to 4-inches thick, 4-inches wide: No. 2 or better douglas fir or douglas fir-larch.

b. 2- to 4-inches thick, 6-inches and wider: No. 1 douglas fir or douglas fir-larch.

5. Roof beams: 6-inches and thicker, 6-inches and wider: Select Structural douglas fir.

6. Blocking and bridging: No. 2 and better, douglas fir or douglas fir-larch.

7. Surfacing: S4S, unless otherwise indicated.

8. Moisture Content: All lumber shall be kiln-dried to percent specified below. Air season in place, protected from rain and high humidity conditions, no less than 15 days before applying finish materials.

a. Concealed lumber: 19 percent maximum moisture content at time of dressing and shipment, unless otherwise indicated.

b. Exposed lumber and timber: 15 percent at time of delivery, unless otherwise indicated.

B. Construction Panels: APA Performance-Rated Panels, Group 1 Series, PS 1.

1. Plywood panels for roof sheathing: Douglas fir, Structural I, APA RATED SHEATHING.

a. Exposure Durability Classification: EXTERIOR.

b. Thickness: As indicated on the Drawings.

c. Edge detail, low slope roofs: Square if all edges supported on framing or tongue-and-groove (T&G) if edges are

unsupported. Plyclips will not be acceptable.

d. Edge detail, high slope roofs: Square.

2. Plywood panels for wall sheathing: Douglas fir, Structural I, APA Rated Sheathing.

a. Exposure Durability Classification: Exterior.

b. Thickness: As indicated on the Drawings.

c. Edge detail: Square.

C. Framing Anchors and Connectors: Simpson Strong-Tie Co., Pleasanton, CA (510/460-9912) or equal.

06 18 00 - Glued-Laminated Construction

A. Wood Species for Glued-Laminated Wood Beams:

1. Lumber for members not exposed to weather: Douglas fir-larch lumber conforming to WCLIB or WWPA grading standards.

2. Lumber for members exposed to weather: Alaskan Cedar (Pacific Coast Yellow), also known as Alaskan Yellow Cedar (*Chamaecyparis Nootkatensis*), heartwood.

B. Glued-Laminated Wood Beams Fabrication: ANSI/AITC A190.1 and AITC 117, using laminating stock and adhesives of type to suit specified Service Grade and exposure.

1. Members not exposed to view and not exposed to weather: Douglas fir, Industrial appearance grade, Service Grade 24F-V8. Simple span members may be 24F-V4.

2. Members exposed to view but protected from weather by roof: Douglas fir, Architectural appearance grade, Service Grade 24F-V8.

3. Members exposed to view and not protected by roof: Alaskan Yellow Cedar, Architectural appearance grade, Service Grade 20F-V12.

C. Connectors, Anchors, and Accessories: Provide stock- and custom-fabricated connectors of structural steel (ASTM A 36) shapes, plates and

bars, welded into assemblies of types and sizes indicated, with steel bolts (ASTM A 307), lag bolts, and other fasteners, as indicated and as necessary.

06 20 23 - Interior Finish Carpentry

A. Softwood Lumber and Moldings: For opaque, painted finish, AWI Custom Grade, WWPA Grading Rules, C-Select.

B. Hardwood Lumber and Moldings: For transparent finish, AWI Custom Grade, white oak.

C. Construction Panels: For telecommunication backboards, minimum APA C-D PLUGGED.

1. Exposure Durability Classification: EXPOSURE 1.

2. Thickness: As indicated on the Drawings, or, if not otherwise indicated, not less than 15/32-inch thick.

3. Fire-retardant treatment: If required by authorities having jurisdiction or serving utility.

06 41 00 - Architectural Wood Casework

A. Casework, Classrooms: Plastic-laminate faced casework, AWI Custom Grade, Flush Overlay Construction.

1. Casework panels: ANSI A208.2, Grade MD, medium density fiberboard (MDF), formaldehyde-free.

2. Plastic laminate, exposed surfaces: NEMA LD 3 and ANSI A161.2., solid color, matte finish, as selected by Architect from manufacturer's full selection of standard and limited production colors.

a. Vertical applications: NEMA Type GP28 (0.028-inch nominal thickness) or NEMA Type PF42 (0.039-inch nominal thickness).

b. Horizontal applications, other than countertops, and mill option for vertical applications: NEMA Type PF42 (0.039-inch nominal thickness).

3. Plastic laminate backing: NEMA LD-3, BK 20, high pressure paper base laminate without a decorative finish; Style ND, Type IV,

0.020-inch thick, smooth surface finish, for backing at countertops and other concealed locations.

4. Cabinet liner: High-pressure cabinet liner laminate (HPL), 0.020-inch thick. Provide white color, unless otherwise directed.

5. Panel edging: PVC edge band, to match exposed panel face.

B. Casework, Reception Desk in Administration: Hardwood veneer, AWI Premium Grade, Flush Overlay construction.

1. Casework panels: Hardwood plywood complying with HPM standard, veneer (plywood) core.

2. Hardwood lumber: White oak.

3. Hardwood veneer: White oak, rotary sliced, book matched.

4. Finish: Cherry stain and catalyzed polyurethane varnish.

Division 07 - Thermal and Moisture Protection

07 21 00 - Building Thermal Insulation

A. Thermal Batt Insulation: Flexible, resilient, noncombustible blankets of mineral or glass fiber, complying with ASTM C 665, type, class and facing material as indicated following.

1. Concealed conditions: ASTM C 665, Type III, Class C, Category 1, vapor-retarding kraft facing.

2. Exposed conditions: ASTM C 655, Type III, Class A, Category 1, fire-resistant, foil-reinforced-kraft (FRK) facing.

07 51 13 - Built-Up Asphalt Roofing

A. (Base Bid) Roofing: Hot-applied built-up asphalt roofing system consisting of base ply plus two interplies of asphalt impregnated and coated glass fiber roofing felts, with granule-surfaced glass fiber cap sheet and modified bitumen (SBS) flashing materials, manufacturer's 10 year No Dollar Limit warranty.

07 51 26 - Cold Process Built-Up Roofing

A. (Alternate Bid) Roofing: Cold-applied built-up roofing consisting of rosin paper underlayment, base ply of mineral-surfaced asphalt-coated fiberglass roofing sheet, three plies of coated fiberglass roofing sheet, adhered with cold-applied asphalt based adhesive and surfaced with fiberglass-reinforced asphalt emulsion, and coated with aluminum emulsion reflective surfacing, manufacturer's 15 year No Dollar Limit warranty.

07 62 00 - Sheet Metal Flashing and Trim

- A. Extruded aluminum fascia and gravel stop, painted.
- B. Flashings at roof projections to be stainless steel.

07 71 00 - Manufactured Roof Specialties

- A. Factory-manufactured reglets and counterflashing; stainless steel sheet metal.
- B. Factory-manufactured, formed aluminum parapet copings, prefinished, custom color.

07 72 13 - Roof Accessories

- A. Roof hatch with integral sheet metal curb, aluminum cover, with safety railing system.

07 84 13 - Penetration Firestopping

A. Through-Penetration Firestopping at Fire-Rated Construction: Provide firestopping materials and assemblies to seal all penetrations at all fire barriers. Firestopping assemblies shall be listed in the UL Fire Resistance Directory under categories XHCR and XHEZ, providing that such assemblies conform to the construction type, penetration type, annual space requirements and fire-rating requirement for each distinct condition, and that the system shall be symmetrical for wall applications.

07 92 00 - Joint Sealants

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses.

1. Exterior elastomeric joint sealant: One-Part Neutral-Curing

Silicone Sealant, Type S, Grade NS, Class 50; suitable for Uses NT, M, G, A and, as applicable to joint substrates indicated, O.

2. Interior sanitary joint sealant: One-Part Mildew-Resistant Silicone Sealant (Sealant Type 2), Type S, Grade NS, Class 25; suitable for Uses NT, G, A and, as applicable to non-porous joint substrates indicated, O; formulated with fungicide.

3. Interior floor joint sealant: One-Part Moisture-Cured Polyurethane (Sealant Type 3), Type M, Grade NS, Class 25

B. Interior Calk (Painter's Calk): Non-movement joints not intended to prevent passage of moisture or water, one-part, non-sag, mildew-resistant, acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable.

C. Joint Backing: Preformed, compressible, resilient, non-waxing, non-extruding strips of flexible, non-gassing plastic foam, non-absorbent to water and gas.

Division 08 - Doors and Windows

08 11 12 - Steel Doors and Frames

A. Steel Door Frames: Full-formed sheet steel frames for doors, transoms, sidelights, borrowed lights, fixed windows and other openings, of types and styles as shown on Drawings and schedules, with concealed fastenings, welded construction, complying with ANSI A250.

1. Exterior door frames: 14 gage minimum gage steel, galvanized steel, shop primer finish.

2. Interior door frames: 16 gage minimum steel, primer painted steel finish.

B. Steel Doors: Full flush panel steel doors, complying with requirements indicated below by reference to ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level.

1. Exterior steel doors: Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless), 0.053-inch (1.3 mm) thick faces.

2. Interior steel doors: Not used.

08 14 16 - Flush Wood Doors

A. Flush Wood Doors: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

1. Classroom interior doors: Custom (Grade A faces), Natural Birch, rotary cut, for opaque (painted) finish.

2. Administration Building doors: Custom (Grade A faces), White Oak, plain sliced, bookmatched, for cherry color stain and clear polyurethane varnish finish.

B. Door Construction:

1. Non-fire-rated doors: Particleboard core.

2. 20-minute fire-rated doors: Particleboard core.

3. 45-minute and greater fire-rated doors: Mineral core.

4. Door edges: Hardwood to match door face.

C. Warranty: Lifetime of installation.

08 33 11 - Access Doors and Panels

A. Specified Manufacturer: Karp Associates, Inc. (www.karpinc.com)

B. Acceptable Manufacturers:

1. Larsen's Manufacturing Co. (www.larsenmfg.com)

2. Nystrom Access Doors & Hatches (www.nystrom.com)

3. Or equal.

C. Access Panels in Walls: Sizes as indicated on Drawings.

1. Gypsum board walls, dry locations, non-rated: Karp DSC-214M, plain steel.

2. Gypsum board walls, damp locations, non-rated: Karp DSC-214M, stainless steel.

3. Gypsum board walls, ceramic tile wall finish, non-rated: Karp DSB-214SM, flush-mounted with face of tile, stainless steel finish.

4. Gypsum board walls, dry locations, fire-rated: Karp KRP-150FR, UL-listed B-Label assembly, 20 gage steel door in 16 gage steel frame, filled with 2-inch thick fire-rated insulation, with automatic closer, self-latching bolt-type latch.

D. Access Panels in Ceilings: Sizes as indicated on Drawings.

1. Gypsum board ceilings, dry locations, non-rated.

2. Gypsum board ceilings, dry locations, fire-rated.

3. Gypsum board ceilings, damp locations, fire-rated.

E. Keying: Lock cylinder keyed to building lock system; coordinate with Section 08 71 00 - Door Hardware.

08 71 00 - Door Hardware

A. Door Hardware: Match District Standards and existing campus hardware.

B. Keying: Integrate with existing grand masterkey system.

08 81 00 - Glass Glazing

A. Interior Glass: Clear float glass, Q3 (Glazing Select) quality, annealed, heat-strengthened or tempered as indicated. Provide double-strength (DS) glass typically except where tempered glass is required. Unless otherwise indicated, interior clear glass shall be 3/16-inch thick, minimum.

B. Exterior Glass:

1. Tinted Float Glass: Q3 (Glazing Select) quality, annealed, heat-strengthened or tempered as indicated, Solexia™, light green tint as manufactured by PPG Industries, Inc., Springdale, PA (724/274-7900 or 800/258-6398), double-strength (DS) glass, 1/4-inch thick typically.

2. Low-Emissivity Coated Float Glass: PPG Solarban® 60-XL Low-E Glass, annealed clear coated float glass meeting requirements of ASTM C 1036, Type 1, Class 1, Quality q3; with pyrolytic coating on Surface 3 in sealed insulating glass units, thickness and performance attributes as specified below for sealed insulating glass units.

C. Safety Glass: Tempered where required by US Consumer Product

Safety Commission Standard 16CFR1201 CI and CII.

D. Sealed Insulating Glass Units: Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated. Performance:

1. Transmittance:

- a. Visible light: 60 percent.
- b. Ultra-violet light: 8 percent.
- c. Total solar energy: 25 percent.

2. Reflectance:

- a. Visible light: 11 percent.
- b. Total solar energy: 11 percent.
- c. U-value:

1. Winter: 0.29.

2. Summer: 0.28.

3. Shading coefficient: 0.42.

4. Solar heat gain coefficient: 0.37.

5. Light to solar gain (LSG): 1.62.

Division 09 - Finishes

09 22 16 - Non-Load Bearing Metal Framing

A. Interior Light Gage Metal Framing: ASTM C 645, minimum yield strength 33 ksi, size as indicated on Drawings, galvanized, minimum 22 gage, actual gage according to manufacturer's product data to limit deflection to L/360.

B. Flexible Head Track: Proprietary deflection track, steel sheet top runner manufactured to prevent cracking of gypsum board applied to

interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs.

09 23 00 - Gypsum Plastering

A. Work Included: Patching of existing gypsum plaster. Match existing materials and finishes.

09 29 00 - Gypsum Board

A. Gypsum Board:

1. Typical: ASTM C36, Type X (special fire-resistant), typically 48-inches wide and 5/8-inch thick.

2. Impact-resistant gypsum board: For corridors and other locations indicated, USG Fiberock Brand VHI Panels, or equal, consisting of face layers of fiberglass scrim embedded in a high-density layer of gypsum and cellulose fibers, with perlite core, producing panels with high resistance to abrasion, indentation and penetration.

B. Finishing Materials and Accessories:

1. Joint treatment materials, general: ASTM C 475.

2. Finishing or topping compound: Factory-mixed compound, specifically formulated and manufactured for use as filling and finishing compound.

3. Cornerbead: USG No. 800 or equal.

4. Edge Trim: USG No. 200-B or equal.

5. Casing Bead: USG No. 66, square edge, or equal.

C. Installation and Finishing: Comply with GA-201 and GA-216.

1. Concealed Locations: GA-214, Level 1. Provide this level of finish at locations such as plenum areas above ceilings, in attics, in areas where assembly would generally be concealed.

2. Semi-Exposed Locations: GA-214, Level 2. Provide this level of finish at locations such as under paneling and in service spaces not exposed to public view.

3. Locations with Texture Topping and Paint Finish: GA-214, Level

3. Provide this level of finish with orange peel spray-texture topping compound covering no less than 80 percent of surface. Otherwise, provide Level 4 finish and not less than 60 percent of surface with spray-texture topping compound.

4. Locations to Receive Flat and Eggshell Paint on Smooth Surface: GA-214, Level 4. Provide this level of finish at locations with flat and eggshell paint finishes. Gypsum board shall be covered with spray-applied topping with not less than 60 percent of surface covered with topping compound.

09 30 13 - Ceramic Tiling

A. Floor Tile: Unglazed ceramic mosaic floor, thinset over crack isolation membrane on cured portland cement concrete slab on grade, similar to TCA Handbook Method F122, using latex-modified portland cement setting mortar.

B. Wall Tile: Glazed wall tile installation, thinset over portland cement tile backer board, using latex-portland cement setting mortar, TCA Handbook Method W244.

09 51 13 - Acoustical Panel Ceilings

A. Acoustical Panel Ceilings:

1. Classrooms: Armstrong Silhouette XL bolt-slot ceiling grid with 15/16-inch bottom flange and white painted finish, with Armstrong Fine Fissured panels, catalog no. 1821.

2. Offices: Armstrong Prelude XL ceiling grid with 9/16-inch bottom flange and white painted finish, with Armstrong Fine Fissured panels, catalog no. 1821.

B. Seismic Bracing: Comply with details indicated on the Drawings, requirements of International Building Code (IBC).

09 65 00 - Resilient Flooring

A. Resilient Tile Flooring: ASTM F 1066, Composition 1, Class 2 (nonasbestos formulated), homogeneous through thickness, Tarkett series as indicated on the Drawings.

B. Resilient Base and Accessories: ASTM F 1861, Type TS, Group 1, Style A & B, surface applied, smooth finish, solid colors, with molded

inside and outside corners and end stops.

C. Finish: Coordinate with District maintenance program. Field-applied finish shall yield minimum static coefficient of friction of 0.5, when tested according to ASTM D 2047.

09 91 00 - Field Painting

A. Air Quality Regulations: Comply with State and regional air quality regulations.

B. Waste Management: Comply with local regulations for recycling of unused paints and coatings.

C. Painting: Typically primer plus minimum two finish coats at unpainted surfaces and minimum one coat. Finishes:

1. Exterior steel: As specified in Section 09970 - Coatings for Exterior Steel.

2. Exterior plaster and concrete: 100 percent acrylic, low sheen.

3. Interior gypsum board and gypsum plaster: 100 percent acrylic, eggshell (low-sheen) finish except toilet rooms semi-gloss finish.

4. Interior wood, opaque finish: 100 percent acrylic, semi-gloss finish.

5. Interior wood, stain and varnish finish: Wood stain plus two coats of clear satin polyurethane varnish.

6. Interior steel: 100 percent acrylic, semi-gloss finish.

D. Colors: As indicated on the Drawings. Colors by Sherwin Williams Company are indicated.

09 97 16 - Coatings for Exterior Steel

A. Coatings on Exterior Steel Framing, Decking, Door Frames, Doors, Flashing and Sheet Metal: Products by Tnemec Company, Inc., North Kansas City, MO (816/474-3400) or equal.

1. Primer, plain steel: Tnemec Series 90-97 Tnemec-Zinc, two-component catalyzed epoxy coating (2.5–3.5 mils DFT).

2. Primer, galvanized steel: Tnemec Series 66 Epoxoline, two-component catalyzed epoxy coating (2–3 mils DFT).

3. Finish: Tnemec Series 75 Endura-Shield, pigmented, aliphatic, polyurethane coating, semi-gloss sheen (3 mils DFT minimum).

