

# Construction Project Tracking and Control for Eagle Construction Company: A Teaching Example

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**Abstract:** *This paper provides a semester-ending, real-world construction tracking and control example of a two-story building. The example provides a component currently missing from project management literature: information management case studies of real world problems written for undergraduate students. Since this example is designed for undergraduate students, it focuses on carefully selected documentation and communication issues that generally occur during the first few months of the project, including: project meetings, change orders, clarification and interpretation of drawings and specifications, payment requisitions, and conflict resolution. Real-world information provides a sufficiently open-ended problem, requiring students to use creative problem-solving skills. The teaching notes provide detailed guidance for instructors, including a grading evaluation rubric, and suggested solutions.*

## Introduction

A major development in contemporary higher education pedagogy is a broad set of experiential learning techniques, including the case method. As a teaching tool, the case method fulfills a number of learning objectives, including acclimating students to problem-solving, providing "real-world" examples, and using both inductive and deductive thinking (Nelson 1998). John Dewey first espoused experiential learning or "learn-by-doing" early in the 20th century. Even at that time, experiential learning ideas were part of human education, but they did not become a formal part of the educational dialect until the 1930's, mainly due to Dewey's work. However, it was not until the late-1960s that experiential learning found wide acceptance in academic institutions.

The philosophical basis of experiential learning is simple: experience teaches. However, experience can be both educative, providing a valid educational experience, or "miseducative," providing an invalid, unrealistic experience. This paper strives to create an "educative" learning experience by providing a semi-structured case experience. To help ensure a "significant learning" experience, the authors created this case following the guidelines given by Fink (1998).

During the past two decades, the proliferation of computer technology in the construction industry challenges both construction management practice and education (Oglesby, 1990). Information systems add a major dimension to the management of construction organizations, from the office to the jobsite (Lee and Johnson, 1992). Construction management educational programs can adopt information systems courses by using valuable publications in computers (e.g., Hegazy, 2002), information systems (e.g., Stair and Reynolds, 2003), jobsite management (e.g., Mincks and Johnston 2004), and construction project administration (e.g., Fisk 2003), to name a few. However, even with the quality of these publications, case studies on computerized construction document management are missing. [The exceptions to these findings are the case studies found in training materials of software companies such as Primavera (2002). These materials are very useful, but are designed to provide training and support for software users, but not to provide academic preparation for undergraduate students.]

Using the case method to teach information systems in construction management education has its barriers. Chinknowsky (1998) found that courses that diverge from the traditional pedagogical techniques require a major undertaking. Duval and Schmidt (2002) found that teaching information technology (relational databases) cases remains a missing component in construction management education because of a failure to understand how these cases relate to company management.

### Methodology

The author originally developed this case to support the learning objectives of a construction management class in "Computer-aided Construction Management" originally taught at John Brown University (JBU), Siloam Spring, Arkansas, in the Fall of 2002, but it could be used in any construction control type course. The purpose of the course was to provide students with an understanding of the role of information systems, in general, and document management systems (like Primavera System's *Expedition*), specifically, in the management of construction projects and documentation. To introduce information systems to the students, the course included a general introduction to databases, and database functions in spreadsheets. However, the focus of the course was on the application of information system concepts to construction project control, tracking, communication, and documentation.

The textbook for the course was *Construction Jobsite Management*, by Ralph Mincks and Harold Johnston (published by Delmar Learning, Clifton Park, New York, 2004). The textbook is an excellent source of information for documentation processes and procedures, but lacks homework exercises, problem-solving activities, and case studies. Therefore, the author of this case developed several exercises to supplement the reading.

The case, intentionally, is a relatively open-ended, comprehensive, end-of-the-semester case study on the tracking and control of a construction project. The software of choice at JBU was Primavera's *Expedition*, though this case could easily be used with any of a number of project tracking and control systems.

The case finds its basis in an actual construction project at JBU, Siloam Spring, Arkansas. Interviews were conducted with the owner's and the contractor's project managers. The author obtained actual documentation from these individuals, and used those documents as the basis for those created in the case. However, the details portrayed in the case are different from actual occurrence, not only to protect the confidentiality of the original documents, to adhere to copyright protections, and to provide students with a learning experience that fits their level of understanding and ability.

Therefore, this work provides an experiential (case) study of a computerized project tracking and control system for the construction industry. The case is structured to provide an "educative" experience for students, but uses an "open-ended" style to allow academic teaching of a project tracking and control using an information system (Cappel & Schwager, 2002).

In general, this paper first gives "the case," then gives "teaching suggestions." The Case Summary and Case Text provide a detailed narrative of the case; they are written in third-person narrative-form to a student audience. The intent is for the Case Summary and Case Text to be distributed to students as their assignment. The last portion of the paper contains the Teaching Notes, designed for the instructor's use. These notes provide detailed suggestions on how to use the case in the classroom.

The complete outline of the case and teaching notes is:

- i. Case Learning Objectives
- ii. Case Suggestions
- iii. Case Summary
- iv. Case Text
  - a. Background
  - b. Details of Case (this case is divided into two parts: A and B)
- v. Teaching Notes
  - a. Methodology
  - b. Teaching Suggestions and Proposed Solutions
  - c. Conclusion

### **Case Purpose and Objectives**

In general, the purpose of this case is for students to learn skills needed to manage documents and communications using a project tracking and control system in the construction industry.

The specific learning objectives of this case are:

1. Apply the skills needed to set up a project in a document management system, including the following:
  - a. The company directory and contract drawings; and
  - b. A letter template.
2. Create a log of a meeting.
3. Create a correspondence log for transmittals, phone calls, facsimiles, letters, and other documents.
4. Create and resolve an issue using a "request for information."

5. Create a drawing set.
6. Track changes to drawings.
7. Track and manage a change to a contract.
8. Create and use a "request for proposal."
9. Create and manage payment requisitions.

#### *Part A–Initial Contract Information Assignment*

Part A of the case focuses on the creation of much of the initial database file structure, and populating those files with names of documents, companies, and contacts. Students should refer to the Evaluation Form in [Appendix A](#) to become familiar with the objectives of this part of the assignment. Much of the data to be input during this part is tedious and highly repetitive, so the instructor is encouraged to limit the number of actual data entries to just over the minimum. This helps to alleviate boredom and "busy-work."

Although the tasks are tedious and repetitive, students should not underestimate the amount of time needed to set up the database, and to input the data. It is important that these initial steps of building the database, early in the project, be performed properly to form a solid basis from which to build the rest of the project's database.

#### *Part B–Advanced Contract Information Assignment*

Part B of this case emphasizes some higher order learning objectives. Again, students should familiarize themselves with the Evaluation Form, this one in [Appendix B](#), being sensitive to the following points:

The most difficult task to be conquered in this case occurs in part B: change management. The change management process is a relatively easy concept to understand, but its implementation can be very confusing due to the number of proposals and counterproposals moving across a project manager's desk, the number of subcontracts, the number of line items in the estimate, the amount of money involved, and the on-going time demands. While conceptually simple, the change management process can become confusing in a document management system, due to the high number of steps involved. It would be helpful to review the steps involved in the process with the students.

Part B also involves payment requisition management. Very little instruction is given to the students in the actual case text. Therefore, it is up to the instructor to be sure that the students have adequate preparation for the work given in the case by preparing the students, as suggested in the teaching tips.

### **Case Summary**

A small, private University undertakes an \$8-million contract with Eagle Construction Company for construction of a new science building, designed by MAC Architecture, Inc. The case

highlights various experiences of Ewer A. Eagle, the project manager for Eagle Construction, during the early phase of the construction of the building. The case challenges students in their use of a computerized project tracking and control system. In their role as Ewer, students perform the tasks experienced by an actual construction project manager, such as beginning the documentation process, record job site visits, receive facsimiles and emails, create requests for proposals and requests for information, coordinate estimates among subcontracts, among others.

The case documents about a dozen or so of Ewer's experiences, including a pre-construction conference, minor requests for information from a supplier and from his field superintendent, major negotiations with the architect and subcontractors for a change order, and several payment requests. Students should make a permanent record of these events using project tracking and control software, and create appropriate communication to respond to these requests as would be appropriate on a real project.

[Author's Notes: Special thanks to John Brown University, Siloam Springs, Arkansas (USA), and Nabholtz Construction Company, Conway, Arkansas (USA), for permission to use this information. Pseudonyms are used throughout this case to protect the confidentiality of the organizations involved. Information for this case is drawn from actual construction documents, but the information in the Case Study is not fact, but modification of facts for the sake of classroom education. Format of all documents is based on those found in the software package *Expedition* by Primavera System's, Bala Cynwyd, Pennsylvania (USA).]

## **Case Text**

### *Background*

The University, a small, private, liberal arts institution of higher education is undergoing "growing pains." The science building, laboratories and classrooms, were last updated in the 1950s. During a recent two-year capital campaign, the university President raised several million dollars, with \$6.0 million "earmarked" for a new science building. With the money in hand, the University selected the design team headed by MAC Architecture, Inc., to oversee the design of the new Bell Science Building. MAC Architecture selected Archy T. Eck to be the project manager for the Bell Science Project. The design team also included MS Consulting Engineers, Inc., for structural and civil engineering, and SJF Engineers, Inc., for mechanical and electrical design. Table 1 contains the contact information for the owner and the design team.

Table 1.

***Project Stakeholders' Information***

<b>Role</b>	<b>Name</b>	<b>Address</b>	<b>Contact</b>	<b>Phone/FAX</b>
Owner:	The University	500 University Drive Somecity, MO 99999	Joanna Millford	(988) 988-9888 988-8889
Architects	MAC Architecture, Inc.	302 N. 6th St. Another City, KS 99901	Archy T. Eck, AIA	(988) 888-8888 888-8881
Structural / Civil Design	MS Consulting Engineers, Inc.	6900 Dallas Street Greensleeves, AR 98989	Paul Henley (Structural Engr.) Daniel Silver (Civil Engr.)	(988) 888-8787 888-7877
Mechanical/Electrical Design	SJF Engineers, Inc.	8333 Douglas Avenue Big Deal, AR 84844- 1631	Jane Doe	(988) 788-7888 788-8887

Following several months, MAC Architecture, Inc., and the design team completed the design, including the construction drawings and the contract manual (see [Appendices C and D](#)). The University sent the complete set of documents, listed in [Appendices C and D](#), to several pre-selected construction companies for price negotiation.

The University interviewed each of the prospective construction companies twice during this period. Following several rounds of interviews with each company, negotiations ended on October 15<sup>th</sup>, <Year\_1>, when The University selected, Eagle Construction Company (ECC), to construct the Bell Science Building. Eagle's bid for the initial Bell Science Building package was over \$7.26 million dollars.

Since Eagle's initial price was \$1.26 million over budget, Eagle and The University continued negotiations for several months thereafter, looking for ways to narrow the price-budget gap. The team bridged the gap in three ways:

- (1) on November 30<sup>th</sup>, <Year\_1>, Eagle submitted value engineering suggestions saving The University \$0.50M. The architect and The University accepted these suggestions;
- (2) on December 1<sup>st</sup>, scope reduction suggestions from the architect were submitted; on December 15<sup>th</sup>, Eagle proposed a savings of around \$0.50M for the reductions; and
- (3) on January 4<sup>th</sup>, <Year\_2>, The University found additional funding sources to provide the difference.

