Allocation of Risk Through Construction Contract Provisions and Practice

by

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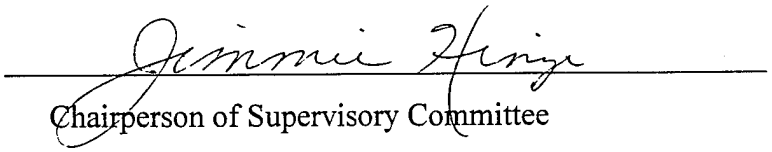
Approved by 

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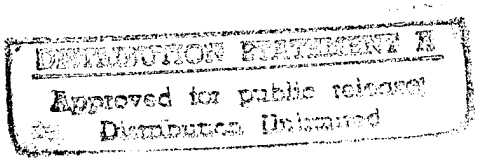

Department of Civil Engineering

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Abstract

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General conditions used by forty-four owners when contracting for construction services were obtained and studied for risk allocation techniques. Additionally, interviews were conducted with twenty-five construction professionals to study how risk is allocated during actual project completion. The study provides a broad view of risk allocation techniques used in specific clauses and of risk allocation in actual practice. The study does not profile the prevalence of risk allocation between contractor and owner, rather, the sole purpose of the study is to identify common contract provisions where risk allocation varies and actual practices that place varying amounts of risk on contractors.

Chapter 1 - Introduction

Every action, whether professional or personal in nature, contains risk. With such prevalence one would logically expect the concept of risk to be basic and well understood. However, this is not the case. In fact, the very nature of risk makes it difficult to understand and characterize. Simply defined, risk is the uncertainty that an event will or will not occur. This uncertainty, fed by a constantly changing world, makes the understanding of risk and its characterization difficult.

In the construction process the importance of a risk is most often determined by its impact. That is, events that have cost, quality, and construction time consequences are particularly important.

It is common knowledge that risk is an integral part of the construction process and, like the general concept of risk, construction risk is a broad complicated subject. In fact, construction risk is most easily understood when it is viewed as the product of multiple discreet risk types. In a 1990 article on risk management Al-Bahar and Crandall (1990) presented a list of the most common construction risk types as acts of God, physical, financial, political, environmental, design, and construction completion. As risk management and allocation are the primary determinants of success in the construction process, it must continue to be studied and characterized.

It is the perception of many construction professionals that the most common risk management strategy employed by construction owners in the past has been strict avoidance through onerous specifications which shift risk to the contractors. That is, contract documents were used to not only communicate an end product but also served as a means to shift the preponderance of risk to the contractor. The litigation crisis of the 1980's proved, however, that risk cannot be avoided. It was in this time period that American society and the construction industry saw an alarming increase in third party and tort litigation. Successful suits for enormous settlements against both owners and contractors were common. It was, in fact, the enormous settlements coupled with increased litigation that served as the messenger that a paradigm shift must occur and

that all parties to the construction process must try to actively manage risk rather than passively avoid it.

It is generally accepted that contracts shifting the preponderance of risk to the contractor will result in the submittal of higher bid prices. When onerous specifications are used, it is probable that the owner drafting the specifications weighed the premium bid price against the potential for loss and decided that the risk of loss required such measures. Again, however, onerous specifications are not fail safe. In fact, such specifications often result in additional litigation and claims costs as they are interpreted strictly against the drafting party. In light of this fact and the rising cost of litigation, it is often in the best interest of owners and contractors that risk be allocated fairly.

This research will focus on the specific construction risk types of design risk and construction risk. For the purposes of this research, design risk is defined as the risk established through the contract documents, and construction risk is the risk encountered during the actual construction of a project. Specifically, the research will identify common areas of risk found in construction provisions and in the actual practice of constructing projects.

It is important to note that this research does not seek to profile or characterize the allocation of risk between owner and contractor. The purpose is solely to identify common contract provisions where risk allocation varies and actual practices that place varying amount of risk on contractors. The study seeks to gain clearer understanding of how risk is allocated between the owner and the contractor through contract provisions and in actual practice. With this added insight, general recommendations on how to fairly allocate risk in the future will be made. The recommendations will focus on minimizing the potential for litigation, minimizing construction costs, and improving profitability for the contractor.

Chapter 2 - Literature Review

2.1 - Introduction

An extensive search of the literature on risk allocation in contract specifications revealed that little has been written on this specific topic. In fact, the most prevalent element of design risk discussed in the literature is the risk encountered when a product or technical specification is defective. For example, the flawed logic of using "or equal" specifications, proprietary specifications, and outdated specification libraries is well documented (Ibbs 1985, Ibbs 1986). Additionally, most construction articles and publications addressing risk deal with either general strategies for risk management or claims avoidance and resolution (Al-Bahar and Crandall 1990, Zack 1993). A small number of articles commented on risk in contract provisions but the issue of risk allocation was not the central theme of the studies being described.

2.2 - Review

In their paper "Impact of Various Construction Contract Clauses", Ibbs and Ashley (1987) studied 96 clauses within the contracts of 36 very large capital improvement projects. The stated purpose of the study was to determine the effect of the clauses on project performance. The study also examined the views of owners and contractors concerning how specific clauses allocated risk. The most significant disparity in perception was encountered on the design rework clause. Owners felt this clause only allocated 23% of the risk to contractors while contractors felt it allocated 80% of the risk to them. Ibbs and Ashley stated that the contractors involved in the study felt this was the most important finding produced by their research effort. The Ibbs-Ashley study quantified perceptions of the contractual parties but did not discuss how each provision allocated risk.

Other articles that presented information on contract provisions, with risk being addressed to some extent, are "Weather in Construction Contracts" (Hinze and Couey 1989), "Time Provisions in State Highway Construction Contracts" (Hinze and Coleman 1991), and "General Conditions Provisions Critical to Construction Contracts" (Hinze

and Tada 1993). Hinze and Couey studied how weather conditions and their effect on construction progress were handled in public works construction contracts. Results indicated that not only were state departments of transportation (DOT) inconsistent in their contractual handling of weather, but that federal agencies, forced to use the Federal Acquisition Regulations as the basis for contracting, were also diametrically opposed in their practice on some issues. The authors stated "that contractors must carefully examine each construction contract to establish the risk that is to be borne in delivering the project on time."

Hinze and Coleman focused on how the issues of time were handled in the construction contracts of the state DOTs. Results indicated that not one provision was identical in all state documents and that multiple provisions dealing with time "unique to just one agency" existed.

Finally, Hinze and Tada studied general conditions in both public and private utility contracts. In this two-part article, the authors found that requirements borne in the general conditions of utility contracts were inconsistent. They attributed part of this inconsistency to "differences in philosophy about the way risk should be allocated between contracting parties." They concluded the article with the recommendation that utilities "join forces" and standardize construction contract documents as a unified front would provide an obvious benefit to all in light of the increasingly litigious nature of American society.

Chapter 3 - Methodology

3.1 - Basis

3.1.1 - Basis Introduction

As stated earlier, the purpose of this research is to identify how selected risk elements common to construction contracts are allocated through contract provisions and through actual practice.

It was determined that the best method to establish a solid basis for this study would be to combine practical insight of contractors with the results of a construction contracts provision review.

3.1.2 - Initial Interviews and Seminar Lectures

Practical insight was gained through selective initial interviews and through attending seminar lectures presented by various contractors. The primary purpose for the initial interviews and seminar attendance was to form a basis for learning how risk is viewed, managed, and allocated in actual practice. As such, the initial interviews were selective, and information gleaned from the seminar lectures was specific to the subject of risk.

Four initial interviews were conducted with key personnel from three construction firms. Accessibility allowed two interviews with a very large national general contractor to be completed. The third interview was with a very large international general contractor and the fourth interview was with a medium sized local (Seattle-based) general contractor. The discussion in initial interviews focused on areas of risk found in actual project completion and what recommendations could be made that would allow fair risk allocation between the owner and contractor in the future.

Three seminar lectures attended by the author also provided insight into the actual allocation and management of risk by contractors. The three seminars were offered at the University of Washington as part of a Construction Engineering and Management seminar lecture series. The format of the three seminar lectures was similar in that each lecture included a brief presentation followed by an open question and answer period. Questions were also encouraged and fielded during the presentation portion of each

program. The first seminar was conducted by the owner of a local medium-sized specialty subcontractor. The second seminar was conducted by the owner of a medium-sized local general contracting firm that specialized in construction manager/general contractor and design-build construction. The third seminar was conducted by a construction/project engineer from the heavy civil division of a very large international construction conglomerate. Questions asked by the author at the seminar lectures were general in nature and were pertinent to the subject being presented.

3.1.3 - Initial Construction Provision Review

An initial construction provision review was completed on the contract documents of four private utility company construction contracts and four public utility construction contracts. The private utility companies could be classified as either medium or large while the public utility organizations were medium in size. The focus of the initial review effort was to determine what mechanisms and techniques were employed in specific clauses to allocate risk.

3.1.4 - Scope of Study

When insights from the construction professionals were combined with the information gathered in the initial construction provision review it was determined that the following provisions would be studied further on the basis of risk allocation: intent, errors and omissions, changes, unforeseen conditions, site investigations, submittals and shop drawings, payments, warranty, and indemnification.

Insights from initial interviews also established that additional interviews with contractors, owners, consultants, and architect-engineers would be the best and most appropriate method to study how risk is allocated in actual practice.

3.2 - Data Sources

Data for the study was gathered from the multiple contract documents collected by the University of Washington Department of Civil Engineering and from initial interviews, seminar lectures, and subsequent interviews with construction professionals. Forty-four different contract documents were utilized to collect examples of various

techniques used to allocate risk in contract provisions. Three seminar lectures were attended, four initial interviews were conducted, and twenty-three subsequent interviews were conducted.

The examples collected from the contracts were found in the general conditions portion of each contract. It was determined that the review should be limited to the general conditions as this was the most likely source of the provisions of interest.

Specifications utilized could be classified as follows: five public utilities, eighteen private utilities, two state contracts for heavy civil work, nine municipality general conditions, and ten state departments of transportation standard specifications.

Table 1: Specification Classifications

Specification Type	Number Reviewed
Public Utility	5
Private Utility	18
State: Heavy Civil	2
Municipality	9
State: Department of Transportation	10
Total:	44

The twenty-five participants in the interviews and seminar lectures could be classified as follows: fourteen different representatives from nine general contracting firms, four specialty subcontractors, two owners, two construction consultants, one surety, one construction attorney, and one architect-engineer.

Table 2: Interview and Lecture Participants

Firm Type	Firms Represented	Number of Participants
General Contractor	9	14
Specialty Subcontractor	4	4
Owner	2	2
Consultant	2	2
Surety	1	1
Construction Attorney	1	1
Architect-Engineer	1	1
	Total participants:	25

3.3 - Detailed Provision Review

A provision checklist that reflected the various elements of risk within each provision of interest was developed as a means to systematically study the various methods used to allocate risk through contract documents. That is, the provision checklist acted as a detailed guide to identify possible risk nuances in the provisions of interest while reviewing the forty-four contract documents. The checklist was developed by correlating observations noted during the initial construction provision review described in section 3.1.3.

3.3.1 - Provision Checklist

Questions contained within the checklist are presented below:

Intent and errors/omissions:

- Does the contract include an intent clause?
- Does intent override obvious errors or omissions?
- Does the contract specifically state that the plans and specifications must be read as complementary?
- Does the contract include an errors and omissions clause?
- Does the contract state that if in the plans and not specifications or in the specifications but not the plans that the requirement will be enforced with the full force and effect as if it is in both?
- Is the contractor explicitly required to inform the owner of an error or omission?

  If so, which apply:

  _ A specified time period is listed to report the error or omission

  List time: _____

  _ A specified time period for owner response to inquiry is listed

  List time: _____

  _ Work completed without informing the owner is not compensable

  _ Contract not specific

Changes:

- Does the contract include a changes clause?
- Are all items negotiable?

  If no, which of the following items are preset by the contract:

  _ Subcontractor overhead
  _ Home office overhead
  _ Field office overhead
  _ Equipment rates or small tools
  _ Profit
  _ Labor rates
  _ Material rates

- Are all overheads, markups, and salaries set at the beginning of the job through a required initial negotiation?

- Is a change or an order in writing required prior to the beginning of changed work?
- Does the owner have the right to direct changed work prior to negotiating price?
- Must the contractor revise and resubmit a schedule after every change?
- Is there a specified response time for a request for a change proposal?

  If so, list the time: _____
- Are owner-caused delays compensable as a change?
- Can the owner require acceleration to meet the original contract completion date or a current schedule?
- Does the owner have the unilateral right to determine the responsibility for acceleration?

Site investigations/Unforeseen site conditions:

- Does the contract require a site investigation?

  If so, to what level of detail must the contractor investigate:

  _ To the extent necessary to be familiar with existing conditions, utilities, or soil conditions

  _ Contract does not address level of detail for the investigation
- Does the contract explicitly state that information provided on existing conditions, site characteristics, etc. may be inaccurate and should not be relied upon for bidding and planning purposes?
- Does the contract explicitly state that the contractor is responsible for existing conditions regardless of statements or representations in the contract documents?
- Does the contract address unforeseen or existing site conditions?
- Is extra work for unforeseen conditions compensable?
- Is notice of an unforeseen site condition required?

  If so, which apply:

  _ Time frame of notice unspecified _ Notice required in writing

  _ Notice required as soon as possible _ Oral notice required

  _ Notice required within 24 hours or longer

- Is owner's review of condition required prior to the continuation of work?
- Does the contract explicitly state that a change request for unforeseen conditions will not be recognized if all proper notices, time frames, etc. were not met?

Submittals and shop drawings:

- Are submittals required?

  If so, which apply:

  _ Product samples
  _ Shop drawings
  _ Product data
  _ Operation and maintenance manuals
  _ Certifications of product quality

- Does the contract state that the submittals will be reviewed only and that the review will not be construed as approval of changes or substitutions to the original contract documents?
- Are any submittals explicitly reviewed for approval?
- Does the contract state the number of days afforded the owner for submittal review?

  If so, list exact days: _____

- Is the coordination of shop drawings between trades and disciplines required?
- Does the contract address the level of detail required in shop drawings?

  If so, which statement most resembles the contract requirement:

  _ Schematics only
  _ Shop drawings will be of detail necessary to ensure work can be installed without conflict with other trades
  _ Shop drawings will be detailed and include specific manner in which work will be connected and coordinated with all related items and trades

Payments:

- Is frequency of invoices controlled by the contract?

- Are payments for material delivered, not installed, allowed?

  If so, which of the following apply:

  _ A certified warehouse is required

  _ Specific maximum mileage from the job site is specified

  _ The contract is not specific

- Is the number of payments controlled by a "length of contract schedule"?
- Are payments only allowed on a monthly basis?
- Are payments allowed more frequently than monthly?
- Does the contract specify the time in which payment will be made?

  If so, is the payment timing dependent on the date of submittal, the invoice cutoff date, or the owner approval date? List the exact days: _____

- Are certified payrolls required?
- Is an owner-approved schedule of prices required prior to first payment?
- Does the contract specify the time afforded for owner invoice review?

  If so, list the time: _____

- Is retainage addressed by the contract?
- Does the contract include a specific retainage percentage?

  If so, what is the exact percentage?

- Can the retainage percentage be reduced through negotiation?
- Does the contract specifically address when retainage will be released?

  If so, which time frame most resembles the contract requirement:

  _ After final acceptance by the owner or final payment

  _ After final release from the contractor

  _ After beneficial occupancy

  _ After the warranty period

- Is retainage released on a schedule (e.g., 50% at occupancy, 30% at acceptance, 20% after final release and with final payment)?
- Is a final release required prior to final payment?

- When is final payment released?
  - _ After final acceptance
  - _ After final release from the contractor
  - _ After the lien statutory period

Warranty:

(Note: Warranty, as used in the context of this study, actually refers to the remedy period required after project completion.)

- Does the contract require a warranty?
- If so, which type applies:
  - _ All defects, including patent
  - _ Latent defects only
  - _ Defects and limited maintenance
  - _ Defects and complete maintenance
- The length of warranty is:
  - _ Less than a year
  - _ More than a year
  - _ One year
  - _ Final acceptance
  - _ Not mentioned
- Is the warranty work notification process included in the specifications?
- Can the owner accept defective work unilaterally, repair the work, and back-charge the contractor?
- Does the specification include a specific time period in which the contractor must respond to a warranty issue?
- Can the owner complete warranty work at their own expense and back-charge the contractor without affording the contractor an opportunity to complete the work?

Indemnification:

- Does the contract indemnify the owner in any way?

  If so, classify the type of indemnity:

  _ Broad _ Intermediate _ Limited

3.3.2 - Provision Review Cross Validation

It was viewed as important to validate and cross-check information gleaned in the provision review. Cross validation of the provision review information was accomplished through the completion of a class assignment by a senior level construction contracts class in the Department of Civil Engineering at the University of Washington.

The class of thirty-six students was broken up into nine groups. Each group was given the general conditions from four different contracts and was asked to evaluate the following areas in terms of risk: intent and errors/omissions, changes, site investigations and unforeseen site conditions, submittals and shop drawings, acceleration, payments, warranty, and indemnification. It should be noted that the thirty-six contract documents reviewed, while similar in cross section to those reviewed by the author (e.g., public utility, private utility, heavy civil, and municipality contracts), were different contracts than the forty-four detailed previously in Table 1 and used specifically for the study.

The assignment proved to be quite useful in that it did validate the results (findings were consistent) presented later in Chapter 4. Results from the assignment nearly mirrored those results found in the study. Only minor nuances, not found in the primary study, were presented by the assignment results. These minor findings are incorporated into and presented with the results.

3.4 - Interviews

Interviews were conducted with construction professionals that are "friends" of the University and with referrals provided by these construction professionals.

All interviews with construction professionals other than the architect-engineer (e.g., contractors, subcontractors, owners, consultants, the surety agent, and the attorney) were conducted in an open, non-structured fashion. That is, the general concepts were presented to the interview participants in an opening statement and notes were taken on the ensuing conversation. The general concepts presented at the beginning of each interview were risk, risk allocation through actual practice, onerous clauses, drawing quality and effect, and procurement reform. It was determined that an "open" approach

would be the most appropriate for these interviews as it would allow free flowing communication and would ensure that insights gained were the original ideas of the interviewed participants rather than ideas "framed" by the author.

The one interview conducted with an architect-engineer was completed to gain a design professionals perspective on procurement reform. It was determined that a series of specific questions borne from the results of other interviews would be most appropriate in this instance. A copy of the specific questions is included with the interview summary in Appendix B.

Of the twenty three subsequent interviews conducted after the initial interviews, two were conducted with participants from the initial interviews and three were conducted with the presenters of the seminar lectures. The remaining eighteen subsequent interview participants were new to the study.

3.5 - Data Analysis

Data from the documents review was gathered into a provisions database that includes multiple examples of each provision of interest. This data was then analyzed in conjunction with data from the interviews to gain specific insight into risk allocation through contract provisions. The provision review database is included as Appendix A. Results of this analysis are included in the following section.

Data from the interviews was gathered through the analysis of information obtained in each individual interview. A detailed summary of each interview and pertinent information from each seminar is presented in Appendix B. Specific insights and trends are summarized in the following Results section.

Chapter 4 - Results

4.1 - General Format

Research results related to risk allocation in contract provisions are presented first. Results for the provisions are presented in the following sections: intent and errors/omissions, changes, site investigations/unforeseen conditions, submittals and shop drawings, payments, warranty, and indemnification. Each section includes an introduction and findings.