Division 10 - Specialties

10 13 11 - Visual Display Boards

A. Porcelain Enamel Markerboards:

1. Fixed markerboards.
2. 3-panel vertical sliding markerboards, wall-mounted.
3. 3-panel horizontal sliding markerboards, casework-mounted.

10 21 13.21 - Plastic Toilet Partitions

A. Solid Polymer Toilet Room Partitions: Solid HDPE polymer panels, 10 percent recycled materials, Comtec Industries, Inc., Moosic, PA (570/348-0997) complying with applicable accessibility regulations.

1. Toilet compartments: Floor-to-ceiling design, with pilasters anchored to floor and ceiling, and side panels and doors standard 55-inches high.
2. Urinal screens: Floor-to-ceiling end pilaster design, with 42-inch high by 24-inch deep panel.

10 28 13 - Toilet Accessories

A. New satin finish stainless steel toilet room accessories, including recessed paper towel dispensers, soap dispensers, toilet paper dispensers, seat cover dispensers, grab bars and metal-framed mirrors.

10 51 13.23 - Metal Lockers RefurbishING

- A. Preparation and repainting of existing steel lockers.**
- B. Replacement of worn and damaged hardware, including accessible door latches, shelves and hooks.**

Division 11 - Equipment

11 53 13 - Projection Screens

A. Front Projection Screens: Manual pull-down, wall-mounted, Da-Lite Model C Roller-Type Screen, with CSR (Controlled Screen Return) feature, standard format, 70-inches high by 70-inches wide, glass bead-coated, optical-quality flexible fabric, with standard black masking borders, with black extra drop fabric, fire retardant and mildew resistant.

Division 12 - Furnishings

12 21 00 - Window Blinds

A. Horizontal Slant Louver Blinds: Nominal 1-inch aluminum blinds, two colors as selected by Architect, at Administration Building offices.

Division 13 - Special Construction

13 31 00 - Fabric Structures

A. Sunshade Fabric Structure: Fabric structure, including framing, cables, connectors and fabric. Fabric structures shall be designed, engineered and fabricated by manufacturer to configurations indicated on the Contract Drawings.

Division 14 - Conveying Equipment

14 42 00 - Wheelchair Lift

A. Wheelchair Lift: Electric-powered, interior platform (wheelchair) lift for access to Stage in Multipurpose Room, complying with applicable accessibility regulations.

Divisions 15 through 20

Not Used

Division 21 - Fire Suppression

21 05 00 - Common Work Results for Fire Suppression

A. Section Includes: Pipe, fittings, valves, and connections for fire sprinkler systems

21 10 00 - Water-Based Fire Suppression System

A. Section Includes:

B. Quality Assurance:

1. Sprinkler Systems: Design and install fire sprinkler system in compliance with NFPA 13.

2. Welding Materials and Procedures: Conform to ASME Code.

3. Valves: Listed by Underwriters Laboratories, Inc. and approved by Factory Mutual Research Corporation. Must be marked with UL and FM. Manufacturer's name and pressure rating must be marked on valve body.

C. Sprinkler And Standpipe Piping, Above Ground:

1. Steel Pipe: Schedule 40 black welded and seamless steel pipe for fire protection use, complying with ASTM A795 or A135, and shall be UL listed and FM approved. Pipe shall provide corrosion resistance ratio (CRR) of 1.00 or greater according to UL listing.

2. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped composition sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

3. Steel Fittings: ANSI/ASME B16.5, steel flanges and fittings; ANSI/ASME B16.11, forged steel socket welded and threaded.

D. Gate Valves: Bronze body, bronze trim, rising stem, handwheel, inside screw, single wedge or disc, threaded ends.

1. Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged grooved ends.

E. Globe and Angle Valves:

1. Up to 2 Inches: Bronze body, bronze trim, rising stem and handwheel, inside screw, renewable composition disc, screwed

ends, with backseating capacity re-packable under pressure.

2. Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, plug/type disc, flanged or grooved ends renewable seat and disc.

F. Ball Valves:

1. Up to and including 2 Inches: Bronze one piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, threaded ends.

G. Butterfly Valves: Bronze body, stainless steel disc, resilient replaceable seat, flanged or grooved ends, extended neck, handwheel and gear drive and integral indicating device.

H. Check Valves:

1. Up to and including 2 Inches: Bronze swing disc, screwed ends.

2. Over 2 Inches: Iron body, bronze trim, swing disc, renewable disc and seat, flanged ends or grooved ends.

I. Glass View Valve: Inspector's fire sprinkler test valve/glass view valve as detailed on Drawings.. Provide shop drawings and submittal on this item.

J. Drain Valves:

1. Bronze compression stop with hose thread nipple and cap.

2. Brass ball valve with cap and chain, 3/4 inch hose thread.

K. Sprinkler Heads:

1. Provide pendant spray type sprinkler heads with escutcheons in areas with finished ceilings.

2. Provide upright in areas with exposed piping.

3. Sprinkler heads in boiler rooms, furnace rooms, or heater rooms shall be furnished with blue arms or blue frangible glass bulbs rated at 286 degrees F. Sprinkler heads in attics that will experience over 100 degrees ambient temperature shall be furnished as 210 to 212 degree rated heads. If a sprinkler is directly affected by a spotlight, steam, or other heat source, then a 360 degrees F sprinkler head will be furnished. Sprinkler heads in all other locations, unless otherwise noted, shall be 165 degrees F rated

Division 22 - Plumbing

22 05 00 - Common Work Results for Plumbing

A. Section Includes: Expansion fittings and loops for plumbing, meters and gages for plumbing piping, general-duty valves for plumbing piping, hangers and supports for plumbing piping and equipment, vibration and seismic controls for plumbing piping and equipment and identification for plumbing piping and equipment.

22 07 00 - Plumbing Insulation

A. Section Includes: Thermal insulation on domestic hot water supply and return piping.

22 11 00 - Facility Water Distribution

A. Section Includes: Domestic hot and cold water piping. Specialties and hot water recirculating pumps.

22 13 00 - Facility Sanitary Sewerage

A. Section Includes: Sanitary waste and vent piping, piping specialties and sanitary waste interceptors.

22 14 00 - Facility Storm Drainage

A. Section Includes: Facility roof and balcony drainage piping, roof drains, deck drains, piping specialties and sump pumps.

22 34 00 - Fuel-Fired Domestic Water Heaters

A. Section Includes: Natural gas-fired domestic water heater, 200 gallon capacity.

22 40 00 - Plumbing Fixtures

A. Section Includes:

1. Flush Valve Water Closet (Floor Mounted):

a. Bowl: Floor mounted vitreous china closet with elongated rim.

- b.** Flush valve: Sloan Royal, Seat; open front without cover.
- 2.** Flush Valve Water Closet (Floor Mounted ADA Accessible):
 - a.** Bowl: Floor mounted vitreous china, 17 inches high closet with elongated rim for handicapped use.
 - b.** Flush valve and seat same as above.
 - c.** Flush valve on wide side.
- 3.** Flush valve water closet (Floor mounted stainless steel);
 - a.** Bowl floor mounted stainless steel, height varies, closet with elongated bowl. (See fixture schedule for ADA requirements.)
 - b.** Flush valve and seat same as above.
- 4.** Urinal: Wall hung back-outlet, vitreous china fixture designed for flushometer valve operation. Siphon jet, flushing rim, top spud flushometer 1.0 gallon per flush, $\frac{3}{4}$ inch connection with 2 inch outlet. Installation to include fixture support. (See fixture schedule for ADA requirements.)
- 5.** Wall Hung Uni Basin (one to three basins):
 - a.** Basin: Solid surface uni-basin complete with thermostatic mixing valve, check stops, supply and waste connections to the wall and 1 $\frac{1}{2}$ " P-trap.
- 6.** Floor Drain - Toilet Room:
 - a.** Cast iron, flashing collar with adjustable 5" square adjustable nickel bronze top and trap primer connections.

Section 22 47 00 - Drinking Fountains And Water Coolers

- A.** Section Includes: Hi-Lo, Handicapped with stainless steel top, stainless steel body, bubbler, stream regulator, mounting bracket.

Division 23 - Heating, Ventilating and Air Conditioning

23 05 00 - Common Work Results For HVAC

A. Section Includes: Common motor requirements for HVAC equipment, expansion fittings and loops for HVAC, meters and gages for HVAC piping, general-duty valves for HVAC piping, hangers and supports for HVAC piping and equipment, vibration and seismic controls for HVAC piping and equipment, and identification for HVAC piping and equipment.

B. Mechanical and Electrical Coordination:

1. Responsibility: Unless otherwise indicated, provide motors and controls for Division 15 equipment, set in place, and wire in accordance with specifications.

2. Control Wiring:

a. Consists of wiring in pilot circuits of contactors, starters, relays, and wiring for valve and damper operators that is not a part of mechanical work.

b. For single phase devices where power current passes through controller, wiring between controller and device shall be considered control wiring; wiring to device from electric panel is considered power wiring.

C. Coordination of Mechanical Openings: Coordinate mechanical openings with related or adjacent work.

D. Coordination with Other Work: Coordinate mechanical work with related or adjacent work.

1. Chases, Inserts and Openings:

a. Provide measurements, drawings and layouts so that openings, inserts and chases in new construction can be built in as construction progresses.

b. Check sizes and locations of openings provided.

c. Cutting and patching made necessary by failure to provide measurements, drawings and layouts at the proper time shall be done at no additional cost to the Owner.

2. Support Dimensions: Provide dimensions and drawings so that concrete bases and other equipment supports to be provided under other Sections of the Specifications can be built at the proper time.

E. Mechanical Vibration and Seismic Control:

1. Elastomeric isolator pads.
2. Elastomeric mounts.
3. Restrained elastomeric mounts.
4. Restrained spring isolators.
5. Housed spring mounts.
6. Elastomeric hangers.
7. Spring hangers with vertical limit stop.
8. Thrust limits.
9. Support assemblies.
10. Spring isolators.
11. Elastomeric isolator pads.
12. Snubber bushings.
13. Restraining cables.
14. Anchor bolts.
15. Equipment base isolation and brackets.

23 05 93 - Testing, Adjusting, Balancing

A. Section Includes: Testing requirements.

B. Quality Assurance:

1. Qualification: Work shall be done by a firm certified by the National Environmental Balancing Bureau (NEBB) or the Associated Air Balance Council (AABC).

2. Industry Standards: Comply with one or all of the following:

- a. HVAC Systems Testing, Adjusting, Balancing published by SMACNA.**
- b. Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems published by NEBB.**
- c. Procedural Standards for Certified Testing of Clean Rooms published by NEBB.**

C. Testing, Adjusting and Balancing:

- 1. Air systems.**
- 2. Detailed requirements.**
- 3. Report.**

23 07 00 - HVAC Insulation

A. Section Includes: Insulation for mechanical materials, equipment and components.

B. Quality Assurance:

1. Regulatory Requirements:

a. Fire Test Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame spread rating of 25 or less, and smoke developed rating of 50 or less.

2. Insulation Installed Outdoors: Flame spread rating of 75 or less, and smoke developed rating of 150 or less.

C. Materials:

1. Semirigid and flexible duct, plenum and breeching insulation.

2. Insulating cements.
3. Field applied jackets.
4. Accessories and attachments.
5. Sealing compounds.
6. Duct insulation.
7. Outdoor duct insulation.
8. Equipment insulation.
9. Breeching and stack insulation.

23 09 00 - Instrumentation and Controls for HVAC

A. Section Includes:

1. Control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory wired controls.
2. Instruments, devices, wiring and conduits, and accessories required for a complete installation.

B. Equipment:

1. Space Thermostats: Heavy duty type room thermostats suitable for industrial environment with adjustable sensitivity and calibrated dial.
2. Smoke detectors
3. Fire alarm supervisory control circuits.
4. Automatic dampers and smoke dampers.
5. Damper operator.
6. Interlocks.

23 05 93 - Testing, Adjusting, Balancing

A. Section Includes: Testing requirements.

B. Quality Assurance:

1. Qualification: Work shall be done by a firm certified by the National Environmental Balancing Bureau (NEBB) or the Associated Air Balance Council (AABC).

2. Industry Standards: Comply with one or all of the following:

a. HVAC Systems Testing, Adjusting, Balancing published by SMACNA.

b. Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems published by NEBB.

c. Procedural Standards for Certified Testing of Clean Rooms published by NEBB.

C. Testing, Adjusting and Balancing:

1. Air systems.

2. Detailed requirements.

3. Report.

23 09 93- Sequence of Operations for HVAC Controls

A. Section Includes:

1. Control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory wired controls.

2. Instruments, devices, wiring and conduits, and accessories required for a complete installation.

B. Sequence of Operation and Points List: To be developed.

23 31 00 - HVAC Ducts and Casings

A. Section Includes: Ductwork and installation products.

B. Quality Assurance:

1. Regulatory Requirements: Comply with Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) recommendations for fabrication, construction and details, and installation procedures, except as otherwise indicated.

C. Materials:

1. Ductwork materials.
2. Round duct.
3. Miscellaneous accessories.

23 33 00 - Air Duct Accessories

A. Quality Assurance:

1. Regulatory Requirements:

- a. Comply with SMACNA recommendations for fabrication, construction and details, and installation procedures, except as otherwise indicated.

B. Materials:

1. Flexible duct, low pressure.
2. Flexible duct, high pressure.
3. Louvers.
4. Fire dampers (standard width).
5. Fire dampers (thin line).
6. Combination fire/smoke dampers.
7. Ceiling radiation dampers.
8. Miscellaneous ductwork accessories.

23 34 00 - HVAC Fans

A. Section Includes: Air handling units.

B. Performance Ratings:

1. Capacity Ratings:

a. Fans: Certified according to ARI 430.

b. Coils: Certified according to ARI 410.

2. Horsepower: Do not increase or decrease fan motor horsepower without written approval from Architect.

C. Quality Assurance:

1. Fire Ratings: Provide thermal and/or acoustical insulation which conforms to the following ratings when tested in accordance with ASTM E 84 (NFPA 255):

a. Flame Spread: 25 or less.

b. Fuel Contributed: 50 or less.

c. Smoke Developed: 50 or less.

D. Centrifugal Fans:

1. Centrifugal Fans for Indoor Installations: Belt-driven with housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, support structure.

2. Tubular Centrifugal Fans: Tubular inline, belt driven with housing, wheel, outlet guide vanes, fan shaft, bearings, drive assembly, motor, mounting brackets, accessories.

3. Inline Centrifugal Fans: Inline, belt driven with housing, wheel, outlet guide vanes, fan shaft, bearings, drive assembly, motor and disconnect switch, mounting brackets, accessories.

E. Axial Fans:

1. Propeller Axial Fans: Belt driven or direct drive propeller fan with fan blades, hub, housing, orifice ring, motor, drive, accessories.

2. Vaneaxial Axial Fans: Belt driven or direct drive, variable pitch or adjustable pitch, vaneaxial fan with fan wheel and housing, straightening vane section, factory mounted motor, inlet cone

section, accessories.

23 37 13 - Diffusers, Registers and Grilles

- A. Section Includes: Diffusers, registers and grilles for HVAC systems.
- B. Regulatory Requirements:
 - 1. Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
 - 2. Install air terminal units according to NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
 - 3. Provide products tested in accordance with Air Diffusion Council test codes and bearing ADC seal.
- C. Materials: Compatible with ceiling construction.
 - 1. Grilles, registers and diffusers.
 - 2. Linear slot diffusers.
 - 3. Bypass single duct air terminal units
 - 4. Dual duct air terminal units.
 - 5. Fan powered air terminal units.
 - 6. Induction air terminal units.
 - 7. Shutoff single duct air terminal units.
 - 8. Integral diffuser air terminal units.

23 41 00 - Particulate Air Filtration

- A. Air Filters: ASHRAE 52, ARI 850, NFPA 90A, 90B.
 - 1. Replaceable (Throwaway) Panel Filters: Flat panels, interlaced glass fiber media, 20 gauge (.0329-inch) (.8 mm) galvanized steel frame, 20 gauge (0.0329-inch) (.8 mm) galvanized steel duct holding frame.

2. Cleanable (Washable) Panel Filters: Flat panels, zinc electroplated steel screening media, 18 gage (0.0358-inch) (.9 mm) galvanized steel duct holding frames.
3. Extended Surface Disposable Panels Filters: Fibrous material media in deep pleats, galvanized steel frame, holding frames.
4. Extended Surface Non-Supported Media Filters: Fibrous material with flexible internal supports, galvanized steel frame, duct holding frames.
5. Automatic (Self Renewing) Roll Filters: Automatic, motor driven type, with fibrous glass material media, galvanized steel holding frame, [manual] [automatic] control.
6. Activated Carbon Filters: Carbon trays in deep V arrangement with replaceable panel prefilter, activated carbon media, 14 gage (0.0625-inch) (1.6 mm) epoxy coated steel frame, 16 gage (.0598-inch) (1.5 mm) galvanized steel duct holding frames.
7. High Efficiency Particulate Air (HEPA) Filters: UL 586 fibrous glass media with vinyl coated aluminum separators, galvanized steel frame, suitable media to frame side bond and face gasket, duct holding frames.
8. Electronic Air Cleaners: Galvanized steel assembly with electronic agglomerator and prefilters, ionizing wire media, self-contained power pack, safety accessories.
9. Front and Rear Access Filter Frames: Aluminum framing members, prefilters, sealers.
10. Side Service Housings: 16 gauge (0.0598-inch) (1.5 mm) galvanized steel side service housings, prefilters, access doors, sealers.
11. Filter Gauges: Diaphragm type with suitable filter gauge range, manometer type filter gauge.