Finally, on January 15th, <Year\_2>, the contract was signed for \$6,268,810.00. [Appendix E](#) contains the approved Schedule of Values.

[Note: At this point Eagle's project manager, Ewer A. Eagle, does the set-up of his document management database using the information in Table 1, the Table of Contents, and other project information given above and in the appendices; students should do the same.]

*Part A – Initial Contract Information: From Contract to Construction*

The University immediately sent The Notice to Proceed (NTP), dated January 17, to Eagle Construction, setting the "contract start date" at January 17, <year\_2>. Eagle responded with their standard form letter. ECC then forwarded, under an ECC cover letter, the NTP to all subcontractors notifying them that their subcontracts would start on January 17. (Here again, students should create this correspondence using the appropriate software. From this point forward, hints specifically stating "students do this or that" will no longer be given, nevertheless, students should make the appropriate entries in the software. Refer to the evaluation forms in [Appendix A](#) and [Appendix B](#) for hints.)

On January 18<sup>th</sup>, Archy T. Eck called ECC and setup a Preconstruction Meeting with Ewer A. Eagle, establishing time, place, location, and agenda. Mr. Eck followed up that conversation with a letter to ECC, stating that the Preconstruction Meeting would be held in the Chapman Conference Room at The University on January 25th at 1:00 p.m. The letter included a copy of the Agenda (Table 2) and informed Eagle to present the following information at the meeting:

1. List subcontractors' contact information.
2. Describe administrative and production procedures with subcontractors.
3. Provide a schedule of construction activities.
4. Describe procedures for close-out of subcontracts.

Ewer created these communication, and/or performed requisite documentation of these communications using his document management database.

*The Preconstruction Meeting*

At the meeting, Archy T. Eck distributed an Attendance Sheet and an Agenda, shown in Table 2. Following brief introductions and opening remarks from all parties present, the owner and architect presented their project requirements. They then turned the meeting over to Ewer A. Eagle. Ewer covered the items on the agenda, as pre-arranged with Mr. Eck.

Table 2.

***The Agenda***

- 
- I. Introductions and Opening Remarks
    - A. Owner
    - B. Architect
    - C. Contractor
  - II. Owner's Project Requirements
  - III. Architect's Project Comments
  - IV. Contractor's Project Requirements
    - A. Administrative
    - B. Production
    - C. Safety
    - D. Schedule
    - E. Close-out
  - V. General Comments and Questions
  - VI. Closing
  - VII. Adjourn

Following a couple of days, a copy of the transcript of that meeting and the attendance sheet arrived in the mail from MAC. [Appendix G](#) contains the meeting transcript; Table 3 contains the attendance sheet of that meeting. Ewer updates his database accordingly.

Table 3.

***Preconstruction Meeting Attendance Sheet***


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<b>Name</b>	<b>Position</b>	<b>Company</b>
Dan Prins	Vice-President	MAC Architecture
Archy T. Eck	Project Manager	MAC Architecture
(Ms.) Eva Douglas	Vice-President of Finance	The University
Curt Clark	Construction Administrator	The University
Everett Easley	Director of Operations	The University
Ewer A. Eagle	Project Manager	Eagle Construction
Joseph Hood	Administration	ECC
Darek Halpin	Superintendent	ECC
Gene Thompson	Safety	ECC

***Day One and Two***

As the Project Manager, Ewer A. Eagle does not visit the jobsite every day to observe the progress of the project, that is left to the Project Superintendent. However, during the first two days, the Superintendent had to be at another jobsite to "wrap-up" work on that project. So,

Ewer went to the jobsite of the Bell Science Building and made the following observations during Days One and Two:

*Day One:*

- No work on-site, rained all day.
- Called utility companies (telephone, water, electric, and Internet) for temporary project connections.
- Moved project trailer on-site. Began setup.
- Called and mailed letter to steel company for shop drawings.
- Excavation sub moved dozer and backhoe on-site.

*Day Two:*

- Sunny.
- Water connection set-up.
- Project trailer set-up, connected water.
- Received 5 sets of shop drawings (5 pages, "D-size") from steel company.
- Architect stopped by for 10 minutes.
- Survey crew confirmed and marked control points in drawings. Earthwork subcontractor and general contractor (GC) met them on-site.
- Called home office to check status of GC crews.

Using the document database, Ewer documents his observations.

### *Part B—Advanced Contract Management*

#### *Duct and Door Conflict*

Very early in the project, Ewer receives an email, shown in [Figure 01](#), from his field superintendent, about a heating, ventilation, and air conditioning (HVAC) duct interfering with a door location. The superintendent requests that the wall be relocated, initiating Request for Information (R.F.I.) Number 12, and records it in his database. [Note: The previous 11 R.F.I.'s do not require documentation for this project.]

#### *Elevator Dimensions*

On January 24th, Ewer receives a phone call from Otts Elevator about the dimensions for the elevator needing clarification and, potentially, modification. Ewer tells him to submit the elevator drawings, noting the changes. On the morning of January 26th, Ewer receives the submittal in [Figure 02](#) from the Elevator Subcontractor.

Ewer immediately calls the field superintendent to discuss this clarification. They decide to propose (to the Architect) moving the elevator pit wall 2-3/4" to the east to make up the difference. Ewer transmits (via facsimile) to the Architect the elevator transmittal (the two pages received from the elevator subcontractor) and a Request for Information (RFI) about this issue, requesting approval.

A couple of hours later, Ewer receives a phone call from Archy T. Eck. Mr. Eck asks Ewer some questions about moving the wall and the elevator's dimensions, and then concludes the conversation by telling Ewer that the change is OK. Ten minutes later Ewer receives a faxed copy of the RFI with a note saying, "This is acceptable to MAC, Archy T. Eck" at the bottom. Ewer transmits the information on to the subcontractor.

Naturally, Ewer uses his document software to create and/or document these communications.

### *Connection Detail*

In a new issue, Ewer receives the fax in [Figure 03](#) from the Architect (and the Engineer, SJF Engineers) showing changes in a connection detail for 6-inch by 6-inch structural square tube (abbreviated TS) member shown in SDS-12 ("SDS-12" reads, supplemental drawing-structural number 12). At first, Ewer is concerned about the change, so he studies the fax, calls the steel fabricator, and talks to the estimator in his office. These conversations relieve his fears, concluding that these proposed changes are within the original scope of the contract. He sends a response to the Architect that there is no change in the contract, and records all of these communications.

### *Change Order (CO) Number 1*

*Request for Proposal (RFP) Number 1:* On February 8, Ewer receives Request for Proposal (RFP) 00001 from MAC Architects, see [Figure 04](#), regarding a proposed change order (PCO) in the plumbing, mechanical, and electrical work. Ewer reviews the RFP, decides that the change requires additional input from several subcontractors, and sends an RFP of his own (along with the Architect's RFP 00001 and the drawing changes) to the appropriate subcontractors: (1) for mechanical, including plumbing, (2) for electrical, and (3) for internal estimation. (Abbreviations used in figures: "SDP" and "SDM" read, respectively: supplemental drawing-plumbing and supplemental drawing-mechanical.)

[Note to students: Some document management software programs (such as Primavera's *Expedition*) assumes that project changes are initiated by the Contractor. Here is an instance, however, where the Architect/Owner initiates the change. Use the tutorials that come with the project tracking and control software, and the following hints to help in getting started on this change:

1. Consider creating a "Drawing Set" (a feature available in the project tracking and control software) for this change.
2. Consider tracking "revisions due to a change" (a feature available in the project tracking and control software) for these drawings.
3. Considered configuring the change management settings, whereupon you could allow the software's change management tools to create the RFP from the Architect.]

Ewer calls each subcontractor to discuss the changes and to let them know that the RFPs are in the mail. Several times over the next few days, Ewer talks to the subcontractors and to others in

his office about these changes. He also exchanges several phone calls with the Architect about the work. Following each communication, Ewer documents them.

Finally, following over two weeks of negotiations, the estimates from the subcontractors arrive, as shown in [Figure 05](#) for the plumbing changes, [Figure 06](#) for the mechanical changes, and [Figure 07](#) for the electrical changes. (Notice that "lump sum" is abbreviated LS.)

When Ewer receives these "Estimates," he enters them as "Change Order Requests" (COR). Following careful consideration of the subcontractors' proposals, Ewer accepts and records them.

His estimators tell him that it will take the additional expenses shown in Table 4 for his company, as General Contractor, to manage this change:

Table 4.

***Eagle's Estimate for General Contractor's Fees***

<b>Plumbing</b>	<b>Mechanical</b>	<b>Electrical</b>
Labor: \$1,541	Labor: \$1418	Labor: \$131
Equipment: \$154	Equipment: \$187	Equipment: \$13
Overhead: \$586	Overhead: \$539	Overhead: \$50
Insurance: \$311	Insurance: \$285	Insurance: \$64
	Tax: \$46	
	Materials: \$645	

Ewer adds these additional costs (from the estimator) to the proposal. In addition, based upon the increase in the scope of work, Ewer requests eight (8) calendar days be added to the contract. When the package is ready, he forwards it on to the Architect as a "Proposed Change Order" (PCO)

After several days, Ewer receives a response accepting the proposal with several deductions and modifications, see [Figure 08](#), from the Architect, whereupon, Ewer places this communication into his database.

Ewer calls the subcontractors to discuss the response from the Architect. They agree upon the following:

- for item 1, MMM agrees to a \$698 deduction;
- for item 2, MMM agrees to a \$475 deduction;
- for item 3, the electrical subcontractor agrees to a deduction of \$250. The electrical subcontractor agrees to a price of \$225/each for the proposed floor box, whereas the original floor box cost \$125/each. In addition, for Item B on sheet E1.10, the electrical subcontractor will have to cut the openings in the millwork. Since these openings were not indicated in the casework drawings, the electrical subcontractor cost needs to be an additional \$100 per opening and \$50 for labor and miscellaneous. Therefore, the deduction for this item is only \$250.

- The total deduction is now \$1423, changing the cost for RFP#1 to \$43,239.

Ewer calls the Architect about the discussions with the subcontractors, and forwards these changes on to the Architect by letter. Several hours later, Ewer receives a confirmation by a faxed copy of his letter, covered by a letter from the Architect, approving the changes. Again, Ewer uses the document management system to create and/or record these communications.

*Request for Proposal Number 2:* In the mean time, while negotiations are ongoing over RFP#1, Ewer receives RFP#2 from the Architect, shown in [Figure 09](#), (which he records) regarding the addition of sidewalks and changes in drainage improvements.

Ewer decides to complete this work using "in-house" resources only. He asks his estimators to look at RFP#2 and come up with an estimate. A few days later, he has the estimate. He calls the Architect with the numbers, and, on February 27, sends the numbers to the Architect in a "Proposed Change Order" (PCO). He documents the quoted amount for Item 1 as \$20,703; and the quoted amount for Item 2 as a deduction of (\$1,442).

On March 15, Ewer talks to the Architect by phone. The Architect tells Ewer that Item 1 of RFP#2 is too expensive for the Owner, and therefore rejected completely; in other words, the work will not be undertaken at all. The Owner accepted only Item 2 of the PCO (proposed change order). Late that day Ewer receives a facsimile from the Architect, returning Ewer's proposal, with the Architect's signature on it, and a note to "Modify storm drainage only—total is a deduction of \$1,442." Ewer documents this exchange.