Research results related to interviews are presented after the provisions results. Results for the interviews are broken into the following sections: areas of risk, current trends, recommendations for future risk allocation, effect of onerous provisions, and effect of design quality. Each section includes multiple subsections and each subsection includes an introduction and findings.

Conclusions reached after reviewing the results are included in Chapter 5.

4.2 - Provision Results

The information presented in this section was gleaned from the provisions review database, Appendix A. Appendix A represents the compilation of clauses gathered during the review of the forty-four different contract documents.

The definitions provided below clarify risk allocation techniques discussed in this section:

Risk acceptance: Risk acceptance is recognizing exposure to risk and choosing to maintain this exposure.

Risk avoidance: Risk avoidance is recognizing exposure to risk from a specific event and avoiding that event.

Risk transfer: Risk transfer is shifting exposure to risk from one party to another.

Risk sharing: Risk sharing is defined as accepting responsibility for defined elements of a specific risk and shifting responsibility for other elements of that same risk to another party.

4.2.1 - Intent and Errors/Omissions

Introduction:

Receiving a useable facility when construction is complete is the owner's primary goal. It is for this reason that owners, when drafting the contract, expend great effort to ensure that the execution of contract documents will provide a project that meets all functional requirements and all expectations.

Owners state that the intent and errors/omissions clauses ensure that contractors do not take advantage of patent errors in the documents and ensure that the finished project is complete and useable.

Findings:

Intent:

The contract provisions review indicated that intent clauses employ the risk transfer technique. Table 3 below details some common language found in the intent provision:

Table 3: Risk Allocation in the Intent Provision

	Common Language	Risk Allocation Technique	Purpose of Language
1	...best general practice is to prevail...	Transfer	Shift risk for ambiguous design
2	Contractor agrees that description of Work...is sufficient...	Transfer	Shift risk for incomplete design
3	...[perform work]...with the true intent...without any further expense...	Transfer	Shift risk for ambiguous design
4	Any Work...that may reasonably be inferred... to produce the intended result will be supplied...	Transfer	Shift risk for incomplete design

While the commonly accepted purpose of the intent clause is to protect the owner from claims due to patent ambiguities, a review of the documents and Table 3 indicates that an alternative purpose would be to shift the risk of any ambiguous or incomplete design to the contractor. The review also indicated that intent clauses are particularly onerous and provide little opportunity for contractor relief.

An example of a typical intent clause is provided below:

"Contractor agrees that the description of the Work to be performed is sufficient and understands that the Work must be completed in its entirety so that it is fully ready to perform its intended function and produce its intended results. Contractor agrees that everything necessary to accomplish this is included in the Contract, unless explicitly excluded on the drawings or in the specifications."

A review of this clause indicates that it allocates substantial risk for design completion to the contractor. The clause attempts to force the contractor to "agree" that the design is complete and unambiguous, even though the contractor had no control over the design and probably spent the minimum time reviewing the documents necessary to bid. The clear aim of this clause is to transfer design risk to the contractor.

Several clauses, in fact, required contractors to "warrant " the adequacy of design. The clause below provides an example of this risk transfer technique:

"By the act of submitting a bid for a proposed contract, the bidder warrants that:

(1) The bidder and all subcontractors he intends to use have carefully and thoroughly reviewed the plans, specifications, special provisions and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended."

Again, the sole purpose of this intent clause is to shift the risk for inadequate, uncoordinated design to the contractor. In this instance the owner expects the contractor to accept untold responsibility when having only reviewed the documents for patent conflicts.

Errors/Omissions:

The contract provisions review indicated that errors/omissions clauses vary significantly in their employed risk allocation technique. Table 4 summarizes these variations and presents some common language found in the errors/omissions provisions:

Table 4: Risk Allocation in the Errors/Omission Provision

	Common Language	Risk Allocation Technique	Purpose of Language
1	The various parts of the contract are intended to be complimentary	Transfer	Shift design risk
2	…[owner may correct]…any errors or omissions…when…necessary to bring out clearly the intention…indicated by a reasonable interpretation…	Transfer	Shift design risk
3	…[contractor] shall not be liable…for his failure to discover any conflict, error or discrepancy…	Accept	Accept design risk
4	Anything shown…in [the specifications or drawings]…shall be furnished…as if shown…in both…	Transfer	Shift design risk
5	In case of conflict, the work shall not proceed until a decision has been agreed upon by all parties concerned.	Share	Share design risk

Again, the commonly accepted purpose of an errors/omission clause is to protect against claims for patent ambiguities. Many common errors/omission provisions do not, however, read true to this purpose. For example, items 1 and 2 in Table 4 are from the same provision. They clearly shift the risk of an ambiguously drafted, uncoordinated document to the contractor. The full text of this clause is presented below:

> "The various parts of the Contract are intended to be complimentary to each other, but should any discrepancy appear, or any misunderstanding arise as to the import of anything contained therein, the explanation of the Engineer shall be final and binding. The correction of any errors or omissions of the Drawings and

> Specifications may be made by the Engineer, when such correction is necessary to bring out clearly the intention which is indicated by a reasonable interpretation of the Drawings and Specifications as a whole."

The fact that the effect of this clause is dependent on the owner's "reasonable interpretation" allocates substantial risk to the contractor. "Reasonable interpretation" is often a function of the parties position and is not an item that is easily bid (e.g., an owner's reasonable interpretation may be quite different from a bidding contractor's).

Item 5 details a clause that shares risk. The full text of this clause is presented below:

> "The intent of the contract documents is to provide everything necessary for the proper execution of the work. In case of conflict, the work shall not proceed until a decision has been agreed upon by all parties concerned."

This provision allocates risk in a much more reasonable fashion as it requires communication between the contracting parties and requires that the clarification and its effect be agreed upon.

4.2.2 - Changes

Introduction:

It is a fact that, in spite of the tremendous effort spent on design, changes to the design and the contract are inevitable. In Construction Contracts Hinze wrote, "The total elimination of changes to a design, while desirable, is not realistic in that the design phase would have to be extended considerably."

The events that must occur in the eventuality of a change are almost always choreographed by a "changes" provision. In fact, the very purpose of the changes clause is to allow the owner to add or delete work without being in breach of contract and to allocate risk among the contracting parties.

Findings:

Changes:

The provision review indicated that the changes clauses used by owners differs substantially. Table 5 presents a few of the risk elements found in a typical changes clause. Table 5 also demonstrates the multiple risk allocation techniques employed.

Table 5: Risk Allocation in the Changes Clause

		Common Language	Risk Allocation Technique	Purpose of Language
Rights	1	Anticipate that extra work might be necessary…	Share	Secure right to make changes
	2	The Contractor shall not perform any change…without a…written Field Directive…or …Change Order.	Avoid	Avoid payment for unauthorized work
Release	3	Each change…[is] final… with no reservations…allowing…additional money or time…	Share	Share risk of final settlement
Costs/Fee	4	…(15%) of the…field cost [will] be paid to…cover…profit, overhead, general superintendence and field office expense…	Share	Share risk of indirect costs
	5	Fee…allowed…for [contractor] overhead and profit shall be…a mutually acceptable fixed fee…	Share	Share risk of indirect costs
	6	…owned equipment [cost will not] exceed 85% of the equipment rental rates set forth in the …"Rental Rate Bluebook"…	Share	Share risk of direct costs
Timing	7	If Contractor fails to submit an estimate within fifteen (15) working days…, Contractor…[has] waived all claims for any adjustment…	Transfer	Transfer risk for timely pricing
	8	The approval… requires…(45) calendar days after submission...	Transfer	Transfer risk of long-lead approval

A review of Table 5 indicates that the very nature of changes is unsure and complicated. Items 1 and 2 control contractor and owner rights, item 3 dictates that once compensation for a change is agreed upon neither party can seek further relief, items 4

through 6 choreograph compensation, and items 7 and 8 dictate the timing of the process. Additionally, each item above has specific risk allocation ramifications. For example, on the surface, the "forty-five day approval" criteria presented in item 8 appears as if it transfers the risk of accurate long-lead pricing to the contractor. A possible result of this clause is, however, that the contractor will price the work at an extreme premium. If the change is priced at a premium and accepted by the owner, the contractor will have successfully shifted the risk of long-lead pricing back to the owner.

While each changes clause reviewed was found to be unique in its approach to risk allocation, all had some similarities. An example of a typical changes clause is provided below:

> "Without invalidating the Agreement and without notice to any surety, COMPANY may, at any time, order additions, deletions, or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Prior to issuance of any Written Amendment, Change Order, or Work Directive Change, the Change of Contract Price and/or Time shall be agreed upon by COMPANY and CONTRACTOR..."

A review of this clause reveals some of the risk allocation complexities contained in the changes clause. That is, this clause alone transfers and shares risk. The fact that work can be ordered without notifying the surety indicates that the risk of default and non-completion of changed work is shifted to the surety without even notifying the surety of the change. The fact, however, that agreement must be met prior to direction indicates that the owner is willing to share the risk of reaching a timely settlement.

No damage for delay:

Common sense says that if an owner's action delays the contractor, the contractor is entitled to compensation. The exact opposite is, however, often expressed in contracts.

That is, owners often try to shift the responsibility for even their delays to the contractor. Examples of this risk transferring technique are provided below:

1. "The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission of the City and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work, as provided for herein."

2. "Delays in delivery of District furnished materials or equipment shall not be cause for claims for extra cost for damages by the Bidder."

Clause 1 appears to share delay risk in that the owner is willing to extend the contract for a owner caused delay. This is, however, of little consequence to the contractor as it only ensures the owner cannot collect liquidated damages. The clause still does not allow the contractor to share the risk of inefficiency and economic loss brought on by the owner's delay.

Clause 2 is clear in its effect: the contractor will receive no relief, schedule or otherwise, for late material delivery by the owner. This clause uses risk avoidance. That is, the owner is unwilling to contractually acknowledge the risk of loss due to the owner's delay. The clause formally shifts the risk of timely completion to the contractor in spite of delays and no matter what the cause. It important to note that no damage for delay clauses are, in fact, illegal in some states.

Acceleration to meet schedule:

Timely completion is always a requirement of a construction contract. The clause included below demonstrates this fact.

"The Contractor shall provide an ample force of workmen and supervisors and provide sufficient construction equipment, tools and facilities to perform the Work at

> the rate of progress set forth in the Contract. Should the Contractor fail to maintain the rate of progress shown in the Contract, as supplemented by a construction schedule approved by the Purchaser, the Purchaser may give notice to the Contractor to initiate sufficient actions necessary to ensure that the Work is brought up to schedule and maintained there. Should the Contractor refuse or fail to take such actions, the Purchaser may proceed under the provisions of the paragraph herein entitled 'CANCELLATION BY THE PURCHASER FOR BREACH'."

This clause effectively allocates the risk of timely completion to the contractor. A risk allocation nuance important to note in this provision is, however, that it does not address how the contractor seeks relief in the event that they believe that the inadequate progress is due to the owner's action. The very fact that this point is unclear allocates additional risk to the contractor as they cannot be sure at bid time how this clause will be administered.

4.2.3 - Site Investigations/Unforeseen Conditions

Introduction:

In construction contracting it would be ideal if all site conditions were known and provided to contractors at bid time. Such a scenario would allow fair bidding and ensure that the owner is paying for actual value received. This ideal scenario cannot, however, be met. It would take a monumental effort to prepare contracts including every eventuality. Such an effort is cost prohibitive.

It is for this reason that site investigation and unforeseen condition clauses exist. These clauses require contractors to complete their own site investigations and allow contractor compensation in the event that a condition is materially different from what could have been expected.

Findings:

Site investigation/existing conditions:

The contract provisions review indicated that the site investigation clause typically transfers risk from the owner to the contractor. Table 6 below details some common language found in site investigation provisions.

Table 6: Risk Transfer through the Site Investigations Provision

	Common Language	Risk Allocation Technique	Purpose of Language
1	CONTRACTOR ...has visited the job site, … familiarized itself with the local conditions… correlated its observations… verified locations of structures…and observed no obstructions…	Transfer	Shift risk for design inaccuracy
2	All underground water, gas…shown…are only approximate in their locations.	Transfer	Shift risk for design inaccuracy
3	No allowance will be made…for any extra…on account of…discrepancies… foreseen by a…proper inspection of the site.	Transfer	Shift risk for design inaccuracy
4	…information is not guaranteed…but is made available…for whatever value it may have.	Transfer	Shift risk for design inaccuracy
5	Incompleteness or error…shall not be cause…for extra payment.	Transfer	Shift risk for design inaccuracy
6	…Contract prices are based on …[Contractor] knowledge and judgment…not upon any representation of the owner…	Transfer	Shift risk for design inaccuracy

Owners maintain that the purpose of the site investigation/existing condition clause is to protect against a contractor who may take advantage of a patent defect in design. A review of the provisions, Appendix A, and Table 6 indicates, however, that another purpose of the site investigations clause is to shift the risk for design inaccuracy to the contractor.

The provision below, while quite onerous, was found to be typical example of a site investigation/existing condition clauses.

> "It is expressly understood and agreed that the Department assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigation thus made, the records thereof, or of the interpretations set forth therein or made by the Department in its use thereof. There is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations or records thereof are representative of those conditions existing throughout such areas, or any part thereof, or that unlooked for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered."

The goal of this provision is clear: hold the owner blameless for design inaccuracy and shift the responsibility for existing conditions to the contractor.

A couple of clauses in which the owner took some responsibility for existing conditions were found. An example of such a clause is provided below. This clause demonstrates risk acceptance by the owner for existing utilities:

> "Water lines, gas lines, sewer lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense..."

It should also be noted that a few of the contracts made no mention of site investigations. The owner, in such instances, is truly vulnerable to differing site conditions claims.

Unforeseen site conditions:

The contract provisions review indicated that risk allocation in unforeseen site condition clauses differs materially. Table 7 below details some common language found in the unforeseen site conditions clause and addresses some of the risk allocation techniques employed.

Table 7: Risk Allocation through the Unforeseen Site Condition Clause

		Common Language	Risk Allocation Technique	Purpose of Language
Change	1	If the Engineer determines… materially different [conditions] cause an increase ... in the cost… an equitable adjustment shall be made…	Share	Share risk for unforeseen condition
Owner Acceptance	2	…[if] conditions [differ] materially from ... the Contract Documents … the owner will obtain … additional surveys and tests …	Accept	Accept exploration risk for unforeseen condition
Notice	3	No claim… shall be allowed unless Contractor has given immediate notice … and confirmed such notice … within ten (10) days of discovery.	Transfer	Transfer risk for untimely notice
	4	… written notice of such conditions within 2 working days … and shall not disturb such conditions until authorized by an FCO.	Transfer	Transfer risk for untimely notice

A review of the provisions indicated that most owners chose to share risk for conditions that "differ materially" from those reasonably expected. They share risk by promising an equitable adjustment for the changed condition if prompt notice is given and the condition goes undisturbed prior to owner's review, see items 1, 3 and 4 above. One owner even chose to accept the exploration risk for the unforeseen condition, see item 2 above.

A typical unforeseen site condition clause is provided in full text below:

"The CONTRACTOR shall promptly notify the DIVISION in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The DIVISION will promptly investigate

those conditions and if further surveys or subsurface tests are necessary, shall obtain the necessary additional surveys and tests and furnish copies to the CONTRACTOR. If the DIVISION finds that the results of such surveys or tests indicate that there are subsurface or latent physical conditions which differ materially from those intended in the Contract Documents, and which could not reasonably have been anticipated by the CONTRACTOR, a Change Order shall be issued incorporating the necessary revisions."

The intended effect of this clause is to share risk. Actual risk allocation will depend, however, on how each party defines a "reasonably" unanticipated condition.

4.2.4 - Submittals and Shop Drawings

Introduction:

The purpose of a submittal or shop drawing is twofold: first, it serves as a means for the contractor to coordinate and plan work and second, it serves as communication between the owner and contractor that the project being built meets the specifications. Submittal and shop drawing clauses dictate how contractors will communicate contract performance to the owners during construction.

Findings:

The contract provisions review indicated that design and coordination risk is transferred to the contractor through the submittal and shop drawing provision. Table 8 details some language and risk allocation techniques common to the submittal and shop drawing clause:

Table 8: Risk Allocation through the Submittal and Shop Drawings Clause

		Common Language	Risk Allocation Technique	Purpose of Language
Review	1	… [owner] will review and approve with reasonable promptness …	Transfer	Transfer risk for "reasonable" review
	2	… every effort to expedite … review [will be made], but … [owner] not responsible for any delays …	Transfer	Transfer risk for untimely review
Approval	3	The approval … shall be general and shall not relieve … adherence to the Contract …	Avoid	Avoid risk for coordination accuracy
Level of Detail	4	The drawings shall be finished plans, … neat, legible…	Transfer	Transfer risk for design
	5	… plans shall be supplemented by such working drawings … necessary to adequately control the work.	Transfer	Transfer risk for design coordination
	6	Working drawings shall be furnished … as required for the completion of the work.	Transfer	Transfer risk for design and coordination
	7	… as … necessary to control adequately the work and its prosecution.	Transfer	Transfer risk for design and coordination

A review of the provisions indicated that the submittal and shop drawing clause allocated more than just contract conformance and design coordination risk to the contractor. The review also indicated that much of the language leans towards the requirement to complete the design. Table 8 demonstrates this point. The phrases that require contractors to furnish "finished plans", "drawings … required for completion", and plans to "control … prosecution", while non-specific, lend themselves to the interpretation that contractors must do whatever is required to supplement the design such that the project can be completed. Such an interpretation would likely conflict with a contractor's interpretation. In final design procurement a contractor would likely assume construction coordination. They would not, however, be willing to assume costs beyond what they consider to be a coordination effort.

Table 8 also shows that phrases in the submittal and shop drawing clause typically transfer risk. There were, however, elements of the reviewed clauses that avoided risk, see item 3.

Substantial risk is borne from owner submittal review time as detailed by items 1 and 2. Both items 1 and 2 are ambiguous and do not state a clear time period for submittal review. Ambiguous language such as this transfers risk to the contractor as the owner will determine the intent of such phrases as "reasonable promptness." A prudent owner may state the exact time of review so that expectations and responsibilities of contractual parties are clear. An example of clear review period language is included below:

> "In no case shall the Contractor's submittal schedule allow less than fourteen (14) days for Owner's review."

Two clauses are presented in full text below. The first clause, while brief, represents an example of a shop drawing clause that is clear and only requires contractor design coordination. The second clause is much more onerous and is unclear in its effect. The second clause is open to multiple interpretations and, as such, allocates more risk to the contractor. The first clause would likely be preferred by the contractor because of clarity and clear effect.

1. "The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction, and the like to enable the DIVISION to review the information as required."

2. "The plans will be supplemented by working drawings as necessary to adequately control the work. Working drawings shall be furnished by the Contractor as required for the completion of the work. Except where otherwise specified, working drawings shall be approved by the Engineer but such approval will not relieve the Contractor of any of his responsibility. Working drawings shall not be considered as plan changes and any conflicts on working drawings,

whether approved or not, shall not supercede the requirements of the original plans and specifications."

4.2.5 - Payments

Introduction:

The manner in which a payment for construction progress is orchestrated helps determine a contractor's aggregate project risk. It determines risk by dictating subcontractor payment, influencing material ordering and delivery, and it controls cash flows. All of these items effect contractor solvency.