23 74 00 - Packaged Outdoor HVAC Equipment

- A. Section Includes: Air conditioning units.
- B. Quality Assurance: Regulatory Requirements:

1. Applicable provisions of NFPA 70 - National Electric Code.
 2. Provide air handling unit thermal insulation with flame spread index of 25 or less, fuel contributed index of 50 or less, and smoke developed index of 50 or less.
 3. Air Movement and Control Association (AMCA) standards as applicable to testing and rating fans, and testing louvers, dampers and shutters.
 4. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) ductwork construction standards as applicable.
 5. Provide refrigerant coils complying with construction and testing standards of ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration.
 6. ASHRAE recommendations applicable to packaged air handling units.
 7. Provide central station packaged air handling units which comply with Air Conditioning and Refrigeration Institute (ARI) Standard 430 and display ARI's certification symbols.
 8. Provide electric components for air handling units which have been listed and labeled by Underwriters Laboratories International (ULI).
 9. Applicable portions of the International Building Code (IBC) as adopted by Authority Having Jurisdiction (AHJ).
- C. Equipment: Air conditioning units including mixing box, fans and motors, compressors, filters, coils, drip pan, thermal insulation, outdoor casing, roof curb, internal isolators of moving equipment and complete factory assembly of all components.

Divisions 24 and 25

Not Used

Division 26 - Electrical

26 05 00 - Common Work Results For Electrical:

A. Section Includes: Electrical power conductors and cables, grounding and bonding, raceways and boxes, cable trays, underfloor raceways, underground ducts and raceways, and identification for electrical systems.

B. Grounding and Bonding:

1. Primary grounding.

2. Substation grounding.

3. Power system grounding.

a. Communication system grounding.

b. Electrical equipment and raceway grounding and bonding.

C. Grounding Materials:

1. Grounding Accessories: Ground rods and connectors.

2. Secondary Grounding:

a. Electrical grounding and bonding systems indicated; with assembly of materials, including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding electrodes and plate electrodes, bonding jumper braid, surge arresters and additional accessories needed for a complete installation.

b. Where more than one type component product meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products which comply with NEC, UL and IEEE requirements and with established industry standards for those applications indicated.

c. Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding system connections that match power supply wiring materials and are sized according to NEC.

D. Hangers and Supports:

1. Conduit and equipment supports.
2. Fastening hardware.
3. Support Channel: Galvanized or painted steel.
4. Hardware: Corrosion resistant.

E. Conductors and Cable:

1. Building Wire:

a. Thermoplastic insulated Building Wire: NEMA WC 5.

b. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, THW, THHN/THWN, or XHHW. Aluminum alloy (AA-8000) wire in sizes 1/0 and larger may be substituted for copper for feeders if ampacity is equal to or greater than copper ampacity and if voltage drop is equal to or less than copper voltage drop.

c. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THW, THHN/THWN, or XHHW, 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid conductor.

d. Control Circuits: Copper, stranded conductor 600 volt insulation, THW or THHN/THWN.

2. Remote Control and Signal Cable:

a. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 75 degrees C, individual conductors twisted together and covered with a PVC jacket.

b. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degrees C, individual conductors twisted together, and covered with a PVC jacket; UL listed.

F. Raceways and Boxes:

1. Raceways:

- a.** Surface metal raceways.
- b.** Multioutlet assemblies.
- c.** Auxiliary gutters (wireways).

2. Conduit:

- a.** Rigid metal conduit and fittings.
- b.** Intermediate metal conduit and fittings.
- c.** Electrical metallic tubing and fittings.
- d.** Flexible metal conduit and fittings.
- e.** Liquidtight flexible metal conduit and fittings.
- f.** Non-metallic conduit and fittings.
- g.** Liquidtight flexible non-metallic conduit.

3. Boxes:

- a.** Wall and ceiling outlet boxes.
- b.** Pull and junction boxes.

4. Cabinets and Enclosures:

- a.** Hinged cover enclosures.
- b.** Cabinets.
- c.** Terminal blocks and accessories.

G. Wiring Devices:

1. Wall Switches:

- a.** Wall Switches for Lighting Circuits: NEMA WD 1; FS-W S-896; AC general use snap switch with toggle handle, rated 20

amperes and 120-277 volts AC.

b. Color selected by Architect.

2. Receptacles:

a. Convenience and Straight-blade Receptacles: NEMA WD 1; FS W-C-596.

b. Locking Blade Receptacles: NEMA WD 5.

c. Convenience Receptacle Configuration: NEMA WD 1; Type 5-20 R.

d. Specific-Use Receptacle Configuration: NEMA WD 1 or WD 5; type as indicated on Drawings.

e. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter.

f. Color selected by Architect.

3. Wall Plates:

a. Decorative Cover Plate: Smooth high abuse nylon or lexan in dry locations, stainless steel in damp or wet locations (kitchens, toilet rooms, etc.).

b. Weatherproof Cover Plate: Gasketed thermoplastic.

c. Color as selected.

H. Wiring Connections:

1. Cords and Caps:

a. Straightblade Attachment Plug: NEMA WD 1.; FS W-C-596.

b. Locking Blade Attachment Plug: NEMA WD 5.

c. Attachment Plug Configuration: Match receptacle configuration at outlet provided for equipment.

d. Cord Construction: Oil resistant thermoset insulated Type

SO multiconductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage.

e. Cord Size: Suitable for connected load of equipment and rating of branch circuit overcurrent protection.

I. Enclosed Switches and Circuit Breakers: Individually mounted enclosed switches and circuit breakers, rated 600 V and less, used for disconnecting and protection functions.

1. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle, interlocked with cover.

2. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, and lockable handle, interlocked with cover.

3. Molded Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

a. Thermal Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit breaker frame sizes 250 A and larger.

b. Adjustable Instantaneous Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

c. Current Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

d. GFCI Circuit Breakers: Single- and two-pole configurations with 30 mA trip sensitivity.

4. Molded Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.

a. Lugs: Suitable for number, size, trip ratings, and material of conductors.

b. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air conditioning, and refrigerating equipment.

c. Ground Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time delay settings, push to test feature, and ground-fault indicator.

d. Shunt Trip: 120 volt trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.

5. Listed for environmental conditions of installed locations, including:

a. Outdoor Locations: NEMA 250, Type 3R.

b. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

J. Electrical Identification:

1. Nameplates and tape labels.

2. Wire and cable markers.

3. Nameplates: Engraved three layer laminated plastic, white letters on a black background (normal power), white letters on a red background (emergency power).

4. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.

5. Conduit Color Coding Identification:

a. Paint or tape the following systems with the appropriate color on conduits every 30 feet and every pullbox.

b. Fire Alarm System: Yellow.

c. Security System: Purple.

d. Emergency Power: Red.

K. Electrical Testing:

1. Electrical testing.

a. Testing Equipment: Provide Megger tester for megohmmeter and earth tester.

b. Tools: Provide tools required for opening test facilities, making wire connections, splicing, and other purposes.

c. Ground Mat Test.

d. 600 Volt Wire and Cable Test.2. Accessories required for complete testing.

2. Quality Assurance:

a. IES LM-50 Photometric Measurement of Roadway Lighting Installations

b. IEEE 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System

c. National Electrical Testing Association (NETA) Standards for Testing.

26 24 00 - Low Voltage Switchboards and Panelboards

A. Switchboards: Main and distribution switchboards.

1. Switchboard Construction and Ratings: Factory assembled, dead front, metal enclosed, front accessible and self supporting switchboard assembly conforming to NEMA PB2, and complete from incoming line terminals to load side terminations.

a. Rating: Indicated on drawings.

2. Switching and Overcurrent Protective Devices:

a. Fusible switch assemblies, 600 amperes and less.

3. Fuses:

a. Fuses 600 Amperes and Less: Dual element, current limiting, time delay, UL Class J, RK 1 or RK 5 as scheduled on Drawings.

b. Fuses 601 Amperes and Larger: Current limiting, time delay one time fuse, 600 volts, UL Class L.

c. Interrupting Rating: 200,000 rms amperes.

4. Instruments and Sensors:

a. Metering.

b. Current Transformers: ANSI C57.13; 5 ampere secondary, bar or window type, with secondary winding and secondary shorting device, primary/secondary ratio as required.

c. Ground Fault Sensor: Zero sequence type.

d. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay adjustable from 0 to 15 seconds.

B. Panelboards: Lighting and appliance branch circuit panelboards.

1. Branch Circuit Panelboards

a. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1; circuit breaker type. FS W-P-115; Type I, Class 1.

b. Enclosure: NEMA PB 1; Type 1 or Type 3R. as required.

c. Cabinet Size: 53/4-inches (146 mm) deep; 20-inches (508 mm) wide.

d. Provide flush or surface cabinet front as indicated on the Drawings with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

e. Provide with copper bus, minimum AIC rating of 10 K and ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.

f. Molded Case Circuit Breakers: NEMA AB 1; FS W-C-375; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for circuit breaker switched lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.

- g. Series rate system with upstream overcurrent device.

26 22 00 - Low Voltage Transformers

A. Description: Dry type two winding transformers.

B. Materials:

1. Dry Type Two Winding Transformers:

a. Dry Type Transformers: ANSI/NEMA ST 20; factory assembled, air cooled dry type transformers; ratings as shown on the Drawings.

b. Insulation system and average winding temperature rise for rated KVA.

26 51 00 - Interior Lighting

A. Section Includes:

1. Interior luminaires and accessories.

2. Lamps.

3. Ballasts.

B. Interior Luminaires and Accessories:

1. Fluorescent Luminaires: FS W-F-414; provide hinged frames with spring latches, and virgin acrylic lenses unless scheduled otherwise on Drawings.

2. Recessed Fluorescent Luminaires: Provide trim type and accessories required for installation in ceiling system installed.

3. Exit Signs: Stencil face, 6-inch (150-mm) high red letters on white background, directional arrows as indicated, universal mounting type as scheduled.

4. Recessed fixtures shall be thermally protected and UL listed.

5. Lamps:

a. General Use Incandescent Lamps: Inside frosted type, rated

130 volts.

b. Incandescent Reflector Lamps: Shape as scheduled, rated 130 volts.

c. Fluorescent Lamps: Energy saving type compatible with ballasts provided as scheduled on the drawings.

6. Fluorescent Ballasts:

a. Fluorescent Ballasts, Magnetic: ANSI C82.1; high power factor type; nominal 430 ma Lamp Ballasts: Low energy type.

b. Fluorescent Ballasts, Electronic: Frequency of operation of 20 kHz or greater, and operate without visible flicker; power factor of 95 percent or above; sound rated A.

26 56 00 - Exterior Lighting

A. Section Includes:

1. Exterior luminaires and accessories.
2. Lamps.
3. Ballasts.

B. Exterior Luminaries and Accessories:

1. Enclosures: Complete with gaskets to form weatherproof assembly.
2. Provide low temperature ballasts, with reliable starting to 0 degrees F (-17 degrees C).
3. Lamps:
 - a.** Metal Halide HID Lamps: As scheduled on Drawings.
 - b.** High Pressure Sodium Lamps: As scheduled on Drawings.

Division 27 - Communications

Not Used

Division 28 - Electronic Safety and Security

Not Used

Division 29 and 30

Not Used

Division 31 - Earthwork

31 10 00 - Site Clearing

- A. Clearing of plant life and grass, surface rocks and debris.
- B. Removal of minor existing construction within Project area.
- C. Grubbing of root systems of trees and shrubs, abandoned utility lines and structures, and other below grade obstructions.
- D. Protection of trees, landscaping, site improvements, utilities, and other items not scheduled for clearing or that might be damaged by construction activities.
- E. Handling and disposal of debris, including compliance with waste management regulations.

31 20 00 - Earthwork

- A. Site Preparation: Excavation, filling, backfilling and grading of site, including:
 - 1. Stockpiling of soil for later use under the Contract.
 - 2. Shoring and underpinning.
 - 3. Foundation excavations.
 - 4. Dewatering.
- B. Trenching and backfilling for underground utilities.
- C. Capillary break stone fill under slabs-on-grade: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM

D 448, coarse aggregate grading size 57, with 100 percent passing a 1 1/2 inch (38 mm) sieve and not more than 5 percent passing a No. 8 (2.36 mm) sieve to provide, when compacted, a smooth and even surface below slabs on grade.

Division 32 - Exterior Improvements

32 12 11 - Asphaltic Concrete Paving

- A. Patching of existing asphaltic concrete (a.c.) paving where cut for new underground utilities.
- B. New a.c. paving over Class 2 aggregate base at playground expansion, including fine aggregate top course of a.c.
- C. Repair of existing a.c. paving at locations designated on Drawings.

32 12 22 - Portland Cement Concrete Paving

- A. New natural-color portland cement concrete paving at locations designated on Drawings, with medium texture broom finish.
- B. New integral-color, exposed aggregate portland cement concrete at reconstructed Courtyard.

32 17 23 - Pavement Marking

- A. Parking and traffic control markings on asphaltic concrete paving and portland cement concrete curbs.
- B. Playground markings on asphaltic concrete paving.

32 84 00 - Planting Irrigation

- A. Modifications to existing landscape irrigation system to suit reconfigured and expanding planting areas for trees, shrubs and groundcovers.
- B. New irrigation system, including controller, for reconstructed turf playfields.

32 31 13 - Chain Link Fencing

- A. Modifications to existing chain link fencing, including accessible gate hardware and additional fencing to enclose expanded turf playfields; fencing shall be green PVC coated to match existing.

32 91 00 - Planting Preparation

- A. Removal and disposal of existing plant materials in existing planting areas.
- B. Removal of existing turf and sterilization of existing soil.
- C. Soil amendments and fertilizers in planting areas, including turf areas.
- D. Weed abatement.
- E. Black anodized extruded aluminum edgings at perimeter of planting areas where no adjoining paving.

32 82 00 - Turf and Grasses

- A. Hydroseeding of turf areas.

32 93 00 - Landscape Planting

- A. New trees at parking lot adjacent to Administration Building.
- B. Shrubs and ground cover at reconfigured planting areas adjacent to new building addition.

Division 33 - Utilities

33 31 11 - Sanitary Sewerage System

- A. New sanitary sewer lines from new toilet rooms to existing sanitary sewer line in street.

33 51 00 - Natural Gas Distribution

- A. New natural gas service line to new building addition from on-site gas main.

Divisions 34 through 49

Not Used

End of Outline Specifications

Appendix E

Sample AIA Documents

Introduction

Following are AIA documents referenced in Chapters 1 through 21 and noted as being included in this appendix. These sample documents have been reproduced with the permission of the AIA for educational purposes only.

Clean copies of these documents, for use in Project Manuals, should be obtained from the AIA. Most local chapter offices stock these documents, or they may be obtained by contacting:

The American Institute of Architects (AIA)

1735 New York Avenue, N.W.

Washington, DC 20006

202/626-7300 or 800/365-2724

www.aia.org/documents

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AIA[®] Document A701[™] – 1997

Instructions to Bidders

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THE ARCHITECT:
(Name and address)

TABLE OF ARTICLES

- 1 DEFINITIONS
- 2 BIDDER'S REPRESENTATIONS
- 3 BIDDING DOCUMENTS
- 4 BIDDING PROCEDURES
- 5 CONSIDERATION OF BIDS
- 6 POST-BID INFORMATION
- 7 PERFORMANCE BOND AND PAYMENT BOND
- 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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1

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

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§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

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ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

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§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

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§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.



Contract Administration G612 Owner's Instructions to the Architect Regarding the Construction Contract

GENERAL INFORMATION

PURPOSE. AIA Document G612 is directed toward the most common method of arriving at a construction contract, the bidding process. Though it is recommended that all three parts of G612 be given to the Owner simultaneously, they may be staggered.

USE OF CURRENT AIA DOCUMENTS. Prior to using any AIA Contract Document, users should consult the AIA Contract Documents Web site, www.aia.org/documents, or visit a local component chapter to be certain they are using current document editions.

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COMPLETING AIA DOCUMENT G612

AIA Document G612 is divided into a chronological sequence based on the sequence of information requirements on a construction project. Part A of the document relates to contracts, Part B relates to insurance and bonds, and Part C deals with bidding procedures.

Questions relating to the contract may alert an Owner to construction methods and procedures that may affect drawings and specifications and may be overlooked until such documents are almost ready to be issued for bid purposes (e.g., construction to be performed by owner's own forces; fast-track; phased occupancy). Because many items relating to the contract will have some bearing on the development of construction documents, it is important to place Part A in the Owner's hands at the earliest possible phase of the Project, allowing sufficient time to incorporate relevant instructions into these documents.

The use of General Conditions and Supplementary Conditions is often overlooked for cost-plus or phased (fast-track) construction contracts when the Owner-Contractor Agreement is entered into prior to completion of Drawings and Specifications and assembly of other material for the Project Manual. The General Conditions are as important for those forms of agreement as they are for stipulated-sum contracts based on bidding and should be part of those agreements when signed. When used with B141-1997, the project summary completed in B141-1997 should be checked for consistency with the completed G612.

Responses relating to insurance and bonds cannot appropriately be given until specific General Conditions are chosen, as the General Conditions document normally contains any basic insurance requirements. For that reason, Part B should be given to the Owner along with Part A.

The early date by which instructions in Part A and Part B will be required may be too early for the determination of bidding procedures requested in Part C. It would be appropriate, if timing is questioned, to suggest that Owner replies to Part C may be delayed for a time but should be returned to the Architect prior to completion of the Construction Documents. It is imperative that comments are returned before the completion of the Construction Documents so proper arrangements can be made for issuing sets of bidding documents in anticipation of receipt of bids.

The Architect should acquaint the Owner with the G612 document and its purpose, and should be prepared to explain the need for the requested information and provide necessary assistance, particularly by furnishing any related documents which may contribute to obtaining sufficient information for purposes of the construction agreement and bidding procedures. When discussing contractual documents and insurance, it is essential that the Architect keep in mind that the Architect's advice is for guidance purposes only and that relevant decisions in these matters are for the Owner's lawyers and insurance advisors to make. A letter similar to the following example may be used to transmit the questionnaire and related forms to the Owner.

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Dear Owner:

Although we are just starting the construction documents for your project, it is important that we have, at your earliest convenience, information regarding the construction contract, insurance, surety bonds and bidding instructions. Your reply can have considerable bearing on many decisions we will have to make during preparation of drawings and specifications.

Information regarding bidding procedures could be delayed until a later date if these questions cannot be responded to at the same time the other material would be forthcoming.