*Approval.* Ewer documents that both changes were approved as noted above, and together became Change Order No. 1, approved on May 3rd.

*Payment Requisitions.*

[Appendix I through M](#) shows the monthly estimates of work completed from February through June. Ewer uses this information as the basis for creation of the payment requisitions for submission to the Architect and Owner.

### Teaching Suggestions

Throughout this case, the student is to assume the role of the Project Manager, Ewer A. Eagle, working for Eagle Construction Company. The case assumes that students have prior education or experience in the role of a project manager in managing communication on a jobsite. The case also assumes that students have prior experience using a project tracking and control software program. Therefore, the author strongly suggests that, prior to using this case, instructors provide students with laboratory and homework activities that will guide them through both the communication processes on a construction project, and through the appropriate functions of the software being used in the classroom.

Students will also need instruction on how to complete payment requisitions prior to beginning this case. The author suggests that these payment requisition assignments include calculation of several months of payments including payment for materials-on-hand, work in place, and retainage. The authors' experience suggests that students understand these concepts, but the actual calculations are much more tedious and involved than is originally anticipated.

As the case is introduced, provide the students the Evaluation Forms, shown in [Appendix A](#) and [Appendix B](#), and tell the students that their work will be evaluated according to the objectives listed under "Demonstration of Understanding." When initially presenting the case to the students, the instructor should plan to cover several points for clarification and emphasis. First, connect the case to the rest of the course. The instructor should cover the learning objectives of the case, and explain how those objectives relate to the larger objectives of the entire course. Second, provide a general overview of the entire case, so the students can envision the products they are to create. The author prefers to handle this by covering the outputs listed in the evaluation forms. Third, cover the content of the evaluation forms. As carefully as possible, explain the expectation to the students. The evaluation forms are the key element for getting successful results from this case.

### **Proposed Solutions**

The evaluation forms are not only tools for the students, but also for the instructor. Note that the lists of objectives contain the outputs, and therefore the needed solutions, to the case. Actual solutions are not given here, since the answers will vary from software-to-software, and from student-to-student. Therefore, it is instructor's job to use the evaluation form as a check that the work was completed in the manner prescribed.

While the students are working on the case, it is important to set aside class time to address questions that students might have about the case. Providing this type of feedback to students may seem to give away the answer. However, there are ways to address students' questions short of giving the actual answer. Help students understand the means to the end, and not merely the end.

The evaluation forms also provide a much-needed rubric for the evaluation of the open-ended case given. It gives direct guidance to both students and instructors on what actions and outcomes are to be achieved. Students typically struggle with open-ended problems because the solution's means and ends are not specifically apparent; the evaluation forms helps make the solution apparent.

Suggested solutions to some of the learning objective are covered in the following paragraphs:

*"Entered Minutes into Appropriate Module:"* For this objective, the instructor should go to the meetings log to see if the minutes were actually entered. The instructor should check that the student entered such pertinent information as the date, the time, project name, attendees, and, of course, the minutes. The author does not expect the students to enter the entire record of the entire transcript in [Appendix G](#), but a summary and/or an outline of the meeting will suffice.

Since the author teaches the course online, the students are encouraged to make a copy of the transcript and attach it to their summary.

*"Create Correspondence:"* These objectives simply require the instructor to go to the appropriate log to see that the correspondence was created. Most project tracking and control systems have a template for creating these forms, so the students simply need to fill in the appropriate blanks, and write the body of the correspondence to match the context of the case.

The body of these documents will vary from situation-to-situation. Have students look at the example documents given in the case, some are elaborate, others are simple. The instructor should allow the students some latitude when creating the body of their documents, but the body should be easy to read, contain good grammar and no misspelled words, and contain critical information. Technical documents should be short, direct, courteous, but to the point.

*Change Management and Payment Requisitions:* To accomplish these tasks in a document management system often requires the user to follow certain steps, pre-determined by the software manufacturer. This regimen is usually created to prevent the user from circumventing needed approvals and documentation. The evaluation form attempts to prevent this circumvention, but minimizes the instructor's work by visiting a couple of key places in the software to evaluate the work.

### **Conclusion**

This case study fills a gap in the literature by providing a relatively open-ended construction project tracking and control case. The instructor used this case in two classes, and found that students developed a deeper understanding and appreciation for the challenges of jobsite document and communication management. Without this case, students are unable to gain a deep and long-lasting appreciation for these challenges.

The case provides an essential set of open-ended problems for students to learn both how project tracking and control software works, and why project documentation is necessary during construction. The case guides students through problems commonly experienced by project managers, such as: (1) the ability to track changes, a subtle, but complex skill; (2) the management of payment requisition, again conceptually simple, but often confusing; and (3) the creation and management of complex exchanges in communications among multiple parties.

Finally, the case provides additional guidance to both the student and the instructor through the evaluation rubrics. These rubrics proved beneficial for the students, as a checklist of the instructor's expectations; and for the instructor, as a checklist for evaluation of student work.

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# Appendix A

## Computer-aided Documentation Management Project Part A Evaluation Form

Evaluation of the assignment is based upon two factors: general effort, and demonstration of understanding. These are explained further as follows:

\_\_\_\_\_ **Appearance** (suggested weight: 20%): You must include the following on every page (use this as a checklist):  
\_\_\_\_\_ cover page, letter, or memorandum    \_\_\_\_\_ your name    \_\_\_\_\_ course number and name  
\_\_\_\_\_ assignment number    \_\_\_\_\_ title of assignment    \_\_\_\_\_ page number/total pages  
\_\_\_\_\_ names of: project, sponsor, professor, company    \_\_\_\_\_ due date

Also include the following: proper format, balanced on page, headings to columns, printed on one side of paper, pleasing appearance, etc.

\_\_\_\_\_ **General Effort** (suggested weight: 20%): Includes: complete project, completed on time, correct spelling and grammar, proper use of upper/lower case, demonstrates originality, demonstrates forethought, does not appear to be done at the last minute, easy to follow (therefore easy to grade), among others.

\_\_\_\_\_ **Demonstration of Understanding** (suggested weight: 60%): Meets requirements specified:  
\_\_\_\_\_ Modified the specifications dictionary to include 01000 to 01740; 02200, 02202, 04200, 05120; 09220 to 09950; 15010; and 16010.  
\_\_\_\_\_ Created company directory.  
\_\_\_\_\_ Created contract drawings dictionary for Plumbing, Mechanical, and Electrical drawings only.  
\_\_\_\_\_ Created Letter template.  
\_\_\_\_\_ Entered Minutes into appropriate Module.  
\_\_\_\_\_ Entered Letters in appropriate Module.  
\_\_\_\_\_ Entered telephone record in appropriate Module.  
\_\_\_\_\_ Entered all communication in either the "Correspondence Sent" or "Correspondence Received" Modules.  
\_\_\_\_\_ Created Daily Reports for the first two days of the project.  
\_\_\_\_\_ Created tracking of Submittals.  
\_\_\_\_\_ Created the contracts and sub-contracts for Earthwork, Masonry, Steel Material, Steel Erection, Mechanical, Electrical, and Drywall.  
\_\_\_\_\_ Set-up the Project Cost Codes.  
\_\_\_\_\_ Set-up the Cost Worksheet.  
\_\_\_\_\_ **TOTAL GRADE**

## Appendix B

### Computer-aided Documentation Management Project Part B Evaluation Form

Evaluation of the assignment is based upon three factors: appearance, general effort, and demonstration of understanding. These are explained further as follows:

\_\_\_\_\_ **Appearance** (suggested weight: 20%): You must include the following on every page (use this as a checklist):  
\_\_\_\_\_ cover page, letter, or memorandum    \_\_\_\_\_ your name    \_\_\_\_\_ course number and name  
\_\_\_\_\_ assignment number    \_\_\_\_\_ title of assignment    \_\_\_\_\_ page number/total pages  
\_\_\_\_\_ names of: project, sponsor, professor, company    \_\_\_\_\_ due date

Also include the following: proper format, balanced on page, headings to columns, printed on one side of paper, pleasing appearance, etc.

\_\_\_\_\_ **General Effort** (suggested weight: 20%): Includes: complete project, completed on time, correct spelling and grammar, proper use of upper/lower case, demonstrates originality, demonstrates forethought, does not appear to be done at the last minute, easy to follow (therefore easy to grade), among others.

\_\_\_\_\_ **Demonstration of Understanding** (suggested weight: 60%): Includes: meets requirements specified:

- \_\_\_\_\_ All correspondence including in either the "Correspondence Sent" or "Correspondence Received" modules. [NOTE: Print-out the originals of your correspondence, when applicable, and not the Correspondence Sent Log.]
- \_\_\_\_\_ Created "issues."
- \_\_\_\_\_ Part 1, Elevator Dimensions:
  - \_\_\_\_\_ Create correspondence: transmittal, phone calls (3), facsimile
  - \_\_\_\_\_ Create RFI, answer
  - \_\_\_\_\_ Print-out forms from Contractor.
- \_\_\_\_\_ Part 2, Duct & Door Conflict:
  - \_\_\_\_\_ Create correspondence: email
  - \_\_\_\_\_ Create RFI, answer
  - \_\_\_\_\_ Print-outs forms from Contractor.
- \_\_\_\_\_ Part 3, Connection Detail:
  - \_\_\_\_\_ Create correspondence: facsimile, transmittals (2)
  - \_\_\_\_\_ Print-outs forms from Contractor.
- \_\_\_\_\_ Part 4A, Change Order 1-Variou Plumbing, Mechanical & Electrical Changes:
  - \_\_\_\_\_ Create correspondence: phone calls, intra-office meetings, letters, facsimiles
  - \_\_\_\_\_ Create a drawing set for this change
  - \_\_\_\_\_ Track changes to drawings.
  - \_\_\_\_\_ Use change management:
    - \_\_\_\_\_ Create RFPs
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
    - \_\_\_\_\_ Create COR/PCO
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
    - \_\_\_\_\_ Create PRO
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
      - \_\_\_\_\_ Print-outs from Contractor.
- \_\_\_\_\_ Part 4B, Change Order 1-Sidewalks and Drainage:
  - \_\_\_\_\_ Create correspondence: memorandum
  - \_\_\_\_\_ Use change management:
    - \_\_\_\_\_ Create RFPs
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
    - \_\_\_\_\_ Create COR/PCO
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
    - \_\_\_\_\_ Create PRO
      - \_\_\_\_\_ with Owner, answers
      - \_\_\_\_\_ with Subcontractors, answers
      - \_\_\_\_\_ Print-outs from Contractor.
- \_\_\_\_\_ Part 4C, Change Order 1-Approval:
  - \_\_\_\_\_ Create COs
    - \_\_\_\_\_ with Owner, answers
    - \_\_\_\_\_ to Subcontractors, answers
  - \_\_\_\_\_ Print-out forms from Contractor.
- \_\_\_\_\_ Part 5: Payment Requisitions:
  - \_\_\_\_\_ Create Cost Worksheet
  - \_\_\_\_\_ Print: Requisition for Months 1, 2, 3 print-outs, including Continuation Sheet
  - \_\_\_\_\_ Print: Requisition for Months 4 & 5 print-outs with CO #1, including Continuation Sheet.

\_\_\_\_\_ **TOTAL GRADE**

## Appendix G.

### Preconstruction Meeting Minutes

Meeting called to order at 1:05p.m.