Findings:

There are multiple risk elements found in payment clauses. Some of the more common elements include frequency of payment, retention, lag time between payment request and actual payment, payment for delivered material that is not installed, timeliness of final payment, and final release. Table 9 details language and risk allocation techniques for these elements.

Table 9: Risk Allocation through the Payments Clause

		Common Language	Risk Allocation Technique	Purpose of Language
Frequency	1	Progress payments shall be issued monthly.	Share	Share risk of financing
	2	Semi-monthly [payments] may be rendered …	Share	Share risk of financing
	3	…from time to time as work progresses …	Avoid	Avoid strict payment schedule
Retention	4	… reserving ten percent thereof …	Transfer	Transfer risk for non-conformance
	5	… withhold … amount as determined necessary to protect the City's interest …	Transfer	Transfer risk for non-conformance
Lag Time	6	[Owner] will, not later than 30 days after receipt of Application… either pay …or reject …	Transfer	Transfer risk of timely payment
	7	... paid … on or before the 30th day of the month following ...	Transfer	Transfer risk of timely payment
	8	… within ten days after receipt of each Application … [owner will] either pay … the amount submitted, or return the Application …	Share	Share risk of timely payment
Delivered Material	9	… [payment] may include nonperishable materials delivered ... or stored …	Share	Share risk for delivered material
	10	… [payment] will not include … materials or equipment … awaiting installation.	Avoid	Avoid risk for delivered material
Final Payment	11	…(60) days after date of [owner] making the final estimate.	Share	Share risk of timely payment
	12	… (30) days from the date of receipt of …[final] invoice,	Share	Share risk of timely payment
Release	13	Acceptance by Contractor of final payment shall constitute a release and waiver of all claims …	Avoid	Avoid risk of claim or lien

All of the elements included above represent substantial risk to the contractor and owner.

Table 9 demonstrates that owners have multiple theories on what frequency of payment is appropriate. Item 1 details the typical provision of monthly payments. A clause that enables more frequent payment, see item 2, would probably be preferred by contractors as less contractor financing for completed work would be required. Item 3 allocates substantial risk to the contractor as cash flow is uncertain and depends on the owner's interpretation of payments made "from time to time."

The provision review demonstrated that multiple theories on retention exist, see Table 9. The review indicated that the purpose of retention is to transfer the risk of non-conformance to the contractor. Retention amounts found in the review ranged from 2.5% to 10%, with 10% being typical. A retention technique open to interpretation is one which states that the owner will withhold enough money to "protect their interests," (see item 5, Table 9). Contractor risk and cash flow is dependent on how the owner prices their "interests" (e.g., retention may range from $0 to 20%).

Specifying invoice processing time transfers risk to the contractor. The timeliness of the process, however, determines the amount of risk transferred. The provision review indicated that payments are made from ten days after invoice receipt, item 8, to ninety-three days after owner approval. The "ten days" scenario indicates an owner is willing to accept some risk for timely payment while the "ninety-three day" scenario transfers considerable cash flow risk to the contractor.

Risk allocation for delivered equipment ranged from shared risk (e.g., owner pays for delivered equipment to improve cash flow) to transferred risk (e.g., contractor cannot be paid until material is incorporated), see items 9 & 10, Table 9. It should be noted that the owner may, in fact, be accepting additional risk by not paying for delivered material. Such a policy could effect contractor solvency and their ability to complete the work.

Final payment and final release are often integral contract elements. Table 9, item 13, demonstrates that owners hope to avoid claims and lien risks by stating that final release from the contractor is executed upon contractor acceptance of final payment. This clause forces contractors to choose between immediate cash flow and additional claims for further compensation. The contractor's choice in this dilemma determines the actual

risk for each party. Time for final payment ranged from 30 days after invoice receipt to the end of the statutory lien period.

In isolated instances owners were willing to share final payment risk by agreeing to pay interest to contractors if tardy final payment and retainage release occurred because the owner did not accept the project in a timely fashion. Typical language is provided below:

> "Should such final acceptance not be made within 120 days after completion of the Work, the [owner] will pay the Contractor an interest charge on the amount retained ... beyond said 120 days that the retained amount is withheld."

> A typical payments clause is included below:

> "Progress payments shall be issued monthly. In making progress payments, retention shall be withheld so that total progress payments shall at no time exceed ninety percent (90%) of the value of the Work performed, as estimated by Owner, unless otherwise specified in the Contract. Retention shall not be withheld from payments for extra work, reimbursable costs, reimbursement for surety bond premiums, or reimbursement for authorized escalation."

A review of this clause reveals that it employs both risk sharing and risk transferring techniques.

4.2.6 - Warranty

Introduction:

A contract warranty generally serves two purposes: 1) ensures that the "product" delivered conforms to the contract, and 2) by mandating a warranty maintenance period it ensures that an owner will not have to expend additional funds to meet original contract requirements.

Findings:

Warranty clauses allocate the risk of non-conformance and faulty workmanship to the contractor. Owners are willing to pay for warranty maintenance periods to insure against the acceptance of defective work.

Example warranty clauses are included below.

1. "Contractor warrants that the Work shall be: (a) provided in accordance with the Specification and other requirements of the Contract Documents; (b) in accordance with standards of care, skill and diligence consistent with recognized and sound industry practices and procurements; (c) free from faulty design (to the extent of Contractor's design responsibilities) and workmanship; (d) new materials (if furnished by Contractor hereunder) free from faults and defects and of proper size, quality and material to meet the requirements of the Contract Documents; and (e) conveyed with free and clear title.

2. "Contractor, at its own expense, shall promptly repair, replace or otherwise cure all materials, equipment or Work (including payment for labor associated with such repair, replacement or other cure and removal and installation charges) which fails to conform to or requires repair, replacement or other cure as a result of nonconformance to the aforesaid warranties in any respect if such failure occurs or is discovered during the progress of Work or within eighteen (18) months after Commercial Operation, however, the warranty period shall not extend beyond thirty (30) months from the completion of erection. The warranty covering any part of the materials, equipment or Work that shall be replaced, repaired or otherwise cured by Contractor under the above conditions shall be reinstated to the expiration date of the original warranty or one (1) year after said replacement, repair or other cure whichever period shall expire last, however, no warranty will extend beyond thirty-three (33) months from the initial operation.

Notwithstanding the above, there shall be no time limitations on Contractor's warranty of free and clear title."

Clause 1 is a "product" warranty clause. This example was found to be typical. In fact, the provision review indicated that such clauses are nearly uniform in their wording. Such a clause is not particularly onerous as it only requires new material and contract conformance.

Typical warranty maintenance periods are one year. Clause 2 above was found to be particularly onerous as the maintenance period may extend up to thirty-three months. This clause represents extreme risk for the contractor as ramifications range from tying up bonding capacity to administration by the owner as a maintenance program. Clause 3 below is an example of a typical maintenance period warranty provision.

3. "The warranty period for discovery of Defective Work shall commence upon Acceptance and continue for the period set forth in the Specifications or for one year if not so specified. If, during the warranty period, the Work is not available for use due to Defective Work, such time of unavailability shall not be counted as part of the warranty period. The warranty period for corrected Defective Work shall commence upon Acceptance of such corrected Work and shall continue for a duration equivalent to the original warranty period."

The provision review indicated that most contracts allow owners to complete warranty work and back charge the contractor, see clause 4 below. Such a clause transfers the risk of timely warranty response to the contractor.

4. "If the Contractor, after notice, fails to proceed promptly to remedy any failure to meet any of the warranties set forth herein, the Purchaser may remedy such failure, or have such failure remedied by others, and the Contractor shall be liable for all expenses incurred."

Two additional areas encountered that produced substantial risk for contractors were unspecified warranty lengths and ambiguous warranty start dates. Several of the contracts included a product warranty clause such as Clause 1 above but did not state the length of the warranty period. In such an instance it is almost certain that the expected warranty period by the owner will differ from that envisioned by the contractor. Warranty start dates were often ambiguous as the true start date was not defined by the contract. Warranty start dates included the date of substantial completion, final payment, first commercial operation, and the completion of service. In multiple instances, however, terms such as "first commercial operation" and "completion of service" were not clearly defined by the contract and left to interpretation. There is substantial risk of dispute when ambiguous warranty start dates are part of the contract.

4.2.7 - Indemnification

Introduction:

Indemnification clauses aim to shift liability from the owner. They attempt to hold the owner "harmless" from negligence that ranges from contractors to their own.

Findings:

A review of the documents indicated that the preponderance of indemnification clauses were limited in coverage. That is, the owner accepted the risk for owner negligence, contributory or otherwise, but allocated all other negligence liability to the general contractor. A typical limited indemnification clause is provided below.

> "The Contractor shall undertake the work as an independent Contractor at his sole risk and shall protect and indemnify the [Owner] and hold it harmless from any and all claims and causes of action arising out of any injury, including death, or damage to property sustained by any person as a result of the execution of the Work to be performed by the Contractor or of any of the activities of the Contractor, his employees, or of any Subcontractor or his employees."

Several instances of intermediate indemnification were found. Intermediate clauses minimally share the risk of negligence with the contractor as the owner will accept responsibility for sole owner negligence but is unwilling to accept liability for contributory or contractor negligence.

Isolated instances of broad indemnification were found. Broad indemnification is quite onerous in that it seeks to transfer all liability to the contractor, no matter which party is at fault. While the enforceability of such clauses is in question, they are used.

The most interesting finding was that some owners took the opportunity to indemnify themselves from third party suits in product warranty clauses, as noted in the following provision:

> Contractor warrants that all goods and/or services provided by it shall: (a) be of good quality and workmanship and free from defects, latent or patent, (b) conform to all specifications, drawings and descriptions of the Contract, (c) be merchantable, suitable and sufficient for the intended purpose, (d) be in accordance with standards of care, skill and diligence consistent with recognized and sound engineering and construction practices and procedures, and (e) be free of any claim of any third party. (Emphasis added)

Such a clause is particularly onerous as indemnity is not typically contained in a warranty clause. The likelihood of this requirement going unnoticed and unbid is, therefore, increased.

4.3 - Interview Results

The information presented in this section was gleaned primarily from four initial interview summaries, three seminar summaries, and the twenty-three subsequent interview summaries contained in Appendix B.

4.3.1 - Areas of Risk

4.3.1.1 - Document Quality

Introduction:

In Construction Contracts Hinze wrote, "Construction contract documents play an important role in the development of a project. They provide the bridge between the owner's conceptual image of a project and the actual construction of the physical facility. This vital link is provided by project designers: architects, engineers, or both."

Logic follows that the quality of this "vital link" will be a principle determinant of the inherent risk. This point cannot be made too strongly in the case of construction contract documents. That is, the quality of construction contract documents determines if an owner's expectations are met, effects contractor planning and project execution, and often dictates project success.

Findings:

Many of the general contractors interviewed, one owner, and one subcontractor specifically mentioned construction contract document quality as a source of risk in construction. Document risk was most often characterized as risk due to incomplete design or risk due to poorly detailed and coordinated drawings. See Table 10.

Table 10: Quality of Documents as a Risk Determinant

	Participant # and type	Typical Cust. & Proc.	Document Quality
1	1 (GC)	P/LB	1, 2
2	2 (GC)	P/LB	1, 2, x
3	3 (GC)	P/LB	1, 2
4	4 (GC)	A/NEG	1, 2
5	6 (GC)	A/D-B	
6	7 (GC)	P/LB	2, x
7	8 (GC)	P/LB	x
8	9 (GC)	P/A/LB	1, 2
9	12 (GC)	A/NEG	2
10	14 (GC)	P/LB	1,2
11	15 (GC)	P/LB	1
12	16 (GC)	P/LB	1
13	21 (GC)	A/NEG	
14	23 (GC)	A/NEG	x
15	5 (SUB)	A/LB	
16	17 (SUB)	P/LB	
17	18 (SUB)	P/LB	
18	20 (SUB)	A/NEG	x
19	10 (CON)	NA	
20	11 (CON)	NA	
21	13 (OWN)	LB	
22	24 (OWN)	LB	1, 2
23	19 (SURE)	NA	1, 2
24	22 (ATT)	NA	
25	25 (A/E)	NA	

Abbreviations and Codes:

A = private
A/E = architect/engineer
ATT = attorney
CON = consultant
D-B = design/build
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

Document Quality:

1 = incomplete
2 = poorly detailed
x = general mentioning

A review of Table 10 indicates that of the fourteen general contractor representatives interviewed, eight felt that "incomplete" contract documents was a substantial risk area, eight felt that "poorly" detailed documents represented substantial risk, and twelve of the fourteen general contractors interviewed noted a relationship between document quality and how risk is assumed by contractual parties. In fact, the only two general contractors

that did not list document quality as an area of risk concentrated their efforts in private negotiated work and private design/build work.

A further review of Table 10 indicates that of nine general contractor participants that do public work, all felt that document quality in some form was a determinant of how risk is allocated between contractual parties.

It should also be noted that of the four subcontractor's interviewed only one specifically mentioned document quality as an area of risk.

4.3.1.2 - Onerous Contract Administration

Introduction:

Completion of a construction project requires that three basic contractual parties interact: the owner, the contractor, and the designer. Additionally, it is common knowledge that the behavior of any one party greatly influences the exposure to risk experienced by the other parties.

Findings:

Interviews with the construction professionals indicated that multiple areas of risk are borne from the manner in which a construction contract is administered. See Table 11.

Table 11: Areas of Risk from Onerous Contract Administration

	Participant # and type	Typical Cust. & Proc.	Onerous Admin.
1	1 (GC)	P/LB	5
2	2 (GC)	P/LB	1, 4
3	3 (GC)	P/LB	4, 6
4	4 (GC)	A/NEG	6
5	6 (GC)	A/D-B	
6	7 (GC)	P/LB	1,2
7	8 (GC)	P/LB	
8	9 (GC)	P/A/LB	2, 4
9	12 (GC)	A/NEG	
10	14 (GC)	P/LB	4
11	15 (GC)	P/LB	4
12	16 (GC)	P/LB	
13	21 (GC)	A/NEG	
14	23 (GC)	A/NEG	
15	5 (SUB)	A/LB	
16	17 (SUB)	P/LB	3
17	18 (SUB)	P/LB	4
18	20 (SUB)	A/NEG	x
19	10 (CON)	NA	
20	11 (CON)	NA	1,3
21	13 (OWN)	LB	
22	24 (OWN)	LB	1
23	19 (SURE)	NA	
24	22 (ATT)	NA	
25	25 (A/E)	NA	

Abbreviations and Codes:

A = private
A/E = architect/engineer
ATT = attorney
CON = consultant
D-B = design/build
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

Onerous Contract Administration:

1 = owner non-responsibility for design, no "drawing ownership"
2 = inexperience, lack of construction knowledge
3 = non-recognition of changes or improper clause interpretation
4 = unreasonable expectations (maximum "intent", finish design in field: RFIs, etc.)
5 = "micromanage" process
6 = over administration of shop drawing rqmt.
x = general mentioning

A review of the data above reveals the following statistics:

- one contractor and one owner viewed the owner not taking responsibility for the design documents as a means in which risk is allocated,

- two general contractors stated that owner inexperience and lack of construction knowledge shifted risk to the contractor,
- a consultant and a specialty subcontractor stated that owners not recognizing changes and improper clause interpretation allocates risk unfairly to the contractor,
- four general contractors stated that an owner with unreasonable expectations shifts risk to the contractor,
- one general contractor stated that owners that micromanage and strictly control contract processes add risk to the construction effort,
- and two general contractors stated that "over administration" of vague contractual shop drawing language shifts risk to the contractor.

4.3.1.3 - A/E "Ego"

Introduction:

"Ego" is defined as the inner drive that requires an individual to strive to fulfill self serving needs rather than the goals of a group or team. It is clear that individual "egos," when placed above construction team goals, will greatly effect the construction process.

Findings:

Three general contractors stated that project designers with "self serving" attitudes add particular risk to the construction process. See Appendix B, Table 1.

4.3.1.4 - Onerous Provisions

Introduction:

Contract clauses that shift the preponderance of risk to the contractor are said to be onerous. Such clauses have an obvious impact on projects as they clearly influence behavior from project bidding to project completion.

Findings:

Three general contractors and one owner stated that the intent and errors/omissions clauses present in most contracts effect actual risk allocation. One general contractor, one consultant, and one specialty subcontractor stated that specifications that require

impossible criteria, rigid time frames, or untried construction technology shift unreasonable risk to the contractor. One general contractor stated that design or prescriptive type specifications could be a source of substantial risk as they are rigid and do not allow the contractor to make decisions that ease construction and aid productivity. This same contractor also noted that design specifications are often poorly thought out and, as such, the owner runs the risk of having systems installed that do not even meet the functional intent of the contract. Finally, one general contractor and two specialty subcontractors stated that exculpatory language with hidden agendas and multiple interpretations represented significant risk to contractual parties during project completion. See Appendix B, Table 1 for the tabulated results.

4.3.1.5 - Acceptance of Basic Responsibility

Introduction:

Accepting responsibility for an action or inaction is at the core of risk allocation in actual practice. In fact, in construction contracting basic responsibilities are particularly important as timely, cost effective project completion relies on each party understanding and accepting their responsibilities. Basic responsibilities in construction contracting are often described as follows: 1) owner: scope and design, 2) designer: design and function, and 3) contractor: project construction and completion.

Findings:

Four general contractors, one consultant, one specialty subcontractor, and one owner stated that a primary determinant of how risk is actually allocated between parties is whether or not all contractual parties are willing to accept their basic, or "core" responsibilities. See Appendix B, Table 1 for the tabulated results.

4.3.1.6 - Procurement Type

Introduction:

It has been a long-standing argument that the manner in which construction projects are procured has great bearing on how risk is allocated between the contracting parties.

Examples of procurement techniques that possibly influence risk allocation are low-bid, design/build, negotiated procurement, construction manager/general contractor, etc..

Findings:

A review of the interviews revealed that some participants equated risk allocation with procurement type. Specifically, participants indicated that low-bid contracting allocates unreasonable risks to the contractor or that design/build procurement presents unique risk allocation challenges. See Table 12 for tabulated data.

A review of the data indicates that eight of the fourteen general contractor participants stated that contractor risk is increased in the construction process when the low-bid procurement system is used. It should also be noted that six of these eight general contractor participants specialized in public low-bid procurement. The other two general contractor participants specialized in either private negotiated work or private design/build procurement.

It is interesting to note that two specialty subcontractors and one general contractor specifically stated that special risk is borne from design/build procurement.

Table 12: Risk as a Function of Procurement Method

	Participant # and type	Typical Cust. & Proc.	Procurement Type
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	1,3
3	3 (GC)	P/LB	1,2
4	4 (GC)	A/NEG	
5	6 (GC)	A/D-B	1,3
6	7 (GC)	P/LB	1
7	8 (GC)	P/LB	1
8	9 (GC)	P/A/LB	1, 3
9	12 (GC)	A/NEG	
10	14 (GC)	P/LB	
11	15 (GC)	P/LB	1, 3
12	16 (GC)	P/LB	
13	21 (GC)	A/NEG	
14	23 (GC)	A/NEG	1
15	5 (SUB)	A/LB	2
16	17 (SUB)	P/LB	2
17	18 (SUB)	P/LB	
18	20 (SUB)	A/NEG	
19	10 (CON)	NA	1
20	11 (CON)	NA	1
21	13 (OWN)	LB	
22	24 (OWN)	LB	1
23	19 (SURE)	NA	
24	22 (ATT)	NA	
25	25 (A/E)	NA	

Abbreviations and Codes:

A = private
A/E = architect/engineer
ATT = attorney
CON = consultant
D-B = design/build
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

Procurement Type:

1 = low bid adds risk
2 = D/B adds risk
3 = Type determines contractor risk

4.3.1.7 - Work Type

Introduction:

It is true that inherent hazards and risks exist in specific types of work being completed. In construction, for example, the work being completed will often vary in its

sensitivity to the effect of weather, the effect of specific strikes, the effect of existing conditions, etc..