For your convenience, enclosed in duplicate, is a tri-part questionnaire seeking answers to our major concerns involving the construction process. Along with the questionnaire we have enclosed a standard form of construction agreement, related General Conditions and a standard form of Instructions to Bidders; those are for your information, review and approval or other recommendations. We have also enclosed a recent sample Supplementary Conditions, which illustrates the kind of modifications needed to tailor the standard document to a specific project.

Both you and the Contractor will be required to maintain certain insurance coverages during the construction period. These are set forth in the General Conditions, Article 11, along with the bonding option, and suggestions for typical modifications related to coverages, limits and bonds are found in the accompanying suggested Supplementary Conditions.

We urge that you review all of the enclosures with legal and insurance counsel; the will, of course, be available for explanation, interpretation and advice as may be needed. Your insurance advisor should review the suggested requirements in careful detail and evaluate the protection you and the Contractor should be advised to carry.

We would appreciate an early response to these inquiries. Only one copy of the questionnaire and documents need to be returned to us.

Yours truly,
Q. A. Architect

CHANGES FROM AIA DOCUMENTS G610 AND G611

1. Format Changes

Information requests relating to the construction contract have been grouped together in Part A, Owner's Instructions Regarding the Construction Contract.

2. Changes in Content

AIA Document G612 requests that the Owner provide a detailed description of the building-site property, state whether the Contractor or Contractors will be selected by bidding or negotiation, and indicate which Instructions to Bidders will be used. If multiple contracts are to be utilized, the Owner is asked to indicate how coordination of separate Contractors will be accomplished. In addition, minor changes have been made in the requests for information regarding insurance and bonds to take account of changes in the available policy forms.

COMPLETING AIA DOCUMENT G612

The information requests contained in AIA Document G612 are fairly straightforward and require little explanation. However, the information supplied in response to certain requests may have ramifications that are not immediately apparent. These situations are explained below.

2. Part A—Item 6

The single-contract arrangements listed in this request may be effected using the forms of agreement listed in Item 7 and the General Conditions listed in Item 8. Portions of construction by the Owner's own forces and phased construction (fast-track) may be effected by using these documents with suitable modifications. Multiple contracts may also be executed using these documents.

3. Part A—Item 6

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If the Contractor(s) are to be selected by negotiation, Part C need not be completed.

4. Part A—Items 12-16

The information requested herein relates specifically to information that may be incorporated in the Agreement and the Conditions of the Contract Between Owner and Contractor as well as division 1 of the Specifications.

5. Parts A and B

Contract language embodying the requirements listed herein may be found in AIA Document A511, *Supplementary Conditions to the Contract for Construction*.

EXECUTION OF AIA DOCUMENT G612

The completed AIA Document G612 should be signed and dated by the Owner or a person authorized to act on the Owner's behalf. The Owner should retain at least one copy and forward the original to the Architect.

SAMPLE

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Contract Administration

G612 Owner's Instructions to the Architect—Part A, Page 1 of 5

Owner (Name and address):

Date:

Project Title:

Project Number:

Architect (Name and address):

NOTATION TO OWNER—In consultation with your attorney and other appropriate advisors, complete this form, which will provide your instructions regarding requirements for Contract Documents for this Project. Please return the completed form to your Architect. After reviewing your instructions, the Architect will proceed with the preparation of construction-related documents. Respond carefully to every question.

1. What is the Project title to be used in the Contract Documents?

2. What is the legal name and address of the Owner as you wish it to be stated in the Contract Documents?

3. How will the Owner be designated?

Corporation

Partnership

Individual

Other (Specify) _____

If a corporation, what is the state of incorporation? _____

Is it qualified to do business at the Project location? Yes No

Is the Owner, identified in the Contract Documents, the owner of the Project site? Yes No

4. What is the name and title of the Owner's Representative?

Supplementary Conditions of the Contract and General Requirements may or may not be discussed and reviewed directly with Owner's attorney, _____,

whose address is _____.

Telephone () _____

Fax () _____

Email _____

Supplementary Conditions of the Contract and General Requirements may or may not be discussed and reviewed directly with Owner's insurance advisor, _____,

whose address is _____.

Telephone () _____

Fax () _____

Email _____

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Contract Administration

G612 Owner's Instructions to the Architect—Part A, Page 2 of 5

During the construction of the Project, will the Owner's employees be responsible for on-site field representation?

Yes No

5. What is the legal description of the Project site, including the legal name and address of the property owner if different from the Owner identified above?

How will the Owner provide a site survey to the Contractor? Directly from Owner Directly from the surveyor
If from the surveyor, list surveyor's name, address and date of survey.

How will the Owner provide a subsurface investigation report? Directly from Owner Directly from the geotechnical engineer
If from the geotechnical engineer, list the geotechnical engineer's name, address, date of report and report number.

Are special surveys required? Yes No
If so, describe.

Will the Contractor be required to make a videotaped survey of existing conditions prior to starting selective demolition or construction? Yes No
If so, specify which areas of the building or areas surrounding the site require a survey.

6. How will the Project be contracted?
- Single contract, stipulated sum
 - Single contract, Cost of the Work plus a fee
 - Multiple contracts, stipulated sum
 - Multiple contracts, Cost of the Work plus a fee
 - Portions of construction by Owner's own forces

Describe phasing of construction or fast-track project delivery requirements, if any.

(Note: A contract may be phased without being fast-tracked. Please describe any specific criteria for project delivery requirements and attach any available information.)

7. When contracting for the Project, what will be the form(s) of agreement between Owner and Contractor(s)?

(Note: Refer to the Instructions for a complete list of related AIA Owner-Contractor Agreements.)

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Contract Administration
G612 Owner's Instructions to the Architect—Part A, Page 3 of 5

8. What will be the form of the general conditions of the contract for construction?
 AIA Document A201, *General Conditions of the Contract for Construction*
 AIA Document _____

Do the administrative responsibilities of the Architect during construction, as defined in the Owner-Architect agreement, differ from those specified in the form of general conditions of the contract for construction being used?
 Yes No

If so, how do you wish to describe the Architect's different responsibilities to the Contractor?

9. Are any portions of the bidding requirements to be included in the Contract Documents (advertisement or invitation to bid, instructions to bidders, sample forms, the Contractor's bid or portions of Addenda relating to bidding requirements)? Yes No
If so, specify which portions. _____

How many copies of Drawings and Project Manuals will be furnished to the Contractor at the Owner's cost?

10. (Note: The Owner has a right under AIA general conditions to perform construction and to award separate contracts.)
In addition to the general contract for construction, will there be any separate construction contracts? Yes No
If so, summarize scope of such separate contracts. _____

Are there works of separate contracts to be performed concurrently for the Owner on the Project? Yes No
If multiple, separate, contracts as described above are to be used, how will the Owner coordinate the activities of the Contractors?

- Through the Owner's own forces
 Through another service contract

If so, who is providing the service and what is the scope?

If other service contracts exist, please attach a copy of the construction phase duties.

Are there any items to be furnished or installed by the Owner's own forces? Yes No

If so, describe. _____

Do any of these Owner-furnished items require coordination (such as special scheduling, sequencing or inclusion on the Drawings or Specifications) of Work? Yes No

If so, describe. _____

11. (Note: According to the AIA General Conditions, within seven days of receipt the Architect will issue or withhold certificate for payment to the Owner.)

What day of the month will the Architect receive the Application for Payment?

- No later than the _____ day of the _____ month.

Unless otherwise provided, will the form of Application for Payment and Certificate for Payment be AIA Document G702 and AIA Document G703 and the Continuation Sheet for G702? Yes No

If no, please attach sample document.

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Contract Administration

G612 Owner's Instructions to the Architect—Part A, Page 4 of 5

Will payment be made for completed portions of Construction Change Directives prior to execution of a Change Order? Yes No

Should Applications for Payment be accompanied by the Contractor's partial waiver of liens for Work? Yes No

Is a preliminary copy of the Application for Payment required for review by the Owner and Architect prior to submittal of each application? Yes No

12. When will the Contractor's applications for payment be paid?

- By the _____ day of each month
 Other (Specify) _____

13. Retainage:

(a) What percentage of retainage of each progress payment to the Contractor will be retained?

- _____% of each payment.
 _____% of each payment until the Work is 50% complete, after which remaining partial payments shall be paid in full without reduction of previous retainage.
 _____% of each payment (calculated separately for each Work category) until the Work is 50% complete, after which remaining partial payments shall be paid in full without reduction of previous retainage.
 Other (Specify) _____

(b) Upon Substantial Completion, what will the retainage be reduced to?

- _____% of completed work
 \$ _____
 Architect's estimate of incomplete or defective Work remaining in contract (lump sum)

Are there any other inspections or approvals after Substantial Completion that will be required prior to release of retainage or final payment, which are critical to your use and occupancy of the Project? Yes No
If so, describe in detail. _____

(c) Will retained amounts be paid into an escrow account in a financial institution chosen by the Contractor and approved by the Owner, the interest earnings from which accrue to the benefit of the Contractor? Yes No

(d) On a cost-plus-fee contract, will retainage be held on the Contractor's fee?

- Yes No
If so, indicate percentage: _____%

Will retainage on the Contractor's fee be released upon Substantial Completion? Yes No

If no, specify circumstances. _____

Will there be any early releases of retainage to some subcontractors? Yes No

If so, specify which subcontractors. _____

(e) Will retainage information be published in the Supplementary Conditions? Yes No

(Note: The primary location of retainage information is in the Agreement. Reference may be made in the Supplementary Conditions if subcontractors or other are to be made aware of these requirements.)

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Contract Administration

G612 Owner's Instructions to the Architect—Part A, Page 5 of 5

14. Are liquidated damages required? Yes No

If required, liquidated damages shall be assessed in the amount of \$_____ per day for each calendar day necessary to achieve Substantial Completion beyond the date set forth in the AIA Owner-Contractor Agreement.
(NOTE: When liquidated damages are stipulated, it is important that Subcontractors be made aware of this provision of the Contract. Therefore, in addition to inclusion in the AIA Owner-Contractor Agreement, it is recommended that language be included in the Instructions to Bidders and Supplementary Conditions.)

15. Do you know about, or have you been informed of, any hazardous materials or pollutants at the existing site or in the building? Yes No

If so, specify: _____

How will these conditions be abated or mitigated? _____

Will this be done prior to start of demolition or construction? Yes No

Will such abatement be done under separate contracts with the Owner? Yes No

(Note: If the Owner or Contractor is abating hazardous materials or pollutants concurrently with other construction activities, disclosure in the Supplementary Conditions and instructions to bidders is advisable.)

16. Miscellaneous Provisions

Will any of the following conditions require addition or modification to the Contract Documents? Yes No

If so, please attach any available information describing each condition checked.

- Equal opportunity requirements
- Tax exemptions
- Extensions of time criteria
- Submission of payment applications to additional parties
- Monthly affidavits or release of liens
- Lender requirements
- Cost savings provisions
- Reuse of salvaged materials permitted or required
- Substitution and product change procedures
- Special time periods during which the Contractor cannot perform construction
- Progress schedule format to which the Contractor must conform
- Wage or labor standards to which the Contractor must conform
- Utility fee or easement criteria
- Environmental impact fee criteria
- Land use criteria
- Building permit criteria
- Tenant allowance
- Inspection, sampling and testing allowances
- Owner's contingency allowances
- Portions of buildings and site to remain occupied and used during renovation
- Coordination drawings
- Tax requirements for historic structures
- Construction photographs
- Project record document criteria

Owner's Representative _____

By _____

Date _____

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Contract Administration
G612 Owner's Instructions to the Architect—Part B, Page 1 of 5

Owner (Name and address):

Date:
Project Title:
Project Number:

Architect (Name and address):

NOTATION TO OWNER—In consultation with your attorney and other appropriate advisors, complete this form, which will provide your instructions regarding requirements for Contract Documents for this Project. Please return the completed form to your Architect. After reviewing your instructions, the Architect will proceed with the preparation of construction-related documents. Please respond to every question.

1. Certificates and Forms

Will certificates of insurance, per Subparagraph 11.1.3 of AIA Document A201-1997, be on A/CORB Form 25-S, supplemented by AIA Document G715, Supplemental Attachment? Yes No
If no, attach a sample of the required form(s).

2. Contractor's liability insurance

Specify the minimum limits of insurance described in Subparagraph 11.1.2 of AIA Document A201-1997:

a. Workers' compensation insurance

(Note: Workers' compensation is generally required by statute in most states, with several important exceptions. Exceptions depend upon the occupation or the minimum number of workers employed by that business. The Owner can mandate workers' compensation insurance even for those businesses that are exempt by requiring Voluntary workers' compensation as noted below. In addition to each state having applicable workers' compensation laws, federal and foreign laws may apply to the Contractor's or Subcontractor's employees. Where the Work includes construction involving the following categories, specific coverage may be required for maritime work, longshoremen's harbor work, work done outside U.S. boundaries, and benefits required by labor union contracts. Please note such requirements below or by separate attachment.)

Are limits in excess of those required by statute to be provided? Yes No

If so, limits for such insurance shall be as follows: \$ _____

\$ _____ Each accident

\$ _____ Disease, policy limit

\$ _____ Disease, each employee

Voluntary workers' compensation (by any exempt entities):

Will private entities exempt from coverage on account of the number of employees or occupation maintain

voluntary compensation coverage at the same limits specified for mandatory coverage? Yes No

If so, indicate dollar limits of coverage below:

\$ _____ Each accident

\$ _____ Disease, policy limit

\$ _____ Disease, each employee

b. Commercial general liability insurance

Will commercial general liability insurance, including coverage for premises operations, independent contractors' protective, products completed operations, contractual liability, personal injury and property damage (including coverage for explosion, collapse and underground hazards) be required of the Contractor? Yes No

If so, indicate dollar limits of coverage below:

\$ _____ Each occurrence

\$ _____ General aggregate

\$ _____ Personal and advertising injury

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§ _____ Products completed operations aggregate

Will the policy be endorsed to have the general aggregate per Project? Yes No

If so, state the general aggregate amount. \$ _____

Will the Contractual liability insurance include coverage sufficient to meet obligations equivalent to those stipulated under Paragraph 3.18 AIA Document A201, 1997 edition? Yes No

If no, specify the coverage desired. _____

Will products and completed operations insurance shall be maintained for a minimum period of at least _____ () year(s) after either 90 days following Substantial Completion or final payment, whichever is earlier?

Yes No

If no, specify. _____

How much automobile liability insurance (owned, non-owned and hired vehicles) for bodily injury and property damage is required?

\$ _____ Each occurrence

c. What will be the umbrella or excess liability limit?

\$ _____

\$ _____ Over primary insurance

\$ _____ Retention for self-insured hazards, each occurrence

d. What will be the aircraft liability (owned and non-owned), when applicable? (Select one)

With limits proposed by the Contractor for the Owner's approval

With the following limits:

(1) Bodily injury:

\$ _____ Each person

\$ _____ Each occurrence

(2) Property damage:

\$ _____ Each occurrence

e. What will be the watercraft liability (owned and non-owned), when applicable? (Select one)

With limits proposed by the Contractor for the Owner's approval

With the following limits:

(1) Bodily injury:

\$ _____ Each person

\$ _____ Each occurrence

(2) Property damage:

\$ _____ Each occurrence

f. Will there be other contractor's liability insurance? Yes No

If so, describe. _____

Are any revisions required with regard to hazardous substances or other items, or the Architect's role with regard to the same items? Yes No

If so, provide exact written language for insertion into Supplementary Conditions.

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3. Owner's liability insurance
Per Paragraph 11.2 of AIA Document A201, 1997 edition, will the Owner maintain its usual liability insurance?
 Yes No
If no, please specify scope of the Owner's liability insurance as you wish to see it described in the conditions of the Contract. _____
4. Project management protective liability insurance
Will the Contractor be required to provide project management protective liability insurance? Yes No
If so, it shall have the following limits:
(a) Bodily injury: \$ _____ Each occurrence
(b) Property damage: \$ _____ Each occurrence
(c) Aggregate limit, bodily injury and property damage: \$ _____
5. Property insurance
(a) Will the Owner purchase builder's risk coverage with special causes of loss (including coverage for all material and equipment to be incorporated or used in the Project when stored off-site or in transit)? Yes No
(Note: If you answered no to the above question, see question 5i.)
If so, identify the type of form used for the policy:
 Completed Value
 Reporting
 Other (Specify): _____
- (b) What will be the monetary limits of insurance?
 Contract Sum, including future amendments
 Other amount (Specify): _____
- (c) Will any of the following named perils be required, either by specific endorsement or separate policies?
 Yes No
If so, identify below:
 Government ordered demolition Earthquake Flood
- (d) If the Owner provides property insurance, will it be written with a deductible? Yes No
If so, identify below:
 a deductible of not more than \$ _____ (aggregate) or
 a deductible of not more than \$ _____ per occurrence.
Will there be an aggregate deductible applicable to the entire Project? Yes No
If no, provide description of portions of Project subject to an aggregate deductible.

- (NOTE: If coverage for alterations and additions to existing structures is to be included under the Owner's existing coverage, specific instructions should be included under Item 6 below.)
- (e) Should the property insurance required by Paragraph 11.4 of AIA Document A201, 1997 edition, cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work, but not incorporated into the permanent improvements? Yes No

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(f) Will the Owner provide boiler and machinery insurance? Yes No

If so, specify the limits and objects to be insured: _____

(g) Will the Owner provide loss of use insurance? Yes No

The Contractor shall provide this insurance with limits of \$ _____

(h) List any additions/modifications to the specified coverages:

(i) If you answered no to question 5a, will the Contractor be required to carry builder's risk with special causes of loss form property insurance? Yes No

Will the limits of such insurance be the Contract Sum, including future amendments? Yes No

If so, will the limits of such insurance also include the value of separate contracts and Owner-furnished items?

Yes No

Will there be any dollar limits of insurance for Contractor provided property insurance? Yes No

If so, state how much. \$ _____

Will the Owner provide partial property insurance? Yes No

If so, specify scope limits: _____

Can the Contractor, at the Contractor's own expense, provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work? Yes No

If no, specify how you wish insurance on materials off the site to be handled. _____

If the Owner is damaged by the failure of the Contractor to purchase and maintain property insurance without so notifying the Owner in writing, will the Contractor be required to bear all reasonable costs attributable thereto?