Eck: Hello everyone and welcome to the Preconstruction Meeting for The University's Bell Science Building.

Does everyone have a copy of the Agenda? Good. There is an Attendance Sheet being passed around, I ask that everyone put your name, your position, and your company's name on there.

Let's move on to Introductions. I'll just ask that each person tell us their name, their position, their company's name, and any opening remarks you would like to make.

(Each person does so.)

Thank-you very much. So, as I understand it, Ewer will be the primary contact for Eagle; Curt will be the primary contact for The University, and I will be the primary contact for MAC. Are there any questions so far?

So far, I have dominated the conversation, so let's move onto the Owner's Project Requirements, Curt.

Clark: First, I realize that we have already talked about this, but I want to really emphasize the importance of The University having the facility available for use by January 1st, 2003. Our internal plans are hinging on that date. As noted in the contract, substantial completion is November 15, <year 1>.

Along that line, it is important, therefore, for Eagle to start punch list items early, and not wait until the end of the job. We would like for Eagle to analyze The University's move-in process, and coordinate how move-in can be coordinated to maintain production and safety, yet allow The University to begin the move-in process.

Second, I will be maintaining a log of issues and decisions required from The University and MAC. I am asking Eagle to get items on that log to maintain production momentum. I am also maintaining a table and chart of periodic pay requests for monitoring job progress. This information will be made available to Eva Douglas and The University's President.

Third, please emphasize the importance of surrounding campus activities to your staff, suppliers, and subcontractors. Please be sensitive to the foot and automobile traffic, The University's deliveries, and their safety. Also, we greatly appreciate that you would keep the jobsite neat and orderly at all times.

I thank-you again for your good spirit and cooperation in these matters. Archy T..

Eck: Thank-you Curt. Now, let me comment about MAC's procedures.

Let's review a few of the items in the Special Conditions:

Permits: The University has now received permissions from the appropriate departments of the City of Siloam Springs for construction to start. Any and all other permits that are needed are the responsibility of Eagle Construction. But, we will do all we can to help expedite those approvals.

Time: As mentioned, The University has set some realistic, but strict, deadlines. We request that you forward these deadlines to your subcontractors and suppliers.

Submittals and shop drawings: Speaking of deadlines, MAC has agreed to provide feedback on the submittals and shop drawings with two weeks of receipt. This is not to say that we will provide approval of these documents within that time, but we will review and provide our initial primary response within that period.

Changes: Please note the process for getting changes approved in the contract documents, and emphasize those requirements with your subs.

Payment: The process for approval of the Requisitions for Payment is generally given in the Contract. Specifically, Curt and Mr. Eagle, need to meet around the 21st of each month to agree on the request, before it comes to MAC. We will look at the request within 3 days, and either request more information, or request a change, or forward the request to Eva Douglas with our recommendation for approval. The University will take about 5 days to approve the request for payment. A check will be issued to the contractor before the 10th of the following month.

Outstanding changes in the contract: Right now, we have an outstanding Request For Proposal, Number 1 (originally issued on November 15, <year\_1>. This change is mainly related to changes in HVAC and plumbing. As I understand it, Eagle is awaiting some prices from a couple of suppliers, and should have us a price by the beginning of next week.

Well, that covers it for me, are there any questions?

Production, Safety, and Sub-contractor administration: Ewer, are you ready to give the Contractor's report?

Eagle: Yes we are.

First, I have passed around the names of the major subcontractors ([Appendix F](#)) that will be used on this project. These names have been approved by the Owner and the Architect at this time.

Second, does everyone have a copy of the "Eagle Project Requirements" ([Appendix H](#))? This document either has been, or will be given to each subcontractor and to every employee working on the Bell Science Center. Let's go through each item.

(Ewer goes through the list of subcontractors and "Eagle Project Requirements," attached below.)

Eck: Ewer, thanks for that update. Are there any general comments and questions?

Meeting adjourned at 2:36 p.m.

## Appendix C.

### Project Manual Index-Section A through H and 01000 though 15330

SECTION TITLE	SECTION TITLE	SECTION TITLE
A. Notice to Bidders	06100 Rough Carpentry	10000 Miscellaneous Equipment
B. Information for Bidders	06200 Finish Carpentry	10100 Marker Boards
C. Bid Form	06400 Interior Architectural Woodwork	10155 Toilet Compartments
D. Arkansas Statutory Performance and Payment Bond		10260 Wall Protection
E. General Conditions of the Contract for Construction	07110 Sheet Membrane Waterproofing	10420 Letters and Plaques
F. Amendments to General Conditions	07210 Building Insulation	10505 Metal Lockers
G. Supplementary General Conditions	07241 Exterior Insulation and Finish Systems	10522 Fire Extinguishers, Cabinet and Accessories
H. Scope of Contracts	07410 Metal Wall Panels	10800 Toilet and Bath Accessories
01000 General Requirements	07552 Modified Bitumen Roofing	11132 Projection Screens and Television Mounts
01027 Application For Payment	07600 Flashing and Sheet Metal	11615 Walk-In Rooms
01200 Project Meetings	07610 Standing Seam Roofing	
01300 Submittals	07700 Roof Specialties & Accessories	12345 Laboratory Casework and Fume Hoods
01500 Construction Facilities & Temporary Controls	07815 Sprayed Fireproofing	12492 Window Blinds
01700 Contract Closeout	07840 Fire Stoppage	
01740 Warranties	07920 Joint Sealant	13123 Greenhouse
		14240 Hydraulic Elevator
02080 Piped Utilities - Basic Materials and Methods	08110 Steel Doors and Frames	15010 Basic Mechanical Requirements
02200 Grading	08211 Flush Wood Doors	15050 Basic Materials and Methods
02202 Excavation and Embankment	08330 Sectional Overhead Doors	
02282 Termite Control	08410 Aluminum Doors, Windows and Frames	15100 Valves
02530 Sanitary Sewerage	08712 Door Hardware	15121 Piping Expansion Compensation
02630 Storm Drainage	08800 Glazing	15122 Backflow Preventers
02741 Hot-Mix Asphalt Pavement		15140 Supports and Anchors
02751 Cement Concrete Pavement	09220 Portland Cement Plaster	15190 Mechanical Identification
	09250 Shaft Wall Systems	15242 Vibration Isolation
03300 Cast-in-Place Concrete	09255 Gypsum Board Assemblies	15245 Seismic Control
03450 Architectural Pre-cast Concrete	09310 Ceramic Tile	15260 Pipe Insulation
	09511 Acoustical Panel Ceilings	15280 Equipment Insulation
04200 Unit Masonry	09651 Resilient Flooring	15290 Ductwork Insulation
	09652 Sheet Vinyl Floor Coverings	15316 Reverse Osmosis Water Systems
05120 Structural Steel	09653 Resilient Base and Accessories	15330 Fire Protection System
05210 Steel Joist	09680 Carpet	
05310 Metal Decking	09900 Painting	
05400 Cold-Formed Metal Framing	09950 Wall Coverings	
05500 Miscellaneous Metals		
05521 Pipe and Tube Railings		
05580 Metal Column Covers		

Project Manual Index-Sections 15400 and following

SECTION TITLE	SECTION TITLE	SECTION TITLE
15410 Plumbing Piping	15910 Ductwork Accessories	16321 Distribution Transformers
15413 Natural Gas System	15911 Duct Connection System	16441 Enclosed Switches
15415 Waste and Vent Piping Systems	15936 Air Devices	16460 Transformers
15430 Plumbing Specialties	15950 Automatic Temperature Controls	16470 Panel Boards
15440 Plumbing Fixtures	15990 Testing and Adjusting	16477 Fuses
15450 Plumbing Equipment		16481 Enclosed Motor Controllers
15482 Laboratory Gas Systems	16010 Basic Electrical Requirements	16482 Motor Control Center
15510 Hydronic Piping	16111 Conduit	16483 Variable Frequency Controller
15515 Hydronic Specialties	16114 Cable Trays	16485 Contactors
15540 HVAC Pumps	16121 Medium Voltage Cable	16496 Enclosed Transfer Switch
15544 Hydronic System Cleaning	16123 Building Wire and Cable	16510 Interior Luminaries
15545 Chemical Water Treatment	16130 Boxes	16530 Site Lighting
15703 Steam Supply and Return Piping Systems	16141 Wiring Devices	16620 Packaged Gas Engine Generator Systems
15715 Steam Specialties	16170 Grounding and Bonding	16670 Lightning Protection Systems
15730 Steam-To-Water Heat Exchanger	16180 Equipment Wiring Systems	16721 Fire Alarm Systems
15811 Humidifier	16190 Supporting Devices	16741 Telecommunications Distribution Support System
15832 Electric Convector Heaters	16195 Electrical Identification	16880 Seismic Protection For Electrical Equipment
15835 Terminal Heat Transfer Units		
15840 Variable Air Volume Terminal Units		
15855 Air Handling Units With Coils		
15860 Exhaust Fans		
15890 Ductwork		

## **Appendix D.**

### Construction Drawings Index:

- Civil Drawings: C1.1 thru C1.6.
- Architectural Drawings: A1.1 thru A1.3, A2.1 thru A2.6, A3.1, A3.2, A4.1 thru A4.9, A5.1, A5.2, A6.1, A7.1 thru A7.4, A8.1, A9.1 thru A9.4.
- Structural Drawings: S 1.1 thru S1.7, S2.1, S3.1, S3.2, S4.1 thru S4.6, S5.1 thru S5.5.
- Laboratory Drawings: LAB101, LAB200 thru LAB209, LAB300 thru LAB306, DET400 thru DET407.
- Plumbing Drawings: P1.0, P1.1 thru P1.13.
- Mechanical Drawings: M1.1 thru M1.7, M2.1, M3.1 thru M3.4, M4.1, M5.1, M5.2, M6.1 thru M6.4.
- Electrical Drawings: E 1.1 thru E1.11, E2.1, E3.1 thru E3.6.