Findings:

One owner and one general contractor specifically stated that the type of work being performed influences the risk allocated to each party (see Appendix B, Table 1).

4.3.1.8 - Market Dependent

Introduction:

Groups and organizations take on "personalities" and establish business practices that differ materially from others completing the same type of work. For example, it is reasonable to expect a government agency administering construction to behave differently than a private developer administering similar construction based simply on the source of project funds (e.g., tax dollars vs. personal revenue or private loans.)

Findings:

Four general contractors and one consultant stated that the amount of risk borne in the construction process is market dependent. That is, they all stated that the public arena allocated substantially more risk to the contractor than did the private market (see Appendix B, Table 1).

4.3.1.9 - Function of Scope

Introduction:

Scope in a construction project is defined as the physical representation of final expectations. The amount of clarity achieved in this physical representation is the primary determinant of contract document quality. It has long been assumed that in construction the responsibility for this scope and clarity lies with the owner.

Findings:

Four general contractors and one owner stated that actual risk allocation is a function of how well a project is scoped. They all stated that meeting an owner's final

expectations is dependent on the true scope "expressed" by the contract documents, not intent. See Appendix B, Table 1 for tabulated results.

4.3.1.10 - Miscellaneous Areas

Introduction:

Untold areas of risk exist in construction contracting. As such, risk type and risk allocation is often project specific, owner specific, based on existing conditions, based on accuracy of geotechnical information, based on implemented safety programs, etc..

Findings:

The following statistics present some of the miscellaneous areas of risk discussed in the interviews: one general contractor stated his firm saw substantial risk in the completion of warranty work (e.g., the contractor stated that often owners request building maintenance under the guise of the warranty and stated that his firm is inclined to do much of such work as they deal with repeat customers); one subcontractor stated that substantial risk is shifted to a subcontractor when general contractor "whole project" insurance is required (e.g., the safer contractor looses a potential competitive edge over less safety conscious contractors as the general is responsible for all insurance costs which, in turn, forces "tighter bids" with less profit); two general contractors and one subcontractor stated that actual project risk largely depends on the quality of geotechnical information provided; a general contractor and the surety stated that sociological programs such as the minority/women owned business enterprise (MWBE) program adds substantial construction risk to a project (e.g., MWBE organizations were said to be less experienced and often financially lacking as they are typically emerging firms or niche firms that are not forced to compete on the same level as other contractors); effective implementation of safety programs was said to be an area of risk and an area to control risk in actual practice by one subcontractor and one surety; two general contractors and the attorney stated that projects with multiple changes is an area of risk as such projects markedly effect the goods of all parties; and the surety stated that the force of

indemnification clauses is still largely undefined and that this effects actual project risk, see Appendix B, Table 1.

4.3.2 - Current Trends

4.3.2.1 - "Poorer" Document Quality

Introduction:

As stated previously, the contract documents provide the "bridge" between the owner's expectation and the final product. Common sense says that the quality of this "bridge" will greatly effect project completion as it determines if an owner's expectations are met and, to a large extent, how much contractor effort it will take to meet that expectation.

Findings:

A review of the interview results indicated that many of the participants saw a trend towards "poorer" quality documents. This "poorer" quality was manifested through unbuildable details, poorly coordinated drawings, the replacement of details with complicated schedules, etc. In fact, thirteen of the twenty-five participants stated that the quality of contract documents was decreasing when compared to design products of the past. Additionally, eight of the fourteen general contractor participants interviewed recognized this trend. The most significant finding was that six of the nine general contractors specializing in public, low-bid work recognized this trend (see Table 13).

Table 13: "Poorer" Document Quality as Noted by Public/Low-bid General Contractors

	Participant # and type	Typical Cust. & Proc.	Poorer Doc. Quality
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	x
3	3 (GC)	P/LB	x
4	7 (GC)	P/LB	x
5	8 (GC)	P/LB	
6	9 (GC)	P/A/LB	x
7	14 (GC)	P/LB	x
8	15 (GC)	P/LB	
9	16 (GC)	P/LB	x

Abbreviations and Codes:
A = private
GC = general contractor
LB = low bid
P = public

4.3.2.2 - Incomplete Design

Introduction:

Construction designs can be completed to varying degrees. Levels of design include the following: 1) schematics, 2) elevations showing major finishes and aesthetics, 3) 30% design documents to include major finishes and core electrical and mechanical systems, 4) 60% design documents to include all finishes, core electrical and mechanical systems as well as lighting and specific mechanical systems for each room or area, and landscaping, and communication systems, and 5) 100% or final design to include all systems, representations, details, and information necessary to construct and coordinate the project completion.

Findings:

Many of the interview participants stated that there is a trend towards the production of incomplete "final design" bid documents with the assumption that the contractor will "complete" the design in the field through shop drawings, requests for information (RFIs), and submittals. Appendix B, Table 2 indicates that twelve of the twenty-four non-designer interview participants noted this trend and that seven of the fourteen general contractor participants noted this trend. Additionally, five of the nine public/low-bid contractor participants noted this trend (see Table 14).

Table 14: Trend of Incomplete Design as Noted by Public/Low-bid General Contractors

	Participant # and type	Typical Cust. & Proc.	Incomplete Design
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	x
3	3 (GC)	P/LB	x
4	7 (GC)	P/LB	x
5	8 (GC)	P/LB	
6	9 (GC)	P/A/LB	x
7	14 (GC)	P/LB	
8	15 (GC)	P/LB	x
9	16 (GC)	P/LB	

Abbreviations and Codes:

A = private
GC = general contractor
LB = low bid
P = public

4.3.2.3 - Clause "Abuse"

Introduction:

The aim of many contract clauses is to provide a means for contractors to recover funds for unexpected, unbiddable events. Examples of such clauses include "changes" and "differing site conditions". The purpose of such clauses is two-fold in that they allow contractors to be reimbursed for work that could not be anticipated at bid time and they allow the owner to pay fair market value for extra work rather than having the contractor bid the work at a premium contingency price.

Findings:

One consultant and one general contractor specifically stated that owners are "abusing" their rights under the contract by not recognizing the validity of changes and differing site conditions during construction. It should also be noted that while others did not specifically note this trend ten of the remaining twenty-three interview participants did note onerous administration, owner unwillingness to take responsibility for design, owner inexperience, improper clause interpretation by owners, and unreasonable owner expectations (see Appendix B, Table 1, column a).

4.3.2.4 - Impossible Specifications

Introduction:

It is often argued that owners and designers design to unnecessarily conservative or even impossible standards. Such a practice, if it is occurring, is obviously counter productive as design changes would be inevitable and these changes would likely impact project completion.

Findings:

Two general contractors and one specialty subcontractor noted that there was a trend towards "tighter" specifications with impossible criteria. An interesting note is that two of these contractors, one general and the sub, related this trend specifically to concrete design. The general contractor stated reinforcement bar configurations were becoming so tight and conservative that concrete placement in these configurations is often impossible. The subcontractor stated that there is trend towards impossible flatness criteria specifications that are not necessary. The subcontractor speculated that this practice was a direct result of designers not completing proper research and are over-designing for the true requirement.

4.3.2.5 - Unreasonable Owner Expectations

Introduction:

Expectation is the force that drives a construction project from conception to completion. That is, the entire purpose of a construction project is to meet the owner's expectations and ensure the constructed facility functions as required.

Findings:

Five general contractors, one subcontractor, and both consultants stated that there is a trend towards owners having unreasonable expectations. Such expectations ranged from quality of product to design completion in the field. An important finding is that all six of the contractors who noted this trend specialize in public/low-bid construction work (see Table 15).

Table 15: Trend of Unreasonable Owner Expectations

	Participant # and type	Typical Cust. & Proc.	Unreasonable Expectations
1	2 (GC)	P/LB	x
2	3 (GC)	P/LB	x
3	9 (GC)	P/A/LB	x
4	15 (GC)	P/LB	x
5	16 (GC)	P/LB	x
6	18 (SUB)	P/LB	x

Abbreviations and Codes:
A = private
GC = general contractor
LB = low bid
P = public
SUB= subcontractor

Another important result is that both consultants interviewed felt there was a trend towards unreasonable expectations by the owners. One consultant worked primarily with contractors doing low-bid work and the other consultant worked primarily for owners using low-bid procurement.

4.3.2.6 - Voluminous Design

Introduction:

It is common knowledge that owners continually attempt to make contracts more sophisticated. Some would argue, in fact, that an owner's primary focus in contracting is to ensure that every eventuality is covered in some form by the contract documents.

Findings:

Two of the four subcontractors interviewed and one general contractor noted a trend towards voluminous, unnecessary design. All three participants who noted this trend specialized in public/low-bid work (see Appendix B, Table 2).

4.3.2.7 - Exculpatory Language

Introduction:

Exculpatory language is defined language that aims to relieve a specific party of an assumed responsibility. Such language can often have a multitude of meanings or interpretations.

Findings:

Two subcontractors and two general contractors noted a trend towards more unbiddable, exculpatory language. One subcontractor and one general contractor specialized in public/low-bid procurement while the other subcontractor and other general contractor specialized in private/negotiated procurement.

The alarming trend of exculpatory specifications with hidden agendas was noted by five contractors (see Appendix B, Tables 1 and 2). One contractor stated his belief that owners are producing "carefully crafted" specifications with the aim of hiding true intent from the contractor. Three contractors noted a trend towards impossible criteria specifications.

4.3.2.8 - Risk "Passing"

Introduction:

Risk "passing" is defined as attempting to allocate all risk to the next contractual level. Owners, for example, would pass all risk to the general contractor, while the general would pass all risk to subcontractors, etc.

Findings:

Both consultants interviewed and the surety interviewed noted a trend towards more risk "passing" in the construction process.

4.3.2.9 - Contracting Parties not Accepting Basic Responsibilities

Introduction:

As stated previously, accepting responsibility for an action or inaction is at the core of risk allocation. Basic responsibility in construction contracting is often described as follows: 1) owner: scope and design, 2) designer: design and function, and 3) contractor: project construction and completion.

Findings:

Both consultants, two general contractors and the surety felt that there was increasing reluctance among all contracting parties to accept their basic or "core" responsibility in the construction process.

4.3.2.10 - Miscellaneous Trends

Introduction:

A number of specific trends were noted by the interview participants.

Findings:

One general contractor noted the positive trend of more teamwork between the owner, designer, and contractor in recent years. The construction attorney noted a trend toward less litigation due to more "partnering, ADR, etc." and noted that the trend in construction litigation is towards non-typical litigation outside the historic lines. He gave examples of present litigation as the contractor suing designers and varying third party suits.

4.3.3 - Recommendations for Future Risk Allocation

4.3.3.1 - Procurement Techniques

Introduction:

As stated previously, their is sentiment among contractors and owners that the method of procurement used has great bearing on how risk is allocated between the contracting parties. Multiple procurement techniques were suggested by interview participants as a means to allocate risk fairly in the future. Procurement techniques included design/build construction where the contractor manages project design and project construction, the "team approach" where the owner assembles the owner/designer/contractor team during project conceptualization and allows the contractor to participate in design, and negotiated procurement where the owner negotiate and agree to the contract price prior to award.

Findings:

Table 16 presents the results of recommendations for future procurement techniques.

Table 16: Fair Risk Allocation Through Procurement Type

	Participant # and type	Typical Cust. & Proc.	Procurement Technique
1	1 (GC)	P/LB	1
2	2 (GC)	P/LB	1
3	3 (GC)	P/LB	1
4	4 (GC)	A/NEG	
5	6 (GC)	A/D-B	1
6	7 (GC)	P/LB	1, 3
7	8 (GC)	P/LB	1, 2
8	9 (GC)	P/A/LB	3
9	12 (GC)	A/NEG	2
10	14 (GC)	P/LB	1, 5
11	15 (GC)	P/LB	1
12	16 (GC)	P/LB	1
13	21 (GC)	A/NEG	2
14	23 (GC)	A/NEG	3
15	5 (SUB)	A/LB	
16	17 (SUB)	P/LB	1
17	18 (SUB)	P/LB	
18	20 (SUB)	A/NEG	
19	10 (CON)	NA	
20	11 (CON)	NA	4
21	13 (OWN)	LB	
22	24 (OWN)	LB	1
23	19 (SURE)	NA	1, 2
24	22 (ATT)	NA	1, 2, 5
25	25 (A/E)	NA	

Abbreviations and Codes:

A = private
A/E = architect/engineer
ATT = attorney
CON = consultant
D-B = design/build
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

Procurement technique:

1 = Design/build
2 = Team approach
3 = Negotiated
4 = Will not do "low bid" work
5 = Outsourcing, privatization

Table 16 indicates that the most suggested technique to level risk was design/build procurement. In fact, nine of the fourteen general contractors viewed design/build procurement as a viable technique to level risk between contractual parties and eight of

the nine general contractors specializing in public/low-bid procurement felt design/build would allocate risk more fairly. The following items were listed as benefits to design build procurement: 1) contractor will have more opportunity for profitability as they will have more control over the construction process, 2) fewer changes and RFIs as the contractor will be responsible for the documents, 3) faster overall procurement which will open owner and contractor up to less exposure time, 4) more constructable documents as contractor building expertise will be used in design, 5) less disputes and litigation due to the natural team and partnership approach inherent in the system, 6) performance oriented specifications will lead to innovative design, 7) open communication, 8) owner's liability for poor design is eliminated, 9) construction will be delivered to owner at lower overall cost, and 10) complicated, timely three way communication is not required.

It should also be noted, however, that design/build was not seen as a panacea by all. The following items were listed as negative aspects of design/build procurement: 1) design/build promotes poor quality as the designers role as independent inspector no longer exists, 2) a small subcontractor stated they could be put out of business by design/build procurement as they are not big enough to do design, 3) general contractors are exposed to more subcontractor risk, 4) design/build allows owners to get years of design liability insurance from general contractors without paying for it, 5) collusion is more likely in the public market, 6) aesthetics will likely suffer, and 7) it is very expensive for designers as they must compete in a cost exorbitant proposal competition.

Beyond design/build procurement, Table 16 also indicates the following: 1) three general contractors, the surety, and the attorney saw the development of a team approach between the owner, contractor, and designer as a means to fairly allocate risk, 2) three general contractors stated negotiated procurement levels risk, 3) one consultant stated contractors should avoid low-bid work if they desire fair risk allocation, and 4) one general contractor and the attorney listed outsourcing and privatization by public owners as means to level the amount of risk assumed by each contracting party.

4.3.3.2 - Communication

Introduction:

Communication between the contracting parties is essential for efficient, timely project completion. In fact, clear communication of rights and responsibilities is the very purpose of the contract documents.

Findings:

Table 17 presents the results related to fair risk allocation through communication techniques.

A review of Table 17 indicates that three general contractors, two subcontractors and the surety stated that communication through the formal "partnering" method aided in the fair allocation of risk. Five general contractors, both consultants, the surety, and one subcontractor stated that the key to fair risk allocation is open, honest communication between the owner, contractor, and designer. Four public/low-bid general contractors, and the claims consultant stated that owners must become reasonable and better educated in the construction processes. They felt such education would facilitate communication and level risk.

Table 17: Communication as a Risk Allocation Technique

	Participant # and type	Typical Cust. & Proc.	Communication
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	3
3	3 (GC)	P/LB	1, 2
4	4 (GC)	A/NEG	
5	6 (GC)	A/D-B	
6	7 (GC)	P/LB	2
7	8 (GC)	P/LB	2, 3
8	9 (GC)	P/A/LB	
9	12 (GC)	A/NEG	2
10	14 (GC)	P/LB	1, 3
11	15 (GC)	P/LB	3
12	16 (GC)	P/LB	
13	21 (GC)	A/NEG	
14	23 (GC)	A/NEG	1, 2
15	5 (SUB)	A/LB	1
16	17 (SUB)	P/LB	1
17	18 (SUB)	P/LB	
18	20 (SUB)	A/NEG	2
19	10 (CON)	NA	2
20	11 (CON)	NA	2, 3
21	13 (OWN)	LB	
22	24 (OWN)	LB	
23	19 (SURE)	NA	1, 2
24	22 (ATT)	NA	
25	25 (A/E)	NA	

Abbreviations and Codes:

A = private
A/E = architect/engineer
ATT = attorney
CON = consultant
D-B = design/build
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

Communication:

1 = "Partnering"
2 = Open and honest communication: own., gc, a/e
3 = Reasonable, educated owners

4.3.3.3 - Acceptance of Basic or Core Responsibility

Introduction:

As stated previously, core responsibilities in construction contracting are often described as: 1) owner: scope and design, 2) designer: design and function, and 3)

contractor: project construction and completion. Confusion and dispute is likely if the parties do not recognize or agree on the culpability for the various project responsibilities.

Findings:

Eight contractors, including five general contractors and three subcontractors, felt that risk could only be allocated fairly if each contractual party accepted core responsibilities. Of the eight contractors providing this insight, six specialized in public/low-bid work (see Table 18 below).

Table 18: Design Completion and Accepting Responsibility as it Relates to Risk

	Participant # and type	Typical Cust. & Proc.	Accept Basic Responsibility
1	2 (GC)	P/LB	2
2	3 (GC)	P/LB	1
3	5 (SUB)	A/LB	1, 2
4	7 (GC)	P/LB	1, 2
5	8 (GC)	P/LB	1, 2
6	10 (CON)	NA	1
7	11 (CON)	NA	1
8	14 (GC)	P/LB	1
9	17 (SUB)	P/LB	1
10	20 (SUB)	A/NEG	1, 2
11	21 (GC)	A/NEG	1, 2
12	24 (OWN)	LB	1, 2

Abbreviations and Codes:

A = private
CON = consultant
GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor

Accept basic responsibilities:

1 = All parties accept "core" responsibility
2 = Owners complete design prior to bid

One owner and both consultants also alluded to the fact that risk could be allocated fairly through accepting core responsibility (see Table 18).

Additionally, a review of Table 18 indicates that three general contractors, two subcontractors and one owner believed that owners must accept the responsibility of adequately completing designs prior to the bidding of the contract documents.

4.3.3.4 - Use Contractor Expertise

Introduction:

For any process to improve it is necessary to continually seek new insight and knowledge on the process. In fact, common sense would say that a continual effort to seek out and employ the knowledge of all related parties would greatly enhance any process.

Findings:

A review of Table 19 indicates that seven of the fourteen general contractor participants interviewed felt that owners should be actively seeking and using contractor expertise more often in the construction process. Table 19 also indicates (five of the nine public/low-bid general contractors) that contractor expertise should be sought more often by the owner.