Yes No

Will the Contractor be responsible for deductibles? Yes No

Shall Contractor provided property insurance be written with a specified maximum deductible per occurrence?

Yes No

If so, specify the maximum deductible. \$ _____

Specify special instructions for Contractor provided property insurance. _____

6. Other instructions related to bonds or insurance

(If none, please indicate.)

Are any special coverages required with regard to alterations or additions to existing structures? Yes No

Are any revisions required with regard to hazardous substances or other items, or the Owner's, Contractor's or Architect's role with regard to the same items? Yes No

If so, provide exact written language for insertion into Supplementary Conditions.

7. Bonds

Are performance bonds and payment bonds required? Yes No

(a) If so, the required bonds shall be in the amount of (Select one option for each bond):

Performance 100% of Contract Sum _____% of Contract Sum \$ _____

Payment 100% of Contract Sum _____% of Contract Sum \$ _____

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(b) If so, the form of bonds shall be:

AIA Document A312

Other

(If other, describe and furnish sample copy if available)

(c) Special instructions:

Owner's Representative

By

Date

SAMPLE

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Contract Administration
G612 Owner's Instructions to the Architect—Part C, Page 1 of 3

Owner (Name and address):

Date:
Project Title:
Project Number:

Architect (Name and address):

NOTATION TO OWNER—This form provides your instructions regarding requirements for bidding procedures for this Project. Please return the completed form to your Architect. After reviewing your instructions, the Architect will proceed with the preparation of necessary bidding documentation. Please respond to every question.

1. What method will be used for selecting the Contractor(s)?

- (a) Bidding
- Open and competitive
 - By invitation only
 - Other (Specify)
- (b) Negotiating
- A single Contractor
 - Multiple Contractors
 - Other (Specify)

Are there any special eligibility requirements for contractor selection? Yes No

If so, describe requirements. _____

Will the list of invited bidders be included in the bidding requirements? Yes No

Will bidders be required to list sub-contractors in their proposals? Yes No

Will the Bidder be basing the Bid Sum on Time of Completion on partial drawings and specifications?

Yes No

Will any bidders or sub-bidders be pre-qualified? Yes No

If so, please list work categories requiring pre-qualification. _____

Are there any additional instructions on the method of selection or qualification of bidders? Yes No

If so, describe _____

2. Who will prepare the instructions to bidders, Owner or Architect?

If the Architect will prepare the instructions, please attach any standard forms or specific language for special bidding provisions you wish to see incorporated into the instructions to bidders.

3. Who prepares the proposal form?

- Owner
- Architect

4. How will bids be solicited?

- Public advertisement arranged by Owner or Architect
- Private invitation issued by Owner or Architect

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Contract Administration

G612 Owner's Instructions to the Architect—Part C, Page 2 of 3

- Will Bid opening be public or private?
Will there be a pre-bid conference? Yes No
If so, specify when and where. _____
5. Will the cost of the performance and payment bonds be included in the base bid or alternate?
Will property insurance by the Contractor be bid as an alternate? Yes No
Is an itemized breakdown of the bid price required? Yes No
If so, identify those items of Work. _____
- Will the Contractor be required to obtain more than one subcontractor bid on any item of work? Yes No
If so, list items. _____
6. Will bid security be required? Yes No
If so, in the amount of
 \$ _____, or
 _____% of the total bid in the form of:
 A bid bond (AIA Document A310 in conjunction with AIA Document A312), or
 Other _____
(Describe other acceptable types of security or bond forms, if any.) _____
7. Where will copies of the Bidding Documents be made available for reference of the bidders?
 Plan rooms designated by the Owner
 Plan rooms selected by the Architect
 Owner's office
 Architect's office
 Other (Specify) _____
- Who can provide copies of Bidding Documents?
 Owner Architect Printer
Are there any limits on the number of sets of Bidding Documents to be issued to each bidder? Yes No
If so, describe the limitations. _____
8. What date and time is required for receipt of bids?
 (Specify) _____
 Will be determined later by the Owner
 Will be determined by the Architect
9. Where shall bids be received?
 At the Architect's office
 Other (Specify name and address of recipient) _____
10. Who will prepare the bid tabulation forms?
 Owner
 Architect
11. Will bids be publicly opened and read aloud? Yes No
If opened in private, will bid tabulation be furnished to Bidders? Yes No

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Contract Administration

G612 Owner's Instructions to the Architect—Part C, Page 3 of 3

12. Are copies, in addition to the usual original signed bid, required? Yes No
If so, specify how many copies. _____

13. How many calendar days after receipt of bids must a bid remain open for acceptance? _____

14. If a Contract is awarded, when will construction at the site commence?
 Upon execution of the Agreement
 Upon, but not before, receipt of a notice to proceed
 Not earlier than _____ days after award of the Contract
 Other (Specify) _____

15. Will the required time of Substantial Completion be stipulated in the Bidding Documents? Yes No
If so, Work shall be substantially complete:
 _____ calendar days after the Date of Commencement
 By, _____ (Date)
 In the number of calendar days stipulated by the bidder in the bid form

Will a preliminary schedule be required to accompany the bid? Yes No
Will bidders be required to incorporate any milestone dates into the preliminary schedule? Yes No
If so, describe. _____

Will designated portions of the Work require Substantial Completion in advance of the rest of the Project?
 Yes No

Will these portions be identified on Drawings? Yes No
If no, describe the scope and anticipated date(s) of completion for such designated portion(s) of the Work as you wish to see them incorporated in the Drawings. _____

16. Special instructions:
(Note: Please describe checked items by separate attachment.)
 Unit price proposal language
 Substitution criteria
 Fee proposal language
 Overhead or profit limits
 Waivers
 Non-Collusion affidavit
 Qualification statement

Owner's Representative

By _____ Who represents (Name of Owner) _____ Date _____

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 **AIA® Document A201™ – 2007**

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name and address)

THE ARCHITECT:
(Name and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

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but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled

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to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce

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other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

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§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be

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furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

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Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

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§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

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risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

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§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

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ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

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§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker.

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Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

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§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

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§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.



AIA® Document A533™ – 2009

Guide for Supplementary Conditions, Construction Manager as Adviser Edition

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INTRODUCTION

Purpose of This Guide

This guide serves two purposes: it provides guidance to assist in preparing the Contract for Construction, and it provides model language that may be used to amend or supplement the Contract for Construction.

AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, provides the basic legal framework for the Contract for Construction. Because of variations in the nature of individual projects, requirements of individual owners, and variations in specific legal requirements from locality to locality, a nationally distributed standardized document cannot provide all of the basic requirements which must be included for purposes of bidding or construction. Project-specific information must be included in one of four locations:

- 1) In the bidding requirements
- 2) In the Owner-Contractor Agreement
- 3) In modifications or supplements to the General Conditions of the Contract for Construction
- 4) In the Specifications, particularly in the General Requirements (Division 1)

This Guide provides instructions, suggested model language for project-specific issues, and recommendations for where to place project-specific information.

The information and model language presented in this Guide follows the article and section numbering of A232–2009. However, the guidance and model language presented may be relevant to other AIA agreements. This Guide is not a standard form supplementary conditions document. Model language is sometimes presented in several alternative versions, and some language presented may not be appropriate for a particular project. Because of its flexibility, this Guide is intended to be used as a working tool to help you develop and present in an orderly way the additional information needed as part of the Contract Documents for a specific project.

The Conditions of the Contract are ultimately the Owner's responsibility. But the Construction Manager and Architect typically have a contractual duty to assist the Owner in preparing the Contract for Construction, and the Contractor may also serve that role from time to time. This Guide is useful for Owners, Construction Managers, Architects and Contractors alike when assembling bidding and proposal information and the various components of the Contract for Construction.

How to Use This Guide

AIA Document A232–2009, General Conditions of the Contract for Construction, is used as the framework to which all of the items discussed in this Guide are related. The numbering in this Guide follows the numbering of the relevant provisions in A232–2009.

Items that are suggested for inclusion in the Instructions to Bidder—i.e., AIA Document A701™–1997; the Agreement between the Owner and Contractor; or the General Requirements (Division 1 of the Specifications) appear in this Guide under the section number of A232–2009 most nearly related to their subject matter.

This Guide assumes that Supplementary Conditions will be assembled as a separate document cross-referenced to the General Conditions. Alternatively, modifications may be made directly in the text of the General Conditions, typically through the use of AIA Contract Documents software.

The Guide is printed in two typefaces. Times New Roman 10-point typeface indented from the body text of the Guide, is used only for material that is intended as actual model language which may be used for a specific project, and represents material which may be added to, deleted or revised, and then incorporated into the General Conditions or Supplemental Conditions documents. Arial 10-point typeface is used for explanatory notes and identifies items needing attention.

EXAMPLE:

Delete Section 2.2.5 and substitute the following:

Model Language

§ 2.2.5 The Owner shall furnish the Contractor _____ (_____) copies of the Contract Documents. The Contractor may purchase additional copies at the cost of reproduction, postage and handling.

Since some Owners, notably governmental agencies, require the use of their own standard documents, such as instructions to bidders, general conditions and particular requirements for supplementary conditions, these must be carefully reviewed and correlated with any wording taken from this Guide. This Guide may also be used to modify other General Conditions of the Contract, including the AIA documents listed herein in the Bibliography.

Choice of Location for Contract Provisions

The choice of location for contract provisions is based on the following principles, which have been generally agreed upon by representatives of the various professional societies and associations in the construction industry:

- 1) Matters affecting the bidding process but which have no import or effect after the Contract is awarded should be included in the Advertisement or Invitation to Bid, Instructions to Bidders or Supplementary Instructions to Bidders, or elsewhere in the Bidding Requirements.
- 2) The essential terms of the Contract, such as the Contract Sum (which is often confidential), definition of the Work, and similar matters are generally included in the Owner-Contractor Agreement forms.

- 3) Matters affecting the basic legal rights and responsibilities of the parties involved in the construction process that are generally applicable to most construction projects have been included in the General Conditions of the Contract.
- 4) Matters affecting the basic legal rights and responsibilities of the parties to the Contract that may vary from one project to another, such as insurance limits, or that respond to specific legal constraints in the jurisdiction, such as indemnification, liquidated damages and fiduciary obligations, should be handled in the Supplementary Conditions.
- 5) Detailed administrative and procedural requirements (e.g., temporary facilities) should be further specified in the General Requirements (Division 1 of the Specifications). Division 1 expands on certain sections of the broad provisions in the General Conditions and governs the execution of all other sections of the Specifications. Proper use of Division 1 and Supplementary Conditions will avoid conflict, omission and duplication.

This Guide gives the preferred location for all of the items discussed herein. These points are restated here to offer guidance in deciding where to locate other items that may be determined to be necessary for a specific project.

Modifications to the Contract for Construction

Because AIA Document A232–2009, General Conditions of the Contract for Construction, is coordinated with agreements and other documents in the Construction Manager as Adviser Family of Documents, the complete deletion of a particular provision in the General Conditions should be avoided. Section deletions and re-numbering of sections can play havoc with carefully coordinated internal references and cross references to other agreements.

GUIDANCE AND MODEL LANGUAGE

SUGGESTED INTRODUCTORY PARAGRAPH TO SUPPLEMENTARY CONDITIONS

If Supplementary Conditions will be placed in a separate document, an introductory paragraph to explain their purpose may be helpful:

Model Language

The following supplements modify AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

Certain corporate clients or governmental agencies may require the use of terms such as "Project Manager," "Contracting Officer" or others which may have important and necessary connotations, and these terms should be defined here.

§ 1.1.1 If a client requires that the bidding requirements and other documents be included in the Contract Documents, the specific documents should be enumerated in the Agreement between the Owner and Contractor. It may also be advisable to bring this to the attention of Bidders in the Instructions to Bidders.

§ 1.1.4 The Project

If the Work the Contractor will perform does not constitute the total Project; the relationship and coordination of the Contractor's Work to that of other Multiple Prime Contractors or the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager, should be made clear in the Contract Documents. You may provide general information concerning the relationship of the Contractor's activities to the activities of other Multiple Prime Contractors or the Owner's own forces in the General Requirements (Division 1 of the Specifications).

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The AIA General Conditions do not establish a system of precedence among the Contract Documents, but provide that all documents are complementary. In the event of inconsistencies among the Contract Documents, the Architect is to interpret them accordingly. Establishing a fixed order of priority is not recommended because no one document constitutes the best authority on all issues that may arise. The order shown here is suggested for consistency in the event an Owner insists on establishing a precedent. Note that this modification does not establish a precedent between Drawings and Divisions 2 through 49 of the Specifications, which together describe the Work.

Add Section 1.2.1.1 to Section 1.2.1:

Model Language

§ 1.2.1.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- .1 Modifications
- .2 The Agreement
- .3 Addenda, with those of later date having precedence over those of earlier date
- .4 The Supplementary Conditions
- .5 The General Conditions of the Contract for Construction
- .6 Division 1 of the Specifications
- .7 Drawings and Divisions 2–49 of the Specifications
- .8 Other documents specifically enumerated in the Agreement as part of the Contract Documents

In the case of conflicts or discrepancies between Drawings and Divisions 2–49 of the Specifications, or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in accordance with Sections 4.2.17, 4.2.18, and 4.2.19.

ARTICLE 2 OWNER

§ 2.2 Information and Services Required of the Owner

§ 2.2.2 When, after award of the Contract, the Project is subject to a prolonged review or approval process by governmental or other agencies, it is desirable to describe this process and to state (1) whether the Construction Manager or Contractor is expected to play any role in the process and (2) the effect this process may be expected to have on the commencement of the Work and the progress schedule.

§ 2.2.3 It may be necessary in some instances to amend or supplement this section to describe more fully the surveys which the Owner will furnish (i.e., metes and bounds only or topographical).

§ 2.2.5 If the Owner will furnish the Contractor more than one copy of the Contract Documents without charge, this should be stated here, with the basis on which the Contractor will be charged for additional sets. Delete Section 2.2.5 and substitute the following:

Model Language

§ 2.2.5 The Owner shall furnish the Contractor ____ (____) copies of the Contract Documents. The Contractor may purchase additional copies at the cost of reproduction, postage and handling.

ARTICLE 3 CONTRACTOR

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

In AIA Document B132™–2009, Section 3.6.4.4, provides for the Architect’s review of the Contractor’s requests for information after receipt of the Construction Manager’s recommendations. In addition, Section 4.3.2.2 of B132–2009, provides that the Architect’s services in responding to Contractor’s requests for information where such information is already available to the Contractor are Additional Services. The following model language may be used to provide consistency between A232 and B132 provisions where the Owner intends to obtain reimbursement from the Contractor for the Architect’s review of Contractor’s requests for information. Using AIA Document G816™–2004, Request for Information, may mitigate problems associated with such requests.

Add the following Section 3.2.5 to Section 3.2:

Model Language

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.4 Labor and Materials

§ 3.4.2 The following language may be used in situations where the Owner has agreed to consider substitutions after the Contract has been executed. This section establishes the criteria for submission and evaluation of such substitutions. Such language should be included in the General Requirements (Division 1 of the Specifications) as well as the Supplementary Conditions. Note that when the Owner's own forces, including separate contractors are employed or Multiple Prime Contractors are employed, substitutions may expose the Owner to claims from the other Multiple Prime Contractors or the Owner's own forces, including separate contractors.

Add Section 3.4.2.1 to Section 3.4.2:

Model Language

§ 3.4.2.1 After the Contract has been executed, the Owner, Construction Manager and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications).

By making requests for substitutions, the Contractor:

- .1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;
- .3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and
- .4 shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

Substitutions proposed by the Contractor must be evaluated by the Architect and, if accepted, may require revision of the Drawings and Specifications. The resulting demands on the Architect's time and other resources may entitle the Architect to an adjustment in compensation, as is the case under Section 4.3.2.5 of AIA Document B132-2009. The following language allows the Owner to pass this expense on to the Contractor. This language should only be used on Projects where the Owner is fully prepared to deal with disputes that may arise from enforcement of this provision—for example, in situations where the Architect evaluates and then rejects the Contractor's proposed substitution. The Owner and Architect should also be prepared to deal with proposed substitutions that benefit the Owner.

Add the following to the end of Section 3.4.2:

Model Language

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.5 Warranty

Note that the terms of the warranty under Section 3.5 are separate and distinct from the Contractor's obligation to correct the Work, as required under Section 12.2. Special warranties in the technical sections of the Specifications may also limit or expand obligations under this warranty. It is strongly suggested that Section 3.5 only be modified with legal advice.

§ 3.6 Taxes

Certain non-profit organizations may be wholly or partially tax-exempt. Since the degree of tax exemption varies from jurisdiction to jurisdiction, the Owner should provide the exact language for statements concerning tax exemption for inclusion in the Supplementary Conditions.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Where Multiple Prime Contractors are used or where the Owner's own forces, including separate contractors are used, list the permits and governmental fees, licenses and inspections each Contractor is required to obtain and pay for to avoid duplication or error. Attention should be given to Section 2.2.2 which relates to this issue.

§ 3.8 Allowances

§ 3.8.1 Allowances should be specified in the General Requirements (Division 1 of the Specifications) with appropriate references in the particular sections of the Specifications. If allowances are to be expended by Subcontractors rather than directly by a Contractor (for example, an allowance for the purchase of special light fixtures), the information in the General Requirements (Division 1 of the Specifications) should clarify that the Subcontractor's overhead, profit, handling and other costs are included in the Contract Sum and that the allowance covers only the net cost to the Subcontractor.

In recent years, unanticipated price escalations in construction materials after the contract is executed have caused concern to owners and contractors. If the owner and architect are concerned about facing such price escalations in certain materials, they should identify those materials prior to the bid and provide for them in the bidding requirements as allowances.

§ 3.8.2.2 Note that installation costs for materials purchased under allowances are not included in the allowances. If some allowances are to include installation costs, Section 3.8.2.2 should be modified to indicate that installation costs (and other costs mentioned in Section 3.8.2.2) are not included unless so stated in the description of an individual allowance.