**Appendix E.**  
**Schedule of Values (Approved January 15, <Year\_2>)**

Item No.	Description Of Work	Scheduled Value
1000	General Conditions	\$417,056.00
1400	Testing Allowance	\$3,000.00
2000	Site Work	\$88,875.00
2500	Site Concrete	\$40,001.00
2550	Site Utilities	\$47,885.00
2600	Site Paving / Curb & Gutter	\$31,502.00
3100	Concrete Footings/Foundation Walls	\$239,438.00
3200	Concrete Reinforcing	\$79,785.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00
4100	Concrete Block	\$44,729.00
4101	Brick	\$149,740.00
4102	Architectural Pre-cast Concrete	\$68,972.00
5000	Structural & Misc. Steel (Material)	\$398,658.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00
6000	Rough / Finish Carpentry	\$131,752.00
6400	Millwork	\$14,180.00
7100	Waterproofing	\$31,766.00
7240	Exterior Insulation Finish System	\$63,055.00
7270	Fireproofing	\$40,000.00
7500	Roofing	\$127,672.00
8100	Doors / Frames / Hardware	\$100,704.00
8800	Glass & Glazing	\$84,277.00
9100	Lath & Plaster	\$14,500.00
9250	Exterior Framing & Sheathing	\$141,760.00
9251	Interior Framing	\$143,490.00
9252	Insulation & Drywall	\$201,470.00
9253	Ceilings	\$53,630.00
9650	Floor Coverings	\$56,350.00
9900	Painting / Wall covering	\$107,645.00
10000	Specialties	\$40,100.00
12000	Furnishings	\$2,519.00
13030	Pre-Engineered Structures	\$81,621.00
14000	Conveying Systems	\$47,200.00
15000	Plumbing – Utilities	\$72,000.00
15001	Plumbing – Underground	\$62,000.00
15002	Plumbing – Sanitary	\$126,000.00
15003	Plumbing - Domestic Water	\$82,000.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00
15005	Plumbing – Fixtures	\$62,000.00
15100	HVAC – Piping	\$189,219.00
15101	HVAC – Equipment	\$370,057.00
15102	HVAC - Sheet Metal	\$580,911.00
15103	HVAC – Controls	\$276,150.00
15104	HVAC – Insulation	\$128,380.00
15105	HVAC – Chemicals	\$2,283.00
15500	Fire Protection	\$6,068.00
16100	Electrical Rough-In	\$190,000.00
16101	Electrical Panels & Switch Gear	\$227,000.00
16102	Electrical Devices and Fixtures	\$26,000.00
16103	Electrical Fixtures	\$95,000
19000	General Contractor's Fee	\$225,000.00
	Grand Totals	\$6,268,810.00

From: Darek\_Halpin@eagleco.com  
[mailto:Darek\_Halpin@eagleco.com]  
Sent: Monday, Jan 16, <year\_2> 3:00 PM  
To: archyteck@macarch.com  
Cc: Ewer\_Eagle@eagleco.com  
Subject: R.F.I. 12 Duct & Door Conflict  
RE: Drawing Sheet M1.2 , door # 135 location into room 125  
Tissue Culture

HVAC duct is located directly above door 135 and the support framing. There is not enough room to install the duct west or east of the door location.

Can the location of wall containing door 135 be relocated approximately 12" to the west (into the room) to allow room for the duct to be installed on the east side.

Darek

From: Archy Eck <archyteck@macarch.com>  
Sent: 01/16/<year\_2> 03:21 PM  
To: Darel\_Halpin@eagleco.com  
cc: Ewer\_Eagle@eagleco.com  
Subject: RE: R.F.I. 12 Duct & Door Conflict  
Yes. The wall that Door 135 occurs in can be moved 12" west. As we discussed, there will be no change in cost or time for this change.  
Archy T. Eck  
MAC Architecture Inc.

Figure 1: R.F.I. 12-Email regarding Duct and Door Conflict

# Ott's Elevator Company

TRANSMITTAL

No. 00001

Phone: 111-111-1515

Raising, KS

PROJECT: University Bell Science Building

DATE: 01/26/<year\_2>

TO: Eagle Construction

REF: Elevator Submittal

ATTN: Ewer A. Eagle

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
<input checked="" type="checkbox"/> Shop Drawings	<input checked="" type="checkbox"/> Approval	<input type="checkbox"/> Approved as Submitted
<input type="checkbox"/> Later	<input type="checkbox"/> Your use	<input type="checkbox"/> Approved as Noted
<input type="checkbox"/> Points	<input type="checkbox"/> As Requested	<input type="checkbox"/> Return After Loan
<input type="checkbox"/> Change Order	<input type="checkbox"/> Review and Comment	<input type="checkbox"/> Resubmit
<input type="checkbox"/> Plans		<input type="checkbox"/> Submit
<input type="checkbox"/> Samples	SENT VIA:	<input type="checkbox"/> Returned
<input type="checkbox"/> Specifications	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Returned for Corrections
<input type="checkbox"/> Other	<input type="checkbox"/> Separate Cover Via	<input type="checkbox"/> Due Date

ITEM	PACKAGE	SUBMITTAL	DRAWING REV	ITEM NO	COPIES	DATE	DESCRIPTION	STATUS
DWG			E1900	0001	1	1/26/Y2	Elevator E1900 Drawing Details	NEW

**Remarks:** Please note the dimensions highlighted on the attached submittal. We hope this meets with your approval.

Signed: \_\_\_\_\_  
David Ott's

cc:

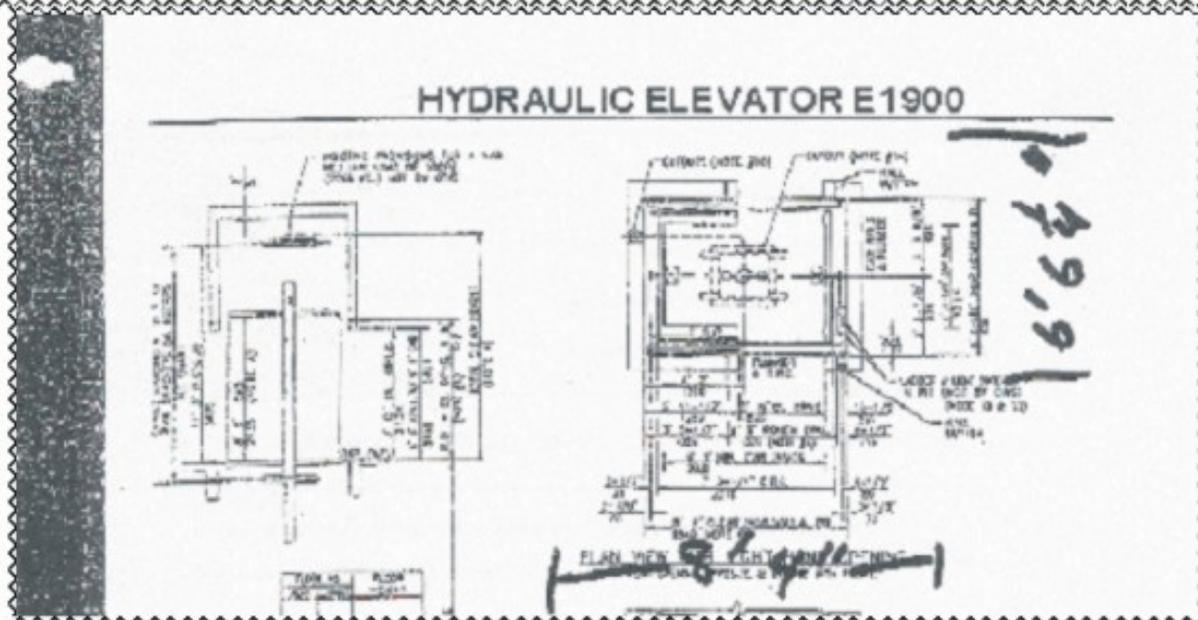


Figure 2: Elevator Subcontractor Submittal

MAC Architects, Inc

FAX

To: Ewer A. Eagle, Eagle Const. Co. From: Archy T. Eck  
 Fax: 988.888.8765 Date: February 2, <year\_2>  
 Phone: 988.888.2345 Pages: 3  
 Re: The University's Bell Science Bldg CC:  
 Connection for TS 6X6 Diagonal

Urgent  For Review  Please Comment  For Your Use  
 • Comments: Transmitted herewith is the supplemental drawing for SDS-12 (see detail below) showing the connection for the TS 6X6 diagonal structural steel member at the second floor level. As discussed by telephone this morning, there will be no change in the contract for these changes. Thanks.

SJF Engineers, Inc

FAX

To: Archy T. Eck, MAC Architects From: Jane Doe  
 Fax: 988.888.8881 Date: February 2, <year\_2>  
 Phone: 988.888.8888 Pages: 2  
 Re: The University's Bell Science Bldg Co:  
 Connection for TS 6X6 Diagonal

Urgent  For Review  Please Comment  For Your Use  
 • Comments: In accordance with our previous conversations, we are transmitting the supplemental drawing for SDS-12 (see detail below) showing the connection for TS 6X6 diagonal structural steel member at the second floor level.

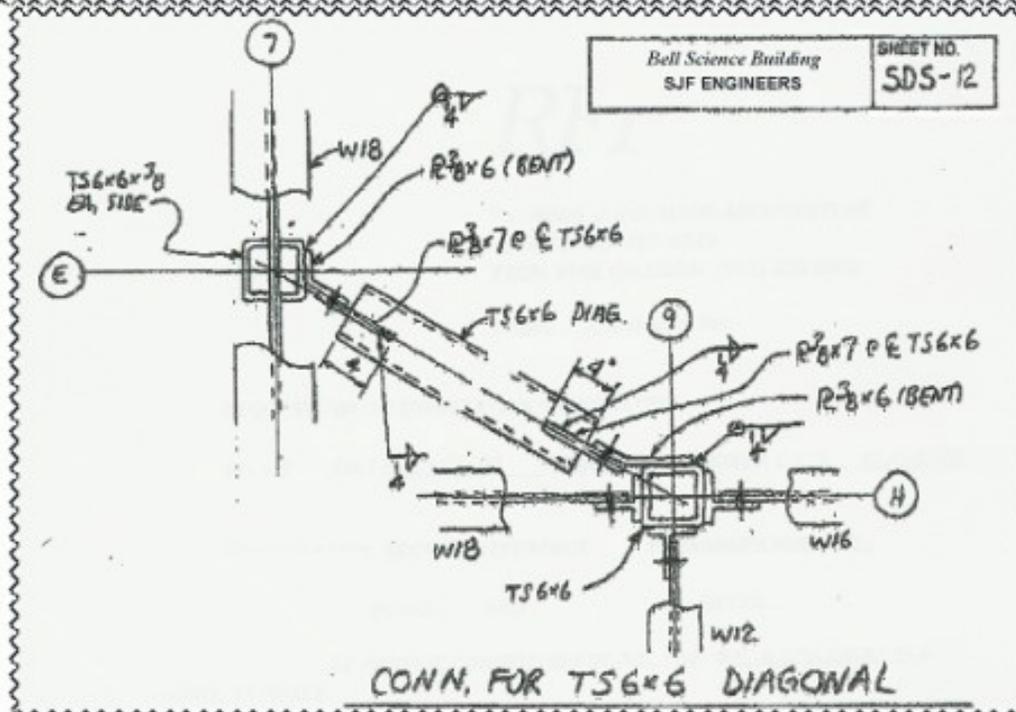


Figure 3: Connection Detail Transmittals

## Appendix F.

### Bell Science Building-List of Major Subcontractors.

Subcontractor Trade	Company Name	Company Address	Company Ph. No.	Contact	Amount
Earthwork	DirtMovers, Inc.	Local City, AR	(988) 985-9855	Mo V. Itover	\$80,000
Masonry	WeBrickIt	Nearby City, AR	(988) 966-0656	B.G. Groutman	\$149,740
Steel Erection	Red Iron Construction	Faraway, TX	(666) 666-6666	B.A. Steelman	\$181,829
Millwork	Millwork of America	Notsoclose, LA	(555) 555-5555	Bob Miller	\$14,180
Waterproofing	CM Brothers	Nearby City, AR	(988) 966-2152	George Waters	\$31,766
Exterior Finishing	Kelly's Company	Othersideof, AR	(898) 922-2525	John Kelly	\$63,055
Roofing	JB Roofing	Nearby City, AR	(988) 966-5216	JB Ontopothings	\$127,672
Glass & Glazing	Acme Glass	Local City, AR	(988) 985-0354	Pauline Acme	\$84,277
Drywall & Acoustics	The Acoustics Shop	Local City, AR	(988) 985-8547	Tom Waller	\$255,100
Floor Coverings	Floors for Less	Local City, AR	(988) 985-1547	Mike Tylers	\$56,350
Painting	Painter Sisters	Nearby City, AR	(988) 966-9841	Pam Paint	\$107,645
Elevators	Otts' Elevator Company	Raising, KS	(111) 111-1515	David Otts	\$47,200
Mechanical	MMM Mechanical	Local City, AR	(988) 985-7412	Manny Makan	\$2,045,000
Fire Protection	Millers'	Fireman, MO	(777) 777-7877	Miller Tompson	\$6,068
Electrical	Eagco Mechanical & Electrical	Nearby City, AR	(988) 966-5652	Fred Henry	\$538,000
Concrete Reinforcing	Arkansas Rebar	Othersideof, AR	(988) 922-5874	Frank Davis	\$79,785
Ready-Mix Concrete	Mid-Continent Concrete	Nearby City, AR	(988) 966-2541	Arnold McDougal	\$150,000
Structural & Misc. Steel	Iron Works of Texas	Faraway, TX	(666) 541-5874	Josh Gorman	\$398,658
Doors/Frames/Hardware	Acme Hardware & Machinery	Nearby City, AR	(988) 966-0101	Donald Doright	\$90,000
Toilet Accessories & Partitions	Acme Hardware & Machinery	Nearby City, AR	(988) 966-3652	Donald Doright	\$62,000