Table 19: Use of Contractor Expertise to Level Risk

	Participant # and type	Typical Cust. & Proc.	Use Contractor Expertise
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	x
3	3 (GC)	P/LB	x
4	4 (GC)	A/NEG	x
5	6 (GC)	A/D-B	
6	7 (GC)	P/LB	x
7	8 (GC)	P/LB	
8	9 (GC)	P/A/LB	x
9	12 (GC)	A/NEG	x
10	14 (GC)	P/LB	x
11	15 (GC)	P/LB	
12	16 (GC)	P/LB	
13	21 (GC)	A/NEG	
14	23 (GC)	A/NEG	

Abbreviations and Codes:
A = private
D-B = design/build
GC = general contractor
LB = low bid
NEG = negotiated

A final note is that one owner stated that using contractor expertise should be the norm in construction during the design phase (see Appendix B, Table 3).

4.3.3.5 - Level Expectations

Introduction:

As stated earlier, owner requirements and expectation drive the construction process. It is, in fact, meeting or failing to meet these expectations that defines the success of a project.

Findings:

Five of the nine general contractors specializing in public/low-bid work stated that owner expectations must be leveled to reasonable standards (see Table 20). One contractor provided an example of leveling expectations during a discussion on requests for information (RFIs). The contractor stated that even one simple RFI decreases productivity which may, in turn, lengthens the construction completion time. He stated that presently owners are unwilling to recognize impacts from RFIs and, as such, an unreasonable amount of risk is being shifted to the contractor. He concluded his statement by saying owners must lower their expectations for exact project delivery dates and exact bid costs as contemporary designs are poorly coordinated and always require substantial clarification. Other contractors also alluded that leveling of an owner's expectations would remove substantial risk and facilitate fair risk allocation.

Table 20: Level Expectations as a Means to Fairly Allocate Risk

	Participant # and type	Typical Cust. & Proc.	Level Expectations
1	1 (GC)	P/LB	
2	2 (GC)	P/LB	x
3	3 (GC)	P/LB	
4	7 (GC)	P/LB	x
5	8 (GC)	P/LB	x
6	9 (GC)	P/A/LB	
7	14 (GC)	P/LB	x
8	15 (GC)	P/LB	x
9	16 (GC)	P/LB	

Abbreviations and Codes:
A = private
GC = general contractor
LB = low bid
P = public

It should also be noted that one public/low-bid subcontractor and one consultant felt owner expectations must be leveled to ensure reasonable risk allocation.

4.3.3.6 - Miscellaneous Techniques: Remove Conflict, Choose Market, Specialize

Introduction:

The following techniques were listed on more than one occasion as a means to allocate risk fairly: remove conflict, choose market, and increased specialization.

Findings:

A general contractor and consultant stated that all parties must be proactive and look to remove conflict from the construction process. Two public/low-bid contractors and two private/negotiated work contractors stated that risk could be better controlled through choosing a specific market. One consultant and one subcontractor stated that risk could be controlled through increased specialization. See Appendix B, Table 3 for tabulated results.

4.3.4 - Effect of Onerous Provisions

Introduction:

It is clear that onerous, exculpatory contract provisions effect the construction process. As stated earlier, such clauses dictate behavior from bidding to completion. It could be argued, in fact, that the harsh and unclear nature of onerous provisions requires all contractual parties to continually guard their interests rather than "team" interests. Owners seek to guard against extra costs, designers seek to guard against design liability, and contractors aim to guard against loss due to onerous contract administration.

Findings:

Interview participants listed the following items as possible effects of onerous provisions. The frequency in which each item was noted is included in parentheses:

a) The contractor will not bid the contract (9 times)
b) The clause is priced at a premium or contingency price (7 times)
c) The clause is not bid and then disputed, negotiated and added as a contingency through a contract change depending on actual damage (7 times)
d) The owner loses value in extra dollars spent, expectations not met, etc. (5 times)
e) The contractor loses money (2 times)
f) The clause is ignored and has no effect (2 times)
g) More staff is included in the overhead portion of the bid (2 times)
h) The contractor "pen and inks" changes in the clause as a condition of contracting with the owner (2 times)
i) The project is delivered later due to disputes, confusion, etc. (1 time)

The statistics above indicate that onerous, exculpatory specifications limit competition and may encourage less competent contractors to bid the work. In fact, a further review of the interview results indicates that half of the contractors interviewed stated that they would not bid an onerous document. Reasons cited for not bidding such a document were: 1) if contingencies were priced reasonably the contractor would not get the job, 2) too much risk, and 3) contractors preferred not to compete in an onerous market that encouraged bid errors and contractor incompetence.

It should also be noted that both owners felt that such clauses could "clearly" allocate the risk and allow the contractor to plan for any contingency. This is important as it is a clear contradiction of what many contractor participants stated (see above). Appendix B, Table 4 contains tabulated results.

An example of a typical onerous clause that may not have its intended effect is the intent and errors/omissions clause. While three contractors and one owner did cite such clauses as an area of risk (see Appendix B, Table 1), one of the contractors stated that the intent clause is a "crock" and the other two contractors inferred that they would fight the enforcement of intent provisions as the contractor can only bid the "black and white." It

should also be noted that one owner stated his organization did not enforce the intent clause as they felt that the owner and designer must maintain design responsibility.

4.3.5 - Effect of Design Quality

Introduction:

As stated previously, the quality and completeness of a design effects actual construction. The simple fact that incomplete, uncoordinated drawings require some clarification before construction begins makes this point obvious.

Findings:

Participants did not largely comment on the effect of poor design quality and incompleteness. Four general contractors, the claims consultant, and the attorney did, however, state that contingency dollars were not added to a bid for poor and incomplete design. Instead they said the quality is noted at bid time and then disputed, negotiated, or litigated depending on the actual effect or "damage" caused by the design. See Appendix B, Table 5 for the tabulated results.

Chapter 5 - Conclusions

5.1 - General Format

Research conclusions related to the contract provisions are presented first. Conclusions for the provisions are presented in the following sections: intent and errors/omissions, changes, site investigations/unforeseen conditions, submittals and shop drawings, payments, warranty, and indemnification.

Conclusions for the interviews are broken into the following sections: document quality, contract administration, market dependency, specifications and provisions, procurement, basic responsibility, and miscellaneous.

The conclusions presented in this section were formed through the combination of the results presented previously, specific clauses found in the provision review, and specific comments made by individual interview participants.

5.2 - Provision Conclusions

5.2.1 - Intent and Errors/Omissions

A review of the contract provisions lead to the clear conclusion that intent clauses are uniformly onerous. This review, coupled with analysis provided in the results, leads to the conclusion that intent provisions shift the risk of ambiguous, inadequate design to the contractor. Additionally, the typical unclear, exculpatory language found in intent clauses lends itself to multiple interpretations and unclear effect that cannot be bid with accuracy.

A review of the errors/omissions results leads to a similar conclusion. While owners appear more willing to share risk in these clauses, the clear objective of the clause is to shift liability for ambiguous, uncoordinated drawings to the contractor.

5.2.2 - Changes

Changes in the contract represent substantial risk to all parties. Owner risk includes cost inflation beyond budget, project delays, and disputes. Contractors risk lost productivity, unrecoverable indirect costs, uncompensated delay, and constructive acceleration. The provisions review lead to the conclusion that the changes clause, with

its multiple elements, looks to transfer and share risk between the parties. The most significant conclusion is that onerous requirements may, in fact, allocate more risk to the owner (e.g., contractors may price long-lead proposals with extreme contingency prices).

5.2.3 - Site Investigations/Unforeseen Conditions

The provisions review indicated that site investigations aim to do more than just protect the owners from patent design defects. That is, they also attempt to hold the owner blameless for design inaccuracy and try to shift all responsibility for existing conditions to the contractor.

The review also lead to the conclusion that, while owners again appear to be willing to share the risk for an unforeseen condition, actual risk is a function of how each party defines and interprets what a "materially different" condition is. If the owner does not recognize a condition as "unforeseen" the contractor maintains all the risk.

5.2.4 - Submittals and Shop Drawing

The provision review and results lead to the conclusion that submittal and shop drawing clauses lend themselves to multiple interpretations. One interpretation is that contractors must complete design documents to the extent necessary to execute the project.

While the stated purpose of a submittal/shop drawing clause is to enforce design conformance and coordination, typical terminology leans towards "catch all" phrases that require contractors to finish design work. It is also safe to conclude that administration of this clause in this fashion would meet with great resistance from a contractor.

5.2.5 - Payments

Common sense says that owners would prefer to contract with stable contractors. One determinant of contractor stability and solvency is cash flow. The provisions review lead, however, to the conclusion that typical payment clauses are quite onerous and restrict timely cash flow to the contractor.

5.2.6 - Warranty

The provisions review lead to the conclusion that a nearly uniform "product" warranty clause is employed by most owners. Maintenance period warranties did, however, differ materially. Some significant differences were the required warranty time and whether or not owners could do warranty work and back-charge the contractor. The review also revealed that 1 year remains the typical warranty maintenance period.

5.2.7 - Indemnification

The most significant finding was that contractors must take care to read all warranty clauses and indemnity clauses together as a few owners required third party liability be granted through a product warranty clause.

5.3 - Interview Conclusions

5.3.1 - Document Quality

A review of the interview results and of the individual interviews leads to the clear conclusion that a clear relationship between risk and the quality, completeness, and constructablility of documents.

Participants stated that it is a "fact" that design quality has been continually decreasing, that details were being designed with less concern for constructability, and that incomplete designs were being sent out to bid. They also stated that these trends have required contractors to finish the design with multiple RFIs, multiple changes, shop drawings, and submittals while they build. These comments, coupled with the results, reveal that document quality is an extreme area of risk.

5.3.2 - Contract Administration

A review of the results clearly indicates that risk is shifted and allocated through the actual administration of the contract.

Unreasonable risk is shifted to contractors when an owner is unwilling to recognize changes and differing site conditions and when they expect contractors to complete designs in the field without additional compensation.

Substantial risk is also allocated to the contractor when an owner is inexperienced or lacks construction knowledge, when owner and designer decisions are based on "egos," when an owner expects maximum "intent" to be provided rather than minimum, and when the owner is unwilling to accept responsibility for design.

5.3.3 - Market Dependency

Results lead to the conclusion that contractors performing public work feel more risk from contract administration procedures than do contractors performing private work. In fact, interviews indicated that risk allocation may be specific to the market (e.g., public or private).

5.3.4 - Specifications and Provisions

As stated earlier, common sense alone would lead to the conclusion that onerous, exculpatory provisions must have a profound effect on risk allocation and the construction process. This conclusion is, in fact, easily drawn from the interview results.

A more striking conclusion is, however, that onerous, exculpatory provisions may produce more risk for an owner rather than shift risk from the owner. Interview participants said owners lose value through exculpatory provisions as disputes, litigation, and delays result from such clauses. Exculpatory specifications may, in fact, limit competition and encourage less competent contractors to bid the work

The results lead to the conclusion that impossible or ambiguous specifications will, at the very least, impact construction efficiency as clarification is the least that will be required. Additionally, the interviews support the conclusion that onerous, impossible, exculpatory clauses are a detriment to the overall construction process.

Finally, specific conclusions drawn from interview results are: 1) experienced general contractors often choose not to bid contracts with an onerous tone, 2) final

construction costs are driven up past value received, 3) contractors will always strive to provide the absolute minimum when onerous clauses are employed, and 4) onerous, exculpatory provisions promote disputes and litigation. The clear sentiment of the contractors was that they are "controlled" risk takers. That is, if risk cannot be controlled, they will seek every opportunity to shift risk back to the owner.

5.3.5 - Procurement

Low bid:

Results indicated that owner risk is higher with low-bid procurement as posturing and hidden agendas are the norm. Additionally, public/low-bid contractors experience substantial risk from low-bid procurement that ranges from unreasonable owner expectations to missed bid items as a result of poor document quality.

Design/build:

Design/build has gained some acceptance as a means to allocate risk fairly. At the very least, it can be concluded that public and private owners should continue to study design/build procurement as a project delivery system.

Team approach and negotiated procurement:

A "team approach" and negotiated procurement opens the lines of communication and allows contractors to aid in design. An effect of contractor design involvement is quicker project delivery since the documents are produced with more sensitivity to design constructability.

Increased communication:

Increased communication between the contractor, designer, and owner is a key to fair risk allocation. Specific interview comments lead to the conclusion that communication techniques such as "partnering" are viewed as positive manifestations of recent procurement. "Partnering" and communication allows owners to manage the construction process pragmatically rather than through ambiguous, exculpatory contract language. This, in turn, aids the entire construction process.

Contractor expertise:

Contractors feel they are a "last minute" team member. Such a view, whether real or perceived, only aids to widen the gap between the owner and the true construction expert, the contractor. Owners are not maximizing contractor expertise during the entire construction process.

5.3.6 - Basic Responsibility

Risk is shifted or manifested when parties to a contract do not accept basic "core" contractual responsibilities.

A basic responsibility that is often assumed to belong to the owner is the establishment of a clear project scope. Some owners are either unwilling to accept basic contractual responsibilities or they do not understand and recognize what their assigned responsibility is. If a contractor believes an owner has chosen not to accept the basic responsibility for adequate scope and design, that contractor must and will look for every opportunity to shift risk back to the owner.

The likely result of owners not accepting the responsibility for adequate scope (e.g., complete, quality design) is dispute, litigation, and lost value. Partnering and other clear communication techniques are a means to facilitate a willingness by all parties to accept basic responsibilities.

5.3.7 - Miscellaneous

Only a handful of risk elements present in construction are addressed by this study. A review of the interviews alone indicates that much risk is specific to each construction participant's particular background. The items listed below represent many of the insights shared by the interview participants that were either specific to their experience

or were noted so infrequently that conclusions could not be drawn from the provided information:

a. Risk is a function of work type
b. Warranty and indemnification represent high risk clauses
c. Sociological programs (e.g., M/WBE) add untold risk to the construction process
d. Successful safety program implementation is a primary risk determinant for all contractual parties
e. The construction industry is benefiting from trends towards more teamwork and less litigation
f. Construction litigation outside of historic lines is the new norm
g. Increased specialization is allowing contractors to better control risk exposure
h. Hazardous material handling represents extreme risk to the contractor

While specific conclusions could not be drawn on the insights provided above, it is clear that each item represents a true element of risk experienced in the construction process.

5.4 - Final Conclusions

The results of the provision review indicated that the intent, errors/omissions, and shop drawing clauses shift the responsibility for design inaccuracy to the contractor. Additionally, the unclear nature of this particular contractual language allows varied interpretation. One interpretation being that contractors are responsible to complete all design necessary to facilitate construction.

Results from the interviews indicated that many participants saw increased risk from incomplete, unbuildable documents. Results also indicated that some saw a trend towards owners requiring designs to be completed in the field.

There is not a clear distinction between owner design responsibility and contractor construction responsibility. This development, combined with unstated expectations amongst contracting parties, may lead to an increased unwillingness from both the owner and contractor to accept "core" or contractual responsibilities.

Chapter 6 - Recommendations

6.1 - General Recommendations

A review of the results and conclusions associated with this study makes the clear point that owners must formally address risk allocation in future procurement. Both the provision review and interview results lead to the conclusion that the present practice in provisions is to address risk in an unclear, exculpatory fashion. This practice has, in turn, led to posturing by both the owner and contractor. Posturing has, in fact, evolved to the point that parties are unwilling to take responsibility for their contractually-assigned risk and "core" risk.

Owners should also accept and share more risk through the provisions. There is an unwillingness by owners to accept design liability. This practice may, in fact, cost the owner additional dollars in disputes, late delivery, etc.. Owners would be well served to accept and share more risk as it would likely minimize posturing and ensure that value received is commensurate with dollars expended. An example of this concept would be improving contractor cash flow through the payments clause. Improved cash-flow would aid contractor solvency and decrease an owner's risk of contractor default. A method to do this may be semi-monthly payments to contractors.

Owners should look to decrease provision "volume" (the longer the contract, the more avenues for dispute and recovery) and look to increase provision clarity. Clarity of effect would allow contractors to bid on the "same level" and would ensure that value received matched dollars expended.

The owners, contractors, and the design community must address "core" responsibility and work to have the provisions reflect the allocation and acceptance of "core" responsibilities by each party.

Owners must continue to facilitate communication between all construction parties. Owners should seek to find procurement techniques that employ contractor expertise during the entire construction process. Such techniques would facilitate clear communication, formally allocate risk, and ensure that value received is equal to dollars spent.

6.2 - Future Study Recommendations

Procedures for formally allocating and acknowledging risk in contract provisions should be studied. Formal allocation of risk and its acknowledgment would aid the construction process by minimizing posturing and by establishing clear contractual responsibilities related to risk.

Owners should study the use of alternative procurement techniques that facilitate a team approach. One specific technique that should be studied further is the design/build procurement method. Particular attention should, however, be given to any possible negative results of design/build (e.g., collusion, adverse impact on small contractors, etc.).

Owners and the design community must study and address the contracting community's perceptions that design quality is decreasing, details are not constructable, and that owners expect contractors to complete the design in the field through RFIs and shop drawings.

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Appendix A - Provision Review Database

A - Provision Checklist

For data collection purposes each question contained within the checklist was assigned a number as shown below. The list of the various example provisions that were collected is presented below in Section B under the question number it pertains to.

Intent and errors/omissions:

1. Does the contract include an intent clause?
2. Does intent override obvious errors or omissions?
3. Does the contract specifically state that the plans and specifications must be read as complementary?
4. Does the contract include an errors and omissions clause?
5. Does the contract state that if in the plans and not specifications or in the specifications but not the plans that the requirement will be enforced with the full force and effect as if it is in both?
6. Is the contractor explicitly required to inform the owner of an error or omission?

   If so, which apply:

   a) _ A specified time period is listed to report the error or omission

      List time: _____

   b) _ A specified time period for owner response to inquiry is listed

      List time: _____

   c) _ Work completed without informing the owner is not compensable

   d) _ Contract not specific

Changes:

7. Does the contract include a changes clause?
8. Are all items negotiable?

   If no, which of the following items are preset by the contract:

   a) _ Subcontractor overhead
   b) _ Home office overhead
   c) _ Field office overhead
   d) _ Equipment rates or small tools
   e) _ Profit
   f) _ Labor rates
   g) _ Material rates

9. Are all overheads, markups, and salaries set at the beginning of the job through a required initial negotiation?
10. Is a change or an order in writing required prior to the beginning of changed work?
11. Does the owner have the right to direct changed work prior to negotiating price?
12. Must the contractor revise and resubmit a schedule after every change?
13. Is there a specified response time for a request for a change proposal?

    If so, list the time: _____

14. Are owner caused delays compensable as a change?

15. Can the owner require acceleration to meet the original contract completion date or a current schedule?
16. Does the owner have the unilateral right to determine the responsibility for acceleration?

Site investigations/Unforeseen site conditions:

17. Does the contract require a site investigation?

    If so, to what level of detail must the contractor investigate:

    a) ___ To the extent necessary to be familiar with existing conditions, utilities, or soil conditions

    b) ___ Contract does not address level of detail for the investigation

18. Does the contract explicitly state that information provided on existing conditions, site characteristics, etc. may be inaccurate and should not be relied upon for bidding and planning purposes?
19. Does the contract explicitly state that the contractor is responsible for existing conditions regardless of statements or representations in the contract documents?
20. Does the contract address unforeseen or existing site conditions?
21. Is extra work for unforeseen conditions compensable?
22. Is notice of an unforeseen site condition required?