Renovation projects often require implementation of contractual techniques to manage unknown conditions. Quantity allowances may be established for such conditions and coupled with unit pricing mechanisms that will be triggered in the face of greater or lesser quantities of Work than those anticipated by the quantity allowance. If the potential range of variation is large, the Owner may wish to include overhead and profit in the quantity allowance, but not in the unit price. Since the quantity allowance is an assumed amount of Work in the Contract Sum and the unit price is the amount proposed by the Contractor to perform a greater or lesser increment of Work, the fair overhead and profit percentage for greater quantities is usually different from the percentage applied to lesser quantities of Work. If such conditions exist on a Project, Section 3.8.2.2 may be modified accordingly.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 A detailed description of the Contractor's construction and submittal schedules (CPM, bar graph or other), the process by which they are to be prepared and updated, and the extent of information required should be specified in the General Requirements (Division 1 of the Specifications).

§ 3.11 Documents and Samples at the Site

The documents required here constitute "a record of the Work as constructed" and their function is limited to showing actual changes made in the Work during construction. Specific detailed requirements for recording as-constructed conditions, especially for mechanical and electrical portions of the Work, should be specified in the General Requirements (Division 1 of the Specifications), or in the appropriate section of the Specifications.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.5 Detailed procedures for handling Shop Drawings, Product Data and Samples should be specified in the General Requirements (Division 1 of the Specifications).

§ 3.12.11 Reviewing multiple resubmittals can be a serious drain on the Architect's time and other resources. If the Architect is entitled to an adjustment in compensation for such services under the Owner-Architect agreement (for example, under Section 4.3.3 of AIA Document B132-2009), language such as that shown below may be appropriate.

Add Section 3.12.11 to Section 3.12:

Model Language

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and _____ (_____) resubmittals. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13 Use of Site

Detailed requirements may need to be specified in the General Requirements (Division 1 of the Specifications) if an existing building will remain occupied or require access by the public.

§ 3.14 Cutting and Patching

§ 3.14.1 Special requirements for Work involving renovation, remodeling, or historic restoration or other detailed requirements should be specified in Divisions 1–49 of the Specifications.

§ 3.15 Cleaning Up

§ 3.15.1 Detailed requirements for cleaning should be specified in the General Requirements (Division 1 of the Specifications). Where Multiple Prime Contractors will perform portions of the Work, special attention is required to define and delegate the detailed requirements for cleaning in the General Requirements (Division 1 of the Specifications).

§ 3.18 Indemnification

In some jurisdictions, statutory requirements may modify this indemnification section or void it completely. The Owner should seek the advice of legal counsel for modifications to this section.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

Some clients, especially public authorities, may elect to engage the Construction Manager and Architect for limited contract administration services or elect to omit contract administrative services from the Construction Manager or Architect's scope of services altogether. If this occurs, the Construction Manager and Architect's services in the General Conditions should be reviewed carefully and correlated with the provisions of the Agreements between the Owner and Architect and the Owner and Construction Manager. The parties should be especially alert to the possible delegation of the Construction Manager and Architect's duties or authority to someone else, and should specify under this section who will assume each function normally assigned to the Construction Manager and Architect. Other provisions of the General Conditions may have to be modified as well. The parties should be aware that any changes to the Construction Manager or Architect's services in AIA Document A232–2009 may conflict with the services described in AIA Documents B132–2009 and C132™–2009. Pursuant to the terms of those Agreements, the terms of the A232 are only enforceable to the extent they are consistent with the terms of the B132 and C132.

If the Construction Manager or Architect's construction administration duties vary from those identified in A232–2009, use the following model language to identify the variations.

Model Language

§ 4.1.1.2 The Architect's duties, responsibilities and limitations of authority are modified as follows:
(List or attach as an exhibit.)

§ 4.1.1.3 The Construction Manager's duties, responsibilities and limitations of authority are modified as follows:
(List or attach as an exhibit.)

§ 4.2.2.1 AIA Document B132–2009 addresses instances when the Architect makes site visits as a result of Contractor actions. The following language may be added for consistency between Section 4.2.2 of AIA Document A232–2009 and Section 4.3.3 of B132–2009.

Add Section 4.2.2.1 and 4.2.2.2 to Section 4.2.2:

Model Language

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.2.2 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Construction Manager for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.10 AIA Document A232–2009 requires the Construction Manager and Architect to perform submittal review in accordance with a submittal schedule that stipulates the turn-around time for the Construction Manager and Architect’s review of submittals, and that the Architect approves. In the absence of an approved submittal schedule, or in anticipation of receiving it, the parties may wish to stipulate a minimum review period for submittals in conformance with standard office procedures.

The following language may be added as Section 4.2.7.1:

Model Language

§ 4.2.9.1 In no case will the Architect’s review period on any submittal be less than ____ (____) days after receipt of the submittal from the Contractor.

§ 4.2.9.2 In no case will the Construction Manager’s review period on any submittal be less than ____ (____) days after receipt of the submittal from the Contractor.

§ 4.2.20 On many projects, especially publicly bid projects, the Owner may wish to expand upon the A232–2009 language regarding review and response to requests for information. AIA Document B132–2009 stipulates the situations where the review of requests for information is considered an Additional Service. Requirements in A232 should be coordinated with Section 4.3.2 of B132–2009.

The following language may be added as Section 4.2.20.1. Note that only one of the “or” clauses relating to the type of form used for requests for information should be included:

Model Language

§ 4.2.20.1 Contractor’s requests for information shall be prepared and submitted in accordance with Division 1 “General Requirements” sections on the form included in the Contract Documents [OR] on AIA Document G716™–2004. The Architect will return without action requests for information that do not conform to requirements of the Contract Documents.

§ 4.2.6 Administration of the Contract

§ 4.2.16 In addition to any representative hired by the Construction Manager, this model language advises the Contractor in advance that a Project Representative will be employed for the Project. In addition, a copy of AIA Document B207™–2008, which enumerates the duties, responsibilities and limitations of authority of the Project Representative, should be attached in an exhibit to be incorporated into the Contract Documents.

Delete Section 4.2.16 and substitute the following:

Model Language

§ 4.2.16 A Project Representative will be employed at the site by the Architect. The Project Representative’s duties, responsibilities and limitations of authority are as set forth in AIA Document B207™–2008, Standard Form of Architect’s Services: On-Site Project Representation; a copy of which is attached in an exhibit to be incorporated into the Contract Documents.

ARTICLE 5 SUBCONTRACTORS

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 If any Subcontractors are to be identified and selected prior to execution or award of the Contract, this should be set forth in the bidding requirements (e.g., AIA Document A701–1997, Instructions to Bidders). If this procedure is followed, it will be necessary to modify Section 5.2 to conform to the stipulations in the bidding requirements. This should be done by a supplement to Section 5.2.1.

If the Owner wishes to take sub-bids on certain parts of the Work or to require the Contractor to employ certain Subcontractors or material suppliers of the Owner’s choosing, this should be explained in detail in the Instructions to Bidders.

A232 Section 5.2 requires the Contractor to submit a list of Subcontractors through the Construction Manager "as soon as practicable after award of the Contract." If the Owner wishes certain Subcontractors to be identified more quickly, a list of those Subcontractors and their submittal dates should be included in the Supplementary Conditions.

If the Owner, through the Construction Manager and Architect, wishes to review certain proposed manufacturers or fabricators, then this should be explained in the Supplementary Conditions. It is recommended that not more than 60 days be allowed; shorter times may be practicable on smaller projects.

The following language may be added as Section 5.2.5:

Model Language

§ 5.2.5 Not later than ____ (____) days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner, through the Construction Manager and Architect, the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment and systems identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor.

If, however, the Owner wishes to have an opportunity to both review and reject certain proposed manufacturers or fabricators, then this version of Section 5.2.5 should be added to Section 5.2.

Model Language

§ 5.2.5 MANUFACTURERS AND FABRICATORS

§ 5.2.5.1 Not later than ____ (____) days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner through the Construction Manager and Architect the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment and systems identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor. The Construction Manager may reply within 14 days to the Contractor in writing stating 1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to any such proposed person or entity or 2) that the Construction Manager or Architect requires additional time to review. Failure of the Construction Manager, Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.5.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected manufacturer or fabricator was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute manufacturer's or fabricator's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.5.4 The Contractor shall not substitute a person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Multiple Prime Contracts

§ 6.1.2 If the Owner performs construction or operations with the Owner's own forces, including persons or entities under separate contracts, not administered by the Construction Manager, Section 6.1.2 of the General Conditions requires that the Owner coordinate this construction with the Work of the Contractor or Multiple Prime Contractors, through the Construction Manager. The details of this coordination should be set forth in the General Requirements (Division 1 of the Specifications), including the enumeration of those portions of the Work to be provided under this article, and identification of the Owner's own forces and separate contractors, when known.

ARTICLE 7 CHANGES IN THE WORK

This suggested modification of Section 7.1 applies only to contracts where the basis of payment is a stipulated sum, such as, AIA Document A132™–2009, if the parties select a stipulated sum amount to be the basis of payment. They do not apply to contracts where the basis of payment is the cost of the Work plus a fee, such as A132–2009, if the parties select this as the basis of payment through the use of Exhibit A.

For changes in the Work, overhead and profit may be stated separately or combined but, in either case, should distinguish among the following:

- 1) Amounts paid to the Contractor for Work performed by the Contractor with that Contractor's own forces and amounts paid for materials purchased directly by the Contractor (not through a Subcontractor).
- 2) Amounts paid to the Contractor and Subcontractor for Work performed by the Subcontractor with that Subcontractor's own forces or purchased directly by that Subcontractor (not through a Sub-subcontractor).
- 3) Amounts paid to the Contractor, Subcontractor and Sub-subcontractor for Work performed by the Sub-subcontractor with that Sub-subcontractor's own forces and amounts paid for material and labor purchased by that Sub-subcontractor.

On some projects it may be desirable to add more specific information concerning items to be considered as part of "cost" as opposed to "overhead." Items that might be defined as one or the other may include costs for preparing Shop Drawings, reserves for future service liability, engineering and estimating costs, added costs for bonds and insurance, and travel and transportation expenses.

Add the following Section 7.1.4 to Section 7.1:

Model Language

§ 7.1.4 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor's own forces, ____ percent (____%) of the cost.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractors, ____ percent (____%) of the amount due the Subcontractors.
- .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, ____ percent (____%) of the cost.
- .4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, ____ percent (____%) of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.
- .6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over _____ Dollars (\$____) be approved without such itemization.

§ 7.3.6 If the amounts to be paid for overhead and profit on changes are to be established in the Contract Documents rather than being negotiated at the time of the changes, the figures to be used should be stated in the Supplementary Conditions.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.4 If there is a requirement or preference to measure time related to the Contract in actual working days rather than calendar days, this section should be modified.

Delete Section 8.1.4 and substitute the following:

Model Language

§ 8.1.4 The term "day" as used in the Contract Documents shall mean working day, excluding weekends and legal holidays.

Occasionally, an Owner will want no Work performed on certain days when Work might normally be carried out (i.e., special religious holidays); it would be appropriate to list these in a supplement to this section.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.2 Schedule of Values

§ 9.2.1 Requirements concerning the format and data required for the schedule of values should be stated in the General Requirements (Division 1 of the Specifications), rather than by inserting language here to modify the General Conditions. A frequent requirement is that the schedule must be prepared in such a manner that each major item of Work and each subcontracted item of Work is shown in such detail as the Construction Manager and Architect may require on AIA Document G703™–1992, Certificate for Payment, Continuation Sheet for AIA Document G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition.

§ 9.3 Applications for Payment

§ 9.3.1 Detailed requirements concerning the format (and notarization, if required) of the Contractor's Application for Payment should be specified in the General Requirements (Division 1 of the Specifications) rather than by inserting language here to modify the General Conditions. A frequent requirement is the use of AIA Document G732–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, and AIA Document G703–1992, Continuation Sheet for G732–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition. Public authorities often have their own forms, which must be used. The Construction Manager or Architect may reject unauthorized facsimiles of AIA documents G732 and G703 if the following language is used.

Add the following sentence to Section 9.3.1:

Model Language

The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, supported by a current authorized edition of AIA Document G703™–1992, Continuation Sheet, Construction Manager as Adviser Edition.

The Owner may wish to consider the reduction of retained sums. Various methods for this procedure are set out in OPTIONS A and B, which follow. OPTION C is used for constant retainage only.

When reduction in retainage is provided for in the Supplementary Conditions, the Construction Manager or Architect should recommend that the Agreement between the Owner and Contractor (for example, in Article 5 of AIA Document A132–2009) incorporate this supplement by reference rather than adding the language to the Agreement. Including this provision in the Supplementary Conditions is preferable because the Agreement is not generally made available to other interested persons, such as affected Subcontractors and material suppliers, whereas the Supplementary Conditions should be available.

OPTION A

Option A provides for progress payments in full to the Contractor after the Work is 50 percent complete. This method can have the disadvantage of applying retainage unequally to the Subcontracts, requiring full retainage on Work performed during the early stages of construction, while the amount of retainage withheld on Work in the later stage of construction may be reduced or perhaps even eliminated. The net effect of this method is a sliding reduction to 50 percent of the basic retainage at the time of Substantial Completion. This supplement should be coordinated with Section 9.8.5.

Add the following Section 9.3.1.3 to Section 9.3.1:

Model Language

§ 9.3.1.3 Until the Work is 50 percent complete, the Owner shall pay _____ percent (____%) of the amount due the Contractor on account of progress payments. At the time the Work is 50 percent

complete and thereafter, the Construction Manager and Architect will authorize remaining partial payments to be paid in full.

OPTION B

Option B provides for line item retainage. This method applies retainage and any reduction thereof equally to all phases of the Work. Thus, early finishing Subcontractors (i.e., foundations, structural steel) can have their retained funds reduced when they have satisfactorily performed 50 percent of their Subcontracts without waiting for the entire Project to be 50 percent complete. This supplement should be coordinated with Section 9.8.5 because that section requires release of retainage at Substantial Completion.

Add the following Section 9.3.1.3 to Section 9.3.1:

Model Language

§ 9.3.1.3 Until final payment, the Owner shall pay _____ percent (____%) of the amount due the Contractor on account of progress payments. For each Work category shown to be 50 percent or more complete in the Application for Payment, the Construction Manager and Architect will, without reduction of previous retainage, certify any remaining progress payments for each Work category to be paid in full.

OPTION C

Option C is used if payment to the Contractor will be made with a constant percentage retained until the Date of Substantial Completion. The percentage called for here and that shown in Article 5 of AIA Document A132-2009, Agreement Between the Owner and Contractor, Construction Manager as Adviser Edition, must be identical.

Add the following Section 9.3.1.3 to Section 9.3.1:

Model Language

§ 9.3.1.3 Until Substantial Completion, the Owner shall pay _____ percent (____%) of the amount due the Contractor on account of progress payments.

§ 9.3.2 If it is not intended that stored materials and equipment, either on or off the site, will be paid for until incorporated in the Work, this section needs to be modified appropriately. This should also be reflected in the provisions of Article 5 of AIA Document A132-2009, Standard Form of Agreement between the Owner and Contractor, Construction Manager as Adviser Edition, which must likewise be modified to omit reference to stored materials. In addition, modifications should also be made to Section 11.3.1.4.

§ 9.4 Certificates for Payment

§ 9.4.1 If the Agreement between the Owner and Contractor is other than on a stipulated-sum basis (such as cost-plus-fee where payments are made based on invoices or vouchers submitted to the Construction Manager or Architect, or both), this section may be qualified to limit the extent and meaning of the Construction Manager's and Architect's Certificates for Payment with respect to the progress of the Work.

§ 9.6 Progress Payments

Placing retained funds in an escrow account that earns interest provides a method of compensating the Contractor for money earned but not made available for the Contractor's use. Several government entities have enacted legislation requiring escrow accounts for retainage on public work, but it can be equally appropriate for private projects. Before using this supplement, the Owner's legal counsel must review it for conformance with local laws. An escrow account can be used with all the various methods of retainage recommended above.

Add the following Sections 9.6.8 through 9.6.14 to Section 9.6:

Model Language

§ 9.6.8 Upon commencement of the Work, an escrow account shall be established in a financial institution chosen by the Contractor and approved by the Owner.

§ 9.6.9 The escrow agreement shall provide that the financial institution will act as escrow agent, will pay interest on funds deposited in such account in accordance with the provisions of the escrow agreement and will disburse funds from the account upon the direction of the Owner as set forth below. Compensation to the escrow agent for establishing and maintaining the escrow account shall be paid from interest accrued in the escrow account.

§ 9.6.10 As each progress payment is made, the retainage with respect to that payment shall be deposited by the Owner in the escrow account.

§ 9.6.11 The interest earned on funds in the account shall accrue for the benefit of the Contractor until the date of Substantial Completion. Interest earned after such date shall accrue for the benefit of the Owner. Cost of compensation to the escrow agent paid out of interest earned shall be borne by the Contractor.

§ 9.6.12 When the Contractor has fulfilled all of the requirements of the Contract providing for reduction of retained funds, the escrow agent shall release to the Contractor one-half of the accrued funds but none of the interest thereon. When the Work has been fully completed in a satisfactory manner and the Construction Manager and Architect have certified and the Architect has issued a final Certificate for Payment, the escrow agent shall pay to the Contractor the full amount of funds remaining in the account, including net balance of the interest paid to the account, but less any interest that may have accrued for the benefit of the Owner, which shall be paid to the Owner.

§ 9.6.13 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor, the escrow agent shall make payment to the Contractor as provided in Section 9.10.3.

§ 9.6.14 Sums owed to the Owner by the Contractor may be deducted from payments otherwise due the Contractor pursuant to Article 9.

§ 9.8 Substantial Completion

§ 9.8.1 If designated portions of the Work are to be accepted separately by the Owner, clearly define the limits of the Work to be accepted separately and include other appropriate information in the General Requirements (Division 1 of the Specifications).

§ 9.8.3 Multiple reinspections can be a serious drain on the Architect's time and other resources. If the Architect is entitled to an adjustment in compensation for such services under the Owner-Architect agreement (for example, under Section 4.3.3.3 of AIA Document B132-2009), the following language may be appropriate.