## Appendix H.

### Eagle Construction Company's Project Requirements for Bell Science Building (Nabholz 2003).

Please note the following items that are required as a part of your subcontract with Eagle Construction Corporation. These items have been developed to help the flow of the project and aid in allowing everyone to work to their maximum potential:

#### Administrative

*Job Numbers:* All correspondence sent to Eagle Construction Corporation (ECC) should clearly indicate job #E02-105

*Drug Testing:* Eagle Construction Corporation practices proactive drug-free policies including pre-hire, random, and post-accident testing. Eagle wants the job site drug-free and all subs are asked to follow drug-free procedures and cooperate fully in our efforts.

*Insurance Certificates:* As per the Contract Documents we require a Certificate of Insurance for every subcontractor submitted to this office immediately. We must have these certificates prior to your arrival on site.

*Emergency phone numbers:* All trade foremen shall furnish the project superintendent with home phone numbers for night and weekend emergencies.

*Contracts:* Please sign and return all copies to Eagle Construction Corporation office for signature. We will then return 1 copy for your file.

*Pay Requests:* Contractors will be required to have their invoices into ECC's office on or before the 20th of each month. Invoices will then be processed and forwarded to the Owner on or before the 25th of each month. The Owner will issue check by the 5th day of the next month. Eagle will issue checks to subcontractors and suppliers within 5 days of receipt of payment from Owner. It should be noted that pay requests will be withheld only for the following reasons: delaying the construction schedule, improper workmanship on the project, or incomplete paperwork.

*Payment Retention:* Please note that the contracts specify 10% retention of payments until the work is complete.

Also each subcontractor and/or supplier has been issued a standard pay request form, pay requests should be submitted on this form. Faxed copies of the pay application, although encouraged due to deadlines, must be backed up by originals for payment. Failure to comply with this may result in your pay request not being processed (see attached sample pay application)

#### *Shop Drawings /Submittals:*

- Shop drawings and submittals must be submitted per Section 01300 of the specifications as well as any special requirements per individual specification sections that apply.
- Make all submittals directly to the home office. Nothing is to be submitted directly to the Architect, Owner, or to the ECC field office unless specifically requested by the project manager.
- Eagle will review, mark if necessary and forward to Architect for approval.
- All shop drawings and submittals must be properly identified with ECC job # E02-105
- This project requires a minimum of six (6) copies. Submit four (4) copies of any color charts.
- Only "Approved" or "Approved as noted" submittals are to be delivered to the job site.
- Review and approval of submittals does not relieve anyone of plan and specification compliance. Alternate materials of systems are not acceptable unless approved prior to bidding the project.

- Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions or resubmittals, and for placing orders and securing delivery to meet the requirements of the schedule. Allow at least 15 working days for review by the Architect following the date of receipt of the submittal or shop drawing.

*Back charges:* Back charges will be documented immediately upon discovery and submitted for review by all parties, as a change order to your contract

*Unauthorized extras:* It shall be the policy of this office that if any extras should occur they should have approval of the Eagle Construction Corporation (ECC) project manager or superintendent before any work is to proceed. No payment shall be made to anyone for unauthorized extras.

*Change orders:* Do not proceed with any Change Orders until notified. A Request for Proposal does not constitute authorization of the change. Should it be necessary to proceed with work prior to the written approval of the change order, a memo will be generated by ECC authorizing the work to proceed prior to pricing. NO WORK is to proceed without specific authorization. NO BILLING for a change order should be included on your pay request until the proper forms are executed. All requests for pricing are to be returned within 3 working days.

*Job Site Meetings:* Progress meetings will be held every Monday morning at 8 a.m. Eagle Construction Corporation will hold progress meetings on the job site with all parties who are involved with work on the site and all parties that will be on the job site shortly. The purpose of these meetings is to review the progress of the work, voice outstanding issues, and maintain an open line of communication between all members of the building team.

*Correspondence:* Due to coordination on this job it will be necessary that no subcontractor or supplier converse directly with the Architect, Owner, or Engineer without the permission of the General Contractor. Liberal use of the fax machine is encouraged.

*Drawings:* The contract drawings are comprised of plans and plan changes. They are intended to be treated as a whole and complimentary of each other. Any discrepancy must be brought to our attention prior to the work being started. If this is not done, the responsibility for incorrectly installed items will be the contractors. It is your responsibility to verify the work drawings on-site with those posted in the job trailer as being the most current.

*Attendance:* An attendance list will be kept of each meeting. Failure to attend a meeting does not release the contractor from the decisions made therein.

*Addenda and Alternates:* Please be aware of Addenda #1 dated: September 20,<year\_1>.

*Requests for Information:* All requests for information shall be submitted in writing to Eagle Construction Corporation, Attention: Joseph Hood at jobsite. Do not submit any request for information (RFI) directly to the Architect. Eagle will track the status of all RFI's to ensure timely clarification.

### Production

*Job Coordination-Contractor Schedule:* Each subcontractor and/or material supplier has been supplied with a preliminary construction schedule. This shall serve as a written request for input to each subcontractor and supplier. It shall also give them an idea when they will be needed on the job site. In addition to the schedule, the Superintendent shall arrange and schedule each subcontractor as to when he will be needed at the job site. We will use a three-point notification system:

- Notify the subcontractor at least 1-week prior to needing them on the job.
- We will notify 1-day prior to needing them on the job.
- The morning the contractor is expected on the job, the contractor shall verify that personnel are in route to the job. If this is not the case, and the situation is urgent, we will find someone to staff the job.

*Field Corrections:* We know that there will be some field corrections made as to minor items. In case of a required correction we shall again use the 3-point notification system.

- We will notify the foreman in the field of the correction required.
- If the correction is not accomplished, we will notify the office personnel, and
- If prior steps do not correct the situation, we shall have it corrected and the cost will be born by the subcontractor.

*Supervision:* It is Eagle Construction Corporation's policy to have a qualified supervisor on each job site for your aid. Therefore, we also ask that each of you have someone on the job to assume a supervisory position, or at least have the ability to authorize making field decisions. Please designate that person to the Superintendent prior to occupying the job site.

*Clean Up:* It will be mandatory that each and every subcontractor clean up debris caused by that company's forces. Problems with subcontractors not properly cleaning up their work will be resolved as described under the heading of mistakes/corrections.

*Site Conditions:* Storage space will be at a premium, all materials to be stored are to be coordinated with Eagle Construction Corporation. Each contractor to provide unloading and verification of delivered goods. Eagle Construction Corporation will not sign for a contractor's deliveries.

*Temporary Bracing and Shoring:* Unless otherwise noted or excluded in your subcontract, all subcontractors are responsible for temporary shoring and bracing for their work as required. Eagle reserves the right to review any proposed methods of shoring and temporary bracing in an effort to assist the relative subcontractor in planning of the proposed temporary shoring and bracing applications. All applicable temporary bracing and shoring must be in accordance with OSHA<sup>†</sup> guidelines.

*Job Etiquette:* We are professionals and should conduct ourselves as such. Cursing or the use of foul language will be held to an extreme minimum and will not be tolerated. Any alcoholic beverage on the job site or drugs being used on the job site will be means for immediate removal. Each Contractor is responsible for the conduct of his craftsman and will be held accountable. No speeding, and no harassment of the students.

*Phone Usage:* The project will be supplied with a phone. All long distance calls should be billed to a calling card or collect.

*Delivery of Materials:* We will work with anyone in any form possible. However, we do request that you have the courtesy to notify us in advance of any material being delivered to the job site. We also request that when this material is delivered that you have personnel to observe, inspect, and unload the material. ECC will not sign for any Contractor's material delivery.

*Off Site Storage:* Payment will not be made for stored materials except as outlined in the project specifications.

*Testing:* All payments for testing will be made in accordance with the specifications. All costs associated with retesting shall be by the Subcontractor whose work failed the testing.

*Food and Tobacco Use:*

- Eating will be limited to areas designated by the Project Superintendent. Debris and leftovers will be removed immediately after use and placed in trash receptacles.
- Absolutely no smoking allowed anywhere on The University Campus. If you use smokeless tobacco products, do not spit on slabs or paved areas. If spitting becomes a problem, chewing will be banned.

*Emergency Access:* Keep access to the existing facility clear at all times. The driveways and the gates must be passable at all times.

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<sup>†</sup>Occupational Safety and Health Administration

*Project working hours: 7:00 AM - 3:30 PM Monday--Friday unless building operations require off-hours or weekend work.*

### Schedule

*Time Frame:* By entering into this contract, you are committing the required personnel and resources that are needed to meet the project's schedule. This schedule is posted for the overall project. Modifications and updates of the schedule will be required to keep up with the demands of the project.

*Time Extensions:* Time extensions will only be approved by the Owner.

*Preliminary Project Schedule:* A preliminary project schedule has been provided to you for your information. Please notify Eagle in writing within 5 working days if there are inconsistencies, omissions, or other problems with the sequence or duration that affects your work. This schedule is a tool and an integral part of this project that will be updated on a monthly basis as a minimum throughout this project. If there are any changes made to the schedule that affect the sequencing or duration of your work, Eagle Construction Corporation will notify the affected subcontractors and suppliers. However, it is your obligation to check the progress schedule and be aware of activities that will impact your schedule.

### Close out

*As-Built Drawings:* The contract requires as-built drawings be kept on this project, and a complete set will be accessible at the job site trailer specifically for this purpose. That set shall be updated at all times to record any and all changes or deviations in the actual project from the drawings. Delays in as-built updates may delay payment. Please keep as-builts current weekly.

Approximately 60 days before the substantial completion date, Eagle will direct the following close out procedures: Written notice requiring the submission of warranty letters, cleaning and care instructions, final shop drawings, & manuals, etc. Eagle will schedule and conduct a mandatory closeout-planning meeting.

Approximately 45 days before the substantial completion date, Eagle Construction Corporation will direct the following close-out procedures:

- Resolve any outstanding change orders or disputes.

- Prepare and issue an outstanding subcontract amendments or purchase order amendments.

- Plan and prepare Eagle work list procedures and requirements for the project.