    If so, which apply:

    a) _ Notice required in writing

    b) _ Oral notice required

    c) _ Notice required as soon as possible

    d) _ Notice required within 24 hours or longer

    e) _ Time frame of notice unspecified

23. Is owner's review of condition required prior to the continuation of work?
24. Does the contract explicitly state that a change request for unforeseen conditions will not be recognized if all proper notices, time frames, etc. were not met?

Submittals and shop drawings:

25. Are submittals required?

    If so, which apply:

    a) _ Product samples

    b) _ Shop drawings

    c) _ Product data

    d) _ Operation and maintenance manuals

    e) _ Certifications of product quality

26. Does the contract state that the submittals will be reviewed only and that the review will not be construed as approval of changes or substitutions to the original contract documents?
27. Are any submittals explicitly reviewed for approval?
28. Does the contract state the number of days afforded the owner for submittal review?

    If so, list exact days: _____

29. Is the coordination of shop drawings between trades and disciplines required?
30. Does the contract address the level of detail required in shop drawings?

    If so, which statement most resembles the contract requirement:

    a) __ Schematics only
    b) __ Shop drawings will be of detail necessary to ensure work can be installed without conflict with other trades
    c) __ Shop drawings will be detailed and include specific manner in which work will be connected and coordinated with all related items and trades

Payments:

31. Is frequency of invoices controlled by the contract?
32. Are payments for material delivered, not installed, allowed?

    If so, which of the following apply:

    a) _ A certified warehouse is required
    b) _ Specific maximum mileage from the job site is specified
    c) _ The contract is not specific
33. Is the number of payments controlled by a "length of contract schedule"?
34. Are payments only allowed on a monthly basis?
35. Are payments allowed more frequently than monthly?
36. Does the contract specify the time in which payment will be made?

    If so, is the payment timing dependent on the date of submittal, the invoice cutoff date, or the owner approval date? List the exact days: _____
37. Are certified payrolls required?
38. Is an owner-approved schedule of prices required prior to first payment?
39. Does the contract specify the time afforded for owner invoice review?

    If so, list the time: _____
40. Is retainage addressed by the contract?
41. Does the contract include a specific retainage percentage?

    If so, what is the exact percentage?
42. Can the retainage percentage be reduced through negotiation?
43. Does the contract specifically address when retainage will be released?

    If so, which time frame most resembles the contract requirement:

    a) _ After final acceptance by the owner or final payment
    b) _ After beneficial occupancy
    c) _ After the warranty period
    d) _ After final release from the contractor

44. Is retainage released on a schedule (e.g., 50% at occupancy, 30% at acceptance, 20% after final release and with final payment)?
45. Is a final release required prior to final payment?
46. When is final payment released?
    a) _ After final acceptance
    b) _ After final release from the contractor
    c) _ After the lien statutory period

Warranty:

47. Does the contract require a warranty?

    If so, which type applies:

    a) _ All defects, including patent
    b) _ Latent defects only
    c) _ Defects and limited maintenance
    d) _ Defects and complete maintenance

48. The length of warranty is:

    a) _ Less than a year
    b) _ More than a year
    c) _ One year
    d) _ Final acceptance
    e) _ Not mentioned

49. Is the warranty work notification process included in the specifications?
50. Can the owner accept defective work unilaterally, repair the work, and back-charge the contractor?
51. Does the specification include a specific time period in which the contractor must respond to a warranty issue?
52. Can the owner complete warranty work at their own expense and back-charge the contractor without affording the contractor an opportunity to complete the work?

Indemnification:

53. Does the contract indemnify the owner in any way?

    If so, classify the type of indemnity:

    a) _ Broad b) _ Intermediate c) _ Limited

Miscellaneous:

54. List miscellaneous onerous clauses found

B - Example Provisions

The list of the various example provisions collected during the specification review is presented below. Each provision was categorized and placed under the question number from the Provision Checklist that it pertains to.

The specification type that each provision was found in is listed in parentheses after the provision. Abbreviations for the various specification types are provided below:

A = Private Utility
D = Department of Transportation
DD = State: Heavy Civil
P = Public Utility
PP = Municipality

1

- Contractor agrees that the description of the Work to be performed is sufficient and understands that the Work must be completed in its entirety so that it is fully ready to perform its intended function and produce its intended results. Contractor agrees that everything necessary to accomplish this is included in the Contract, unless explicitly excluded on the drawings or in the specifications. (1 & 2) (A8)

- By the act of submitting a bid for a proposed contract, the bidder warrants that:
(1) The bidder and all subcontractors he intends to use have carefully and thoroughly reviewed the plans, specifications, special provisions and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended...(DD2)

- The Department will make no allowance or concession for a bidder's failure to make the required examination. (1 & 17) (D1)

- It is the intent that the Department will prepare full, complete, and accurate plans and specifications giving directions that will enable any competent contractor to carry them out. (D6)

- Where the plans or specifications describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. (D2)

- The said work shall be performed in accordance with the true intent and meaning of the contract documents without any further expense of any nature whatsoever to the State other than the consideration named in this agreement.
The State reserves the right, at any time during the progress of the work, to alter the plans or omit any portion of the work as it may deem reasonably necessary for the public interest; making allowances for additions and deductions with compensation made in accordance with the Standard Specifications, for this work without constituting grounds for any claim by the contractor for allowance for damages or for loss of anticipated profits, or for any variations between the approximate quantities and the quantities of the work as done. (D3).

- It is the intent of the contract documents that all performance under the contract be in accordance with the best practice. The Contractor shall carefully check the plans both before commencing and throughout the work. The Contractor shall immediately call the Commissioner's attention to any errors, omissions, or discrepancies that the Contractor may discover in the plans before proceeding with the work affected. The Commissioner reserves the right to make such corrections as deemed necessary for the fulfillment of the true intent of the contract documents. (1 & 2) (PP8)

- 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 Work, materials, or equipment

that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. (A18)

- The correction of any errors or omissions of the Drawings and Specifications may be made by the Owner's Authorized Representative when such correction is necessary to bring out clearly the intention which is indicated by a reasonable interpretation of the Drawings and Specifications as a whole. (A9)

- The intent of the contract is to provide for the construction and completion in every detail of the work described. The Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the terms of the contract. (DD1)

- ...Specifications, the Contractor shall not work without clarification from the Architect and resolution by Owner. The Owner's decision as to the appropriate resolution of a conflict or discrepancy shall be final. (1 & 3) (PP2)

- The Contractor shall carefully check, study and compare the Contract Documents with each other and shall at once report to the Architect any error, omission, conflict or discrepancy he may discover. The Contractor shall also verify all dimensions, field measurements and field conditions before laying out the Work. The Contractor will be held responsible for any subsequent error, omission, conflict or discrepancy which might have been avoided by the above described check, study and comparison. In the event Contractor continues to work on an item where an error, omission, conflict or discrepancy exists without clarification or resolution or commences work on an item without raising an error, omission, conflict or discrepancy that might have been avoided by the check, study and comparison required above, it shall be deemed that the Contractor bid and intended to execute the more stringent or higher quality requirement, or accepted the condition as is in the Contract Documents, without any increase to the Contract Sum or Contract Time. The Contractor shall also be responsible to correct any failure of component parts to coordinate or fit properly into final position as a result of Contractor's failure to raise or resolve an error, omission, conflict or discrepancy, without increase to the Contract Sum or Contract Time. (1 & 54) (PP2)

- The Contractor will not be allowed to take advantage of any errors or omissions in the plans and specifications. The Project Manager will provide full instructions when errors and omissions are discovered. (PP5)

2

- When items necessary for the completion of the Work are not shown on the drawings or mentioned in the specifications, but such items are necessary and usually employed in common practice or are necessary to properly complete the Work, Contractor shall furnish and install such items as part of this Contract. (A8)

- The Contractor shall take no advantage of any apparent error or omission which he might discover in the plans or specifications but shall forthwith notify the Engineer of such discovery, who will then make such corrections and interpretations as he deems necessary for reflecting the actual spirit and intent of the plans and specifications. (D4)

- It is intended that any parts or portions of the WORK not specifically covered in the CONTRACT DOCUMENTS, but reasonably inferable as necessary to produce the intended results, shall be supplied by CONTRACTOR as part of this Contract unless it is specifically required to be provided by OWNER or others. (2 & 3) (A4)

3

- The documents furnished by Owner, whether included in the Contract or issued after the Contract award, are intended to supplement each other without being unduly repetitive. Matters adequately addressed in any one document need not be re-addressed in any other document. (A8)

- The various parts of the Contract are intended to be complimentary to each other, but should any discrepancy appear, or any misunderstanding arise as to the import of anything contained therein, the explanation of the Engineer shall be final and binding. The correction of any errors or omissions of the Drawings and Specifications may be made by the Engineer, when such correction is necessary to bring out clearly the intention which is indicated by a reasonable interpretation of the Drawings and Specifications as a whole. (A3)

4

- Before undertaking each part of the Work, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. He shall at once report in writing to the DIVISION any conflict, error or discrepancy which he may discover; however, he shall not be liable to the DIVISION for his failure to discover any conflict, error or discrepancy in the Drawings or Specifications. (P3)

- The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If the CONTRACTOR finds a conflict, error, or discrepancy in the Contract Documents, he shall call it to the DIVISION's attention in writing at once and before proceeding with the Work affected thereby; however, he shall not be liable to the DIVISION for his failure to discover any conflict, error or discrepancy in the Specifications or Drawings. In resolving such conflicts, errors and discrepancies, the documents shall be given precedence in the following order: Agreement, Modifications, Addenda, Special Conditions, Instructions to Bidders, General Conditions, Specifications, and Drawings. Figure Drawings shall govern over General Drawings. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials, or equipment described in words which, when so applied, have a well-known technical or trade meaning shall be deemed to refer to such recognized standards. (P3)

- The intent of the contract documents is to provide everything necessary for the proper execution of the work. In case of conflict, the work shall not proceed until a decision has been agreed upon by all parties concerned. (A6)

- The Contractor shall carefully review and compare the Contract documents for any inconsistency or uncertainty. In the event any requirements appear inconsistent or uncertain, such shall be referred to the Purchaser for a ruling or decision. The ruling or decision of the Purchaser shall be final. (A7)

5

- All work required by the specification but not shown on the drawings, or shown on the drawings but not called for in the specifications, shall be furnished and executed by the Contractor as if described in all such documents. (A5)

- Where and when required, the Purchaser shall furnish the Contractor with Specifications and drawings for the several sections of the Work prepared in accordance with accepted engineering standards and methods. Anything shown on or mentioned in one and not shown on or mentioned in the other, shall be furnished and done, the same as if shown and mentioned in both Specifications and drawings. (A7)

6

- In case of any errors, omission or discrepancies in the Drawings or Specifications, the Contractor shall promptly submit the matter to the City Engineer who, in turn, shall promptly make a determination and issue the necessary instructions in writing. Any adjustment by the Contractor without this determination and instructions shall be at the Contractor's own risk and expense. (PP1)

7

- Anticipate that extra work might be necessary in order to complete the project as contemplated. Perform extra work in accordance with the specifications and only when authorized in writing...(D1)

- If the work is to be paid for extra work and:
    - the Contractor or District Engineer cannot agree on a tentative price, therefore, and
    - the work is such that force account records cannot be kept by the Department,

  the District Engineer's writing will contain a firm, binding price determined by the District Engineer to be fair and equitable for the work to be performed. (D1)

- It is agreed by the parties hereto that the State Construction Engineer shall decide all questions, difficulties and disputes, of whatever nature, which may arise relative to the interpretation of the plans, construction, prosecution and fulfillment of the contract, and as to the character, quality, amount and value of any work done, and materials furnished, under or by reason of the contract. (D4)

- Without invalidating the Agreement and without notice to any surety, COMPANY may, at any time, order additions, deletions, or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Prior to issuance of any Written Amendment, Change Order, or Work Directive Change, the Change of Contract Price and/or Time shall be agreed upon by COMPANY and CONTRACTOR as set forth... (A18)

- Provided, however, that except for claims based on defective specifications, no claim for any modification as set forth above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as herein required. (P5)

- Contractor shall notify [*Owner*] of any objections to the FCO or Change Order within 14 calendar days after Contractor receives the FCO or Change Order. The FCO or Change Order shall be revised as agreed by the Parties. Contractor expressly waives any future claim for compensation, damages, or schedule extensions resulting from, or alleged to result from, changes, whether or not such claims were discussed by the Parties at the time the FCO or Change Order became effective. (A10)

- Contractor shall make changes in the contracted work only as ordered by the Superintendent of Production, quoted by Contractor and upon issuance of [*Owner*] Purchase Order Revision. (A6)

- Each Change Order shall be specific and final as to prices and extensions of time, with no reservations or other provisions allowing for future additional money or time as a result of the particular changes identified and fully compensated in the Change Order. (PP2)

8

- It is also agreed that the compensation to be paid to the Contractor for performing said extra work shall be determined by the following methods:

  Method (A) - By agreed unit prices; or
  Method (B) - By agreed lump sum; or
  Method (C)- If neither Method (A) or Method (B) be agreed upon before the extra work is commences, then the Contractor shall be paid the actual field cost of the work, plus fifteen (15%) percent.

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  .

  The fifteen percent (15%) of the actual field cost to be paid to Contractor shall cover and compensate him for his profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the actual field cost as herein defined, save that where the Contractor's Camp or Field Office must be maintained primarily on account of such Extra Work, then the cost to maintain and operate the same shall be included in the "actual field cost."
  No claim for extra work of any kind will be allowed unless ordered in writing by Owner's Representative. (PP6)

- The Contractor's Fee which shall be allowed to the CONTRACTOR for his overhead and profit shall be determined as follows:

  ...a mutually acceptable fixed fee... (P3)

- In force account, cost shall be the sum of cost of the following items:

  .
  .
  .

  D. Twenty percent (20%) of the cost of items [*material and labor*]. (PP3) **20% represents Subcontractors overhead, HOH, FOH and profit.*

- Extra work to be done on a proposal basis at a price or prices agreed upon shall be broken down into its various segments of cost as follows:

  a. Cost of labor: No. of hours x base wages.
  b. Add cost of fringes.
  c. Add 30% to the above cost (a & b)
  d. Add cost of insurance and taxes.
  e. Add 10% to item (d)
  f. Add cost of equipment to which no percent shall be added.
  g. Add cost of materials supported by quotations from the suppliers.
  h. Add 15% to item (g) if supported by quotations from the suppliers.
  i. Add cost of bond in accordance with Section 01200, Article 5, paragraph B1f. (PP4)

8d

- Whenever practical, construction equipment which the Contractor has on the jobsite and which is of a type and size suitable for use in performing the extra work shall be used. In no case shall the charges for Contractor owned equipment exceed 85% of the equipment rental rates set forth in the current edition of the "Rental Rate Bluebook, Vol. 1, for Construction Equipment" published by Data Quest Inc. (P1)

- For equipment, either rented or owned, including pumps and compressors, an hourly rental rate will be determined using the monthly rental rates taken from the current edition (updated supplements will be authorized for use statewide on specified dates) of the Rental Rate Blue Book for Construction Equipment and dividing by 176. (D1)

- Charges for construction machinery and equipment shall be determined by using seventy-five (75) percent of the latest revision of the rental rate as stated in the Rental Rate Blue Book for Construction Equipment and as modified for the geographical region in which the equipment is being used. (A12)

9

10

- The Contractor shall not perform any change to the work without a formal written Field Directive, as an interim authorization, or a formal Contract Change Order. (P1)

- No instructions, either written or verbal, shall be construed as an order for changes unless it be in the form of an Order-on-Contract bearing the signed approval of the Commissioner. (D3)

- The Contractor must obtain written authorization for extra work prior to the actual performance of such work. Failure to obtain such written authorization will be sufficient cause for the Company to refuse payment. (A5)

- Except for minor modifications in the work, not involving extra cost and not inconsistent with purposes of the work, and except in emergency, endangering life or property, no extra work or change shall be made unless pursuant to an order from the Owner authorizing the extra work or change, and no claim for an addition to the Contract amount shall be valid unless so ordered. Such orders may initially be oral, but shall ultimately be confirmed by the Owner in the form of a written "Extra Work Order" in which the consideration will be set forth. (A2)

11

- If Company so directs, Contractor shall proceed promptly and diligently with any change, despite a delay or failure of parties to agree upon a reasonable adjustment to Contract Price. (A1)

- If the City Engineer determines that the work in question is Contract work and not extra work, or that the determination or order complained of does not require performance by the Contractor beyond that required by the Contract or violates the terms and provisions of the Contract, he will direct the Contractor to proceed and the Contractor must promptly comply. However, in order to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five days after receiving the City Engineer's determination and direction, notify the City Engineer in writing that the work is being performed, or that the determination and direction is being complied with, under protest. (PP1)

12

13

- If Contractor intends to assert a claim for an equitable adjustment under this clause, it must within fifteen (15) working days after receipt of a written order submit a written statement setting forth the general nature and monetary extent of such claim. If Contractor fails to submit an estimate within

fifteen (15) working days from the date of receipt of the change, Contractor shall be deemed to have waived all claims for any adjustment relating to the Work performed pursuant to the order. (A14)

- All responses to proposal requests shall be accompanied by a complete, itemized breakdown of costs. Responses to proposal requests shall be submitted far enough in advance of the required work to allow the Owner and Architect a minimum of thirty (30) calendar days after receipt by Architect to review the itemized breakdown and to prepare or distribute additional documents as may be necessary. (PP2)

- All Change Orders require approval by either the City Council or, where authorized by the state law and City ordinance, by the City Manager pursuant to Administrative Action. The approval process requires a minimum of forty-five (45) calendar days after submission to the Owner in final form with all supporting data. Receipt of a submission by Owner does not constitute acceptance or approval of a proposal, nor does it constitute a warranty that the proposal will be authorized by City Council Resolution or Administrative Action. The time required for the approval process shall not be considered a delay and no extensions to the Contract Time nor increase in the Contract Sum will be considered or granted as a result of this process. (134 & 14) (PP2)

<u>14</u>

- No extension of time will be made for delays occurring more than seven (7) calendar days before the Contractor's request is made in writing to the Engineer. In the case of a continuing delay, only one request is necessary. (P1)

- Expect delays in the performance of work under contract in order to permit public and private facilities and structures to be place, replaced, relocated, adjusted, or reconstructed. In the event of such delays, the work under contract may be required to proceed for the convenience, facility and safety of the public. Do not hold the Department liable for charges or claims for additional compensation for any delays, hindrances, or interferences, regardless of duration or extent, resulting from the failure of owners to place, replace, relocate, adjust, or reconstruct their facilities and structures within the time estimated by the Department.
  Resolve all disputes or disagreements concerning placement, replacement, relocation, adjustment, or reconstruction of facilities and structures directly with the owners. Upon written request, the Department may, at its discretion, render assistance in resolving such disputes or disagreements. However, under no circumstances will such assistance be construed to relieve the Contractor of his responsibility to resolve conflicts with the owners. Do not hold the Department liable for charges or claims for additional compensation for any delays, hindrances, or interferences that arise from the dispute and its resolution. However, upon written request, the Department may grant an extension of contract time. (D1)

- No payment of compensation of any kind shall be made to the contractor for damages because of any hindrance or delay from any cause in the progress of work, whether such hindrance or delay be avoidable or unavoidable. Any finding by any administrative officer, arbitrator and/or judge that a delay was caused either wholly or in part by actions of someone other than the contractor shall only entitle the contractor to equivalent extensions of time and only such costs allowed by Section 105.20. (D5)