Add the following Section 9.8.3.1 to Section 9.8.3:

Model Language

§ 9.8.3.1 The Architect will perform no more than _____ (_____) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.11 Liquidated Damages

The advantage of liquidated damages is the elimination of the documentation required to prove actual damages. Such a provision would normally appear in the Agreement; for example, space is provided in the Agreement between the Owner and Contractor (AIA Document A132-2009) under Article 3, for insertion of appropriate terms and conditions related to liquidated damages. However, it is important for Subcontractors and others to be aware of such a provision; therefore it is not unusual for this requirement to be set out in the Supplementary Conditions.

The language shown here is a suggested guide. It should not be included as Supplementary Conditions without review by the Owner's attorney and concurrence of the Owner. Repetition should be avoided. If the provision is written in the Supplementary Conditions, a cross-reference should appear in Article 3 of the Agreement between the Owner and Contractor. In multiple-prime contracting, the Owner should include appropriate provisions addressing liquidated damages in the multiple prime contracts.

Care must be taken to avoid even the appearance that a provision is used to extract a penalty rather than for liquidated damages. A liquidated damages provision becomes a penalty when an arbitrarily high amount is inserted into the provision to add pressure on the Contractor to complete the Work within the Contract Time. Liquidated damages are enforceable (not considered a penalty) if the amount per day is a reasonable measure of the anticipated harm. If the amount per day is grossly disproportionate to the anticipated harm, or

if there is no anticipated harm, the amount may be judged an unenforceable penalty. Penalties in contracts are not generally enforceable for public policy reasons. The few exceptions to this policy are typically made by statutes that grant authority to public entities, such as cities and municipalities.

The suggested liquidated damages provision below assumes substantial completion of the entire Work.

Add the following Section 9.11 to Article 9:

Model Language

§ 9.11 The Contractor and the Contractor's surety, if any, shall be liable for and shall pay the Owner the sums hereinafter stipulated as liquidated damages, and not as a penalty, for each calendar day of delay after the date established for Substantial Completion in the Contract Documents until the Work is substantially complete: _____ Dollars (\$_____).

§ 9.12 Bonus

Below is an example of a bonus provision that may be counterbalanced with a liquidated damages provision such as that shown in Section 9.11. Often such a provision is erroneously referred to as a "penalty bonus" provision. To overcome the public policy objection against penalties in contracts, some believe that a bonus counterpoint will cause a court to look more favorably on a penalty. There is little or no legal precedent to support this proposition of linking a bonus with a penalty.

It is not a recommended practice to employ such a section without specific advice from local legal counsel. Bonus provisions should be used only when the Owner will obtain a specific benefit if the Contractor completes the construction prior to the time set for Substantial Completion. On occasion, the Owner may not desire early completion because of the timing requirements of other commitments, such as mortgage closings or the commencement of tenant leases. The model language below assumes substantial completion of the entire Work.

Add the following Section 9.12 to Article 9:

Model Language

§ 9.12 The Owner shall pay as a bonus to the Contractor a sum of _____ Dollars (\$_____) for each calendar day preceding the date established for Substantial Completion in the Contract Documents that the Work is determined to be substantially complete by the Architect and Construction Manager.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.2 Safety of Persons and Property

§ 10.2.4 In some cases, it may be beneficial for the Owner and Contractor to inform each other of known potential hazards on the site. The Owner and Contractor may be held liable to third parties who are harmed by them, and may therefore wish to take precautions against unauthorized access.

Add the following Section 10.2.4.1 to Section 10.2.4:

Model Language

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the Owner and Construction Manager reasonable advance notice.

The Contract Documents may require the Contractor to handle materials that under certain circumstances may be designated as hazardous.

Add the following Section 10.2.4.2 to Section 10.2.4:

Model Language

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.3 Hazardous Materials

Note that AIA Document A232–2009 allows an Owner who has knowledge of the existence of materials of the type discussed in Section 10.3.1 to disclose the existence of those materials in the Contract Documents and to require the Contractor to remove or take other action regarding them. If the Owner has made such disclosure, the Contractor is not entitled to stop the Work as described in Section 10.3.1 or to require the Owner to take the actions described in Section 10.3.2.

Disclosure of the existence and location of the material should be made in Division 1—General Requirements—and, if appropriate, on the Drawings. In addition, supplementary language may be added requiring the Contractor to comply with all applicable statutes in working with such materials including the environmental cleanup of materials that are accidentally disturbed or released into the environment. Coordinate with Article 11 regarding insurance for special hazards or pollutants.

As the Construction Manager and Architect are unlikely to be experts in the removal or other treatment of hazardous materials, it may be appropriate to require the Contractor to engage a licensed laboratory and qualified consultants and subcontractors to perform services mirroring those described in the first four sentences of Section 10.3.2 and to certify that the material or substance has been removed or rendered harmless and any necessary environmental cleanup performed.

ARTICLE 11 INSURANCE AND BONDS

Typically, the Construction Manager and Architect are not qualified as insurance counselors, and the architect's professional liability insurance may not cover providing insurance advice. For that reason, the Construction Manager and Architect are cautioned not to make recommendations about insurance or approve insurance certificates or policies. It is in the best interests of all parties that insurance matters be placed in the hands of the Owner's insurance counselor. The Owner's insurance counselor must review the Contractor's submittals regarding insurance to determine that the required coverages are in place.

§ 11.1 Contractor's Liability Insurance

§ 11.1.1.1 In some states, some business entities may not be required by statute to carry workers compensation insurance. Such exempted employers, however, can be required by the Contract Documents to maintain voluntary compensation coverage. The Owner's insurance advisor should determine whether or not this coverage should be a contract requirement. In most states, an exempted employer, by maintaining such voluntary coverage, is entitled to indemnity from normal tort liability and is not subject to other tort liability to employees for job-related injuries.

In addition to each state having applicable workers' compensation laws, federal and foreign laws may apply to the Contractor's or Subcontractor's employees. Where the Work includes construction involving the following categories, specific coverage may be required: maritime work, longshoremen, harbor work, work at or outside U.S. boundaries, and benefits required by labor union contracts.

Delete the semicolon at the end of Section 11.1.1.1 and add:

Model Language

, including private entities performing Work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;

§ 11.1.1.2 This requires Employers' Liability Coverage, which is normally afforded as separate coverage under the workers' compensation policy, but evidence of such coverage should be shown on the certificate of insurance. If the modification to Section 11.1.1.1 shown above is used, this modification to Section 11.1.1.2 must be used as well.

Delete the semicolon at the end of Section 11.1.1.2 and add:

Model Language

or persons or entities excluded by statute from the requirements of Section 11.1.1.1 but required by the Contract Documents to provide the insurance required by that section;

§ 11.1.1.4 There is a difference between the bodily injury coverage required in Section 11.1.1.3 and the personal injury coverage required by this section. Bodily injury is, as its name implies, physical harm to a

person, including death, while personal injury includes libel, slander, false arrest and similar wrongs. Both bodily and personal injury coverages are required; hence the need for a careful review of the original insurance certificates by the Owner's insurance counselor.

§ 11.1.1.6 Business Auto Liability Insurance is normally issued as a separate policy. It is generally advisable to have this policy and the Commercial General Liability policy written by the same insurance company to avoid disputes as to which insurer is responsible for a particular loss.

§ 11.1.1.7 Products and Completed Operations insurance is specified to cover claims arising out of or resulting from the Contractor's operations when the injury or damage occurs after the Contractor's Work at the site has been completed, the Project has been put to its intended use and the Contractor is no longer at the site.

§ 11.1.1.8 In some jurisdictions statutory requirements may modify the indemnification section of Section 3.18 or void it completely. The Owner should seek the advice of legal counsel for modifications to Section 3.18 or this Section 11.1.1.8.

§ 11.1.1.9 Some projects or jurisdictions may require special types of coverages. The Owner should seek the advice of insurance counsel for the nature of coverage required. The coverages listed below are common on construction projects:

- 1) Premises-Operations
- 2) Independent Contractors' Protective
- 3) Products-Completed Operations
- 4) Personal Injury Liability
- 5) Contractual Liability
- 6) Personal and Advertising Injury
- 7) Owned, Non-Owned and Hired Motor Vehicles
- 8) Excess or Umbrella Liability

§ 11.1.2 The Owner, not the Construction Manager or Architect, must establish the amounts and time limits of insurance required by Article 11. The Construction Manager or Architect may obtain insurance information from the owner by using AIA Document G612™-2001, Owner's Instructions Regarding the Construction Contract, Insurance and Bonds, and Bidding Procedures. Note that while location, size and potential exposure have bearing on the limits of coverage for each project, serious injury or loss of life may result in the same amount of damages no matter what the size, cost or location of the project.

Explanatory material about Workers' Compensation is provided in Sections 11.1.1.1 and 11.1.1.2 above.

The Commercial General Liability (CGL) policy combines several coverage aggregates into a single General Aggregate, which is the maximum amount that will be paid under the policy. The General Aggregate may be modified to apply to an individual project, and this endorsement should be called for as shown in the suggested language. Note that the "per project" limit of liability called for in Section 11.1.2.2.2 requires an endorsement amending the standard CGL policy. In some circumstances, this may be difficult to obtain.

If Umbrella or Excess Liability insurance coverage is required over the primary insurance, insert the coverage limits. Commercial General Liability and Automobile Liability limits may be attained by individual policies or by a combination of primary policies and Umbrella or Excess Liability policies. The following supplements represent sample modifications.

Add the following Sections 11.1.2.1 through 11.1.2.4 to Section 11.1.2:

Model Language

§ 11.1.2.1 The limits for Worker's Compensation and Employers' Liability insurance shall meet statutory limits mandated by State and Federal Laws. If (1) limits in excess of those required by statute are to be provided, (2) the employer is not statutorily bound to obtain such insurance coverage, or (3) additional coverages are required, additional coverages and limits for such insurance shall be as follows:

§ 11.1.2.2 The limits for Commercial General Liability insurance including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual

Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground hazards) shall be as follows:

\$ _____ Each Occurrence
\$ _____ General Aggregate
\$ _____ Personal and Advertising Injury
\$ _____ Products-Completed Operations Aggregate

- .1 The policy shall be endorsed to have the General Aggregate apply to this Project only.
- .2 The Contractual Liability insurance shall include coverage sufficient to meet the obligations in AIA Document A232™–2009 under Section 3.18.
- .3 Products and Completed Operations insurance shall be maintained for a minimum period of at least _____ (____) year(s) after the expiration of the period for correction of Work.

§ 11.1.2.3 Automobile Liability insurance (owned, non-owned and hired vehicles) for bodily injury and property damage: \$ _____ Each Accident

§ 11.1.2.4 Umbrella or Excess Liability coverage:

§ 11.1.3 If a Commercial General Liability form is used for this insurance, ACORD form 25-S, is written specifically to list required coverages under those policies.

Add the following sentence to Section 11.1.3:

Model Language

If this insurance is written on a Commercial General Liability policy form, the certificates shall be ACORD form 25-S, completed and supplemented in accordance with AIA Document G715™–1991, Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S.

§ 11.3 Property Insurance

During preparation of the Supplementary Conditions the Owner's insurance counselor should carefully compare the terms of Section 11.3 with the actual policy form to be purchased to make certain all requirements for property insurance are, or can be, met, and certainly before any major changes in these requirements are proposed. If modifications are desirable, all other sections and sections of Section 11.3, in addition to the one being changed, should be reviewed and conflicting requirements reconciled. Every effort should be made to obtain the most appropriate protection for the specific project.

This section, as it appears in the General Conditions, requires the Owner to provide property insurance on a "builder's risk", "all-risk" or "equivalent policy form." Despite the name, "all-risk" policies may exclude coverage for certain perils. In many cases, these exclusions can be avoided by payment of a higher premium. Section 11.3.1 provides a list of specific perils such as earthquake, flood and windstorm which must be covered, but the list does not include other perils such as war or terrorism. Changes to the list of perils should be made only upon receipt of instructions from the Owner and using language obtained by the Owner from the Owner's insurance counselor to describe any added perils. The actual policy form referred to as "all-risk" is also called "open perils."

The supplements suggested in this Guide are in two parts: OPTION A, modifications to Section 11.3 as written; and OPTION B, modifications to Section 11.3 when the Contractor is required to furnish property insurance coverage.

When considering the use of Option B, it is important to consider that, by the terms of Section 9.3.3 of AIA Document A232–2009, Work completed and paid for is the property of the Owner and insurance proceeds for such property damaged or destroyed by a covered loss are rightfully the Owner's. Special consideration should be given to property insurance requirements when the Project involves additions or alterations to existing buildings.

Other exclusions under the property insurance for which waivers may be equally desirable are those that relate to claims based upon the Architect's professional acts or omissions or to claims based upon the Contractor's faulty workmanship or materials. Such exclusions are typically standard in most property insurance policies.

The amount for property insurance coverage is established in this section as being equal to the Contract Sum, plus the value of subsequent modifications and cost of materials supplied or installed by others, on a replacement cost basis. There may be occasions when an Owner is advised to carry less insurance, in which instance the Contractor must be so advised in the Supplementary Conditions so that the Contractor can include the cost of any additional necessary coverage in the Contract Sum.

As previously noted, A232–2009 requires insurance for physical loss or damage on an “all-risk” or equivalent policy form. Since these policies vary in their exclusions, it is important for the Owner’s insurance counselor to carefully review the policy that may be used to be certain it provides the desired protection. If any of the excluded risks are to be included in the coverage by endorsement, they should be specifically noted here so that the Contractor and Subcontractors will be aware of the extent of the coverage.

An example of when removal of an excluded risk might be necessary is in regard to theft coverage. Most “all-risk” policy forms include coverage for theft of materials and equipment (excluding the Contractor’s own equipment) stored on the site or in transit. However, some policies may restrict the theft protection to property that is an integral part of a building or structure. In this case, the Owner normally can obtain expanded coverage to provide the necessary protection for materials and equipment stored on the site but not yet incorporated in the Work. If the Owner does not obtain this coverage, then the Contractor should be required to obtain an installation floater to make certain the necessary insurance is in effect. If the Project is located in a high crime area, it may not be possible, or financially feasible, to acquire theft insurance.

Certain policy forms prohibit any waiver of the insured’s rights. When this is the case, it is necessary to provide a further endorsement to acknowledge the contractual provision for waiver of subrogation (A232–2009, Section 11.3.7) before any loss occurs.

OPTION A

(When the Owner carries property insurance as required by AIA Document A232–2009.)

§ 11.3.1.3 Most property or fire insurance policies are written with a deductible. This section describes how deductibles are to be handled. It is necessary to show amount of deductible per occurrence unless no deductible is, or will be, established in the policy, in which case the added sentence would read, “This property Insurance shall be written with no deductibles.” There is no need to identify the voluntary deductibles described in this Section 11.3.1.3, since they will be paid by the Owner in the event of an insured occurrence.

Add the following sentence to Section 11.3.1.3:

Model Language

§ 11.3.1.3.1 This property insurance is written with a deductible of \$ _____ per occurrence with a deductible aggregate of \$ _____.

§ 11.3.1.4 If the Owner does not intend to secure coverage for off-site storage or materials in transit, the Contractor must be advised so that this coverage can be obtained. See also Section 9.3.2.

Delete Section 11.3.1.4 and substitute the following:

Model Language

§ 11.3.1.4 The Contractor shall, at the Contractor’s own expense provide insurance coverage for materials stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit until such materials are permanently attached to the Work.

The property insurance is to cover the entire Work, which is defined under Section 1.1.3 as including “all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations.” The following provision clarifies the Contractor’s responsibility to provide insurance coverage for the Contractor’s machinery, tools and equipment that remain the property of the Contractor upon completion of the Project.

Add the following Section 11.3.1.6 to Section 11.3.1:

Model Language

§ 11.3.1.6 The insurance required by Section 11.3 is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance coverage for owned or rented machinery, tools or equipment, which shall be subject to the provisions of Section 11.3.7.

OPTION B

(When the Contractor is required to carry the property insurance.)

§ 11.3 Because deletion of Sections 11.3 in its entirety and substitution of a simplified single paragraph requiring the Contractor to carry this insurance (a frequent method used to effect this change) results in omission of important statements, it is recommended that Section 11.3 be modified only where appropriate, with the balance of the wording left intact. The following discussion of the sections under Section 11.3 is offered as a guide for use under those circumstances.

Other Multiple Prime Contractors and the Owner's own forces, including separate contractors, other than the designated Contractor, should be reminded of the necessity for Inland Marine coverage in the event of the need to insure their materials and equipment in transit. If a Project includes two or more buildings, each under separate contract, and the Owner does not intend to provide a single policy covering all buildings, each contractor should be required to carry the property insurance covering that contractor's Work on the Project. Possible areas of duplication of coverage should be assigned to one specific separate contractor. The Owner's insurance counselor should carefully evaluate the possible advantages or disadvantages if separate insurance is being provided by more than one contractor under the above circumstances.

Under certain circumstances, it is possible that the Contractor may be unable to obtain "all-risk" insurance, or would propose providing named-perils property insurance. In this situation, the Owner's insurance counselor would be well-advised to have the Contractor consider supplementing the named-perils property insurance policy with a Difference In Conditions contract (D.I.C.) to make the named-perils policy coverage consistent with the "all-risk" requirement.

If the Owner does not intend to carry the property insurance, the following modifications apply:

Modify the first sentence of Section 11.3.1 as follows: Delete "Unless otherwise provided, the Owner" and substitute "The Contractor." Add the following sentences:

Model Language

If the Owner is damaged by the failure of the Contractor to purchase and maintain such insurance without so notifying the Owner in writing, then the Contractor shall bear all reasonable costs attributable thereto.

Delete Section 11.3.1.2.

Since the Owner pays the deductible when responsible for property insurance, it may be advisable to modify Section 11.3.1.3 when the Contractor is responsible for purchasing and maintaining the property insurance.

Modify Section 11.3.1.3 by substituting "Contractor" for "Owner."

Delete Section 11.3.4. Since it relates to the Contractor's own insurance requirements, this section can be omitted.