Approximately 30 days before the substantial completion date, Eagle will direct the following closeout procedures.

- Follow-up with subcontractors on completion of work lists.

- Plan and schedule systems training sessions with the Owner and Architect.

- Follow up with subcontractors and suppliers to finalize all closeout documents.

## Appendix I.

### Schedule of Values for Work Through February 25, <Year\_2>

Item No.	Description Of Work	Scheduled Value	Work Completed This Period	Materials Presently Stored
1000	General Conditions	\$417,056.00	\$107,227.00	\$0.00
1400	Testing Allowance	\$3,000.00	\$3,000.00	\$0.00
2000	Site Work	\$88,875.00	\$63,216.00	\$0.00
2500	Site Concrete	\$40,001.00	\$0.00	\$0.00
2550	Site Utilities	\$47,885.00	\$34,520.00	\$0.00
2600	Site Paving / Curb & Gutter	\$31,502.00	\$0.00	\$0.00
3100	Concrete Footings/Foundation Walls	\$239,438.00	\$221,723.00	\$0.00
3200	Concrete Reinforcing	\$79,785.00	\$71,290.00	\$0.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00	\$34,781.00	\$0.00
4100	Concrete Block	\$44,729.00	\$0.00	\$0.00
4101	Brick	\$149,740.00	\$0.00	\$0.00
4102	Architectural Pre-cast Concrete	\$68,972.00	\$0.00	\$0.00
5000	Structural & Misc. Steel (Material)	\$398,658.00	\$260,574.00	\$0.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00	\$31,077.00	\$0.00
6000	Rough / Finish Carpentry	\$131,752.00	\$0.00	\$0.00
6400	Millwork	\$14,180.00	\$0.00	\$0.00
7100	Waterproofing	\$31,766.00	\$15,292.00	\$0.00
7240	Exterior Insulation Finish System	\$63,055.00	\$0.00	\$0.00
7270	Fireproofing	\$40,000.00	\$0.00	\$0.00
7500	Roofing	\$127,672.00	\$0.00	\$0.00
8100	Doors / Frames / Hardware	\$100,704.00	\$0.00	\$0.00
8800	Glass & Glazing	\$84,277.00	\$0.00	\$0.00
9100	Lath & Plaster	\$14,500.00	\$0.00	\$0.00
9250	Exterior Framing & Sheathing	\$141,760.00	\$0.00	\$0.00
9251	Interior Framing	\$143,490.00	\$0.00	\$0.00
9252	Insulation & Drywall	\$201,470.00	\$0.00	\$0.00
9253	Ceilings	\$53,630.00	\$0.00	\$0.00
9650	Floor Coverings	\$56,350.00	\$0.00	\$0.00
9900	Painting / Wall covering	\$107,645.00	\$0.00	\$0.00
10000	Specialties	\$40,100.00	\$0.00	\$0.00
12000	Furnishings	\$2,519.00	\$0.00	\$0.00
13030	Pre-Engineered Structures	\$81,621.00	\$0.00	\$0.00
14000	Conveying Systems	\$47,200.00	\$6,380.00	\$0.00
15000	Plumbing - Utilities	\$72,000.00	\$20,305.00	\$0.00
15001	Plumbing - Underground	\$62,000.00	\$60,000.00	\$0.00
15002	Plumbing - Sanitary	\$126,000.00	\$55,000.00	\$0.00
15003	Plumbing - Domestic Water	\$82,000.00	\$18,000.00	\$0.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00	\$15,000.00	\$0.00
15005	Plumbing - Fixtures	\$62,000.00	\$0.00	\$0.00
15100	HVAC - Piping	\$189,219.00	\$20,000.00	\$0.00
15101	HVAC - Equipment	\$370,057.00	\$0.00	\$0.00
15102	HVAC - Sheet Metal	\$580,911.00	\$13,150.00	\$0.00
15103	HVAC - Controls	\$276,150.00	\$0.00	\$0.00
15104	HVAC - Insulation	\$128,380.00	\$0.00	\$0.00
15105	HVAC - Chemicals	\$2,283.00	\$0.00	\$0.00
15500	Fire Protection	\$6,068.00	\$0.00	\$0.00
16100	Electrical Rough-In	\$190,000.00	\$45,400.00	\$0.00
16101	Electrical Panels & Switch Gear	\$227,000.00	\$0.00	\$0.00
16102	Electrical Devices and Fixtures	\$26,000.00	\$0.00	\$0.00
16103	Electrical Fixtures	\$95,000	\$0.00	\$0.00
19000	General Contractor's Fee	\$225,000.00	\$30,000.00	\$0.00
	<b>Grand Total</b>	<b>\$6,268,810.00</b>	<b>\$1,125,935.00</b>	<b>\$0.00</b>

## Appendix J.

### Schedule of Values for Work Through March 25, <Year\_2>

Item No.	Description Of Work	Scheduled Value	Work Completed This Period	Materials Presently Stored
1000	General Conditions	\$417,056.00	\$29,090.00	\$0.00
1400	Testing Allowance	\$3,000.00	\$0.00	\$0.00
2000	Site Work	\$88,875.00	\$0.00	\$0.00
2500	Site Concrete	\$40,001.00	\$0.00	\$0.00
2550	Site Utilities	\$47,885.00	\$0.00	\$0.00
2600	Site Paving / Curb & Gutter	\$31,502.00	\$0.00	\$0.00
3100	Concrete Footings/Foundation Walls	\$239,438.00	\$7,321.00	\$0.00
3200	Concrete Reinforcing	\$79,785.00	\$3,420.00	\$0.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00	\$44,675.00	\$0.00
4100	Concrete Block	\$44,729.00	\$0.00	\$0.00
4101	Brick	\$149,740.00	\$0.00	\$0.00
4102	Architectural Pre-cast Concrete	\$68,972.00	\$0.00	\$0.00
5000	Structural & Misc. Steel (Material)	\$398,658.00	\$38,663.00	\$0.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00	\$21,034.00	\$0.00
6000	Rough / Finish Carpentry	\$131,752.00	\$0.00	\$0.00
6400	Millwork	\$14,180.00	\$0.00	\$0.00
7100	Waterproofing	\$31,766.00	\$0.00	\$0.00
7240	Exterior Insulation Finish System	\$63,055.00	\$0.00	\$0.00
7270	Fireproofing	\$40,000.00	\$12,880.00	\$0.00
7500	Roofing	\$127,672.00	\$0.00	\$0.00
8100	Doors / Frames / Hardware	\$100,704.00	\$4,315.00	\$0.00
8800	Glass & Glazing	\$84,277.00	\$0.00	\$0.00
9100	Lath & Plaster	\$14,500.00	\$0.00	\$0.00
9250	Exterior Framing & Sheathing	\$141,760.00	\$0.00	\$0.00
9251	Interior Framing	\$143,490.00	\$0.00	\$0.00
9252	Insulation & Drywall	\$201,470.00	\$0.00	\$0.00
9253	Ceilings	\$53,630.00	\$0.00	\$0.00
9650	Floor Coverings	\$56,350.00	\$0.00	\$0.00
9900	Painting / Wall covering	\$107,645.00	\$0.00	\$0.00
10000	Specialties	\$40,100.00	\$0.00	\$0.00
12000	Furnishings	\$2,519.00	\$0.00	\$0.00
13030	Pre-Engineered Structures	\$81,621.00	\$0.00	\$0.00
14000	Conveying Systems	\$47,200.00	\$0.00	\$0.00
15000	Plumbing – Utilities	\$72,000.00	\$0.00	\$0.00
15001	Plumbing – Underground	\$62,000.00	\$8,800.00	\$0.00
15002	Plumbing – Sanitary	\$126,000.00	\$5,675.00	\$0.00
15003	Plumbing - Domestic Water	\$82,000.00	\$9,110.00	\$0.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00	\$5,500.00	\$0.00
15005	Plumbing – Fixtures	\$62,000.00	\$0.00	\$0.00
15100	HVAC – Piping	\$189,219.00	\$0.00	\$0.00
15101	HVAC – Equipment	\$370,057.00	\$0.00	\$0.00
15102	HVAC - Sheet Metal	\$580,911.00	\$11,220.00	\$0.00
15103	HVAC – Controls	\$276,150.00	\$1,965.00	\$0.00
15104	HVAC – Insulation	\$128,380.00	\$0.00	\$0.00
15105	HVAC – Chemicals	\$2,283.00	\$0.00	\$0.00
15500	Fire Protection	\$6,068.00	\$0.00	\$0.00
16100	Electrical Rough-In	\$190,000.00	\$9,255.00	\$0.00
16101	Electrical Panels & Switch Gear	\$227,000.00	\$0.00	\$0.00
16102	Electrical Devices and Fixtures	\$26,000.00	\$0.00	\$0.00
16103	Electrical Fixtures	\$95,000	\$0.00	\$0.00
19000	General Contractor's Fee	\$225,000.00	\$15,000.00	\$0.00
	Grand Total	\$6,268,810.00	\$227,923.00	\$0.00

## Appendix K.

### Schedule of Values for Work Through April 25, <Year\_2>

Item No.	Description Of Work	Scheduled Value	Work Completed This Period	Materials Presently Stored
1000	General Conditions	\$417,056.00	\$26,340.00	\$0.00
1400	Testing Allowance	\$3,000.00	\$0.00	\$0.00
2000	Site Work	\$88,875.00	\$13,223.00	\$0.00
2500	Site Concrete	\$40,001.00	\$0.00	\$0.00
2550	Site Utilities	\$47,885.00	\$6,211.00	\$0.00
2600	Site Paving / Curb & Gutter	\$31,502.00	\$0.00	\$0.00
3100	Concrete Footings/Foundation Walls	\$239,438.00	\$8,345.00	\$0.00
3200	Concrete Reinforcing	\$79,785.00	\$3,970.00	\$0.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00	\$92,140.00	\$0.00
4100	Concrete Block	\$44,729.00	\$37,620.00	\$0.00
4101	Brick	\$149,740.00	\$0.00	\$0.00
4102	Architectural Pre-cast Concrete	\$68,972.00	\$0.00	\$0.00
5000	Structural & Misc. Steel (Material)	\$398,658.00	\$82,350.00	\$0.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00	\$92,355.00	\$0.00
6000	Rough / Finish Carpentry	\$131,752.00	\$0.00	\$32,111.00
6400	Millwork	\$14,180.00	\$0.00	\$0.00
7100	Waterproofing	\$31,766.00	\$2,348.00	\$0.00
7240	Exterior Insulation Finish System	\$63,055.00	\$0.00	\$0.00
7270	Fireproofing	\$40,000.00	\$4,760.00	\$0.00
7500	Roofing	\$127,672.00	\$0.00	\$0.00
8100	Doors / Frames / Hardware	\$100,704.00	\$5,765.00	\$0.00
8800	Glass & Glazing	\$84,277.00	\$0.00	\$0.00
9100	Lath & Plaster	\$14,500.00	\$0.00	\$0.00
9250	Exterior Framing & Sheathing	\$141,760.00	\$85,640.00	\$0.00
9251	Interior Framing	\$143,490.00	\$16,990.00	\$0.00
9252	Insulation & Drywall	\$201,470.00	\$0.00	\$0.00
9253	Ceilings	\$53,630.00	\$0.00	\$0.00
9650	Floor Coverings	\$56,350.00	\$0.00	\$0.00
9900	Painting / Wall covering	\$107,645.00	\$0.00	\$0.00
10000	Specialties	\$40,100.00	\$0.00	\$0.00
12000	Furnishings	\$2,519.00	\$0.00	\$0.00
13030	Pre-Engineered Structures	\$81,621.00	\$0.00	\$0.00
14000	Conveying Systems	\$47,200.00	\$8,709.00	\$0.00
15000	Plumbing – Utilities	\$72,000.00	\$5,695.00	\$15,000.00
15001	Plumbing – Underground	\$62,000.00	(\$6,800.00)	\$0.00
15002	Plumbing – Sanitary	\$126,000.00	\$4,325.00	\$30,000.00
15003	Plumbing - Domestic Water	\$82,000.00	\$2,950.00	\$9,000.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00	\$3,000.00	\$6,000.00
15005	Plumbing – Fixtures	\$62,000.00	\$9,400.00	\$8,000.00
15100	HVAC – Piping	\$189,219.00	\$6,205.00	\$38,000.00
15101	HVAC – Equipment	\$370,057.00	\$18,565.00	\$0.00
15102	HVAC - Sheet Metal	\$580,911.00	\$28,830.00	\$85,250.00
15103	HVAC – Controls	\$276,150.00	\$0.00	\$0.00
15104	HVAC – Insulation	\$128,380.00	\$0.00	\$40,000.00
15105	HVAC – Chemicals	\$2,283.00	\$0.00	\$0.00
15500	Fire Protection	\$6,068.00	\$0.00	\$0.00
16100	Electrical Rough-In	\$190,000.00	\$27,860.00	\$0.00
16101	Electrical Panels & Switch Gear	\$227,000.00	\$51,230.00	\$0.00
16102	Electrical Devices and Fixtures	\$26,000.00	\$0.00	\$0.00
16103	Electrical Fixtures	\$95,000	\$0.00	\$0.00
19000	General Contractor's Fee	\$225,000.00	\$15,000.00	\$0.00
	Grand Total	\$6,268,810.00	\$653,026.00	\$263,361.00