- No claim for extra cost or damages shall be made by the Bidder for work stoppage or delays caused by any government agency or for any cause beyond the control of the District.
  Delays in delivery of District furnished materials or equipment shall not be cause for claims for extra cost for damages by the Bidder. (P4)

- The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission of the City and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work, as provided for herein. (PP1)

15

- Should the Contractor fail to maintain the rate of progress required to complete the work within the contract time specified, the Commissioner may require that additional workers or equipment be placed on the work or a reorganization of plant layout be effected in order that the work be brought up to schedule and maintained there. (PP8)

- ...the Contractor shall, if so directed, increase the working force and equipment to such an extent as to give reasonable assurance of compliance with the schedule of completion. (A9)

- The Contractor shall provide an ample force of workmen and supervisors and provide sufficient construction equipment, tools and facilities to perform the Work at the rate of progress set forth in the Contract. Should the Contractor fail to maintain the rate of progress shown in the Contract, as supplemented by a construction schedule approved by the Purchaser, the Purchaser may give notice to the Contractor to initiate sufficient actions necessary to ensure that the Work is brought up to schedule and maintained there. Should the Contractor refuse or fail to take such actions, the Purchaser may proceed under the provisions of the paragraph herein entitled "CANCELLATION BY THE PURCHASER FOR BREACH". (A7)

16

17

- In order to make the most effective use of available engineering personnel, the Department is unable to assign engineering responsibilities at the time of contract preparation; however, the District Construction Engineer will, by appointment, arrange for himself or his representative to be available to lend assistance to prospective bidders for plan-in-hand review of the proposed work features, and , if desirable, field inspection of the site of the proposed work. The Resident or Project Engineer for the contract will be assigned as soon as the Department can reasonably make an appropriate determination. (D6)

- CONTRACTOR represents that it has visited the JOB SITE, or has had the opportunity to visit the JOB SITE, familiarized itself with the local conditions under which the WORK is to be performed and correlated its observations with the requirements of the CONTRACT DOCUMENTS. In connection with such visitation, CONTRACTOR represents that is has verified locations of structures and equipment and has observed no obstructions or interferences that would prevent installation in accordance with the COTNRACT DOCUMENTS. (17 & 21) (A4)

17a

- No charge for an extra shall be allowed where such extra is due to the Contractor's lack of observation or knowledge of local conditions. (A13)

- All underground water, gas, oil, telephone, electric, storm drain, sewer and other pipes or conduits, shown on the plans, are only approximate in their locations. The Contractor shall make a personal investigation and inspection of the records of the owners of the utilities, supplemented by actual

digging in the field if necessary to determine the actual locations of such utilities with all their branch and service lines. The Contractor shall make satisfactory arrangements with the owners of the utilities for the relocation, maintenance and protection of existing utilities and shall furnish the Officer-in-Charge with evidence in writing that satisfactory arrangements have been made, not less than ten (10) days before the commencement of the parts of the project under the contract affecting such utilities. (PP3)

- In addition to the requirements in the "Requirements for Bidding and instructions to Bidders", the Contractor shall verify, at the site, all dimensions, areas, physical and any other conditions affecting the work. No allowance will be made to the Contractor for any extra labor and/or materials required on account of site conditions or discrepancies which might have been foreseen by a thorough and proper inspection of the site. (17a, 19, 21) (PP4)

17b

18

- Existing conflicting underground utilities and obstructions are shown on the drawings if known to the District. Such information was obtained from drawings and verbally from persons connected with the particular utility. Such information is not guaranteed but is made available to the Bidder for whatever value it may have. Incompleteness or error in this information shall not be the cause for any claim for extra payment under this Contract nor shall it relieve the Bidder of his responsibility for repairing any damage he may cause to these utilities at the Bidder's expense. (P4)

- It is expressly understood and agreed that the Department assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigation thus made, the records thereof, or of the interpretations set forth therein or made by the Department in its use thereof. There is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations or records thereof are representative of those conditions existing throughout such areas, or any part thereof, or that unlooked for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered. (DD1)

19

- If the Contractor, in the course of the work, finds any discrepancy between the plans and the physical conditions of the locality, or any errors or omissions in plans, he shall immediately inform the Project Manager, in writing, and the Project Manager shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk. (PP5)

- Existing utilities indicated on the drawings have been plotted from information currently available to the Engineer. The source of information generally consists of "Construction Record" drawings and data obtained verbally from officials associated with the particular utility. The data is shown on the drawings for whatever benefit the Contractor may derive therefrom; and, unless specific instructions or data concerning certain utilities are set forth in the Technical Specifications, the data shown on the drawings shall not necessarily be considered precise or complete; and the Engineer and Owner make no guarantee as to completeness, precision, or dimensions. This shall in no way relieve the Contractor from his responsibility for maintenance of existing utilities and performance of the Contract as provided in the Specifications. Under no circumstances will errors or omissions in location of existing utilities or improvements, whether they be visible from the surface, buried, or otherwise obscured, be considered as an absolute basis for additional compensation to the Contractor. (P2)

- The Contractor further states that the Contract prices are based on his own knowledge and judgment of the conditions and hazards involved and not upon any representation of the Owner or the Engineer. (A2)

20

- Contractor shall immediately and before such conditions are disturbed notify Owner...differ materially from conditions ordinarily encountered or from conditions addressed in the Contract. Owner shall promptly investigate such conditions, and if such conditions do materially differ and cause an increase or decrease in Contractor's cost of, or the time required for, performance of any part of the Work under the Contract, an equitable adjustment shall be made and the Contract modified in writing. (A8)

- The Contractor shall immediately, and before the conditions are disturbed, notify the Field Representative of the Engineer in writing, with a copy to the Engineer of: (1) Subsurface or latent physical conditions at the jobsite differing materially from those indicated in this Contract, or (2) unknown physical conditions at the jobsite, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Field Representative of the Engineer will promptly investigate the conditions and notify the Engineer of his findings. If the Engineer determines that, in accordance with the Contract Documents, such conditions are unusual and materially different and cause an increase or decrease in the cost of the work or time required for the performance of this Contract, an equitable adjustment shall be made as provided under GC-27 CHANGES IN WORK. Time or cost adjustments will not be allowed unless the Contractor has given proper notice as specified below. (20, 21, 22, 23, 24) (P1)

- The Contractor shall promptly notify the Owner and Engineer in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The Engineer will promptly investigate those conditions and advise the Owner in writing if further surveys or subsurface tests are necessary. Promptly thereafter, the Owner will obtain the necessary additional surveys and tests and furnish copies to the Engineer and the Contractor. (P2)

- The locations of utilities or other underground man-made features were ascertained with reasonable care and recorded in good faith from various sources, including the records of municipal and other public service corporations, and therefore the location of known utilities may only be approximate. Subsurface information is made available to bidders in good faith so that they may be aware of the information utilized by the State for design and estimating purposes. By doing so, the State and the Contractor mutually agree and understand that the same is a voluntary act and not in compliance with any legal or moral obligation on the part of the Department. Furthermore, insofar as such disclosure is made, the Department makes no representations or warranties, express or implied, as to the completeness or accuracy of this information or data, nor is such disclosure intended as a substitute for personal investigation, interpretations, and judgment of the bidder. (D3)

- Water lines, gas lines, sewer lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for in the special provisions or as noted on the plans. (DD1)

21

- No claim of Contractor under this clause shall be allowed unless Contractor has given immediate notice as required above and confirmed such notice in writing within ten (10) days of discovery. (21 & 22) (A8)

- The Contractor shall perform unforeseen work, for which there is no price included in the contract, whenever it is deemed necessary or desirable in order to complete fully the work as contemplated. Such work shall be performed in accordance with the applicable specifications and as directed. Payment or adjustment in payment will be made as provided under 109.04. (D6)

- The CONTRACTOR shall promptly notify the DIVISION in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The DIVISION will promptly investigate those conditions and if further surveys or subsurface tests are necessary, shall obtain the necessary additional surveys and tests and furnish copies to the CONTRACTOR. If the DIVISION finds that the results of such surveys or tests indicate that there are subsurface or latent physical conditions which differ materially from those intended in the Contract Documents, and which could not reasonably have been anticipated by the CONTRACTOR, a Change Order shall be issued incorporating the necessary revisions. (P3)

22

- During the progress of work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed. (DD1)

22d

- Contractor shall give the Construction Representative written notice of such conditions within 2 working days after Contractor first becomes aware of such conditions and shall not disturb such conditions until authorized by an FCO. (A10)

23

24

- No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.
  No contract adjustment will be allowed under the provisions specified in this section for any effects caused on unchanged work. (D2)

- Failure of Contractor to so notify the Construction Representative and proceeding to disturb such differing conditions shall result in a waiver of any claim for additional compensation and/or extension of the Work Schedule arising out of such differing conditions. (A10)

25

26

- The DIVISION will review and approve with reasonable promptness Shop Drawings and samples, but its review and approval shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. (26 & 27) (P3)

- OWNER'S review and/or approval of SHOP DRAWINGS or samples shall not relieve CONTRACTOR from its responsibility for fulfilling the requirements of the CONTRACT DOCUMENTS. (A4)

- The approval of the Contractor's information covering materials, equipment, articles, manners, and arrangements by the Engineer shall be general and shall not relieve the Contractor from the responsibility for adherence to the Contract, nor shall it relieve him of the responsibility for any errors which may exist. (PP1)

27

28

- The contractor should plan for and allow sufficient time for the checking, returning, and distribution of all submissions. No work shall proceed until the necessary drawings have been approved and distributed. The Department will make every effort to expedite their review, but it will not be responsible for any delays which may result during the proper handling of any submission. (D5)

29

30

- The term "shop drawings" includes the following items furnished by Contractor to explain in detail specific portions of the Work: (a) drawings, diagrams, layouts and schematics; and (b) descriptive literature, illustrations, performance and test data, parts lists, maintenance manuals, operations manuals and similar materials. (A8)

- The shop drawings shall indicate, on each page or sheet, the project name and number, descriptive names of equipment and materials, classified item numbers, locations at which materials or equipment are to be installed in the work, reference to the respective specification paragraph number and/or mark numbers corresponding to schedules shown on drawings and the subcontractor's name and address. (PP4)

- The drawings shall be finished plans, and shall be neat, legible and drawn to scale. (PP3)

30b

- Contractor will furnish all reference drawings and related technical information and documents as required by [OWNER] for layout, installation, licensing, start-up, operation, and maintenance of Equipment. Contractor will also furnish reproducible drawings of the Work as required. (P2)

- The contract plans shall be supplemented by such working drawings prepared by the Contractor as are necessary to adequately control the work. (D2)

- They shall include matchmarks, erection diagrams, and other details such as field connections, for proper installation and erection in the field. (A15)

- Contractor shall prepare all necessary detail drawings, designs, etc., giving full and complete information. Priority shall be given to those drawings and other items necessary for fabrication of the material or equipment in the order of its required delivery. (A14)

- The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction, and the like to enable the DIVISION to review the information as required. (P3)

- The plans will be supplemented by working drawings as necessary to adequately control the work. Working drawings shall be furnished by the Contractor as required for the completion of the work. Except where otherwise specified, working drawings shall be approved by the Engineer but such approval will not relieve the Contractor of any of his responsibility. Working drawings shall not be considered as plan changes and any conflicts on working drawings, whether approved or not, shall not supersede the requirements of the original plans and specifications. (D6)

- These plans shall be supplemented by the Contractor with such additional working and detail drawings as may be found necessary to control adequately the work and its prosecution. The Contractor's drawings shall be furnished well in advance of the work to allow the Engineer time to review the drawings and will be prepared by the Professional Engineer if so noted in the contract or on the plans. When requested, the Contractor shall furnish his basic calculations.
  Working drawings for steel structures shall consist of shop detail, erection, and other working plans showing dimensions, sizes of material, details, and other information necessary for the complete fabrication and erection of the metal work. Working drawings for concrete structures shall consist of such detailed plans as may reasonably be required for the successful prosecution of the work, and which are not included in the plans furnished by the Engineer. These may include plans for falsework, bracing, centering, and form work; masonry layout diagrams; and diagrams for bent reinforcement. Manufacturer's engineering data for prefabricated material, including that for falsework and forms, shall be furnished with each set of drawings. (DD1)

<u>30c</u>

- By approving and submitting working drawings, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data and has checked and coordinated each working drawing with the requirements of the Work and the Contract Documents. (D7)

- The plans furnished by the Department consist of general drawings showing such details as are necessary to give a comprehensive idea of the construction contemplated. Roadway plans will show in general, alignment, profile grades, typical cross sections and general cross sections. Structure plans, in general, will show in detail all dimensions of the work contemplated. When the structure plans do not show the dimensions in detail, they will show general features and such details as are necessary to give a comprehensive idea of the structure. (D4)

- The plans furnished by the Department consist of general drawings and show details necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the plans shall be in writing. The Contractor shall keep one set of plans available on the work site at all times.
  The Contractor shall furnish working drawings for structures which shall consist of the detailed plans required to control the work. The working drawings to be furnished by the Contractor shall include, but not be limited to, stress sheets, anchor bolt layouts, shop details, erection plans, cribs, cofferdams, falsework, centering, form work and other temporary work and methods of construction.
  The Contractor shall be responsible for the accuracy of dimensions and details, and for agreement of dimensions and details. He shall be responsible for the agreement and conformity of his working drawings with the plans and specifications.
  All working drawings must be approved by the Engineer and such approval shall not operate to relieve the Contractor of any of his responsibility under the contract for the successful completion of

the work. No change shall be made in any approved working drawings without the written permission of the Engineer. The contract price shall include the cost of furnishing all working drawings, and no additional compensation will allowed therefor. (DD2)

- When required by the Company, the Contractor shall submit outline and connection drawings showing all parts and accessories in their proper location and all clearance dimensions so that the arrangement of the equipment and its connections may be properly checked. Should any changes in the arrangement of the equipment or any interference in the making of any connections thereto occur during installation and be caused by lack of adequate information on the Contractor's drawings, the cost of such changes in the arrangement of the equipment and of removing such interference may be deducted from the Contract price. (A3)

31

- Progress payments shall be issued monthly. In making progress payments, retention shall be withheld so that total progress payments shall at no time exceed ninety percent (90%) of the value of the Work performed, as estimated by Owner, unless otherwise specified in the Contract. Retention shall not be withheld from payments for extra work, reimbursable costs as set forth in the Article 26.0, reimbursement for surety bond premiums, or reimbursement for authorized escalation. (31 & 41) (A8)

- If the Contractor shall proceed properly and with diligence to perform and complete this contract, the Commissioner may, from time to time as the work progresses, grant to the Contractor an estimate of the amount already earned, reserving ten percent thereof... (PP8)

32

- The Purchaser's monthly estimates will be based on materials and equipment which have been installed as a part of the Work. Unless otherwise agreed in advance, the Purchaser will not include in its monthly estimates materials or equipment which are stored on the jobsite awaiting installation. Materials and equipment shall be delivered F.O.B. destination point. Freight charges shall be included in the Contract Price. (A7)

- Payment will be based on the actual cost to the Contractor as indicated on invoices furnished to the Engineer. Notarized copies of paid invoices for all involved material payments allowed on the estimate must be submitted to the Engineer within 30 calendar days of the date of the estimate on which material allowance was made or such material allowance will be deducted from subsequent estimates until such notices have been furnished or until the materials are on hand. Payment shall not exceed 90 percent of the bid price. (DD1)

- No payment for any material delivered to the site of the work under the contract will be made until said material is incorporated into the parts of the project required to be constructed under the contract, except that the Officer-in-Charge may, to the extent provided for in the contract, include in his monthly estimate for progress payment an amount up to ninety percent (90%) of the delivered cost of specialized materials or equipment usable only for the contract. Such inclusion in the monthly estimate will be made only if all costs are substantiated by evidence of payment and only for such materials or equipment as are specifically described or referred to in the contract as being the subject matter for such inclusion in the monthly estimate for progress payment. (PP3)

- The estimate may include acceptable nonperishable materials delivered to the work or stored as provided for in Paragraph 9.3.2 and such payment will be allowed on the same percentage basis of the net invoice value, less taxes, as provided hereinafter. (PP2)

33

34

- As soon as possible after the first day of each calendar month, and not later than the 12th day of the month, the Purchaser will make an estimate in writing of the cumulative amount of Work completed since the beginning of the job and value thereof consistent with the Contract Price. The Purchaser will make surveys and measurements required to determine the amount of Work. The Purchaser's records will be made available to the Contractor at the Purchaser's field office. (34 & 36) (A7)

35

- At least once each month, the Engineer will make an approximate estimate, in writing, of the materials in place complete, the amount of work performed, and the value thereof, at the contract unit prices. (D8)

- Semi-monthly estimates may be rendered provided (a) the value of the work performed in two successive weeks is more than $50,000 or (b) the Commissioner of Transportation deems it to be for the best interests of the State to do so. (D4)

36

- The review and verification process may be delegated by the Engineer to the Field Representative of the Engineer. (P1)

- Prior to beginning Work, Contractor will submit a breakdown of the Contract Price including quantities and unit prices.
  Contractor will complete an Application for Payment covering all Work accomplished up to the date stated in the Application for Payment. The Application for Payment will be submitted no more than once a month.
  [*Owner*] will, not later than 30 days after receipt of Application for Payment from Contractor, either pay Contractor the amount requested, or reject the Application for Payment.
  Contractor may revise any rejected Application for Payment. If revisions are acceptable to [*Owner*], [*Owner*] will, not later than 21 days after receipt of revised Application for Payment, pay the revised amount. (P2) **Long lead. 51 + 30 (work at start of month) = 81 days.*

- Payments will be made by the [Owner] within approximately thirty (30) days after receipt of proper invoices and documentation.
  The [Owner] may withhold such amounts from any payment as may be necessary in the opinion of the [Owner] for protection from loss on account of, but not limited to:
  a. defective work not remedied,
  b. claims filed or reasonable evidence indicating probable filing of claims,
  c. failure of Contractor to make payment promptly to its employees or to Subcontractors or materialmen for materials or labor within a reasonable time after Contractor has received the material or work for incorporation into the work,
  d. damage to another Contractor or Subcontractor,
  e. bankruptcy, receivership or insolvency of, or pendency of such proceedings against Contractor,
  f. costs to [Owner] for work, as provided in the Contract documents to be reimbursed to the [Owner] by the Contractor. (36 & 40) (P5)

- The DIVISION will, within ten days after receipt of each Application for Payment, either pay the CONTRACTOR, the amount submitted, or return the Application to the CONTRACTOR indicating in writing his reasons for refusing payment. (P3)

- The remainder shall be paid by the Owner to the contractor on or before the 30th day of the month following the making of the estimate. (A9) **60 day delay.*

- Upon preparation of such estimate, the Purchaser will pay to the Contractor a sum equal to 100% of such estimate, less any previous payments that may have been made, and payment will be made to the Contractor on or before the end of the month. (36 & 40) (A7)

- Whenever the said estimate or estimates of work done since the last previous estimate exceeds one hundred dollars ($100) in amount, a percentage of such estimate will be paid the Contractor within fifteen (15) days following receipt of the Certificate for Payment by the Owner. (PP2)

- On or before the fifteenth (15th) day of each month, the Company shall pay the Contractor for work performed for payment by the fifth (5th) day of each month, providing the Contractor shall not then be in default in respect to any of the terms, conditions, and provisions of the Contract. The Company may retain 10 percent from all amounts processed for payment to ensure compliance with the Contract. (A3)