Modify Section 11.3.6 by making the following substitutions: (1) in the first sentence, substitute "Contractor" for "Owner" and "Owner" for "Contractor," and (2) substitute "Owner" for "Contractor" at the end of the last sentence.

Modify Section 11.3.7 by substituting "Contractor" for "Owner" at the end of the first sentence.

Modify Section 11.3.8 by substituting "Contractor" for "Owner"; except that at the first reference to "Owner" in the first sentence, the word "this" should be substituted for "Owner's."

Modify Section 11.3.9 by substituting "Contractor" for "Owner" each time the latter word appears except in the last sentence.

Modify Section 11.3.10 by substituting "Contractor" for "Owner" each time the latter word appears.

§ 11.4 Performance Bond and Payment Bond

The requirements for a Performance Bond and Payment Bond should be noted in the Instructions to Bidders. (See AIA Document A701–1997, Instructions to Bidders.)

The amount of the bonds should be determined by the Owner's legal counsel.

Delete Section 11.4.1 and substitute the following:

Model Language

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to ____ percent (____%) of the Contract Sum.

§ 11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.4.1.2 The Contractor shall require the attorney-in-fact, who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.2 Correction of Work

§ 12.2.2 Note that the time limit of one year within which the Contractor is obliged to correct the Work may be modified by special warranties required by the Contract Documents. This one-year time limit should not be construed as a limitation of the Contractor's warranty under Section 3.5.1.

Section 3.6.6.4 of AIA Document B132–2009 provides for a meeting to be held with the Owner, Owner's Designated Representative, the Construction Manager and the Architect prior to the expiration of one year from the date of Substantial Completion to review facility operations and performance and to make appropriate recommendations. It may be desirable to require the Contractor to attend this meeting, as the recommendations from this meeting may form the basis for the written notice required by Section 12.2.2.1 of AIA Document A232–2009 of Work that is not in accordance with the Contract Documents.

Add the following Section 12.2.2.4 to Section 12.2.2:

Model Language

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect and Construction Manager will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.5 Tests and Inspections

§ 13.5.1 AIA Document A232–2009 requires the Owner to pay for tests, inspections or approvals where building codes or applicable laws and regulations prohibit the Owner from delegating their cost to the Contractor. Those to be paid for by the Owner should be identified in the General Requirements (Division 1 of the Specifications). Although the Owner may be responsible for payment, the responsibility for coordinating the timing of tests and inspections remains with the Contractor.

§ 13.6 Interest

Usury laws and requirements under the Federal Truth in Lending Act, similar consumer credit laws at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect

the validity of this provision. Legal advice should be obtained with respect to deletion, modification, or other requirements such as written disclosures or waivers.

§ 13.8 Non-Discrimination and Affirmative Action

The Construction Manager and Architect must be alert to provisions of local non-discrimination and affirmative action statutes in force at the Project location. If a supplementary condition is required, it should be added as Section 13.8.

§ 13.9 Moisture Control and Mold Mitigation

If project conditions warrant special mold mitigation measures, a Division 1 section should be created, or Division 1 sections should be edited, to address special procedures and protocols that must be performed. A Moisture Control and Mold Mitigation protocol should be written and included in the Contract Documents, clearly outlining the roles and responsibilities of the Owner and Contractor before, during and after construction.

Pre-construction activities at an existing building may include the Owner providing air monitoring and inspection services to determine if mold exists before the Work is commenced at the site, and remediation of such mold.

Activities required during construction may include the use of a construction drying contractor to "dry out" the building using desiccant dehumidification equipment, special procedures for materials storage and installation sequences, a water emergency response plan to address leaks or flooding during construction, execution of a moisture testing and monitoring program of in-place construction, and use of a third party inspection and testing agency to determine if the Contractor is complying with the special protocols specified in the construction documents for moisture control and mold mitigation. Such activities must be covered in the Contractor's construction schedule which should recognize and accommodate requirements for moisture management at the project site including proper drying out of the work and should specifically establish milestone dates for closing in the building before moisture sensitive work is performed.

Post-construction activities may include proper operation and maintenance of building materials and systems by Owner and execution of water emergency response plan for remediation of leaks and excess moisture. A building maintenance schedule should be included in the contract documents and operation and maintenance instructions for building systems should be clearly stipulated. The Owner should provide third party inspections of maintenance of building envelope for a certain number of months after Substantial Completion to determine Owner compliance with the building maintenance schedule.

Mold coverage on Contractor's Commercial General Liability or Pollution Liability policy is available, but is generally difficult to obtain. If this type of insurance is desired because of project conditions, the Owner should seek the advice of insurance counsel to determine (1) if mold coverage is typically available to Contractors who might work on the project (project location/size/cost considerations), (2) what is the most cost-effective way to procure it (project specific v. practice policy), and (3) who should pay the premium, deductible or other costs associated with such coverage.

If mold coverage is not available, or if a decision is made not to require such coverage on a project, an indemnification or hold harmless clause should be inserted to obligate the Contractor and Subcontractors to indemnify and hold harmless the Owner, Construction Manager and Architect if the Contractor's and Subcontractor's faulty workmanship leads to a mold problem. Similarly, an indemnification clause may be included to protect Contractor, Construction Manager and Architect in case Owner neglects to maintain and operate the building materials and systems according to maintenance and operation plan and instruction provides in the contract documents. This should include the requirement that the Owner will notify the Construction Manager, Architect and Contractor of any leaks within a certain time period.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.4 Many Owners reserve to themselves the right to terminate the Contract for convenience, that is, without cause. Termination for convenience is provided for in AIA Document A232-2009.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1.5 Requests for Additional Cost and Extension of Time

On projects where time is especially critical, or where delays are especially likely to occur, the Owner may require added protection in this area. In the language suggested below, Section 15.1.5.3 strengthens the documentation requirements for Claims for additional time, and Section 15.1.5.4 requires the Contractor to demonstrate that the delay was on the critical path. It is advisable to further describe the scheduling, documentation and submittal timing required of the Contractor in Division 1 of the Specifications.

Add the following Sections 15.1.5.3 and 15.1.5.4 to Section 15.1.5:

Model Language

§ 15.1.5.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.5.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6 Claims for Consequential Damages

Under this section, the Owner and Contractor waive consequential damages arising out of the Contract for Construction. Generally, a rule of law known as the economic loss doctrine would bar independent tort claims relating to the Contract. In some states, however, the economic loss doctrine has been weakened or discarded; in that situation the Construction Manager and Architect (against whom the Contractor does not waive consequential damages) would be exposed to tort claims by the Contractor for such damages. Where the law of such a state applies, the following language (and, of course, compliance with the stated conditions) is recommended.

Add the following sentence to Section 15.1.6:

Model Language

If, before expiration of 30 days from the date of execution for this Agreement, the Owner obtains by separate agreement and furnishes to the Contractor a similar mutual waiver of all claims from the Construction Manager and Architect against the Contractor for consequential damages which the Construction Manager or Architect may incur as a result of any act or omission of the Owner or Contractor, then the waiver of consequential damages by the Owner and Contractor contained in this Section 15.1.6 shall be applicable to claims by the Contractor against the Construction Manager and Architect.

§ 15.4 Arbitration

The General Conditions do not require an arbitration to be held in any particular jurisdiction. If it is desired to require that the demand for arbitration be filed with a specific office of the American Arbitration Association and that the arbitration be held in a particular place, unless otherwise mutually agreed, this requirement should be stated in the Supplementary Conditions. These provisions should be reviewed by the Owner's legal counsel, in view of the variance of the rules with respect to such requirements from one jurisdiction to another.

§ 15.4.1 On some projects, the parties may wish to place a dollar limit on Claims subject to arbitration. The rationale for doing this is to make the procedural safeguards of the legal system available for Claims exceeding that specified amount. Possible drawbacks are the costs and delays involved in litigation. If there is to be a dollar limit on Claims subject to arbitration, then in Section 6.2 of AIA Document A132-2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, where the method of binding dispute resolution is to be selected, the parties should so specify the dollar limit of Claims subject to arbitration.

Appendix F

Sample EJCDC Documents*

Engineers Joint Documents Committee Design and Construction Related Documents Instructions and License Agreement

Instructions

Before you use any EJCDC document:

1. Read the License Agreement. You agree to it and are bound by its terms when you use the EJCDC document.
2. Make sure that you have the correct version for your word processing software.

How to Use:

1. While EJCDC has expended considerable effort to make the software translations exact, it can be that a few document controls (e.g., bold, underline) did not carry over.
2. Similarly, your software may change the font specification if the font is not available in your system. It will choose a font that is close in appearance. In this event, the pagination may not match the control set.
3. If you modify the document, you must follow the instructions in the License Agreement about notification.
4. Also note the instruction in the License Agreement about the EJCDC copyright.

License Agreement

You should carefully read the following terms and conditions before using this document. Commencement of use of this document indicates your acceptance of these terms and conditions. If you do not agree to them, you should promptly return the materials to the vendor, and your money will be refunded.

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Related Documents along with all copies, modifications and merged portions in any form.

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EJCDC's entire liability and your exclusive remedy shall be:

1. the replacement of any document not meeting EJCDC's "Limited Warranty" which is returned to EJCDC's selling agent with a copy of your receipt, or
2. if EJCDC's selling agent is unable to deliver a replacement CD or diskette which is free of defects in materials and workmanship, you may terminate this Agreement by returning EJCDC Document and your money will be refunded.

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Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

General:

You may not sublicense, assign, or transfer this license except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign, or transfer any of the rights, duties, or obligations hereunder is void.

This Agreement shall be governed by the laws of the State of Virginia. Should you have any questions concerning this Agreement, you may contact EJCDC by writing to:

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General Counsel
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314

Phone: (703) 684-2845
Fax: (703) 836-4875
e-mail: aschwartz@nspe.org

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between us which supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this agreement.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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EJCDC C-700 Standard General Conditions of the Construction Contract
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**STANDARD GENERAL CONDITIONS OF THE
CONSTRUCTION CONTRACT**

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SAMPLE

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 Reference Standards

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by

Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and

- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 2. *Samples:*
 - a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Submittal Procedures:*
1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or

- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

- A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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Study Questions: Answers

Chapter 1

1. Answer: a., b., and c.
2. Answer: a. and d.
3. Answer: True.
4. Answer: False.
5. Answer: False.
6. Answer: True.
7. Answer: True.
8. Answer: True.
9. Answer: True.
10. Answer: All of the above.

Chapter 2

1. Answer: True.
2. Answer: True.
3. Answer: All of the above.
4. Answer: False.
5. Answer: True.
6. Answer: b.
7. Answer: c.
8. Answer: False.
9. Answer: d.
10. Answer: True.

Chapter 3

1. Answer: True.
2. Answer: True.
3. Answer: False.
4. Answer: d.
5. Answers: c. and d.
6. Answer: d.
7. Answer: b.

8. Answer: c.
9. Answer: c.
10. Answer: 4.
11. Answer: False.
12. Answer: c.

Chapter 4

1. Answer: True.
2. Answer: True.
3. Answer: e.
4. Answer: False.
5. Answer: d.
6. Answer: True.
7. Answer: False.
8. Answer: False.
9. Answer: False.
10. Answer: d.

Chapter 5

1. Answer: True.
2. Answer: 3.
3. Answer: False.
4. Answer: b.
5. Answer: True.
6. Answer: d.
7. Answer: a.
8. Answer: b., c., and d.
9. Answer: True.
10. Answer: True.

Chapter 6

1. Answer: b.
2. Answer: True.
3. Answer: True.
4. Answer: False.
5. Answer: False.

6. Answer: True.
7. Answer: False.
8. Answer: False.
9. Answer: True.
10. Answer: b.
11. Answer: True.
12. Answer: a.

Chapter 7

1. Answer: e.
2. Answer: b.
3. Answer: False.
4. Answer: False.
5. Answer: d.
6. Answer: e.
7. Answer: True.
8. Answer: False.
9. Answer: True.
10. Answer: True.

Chapter 8

1. Answer: True.
2. Answer: b.
3. Answer: True.
4. Answer: b.
5. Answer: False.
6. Answer: a.
7. Answer: b.
8. Answer: True.
9. Answer: True.
10. Answer: False.

Chapter 9

1. Answer: True.
2. Answer: True.
3. Answer: True.

4. Answer: True.
5. Answer: False.
6. Answer: True.
7. Answer: False.
8. Answer: False.
9. Answer: True.
10. Answer: False.
11. Answer: a.
12. Answer: c.

Chapter 10

1. Answer: True.
2. Answer: True.
3. Answer: False.
4. Answer: True.
5. Answer: False.
6. Answer: True.
7. Answer: True.
8. Answer: False.
9. Answer: True.
10. Answer: True.

Chapter 11

1. Answer: False.
2. Answer: True.
3. Answer: True.
4. Answer: True.
5. Answer: True.
6. Answer: False.
7. Answer: a.
8. Answer: True.
9. Answer: False.
10. Answer: True.

Chapter 12

1. Answer: True.

2. Answer: c.
3. Answer: c.
4. Answer: True.
5. Answer: True.
6. Answer: True.
7. Answer: True.
8. Answer: b.
9. Answer: False.
10. Answer: False.

Chapter 13

1. Answer: a. ad c.
2. Answer: True.
3. Answer: d.
4. Answer: True.
5. Answer: d.
6. Answer: True.
7. Answer: c.
8. Answer: True.
9. Answer: False.
10. Answer: True.

Chapter 14

1. Answer: False.
2. Answer: False.
3. Answer: True.
4. Answer: False.
5. Answer: False.
6. Answer: True.
7. Answer: True.
8. Answer: False.
9. Answer: True.
10. Answer: True.

Chapter 15

1. Answer: True.

2. Answer: a.
3. Answer: d.
4. Answer: True.
5. Answer: True.
6. Answer: True.
7. Answer: a., b., c., and d.
8. Answer: d.
9. Answer: True.
10. Answer: True.

Chapter 16

1. Answer: True.
2. Answer: True.
3. Answer: b.
4. Answer: True.
5. Answer: True.
6. Answer: False.
7. Answer: False.
8. Answer: True.
9. Answer: d.
10. Answer: d.

Chapter 17

1. Answer: True.
2. Answer: d.
3. Answer: False.
4. Answer: True.
5. Answer: True.
6. Answer: False.
7. Answer: True.
8. Answer: False.
9. Answer: False.
10. Answer: True.

Chapter 18

1. Answer: False.

2. Answer: False.
3. Answer: False.
4. Answer: c.
5. Answer: d.
6. Answer: a.
7. Answer: c.
8. Answer: a.
9. Answer: b.
10. Answer: False.

Chapter 19

1. Answer: False.
2. Answer: False.
3. Answer: d.
4. Answer: False.
5. Answer: True.
6. Answer: e.
7. Answer: True.
8. Answer: True.
9. Answer: True.
10. Answer: True.

Chapter 20

1. Answer: True.
2. Answer: True.
3. Answer: True.
4. Answer: True.
5. Answer: False.
6. Answer: True.
7. Answer: True.
8. Answer: False.
9. Answer: e.
10. Answer: True.

Chapter 21

1. Answer: False.

2. Answer: False.
3. Answer: d.
4. Answer: True.
5. Answer: True.
6. Answer: True.
7. Answer: True.
8. Answer: d.
9. Answer: False.
10. Answer: False.

Chapter 22

1. Answer: c.
2. Answer: d.
3. Answer: False.
4. Answer: False.
5. Answer: False.
6. Answer: d.
7. Answer: a.
8. Answer: d.
9. Answer: d.
10. Answer: True.

Chapter 23

1. Answer: d.
2. Answer: True.
3. Answer: b.
4. Answer: False.
5. Answer: b.
6. Answer: False.
7. Answer: c.
8. Answer: False.
9. Answer: d.
10. Answer: False.

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AASHTO standards, *see* American Association of State Highway and Transportation Officials standards

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Abbreviations

Access compliance

ACEC (American Consulting Engineers Council)

ACEC (American Council of Engineering Companies)

ACI standards

Acronyms

Addenda

- for changes in bidding documents

- procedures for

- purposes of

Adverbs, legal-sounding

Advertisement to Bid. *See also* Invitation to Bid

AGC, *see* Associated General Contractors of America

Agreement

- parties to

- signing of

AIA, *see* American Institute of Architects

AIA documents, *see* American Institute of Architects documents

All-inclusive language

Allowance Procedures (Division 1 section)

Alternate Bid Procedures (Division 1 section)

Alternative dispute resolution

Amazon.com

American Arbitration Association (AAA)

American Association of Cost Engineers

American Association of State Highway and Transportation Officials (AASHTO) standards

American Concrete Institute (ACI) standards

American Consulting Engineers Council (ACEC)

American Council of Engineering Companies (ACEC)

American Institute of Architects (AIA):

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and NCS Project Committee

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American Society of Civil Engineers (ASCE)
American Society of Professional Estimators
ANSI (American National Standards Institute)
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Appendices (Project Manual)
Arbitration
ARCAT, Inc.:
 ARCAT®—The Product Directory for Architects
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 proprietary specifications
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ASTM standards

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documents comprising

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Bid Form

BIM (Building Information Modeling)

Binding arbitration

Blueprints

BOCA (Building Officials and Code Administrators International, Inc.)

Bonds

Books:

for construction reference

of construction specifications

Internet sales of

Bowne Information Services

Broadscope

BSD, *see* Building Systems Design, Inc.

Building codes and ordinances

Building Officials and Code Administrators International, Inc. (BOCA)

Building Select Product Data (Reed Construction Data)

Building Systems Design, Inc. (BSD):

PerSpective

SpecLink

website of

BuildSelect Product Data (Reed Construction Data),

C

CABO (Council of American Building Officials)

CAD (Computer Aided Design)

CADD/GIS Center

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Canadian master guide specifications

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Carroll, Lewis

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 development of

- technological advances in
- Computer-assisted PPDs
- Computer-assisted specifications
 - computers and peripheral equipment
 - Editspec*
 - history of
 - knowledge-based
 - Linx*
 - Masterworks*
 - precautions with
 - SpecLink+*®
 - and transformation of specification process, word processing enhancements
 - word processing software
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