**Appendix L.**

Schedule of Values for Work Through May 25, <Year\_2>

Item No.	Description Of Work	Scheduled Value	Work Completed This Period	Materials Presently Stored
1000	General Conditions	\$417,056.00	\$33,212.00	\$0.00
1400	Testing Allowance	\$3,000.00	\$0.00	\$0.00
2000	Site Work	\$88,875.00	\$0.00	\$0.00
2500	Site Concrete	\$40,001.00	\$0.00	\$0.00
2550	Site Utilities	\$47,885.00	\$0.00	\$0.00
2600	Site Paving / Curb & Gutter	\$31,502.00	\$0.00	\$0.00
3100	Concrete Footings/Foundation Walls	\$239,438.00	\$0.00	\$0.00
3200	Concrete Reinforcing	\$79,785.00	\$1,105.00	\$0.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00	\$6,985.00	\$0.00
4100	Concrete Block	\$44,729.00	\$4,926.00	\$0.00
4101	Brick	\$149,740.00	\$81,082.00	\$0.00
4102	Architectural Pre-cast Concrete	\$68,972.00	\$0.00	\$37,127.00
5000	Structural & Misc. Steel (Material)	\$398,658.00	\$12,420.00	\$0.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00	\$25,363.00	\$0.00
6000	Rough / Finish Carpentry	\$131,752.00	\$9,240.00	\$32,111.00
6400	Millwork	\$14,180.00	\$0.00	\$0.00
7100	Waterproofing	\$31,766.00	\$0.00	\$0.00
7240	Exterior Insulation Finish System	\$63,055.00	\$0.00	\$0.00
7270	Fireproofing	\$40,000.00	\$12,345.00	\$0.00
7500	Roofing	\$127,672.00	\$27,661.00	\$0.00
8100	Doors / Frames / Hardware	\$100,704.00	\$15,167.00	\$0.00
8800	Glass & Glazing	\$84,277.00	\$0.00	\$0.00
9100	Lath & Plaster	\$14,500.00	\$0.00	\$0.00
9250	Exterior Framing & Sheathing	\$141,760.00	\$37,670.00	\$0.00
9251	Interior Framing	\$143,490.00	\$67,412.00	\$0.00
9252	Insulation & Drywall	\$201,470.00	\$0.00	\$0.00
9253	Ceilings	\$53,630.00	\$0.00	\$0.00
9650	Floor Coverings	\$56,350.00	\$0.00	\$0.00
9900	Painting / Wall covering	\$107,645.00	\$0.00	\$0.00
10000	Specialties	\$40,100.00	\$0.00	\$0.00
12000	Furnishings	\$2,519.00	\$0.00	\$0.00
13030	Pre-Engineered Structures	\$81,621.00	\$0.00	\$0.00
14000	Conveying Systems	\$47,200.00	\$0.00	\$0.00
15000	Plumbing - Utilities	\$72,000.00	\$26,400.00	\$0.00
15001	Plumbing - Underground	\$62,000.00	\$0.00	\$0.00
15002	Plumbing - Sanitary	\$126,000.00	\$39,500.00	\$5,000.00
15003	Plumbing - Domestic Water	\$82,000.00	\$5,000.00	\$9,000.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00	\$3,250.00	\$6,000.00
15005	Plumbing - Fixtures	\$62,000.00	\$12,000.00	\$0.00
15100	HVAC - Piping	\$189,219.00	\$10,000.00	\$38,000.00
15101	HVAC - Equipment	\$370,057.00	\$0.00	\$0.00
15102	HVAC - Sheet Metal	\$580,911.00	\$19,010.00	\$103,830.00
15103	HVAC - Controls	\$276,150.00	\$8,425.00	\$0.00
15104	HVAC - Insulation	\$128,380.00	\$0.00	\$40,000.00
15105	HVAC - Chemicals	\$2,283.00	\$0.00	\$0.00
15500	Fire Protection	\$6,068.00	\$0.00	\$0.00
16100	Electrical Rough-In	\$190,000.00	\$21,177.00	\$0.00
16101	Electrical Panels & Switch Gear	\$227,000.00	\$33,440.00	\$0.00
16102	Electrical Devices and Fixtures	\$26,000.00	\$0.00	\$0.00
16103	Electrical Fixtures	\$95,000	\$0.00	\$0.00
19000	General Contractor's Fee	\$225,000.00	\$15,000.00	\$0.00
CO#1	CHANGE ORDER NUMBER 1	\$41,797.00	\$24,719.00	\$0.00
	<b>Grand Total</b>	<b>\$6,268,810.00</b>	<b>\$552,509.00</b>	<b>\$271,068.00</b>

## Appendix M.

### Schedule of Values for Work Through June 25, <Year\_2>

Item No.	Description Of Work	Scheduled Value	Work Completed This Period	Materials Presently Stored
1000	General Conditions	\$417,056.00	\$49,770.00	\$0.00
1400	Testing Allowance	\$3,000.00	\$0.00	\$0.00
2000	Site Work	\$88,875.00	\$0.00	\$0.00
2500	Site Concrete	\$40,001.00	\$1,200.00	\$0.00
2550	Site Utilities	\$47,885.00	\$5,100.00	\$0.00
2600	Site Paving / Curb & Gutter	\$31,502.00	\$0.00	\$0.00
3100	Concrete Footings/Foundation Walls	\$239,438.00	\$2,049.00	\$0.00
3200	Concrete Reinforcing	\$79,785.00	\$0.00	\$0.00
3300	Concrete Slabs / Pits / Pit Walls	\$179,581.00	\$1,000.00	\$0.00
4100	Concrete Block	\$44,729.00	\$2,183.00	\$0.00
4101	Brick	\$149,740.00	\$37,041.00	\$0.00
4102	Architectural Pre-cast Concrete	\$68,972.00	\$14,200.00	\$0.00
5000	Structural & Misc. Steel (Material)	\$398,658.00	\$1,621.00	\$0.00
5100	Structural & Misc. Steel (Erection)	\$181,829.00	\$4,300.00	\$0.00
6000	Rough / Finish Carpentry	\$131,752.00	\$39,796.00	\$0.00
6400	Millwork	\$14,180.00	\$0.00	\$0.00
7100	Waterproofing	\$31,766.00	\$0.00	\$0.00
7240	Exterior Insulation Finish System	\$63,055.00	\$0.00	\$15,000.00
7270	Fireproofing	\$40,000.00	\$8,015.00	\$0.00
7500	Roofing	\$127,672.00	\$14,920.00	\$0.00
8100	Doors / Frames / Hardware	\$100,704.00	\$3,625.00	\$0.00
8800	Glass & Glazing	\$84,277.00	\$800.00	\$15,930.00
9100	Lath & Plaster	\$14,500.00	\$1,034.00	\$0.00
9250	Exterior Framing & Sheathing	\$141,760.00	\$4,760.00	\$2,840.00
9251	Interior Framing	\$143,490.00	\$16,020.00	\$3,850.00
9252	Insulation & Drywall	\$201,470.00	\$26,210.00	\$24,220.00
9253	Ceilings	\$53,630.00	\$0.00	\$0.00
9650	Floor Coverings	\$56,350.00	\$0.00	\$0.00
9900	Painting / Wall covering	\$107,645.00	\$0.00	\$0.00
10000	Specialties	\$40,100.00	\$0.00	\$0.00
12000	Furnishings	\$2,519.00	\$0.00	\$0.00
13030	Pre-Engineered Structures	\$81,621.00	\$0.00	\$0.00
14000	Conveying Systems	\$47,200.00	\$0.00	\$0.00
15000	Plumbing – Utilities	\$72,000.00	\$3,600.00	\$0.00
15001	Plumbing – Underground	\$62,000.00	\$0.00	\$0.00
15002	Plumbing – Sanitary	\$126,000.00	\$8,500.00	\$0.00
15003	Plumbing - Domestic Water	\$82,000.00	\$4,940.00	\$9,000.00
15004	Plumbing - Gas, Air & Vacuum Piping	\$94,000.00	\$2,000.00	\$6,000.00
15005	Plumbing – Fixtures	\$62,000.00	\$1,000.00	\$0.00
15100	HVAC – Piping	\$189,219.00	\$7,000.00	\$38,000.00
15101	HVAC – Equipment	\$370,057.00	\$150,000.00	\$150,000.00
15102	HVAC - Sheet Metal	\$580,911.00	\$51,250.00	\$124,960.00
15103	HVAC – Controls	\$276,150.00	\$4,490.00	\$100,000.00
15104	HVAC – Insulation	\$128,380.00	\$0.00	\$40,000.00
15105	HVAC – Chemicals	\$2,283.00	\$0.00	\$0.00
15500	Fire Protection	\$6,068.00	\$0.00	\$0.00
16100	Electrical Rough-In	\$190,000.00	\$6,308.00	\$0.00
16101	Electrical Panels & Switch Gear	\$227,000.00	\$30,000.00	\$50,000.00
16102	Electrical Devices and Fixtures	\$26,000.00	\$0.00	\$0.00
16103	Electrical Fixtures	\$95,000	\$0.00	\$0.00
19000	General Contractor's Fee	\$225,000.00	\$15,000.00	\$0.00
CO#1	CHANGE ORDER NUMBER 1	\$41,797.00	\$26,717.00	\$0.00
	Grand Total	\$6,268,810.00	\$544,449.00	\$579,800.00