37

- The submission by the Contractor of weekly payrolls, or copies thereof, is not required. However, each Contractor and Subcontractor shall preserve his weekly payroll records for a period of three years from the date of contract completion. (D6)

- A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or his authorized representative on request. (D2)

38

- This schedule, when approved by the Architect and the Owner, shall be used as a basis for the Contractor's Application for Payment. Schedule of values shall follow the trade division of the Specifications. Contractor's Application for Payment shall be filed on AIA Form G702 (Application and Certificate for Payment). (PP2)

- For the purpose of making monthly estimates for partial payments to the Contractor, the Contractor shall submit to the Commissioner for approval, within 15 calendar days after the effective date of this contract, a detailed breakdown of the estimated value of the work to be done under each of the lump sum items included in this contract. In the case of a lump sum contract, the detailed breakdown shall give a schedule of costs of the various parts of the work, including quantities. The total of these costs shall equal the total amount of the Contract. The schedule shall be divided so that payments due various subcontractors may be checked by the Commissioner. (PP4)

39

40

- Upon completion of the work and prior to computation of the final quantities, 2 percent of the total amount of the contract shall be retained out of said aforementioned reserve, and the balance released to the contractor. (PP4)

- In addition to express provisions elsewhere contained in the Contract, the City may withhold from any payment otherwise due the Contractor, such amount as determined necessary to protect the City's interest,...(PP1)

41

- Payments made under the items of the Bid Schedule shall be full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to perform and complete the work. (P1)

- In making progress payments, if the amount of the Contract price is between $5,000 and $20,000, there shall be temporarily retained ten (10) percent of the progress payment. If the Contract price is greater than $20,000, there shall be temporarily retained five (5) percent of the progress payment. (P1)

- The amount retained shall be determined in accordance with the following schedule:... (D4)

- After satisfactory completion of all work under the contract except for the landscaping items, the Department may adjust the amount of retainage under the contract to 15 percent of the landscaping items or 2½ percent of the total contract amount, whichever is less. This provision shall not apply to contracts the scope of work of which is limited solely to landscaping items. (DD2)

- Progress payments to the Contractor shall be for a sum equal to ninety-five percent (95%) of the above estimate, less previous payments and sums withheld by the City pursuant to the contract. After fifty percent (50%) of the work to be performed under the contract has been completed and progress is satisfactory, progress payments will be for one-hundred percent (100%) of the above estimate...(PP3)

- The percent retained by the Owner will be ten (10%) percent on all contracts in excess of $25,000 and less than $400,000; for contracts where the contract price at time of execution is $400,000 or more, the percent retained will be five (5%) percent. On all contracts of $25,000 or less where the Contractor furnishes performance and payment bonds and progress payments are therefore allowed, the Owner will retain fifteen (15%) percent. (PP2)

- Company shall pay Contractor within thirty (30) days after approval of an invoice from Contractor. Amount due shall be total amount less 10 percent which shall be retained until final payment. (A1)

42

- The retainage amount will not be reduced below 2 percent until the final payment. (D8)

- Five percent of the value of the work done as indicated by the estimate shall be retained as security for fulfillment of the contract until a total of 5% of the total bid price has been retained, unless otherwise determined by the Engineer. (D5)

- Pursuant to RCW 60.28.010, all payments made under this Contract shall have a sum retained equal to five percent (5%) of the approved invoiced amount. At any time after fifty percent (50%) of the original Contract work has been completed, the [Owner] may, if it finds that satisfactory progress is

being made, make any of the subsequent payments in full, providing that the amount retained shall not be less than five percent (5%) of the total amount invoiced under the Contract, and the Contractor may request that retainage be reduced to one hundred percent (100%) of the value of work remaining on the Contract. The retained amount will be paid to the Contractor in accordance with terms concerning final payment. With the consent of the [Owner], the Contractor may submit a bond for all or any portion of the amount of funds retained, in a form acceptable to the [Owner]. (P5)

43

- Payment of the 10 percent retention shall be due sixty (60) days after the date of making the final estimate.
  ...all bills...for which the Owner might be sued or for which a lien might be filed, have been fully satisfied. The Contractor shall execute and file with the Owner a release, in proper form, of any and all claims against the Owner on account of this Contract... (A9)

44

- The amount of retainage will be computed as follows:
  (a) When the value of earned work is less than 90 percent of the value of work scheduled for completion by the approved progress schedule, the amount to be retained is five percent of the value of earned work.
  (b) When the value of earned work is 90 percent or more of the value of work scheduled for completion by the approved progress schedule, the amount to be retained is the percentage of earned work times five percent of the value of earned work.... (D6)

45

- Failure on the part of the Contractor to furnish all required contract documents within 90 days of the Department's offer of final payment will be considered as sufficient grounds to suspend a Contractor's Certificate of Qualification... (D4)

- Acceptance by Contractor of final payment of the contract price shall constitute a waiver of all claims against Owner which have not theretofore been timely filed as provided in this contract. (PP6)

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- Acceptance by the Contractor of final payment shall operate as and shall be a release to the Department from all claims or liability under the contract and any act or neglect of the Department relating to or connected with the contract. (D6)

- ...that the Company shall have the right to retain from such final payment, so long as any of such bills or claims remain unsettled and outstanding, a sum sufficient in the opinion of the Company's Representative to provide for the payment of the same, unless the Contractor shall post a surety bond with the Company in form and amount and with a surety satisfactory to the Company's Representative... (A16)

- Final request for payment shall constitute a waiver of all claims by the Contractor except for any unsettled claims specifically stated in the Contractor's final statement concerning settlement of claims. (P5)

- Acceptance by Contractor of final payment shall constitute a release and waiver of all claims by Contractor against Owner, its officers and employees. (A14)

- Sixty percent of the retainage will be paid immediately after the "Final Acceptance." (D9)

- When OWNER has given CONTRACTOR notification that the WORK has been accepted, and after CONTRACTOR has complied with all other terms, conditions and provisions of the CONTRACT DOCUMENTS the final amount due shall be paid by OWNER to CONTRACTOR within thirty (30) days from the date of receipt of CONTRACTOR'S invoice, or upon acceptance of the WORK, whichever is later. (A4)

- (PP6) **93 days after completion.*

46a

- ...all as required by the Contract Documents, the DIVISION is satisfied that the Work has been completed and the CONTRACTOR has fulfilled all of his obligations under the Contract Documents, it will, within ten days after receipt of the final Application for Payment, pay the CONTRACTOR the amount requested subject to the provisions of paragraph 12.9. (46a & b) (P3)

46b

- The final payment and release of retention shall become due and payable thirty (30) days after the date of completion and acceptance of Work, provided that Contractor is in compliance with the Contract and that Contractor submits a satisfactory completed Affidavit of Completion. (A8)

- If the bid amount of the Contract is $20,000 or more, release and payment of temporarily retained funds shall not be made prior to the expiration of a period free from the filing of Stop Notices, of a duration of 35 days following the date of recording of the Notice of Completion in the office of the county recorder, or otherwise as prescribed by law. (46b & 46c) (P1)

- The retained percentage will not be due and payable prior to 30 days after the date of final acceptance of the entire contract or following the release or adjudication of claims that may have been filed, or until the Contractor has filed the sworn final estimate with the Contracting Authority. (D10)

- Notwithstanding provisions to the contrary in paragraph 74 above, the final payment shall not become due until the following are submitted, to the extent and in a form acceptable to the Purchaser, by the Contractor (and, if requested by Purchaser, by any and all Subcontractors): (1) an affidavit that all sums owed for services rendered, labor performed, and materials, equipment, supplies, tools or construction equipment furnished or used, and other indebtedness connected with the Work for which the Purchaser or its property might in any way be liable, have been paid or otherwise satisfied, and (2) if required by Purchaser, other data establishing full payment and satisfaction of all obligations, such as receipts, releases and waivers of liens, arising out of the performance of the Contract. (A7)

46c

- Five percent (5%) of the amount of each payment shall be withheld from each payment until final acceptance of the completed contract by the District and the expiration of the thirty-day (30-day) period for filing of liens as provided by law... (P4)

47

- Contractor warrants that the Work shall be: (a) provided in accordance with the Specification and other requirements of the Contract Documents; (b) in accordance with standards of care, skill and diligence consistent with recognized and sound industry practices and procurements; (c) free from

faulty design (to the extent of Contractor's design responsibilities) and workmanship; (d) new materials (if furnished by Contractor hereunder) free from faults and defects and of proper size, quality and material to meet the requirements of the Contract Documents; and (e) conveyed with free and clear title. (A12)

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- Contractor, at its own expense, shall promptly repair, replace or otherwise cure all materials, equipment or Work (including payment for labor associated with such repair, replacement or other cure and removal and installation charges) which fails to conform to or requires repair, replacement or other cure as a result of nonconformance to the aforesaid warranties in any respect if such failure occurs or is discovered during the progress of Work or within eighteen (18) months after Commercial Operation, however, the warranty period shall not extend beyond thirty (30) months from the completion of erection. The warranty covering any part of the materials, equipment or Work that shall be replaced, repaired or otherwise cured by Contractor under the above conditions shall be reinstated to the expiration date of the original warranty or one (1) year after said replacement, repair or other cure whichever period shall expire last, however, no warranty will extend beyond thirty-three (33) months from the initial operation. Notwithstanding the above, there shall be no time limitations on Contractor's warranty of free and clear title. (A12)

- If the Purchaser gives the Contractor written notice within a reasonable time after discovery of any failure to meet any of the warranties set forth herein, which failure shall appear prior to the expiration of one year after the final completion of the Work, the Contractor shall promptly make the repair or replacement or re-perform the Work necessary to remedy the failure with the expenses thereof to be borne by the Contractor. In addition, the Contractor shall, at his own expense, make such tests as the Purchaser may require to show the effect of such repair, replacement or re-performance. The Work, or portion thereof, repaired, replaced, or re-performed under the "WARRANTY" provisions hereof shall be further warranted for one year after the date such repair, replacement, or re-performance is completed or until the end of the time period specified above, whichever is later. (A7)

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50

- If, instead of requiring correction or removal and replacement of defective Work, the DIVISION prefers to accept it, it may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price; or if the acceptance occurs after approval of final payment, an appropriate amount shall be paid by the CONTRACTOR to the DIVISION. (P3)

- If the Contractor should neglect to prosecute the work properly or fail to perform any provisions of this Contract, the Company, after three (3) days written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and charge the Contractor for the costs of so performing the work. (A3)

51

- The warranty period for discovery of Defective Work shall commence upon Acceptance and continue for the period set forth in the Specifications or for one year if not so specified. If, during the warranty period, the Work is not available for use due to Defective Work, such time of unavailability shall not be counted as part of the warranty period. The warranty period for corrected Defective Work shall

commence upon Acceptance of such corrected Work and shall continue for a duration equivalent to the original warranty period. (A10)

- If the Contractor, after notice, fails to proceed promptly to remedy any failure to meet any of the warranties set forth herein, the Purchaser may remedy such failure, or have such failure remedied by others, and the Contractor shall be liable for all expenses incurred. Compliance with or conformance to a Quality Assurance, Quality Control or similar program shall not relieve Contractor of its warranty obligations under the Contract. (51 & 52) (A7)

52

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- ...except that Contractor's obligation to indemnify Owner shall not apply to any liabilities arising from Owner's sole negligence, or that portion of any liabilities that arise out of Owner's contributing negligent acts or negligent omissions... (A8)

- This obligation is binding on the Contractor without regard to whether or not such claim, damage, loss, or expense is caused in part by the act, omission or negligence of the Department or its officers, employees or agents. (D8)

- Contractor further agrees to indemnify and save harmless the [Owner] or its representatives from and against any and all liability arising from injury or death of persons or damage to property occasioned by the concurrent negligence of the [Owner] or its agents, representatives and employees, and the concurrent negligence of the Contractor, or its agents, representatives and employees, including any and all expense, legal or otherwise incurred by the [Owner] or its representatives in the defense of any claim or suit relating to such injury or damage. Contractor shall indemnify the [Owner] only to the extent of Contractor's negligence. This indemnification does not apply to liability arising from the sole negligence of the [Owner] or its representatives.
  For the purpose of fulfilling this indemnity obligation, the Contractor hereby waives any and all immunity rights or protections created by the Workers' Compensation Act and further agrees that this indemnity agreement shall apply to, but shall not be limited to, actions brought by its own employees. [Owner] and Contractor agree that for actions brought by Contractor's employees where the Contractor is the sole defendant, the Contractor has not waived its Industrial Insurance Act immunity rights or protection. (P5)

- The Contractor shall undertake the work as an independent Contractor at his sole risk and shall protect and indemnify the Company and hold it harmless from any and all claims and causes of action arising out of any injury, including death, or damage to property sustained by any person as a result of the execution of the Work to be performed by the Contractor or of any of the activities of the Contractor, his employees, or of any Subcontractor or his employees. (A13)

- The Contractor shall indemnify and hold harmless the Purchaser and its representatives, agents, officers and employees from and against any and all loss, damage or liability resulting from demands, claims, suits or actions of any character presented or brought for any injuries (including death) to persons and for damages to property caused by or arising out of any negligent (including strict liability), wanton or intentional act or omission of the Contractor, Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts anyone of them may be liable, in any way associated or connected with the performance of the obligations herein, including obligations under the "WARRANTY" provisions hereof, in whatever manner the same may be caused, and whether or not the same be caused by or arise out of the joint, concurrent or contributory negligence of

the Purchaser, or its representatives, agents, officers or employees. The foregoing indemnity shall include, but not be limited to, court costs, attorney fees, costs of investigation, costs of defense, settlements and judgments associated with such demands, claims, suits and actions. (A7)

- Contractor warrants that all goods and/or services provided by it shall: (a) be of good quality and workmanship and free from defects, latent or patent, (b) conform to all specifications, drawings and descriptions of the Contract, (c) be merchantable, suitable and sufficient for the intended purpose, (d) be in accordance with standards of care, skill and diligence consistent with recognized and sound engineering and construction practices and procedures, and (e) be free of any claim of any third party. (A1)

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- In accordance with Chapter 360 of the Milwaukee Code of Ordinances, Equal Opportunities Enterprise Program Ordinance requirement, it is the City's policy to accomplish Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) participation in all contracting activities in the Department of Public Works. The City has established for itself an overall goal of 12.5% Minority Business Enterprise and 1.0% for Women's Business Enterprise for 1988 contracts. In an effort to meet these overall goals, the Commissioner of Public Works, as contracting officer for the City, expects the bidders to use their best efforts to enable MBEs/WBEs to be considered fairly as subcontractors and material suppliers under all contracts. The goals for this contract are: MBE 12.5% , WBE 1% . (PP9)

- In order to determine whether the WORK has been completed in accordance with the CONTRACT DOCUMENTS, OWNER shall make a final inspection within sixty (60) days after receipt of notice from CONTRACTOR that the WORK has been completed and is ready for final inspection. (A4)

- Failure of the Contractor to comply strictly with these requirements shall constitute a waiver of all or part of any claim for extra compensation on account of the performance of such work. (PP1)

Appendix B - Interviews and Seminar Lectures

A - Construction Professional Profiles

Contractor 1: Contractor 1 is a very large national general contractor. The contractor specializes in new building construction but completes limited work in heavy civil and renovation. Does both private and public work.

Contractor 2: Contractor 2 is a very large international general contractor. The contractor specializes in new building construction in the United States but completes new building, heavy civil, and renovation internationally. Does both private and public work.

Contractor 3: Contractor 3 is a medium size local general contractor. Contractor 3 does private work with repeat customers and specializes in small industrial facilities and small to medium building construction.

Contractor 4: Contractor 4 is a medium size specialty subcontractor. Contractor works at finding a "niche" contracting in the private sector but does some public work.

Contractor 5: Contractor 5 is a medium size local general contractor. Contractor only does private work and specializes in construction manager/general contractor and design build construction of small industrial facilities, pre-engineered buildings, and small to medium size building construction.

Contractor 6: Contractor 6 is the "heavy civil" division of a very large international construction conglomerate. The contractor specializes in public work but does some private work.

Contractor 7: Contractor 7 is a medium size general contractor working primarily in Washington and Alaska. The contractor does public and private work but is currently focusing on establishing repeat customers in the private market.

Contractor 8: Contractor 8 is a small local general contractor that specializes in the construction of small to medium private commercial projects.

Contractor 9: Contractor 9 is a large general contractor working in Alaska and Washington. The contractor specializes in federal and state public work.

Contractor 10: Contractor 10 is a medium size general and subcontractor specializing in underground and utility public work. The contractor focus is on small, straight forward design/build construction.

Contractor 11: Contractor 11 is a small female owned business specialty subcontractor. They do very specialized "niche" work and focus on public work projects.

Contractor 12: Contractor 12 is a large subcontractor specializing in earth work for private developers.

Contractor 13: Contractor 13 is a large local general contractor that does primarily negotiated, private work.

Owner 1: Owner 1 was a representative of the Washington State Department of Transportation.

Owner 2: Owner 2 heads the construction office at a local military installation.

Consultant 1: Consultant 1 is an ex-general contractor. The consultant specializes in public works contracting and public works inspection.

Consultant 2: Consultant 2 specializes in construction claims.

Surety 1: The surety is a large local firm specializing in construction insurance, construction bonds, and construction benefits.

Construction attorney: The construction attorney works for a firm specializing in construction law. He had a background in construction contract administration and construction engineering before entering the legal field.

Architect-Engineer 1: The architect-engineer firm is a very large national firm. It specializes in building construction but has multiple specialty divisions throughout the United States.

B - Initial Interviews and Seminar Summaries

The data from the initial interviews and seminar summaries is presented in the general categories of "Areas of risk" and "Recommendations for future risk allocation".

Italicized codes are included at the end of each "bullet". The codes refer to how the information contained under that "bullet" was categorized. The code abbreviations and tabulated results are contained in the tables under Section D of this appendix. An example code interpretation is provided below:

1a1 ----- First Number: *1* = Refers to Appendix B Table 1
Middle letter: *a* = Refers to the subheading "a" (Document Quality)
Las Number: *1* = Refers to the "a" subheading code "1" (Incomplete design)

Company size and nature is contained in the Construction Professional Profile section at the beginning of this appendix.

B.1 - Initial Interview Summary 1

Participant 1: Principal, Contractor 1

Areas of risk:

- Owner over-inspects, micro-manages KTR process. *(1b5)*
- A/E ego involved: purity of design, ownership of ideas. This may inflate costs with out providing a better product when inevitable changes occur. *(1c)*
- Contractor stated that contrary to owner's belief, money is never made on changes in building construction contracts due to multiple hidden costs and lost efficiency that is not easily documented or obvious. *(1j6)*
- Initial cost is based on documents and is not true cost of product. For example, with poor documents a contractor's low bid is a reflection of document quality. If an owner-A/E does not accept responsibility for the poor *detailed or coordinated* documents, the contractor will be forced to litigate. He stated that poor, incomplete designs are an area of extreme risk for both the contractor and owner. *(1a1, 1a2)*
- Contract processes that wrestle all control from the contractor. Less control means less opportunity for profit and more opportunity for loss. *(1b5)*

Recommendation for future risk allocation:

- Utilization of innovative procurement strategies by the owner. He used the example of design/build procurement by the owner as a method to allocate risk fairly. *(3a1)*

- The following were given as characteristics and benefits of possible innovative procurement strategies such as design build:
  - Contractor will have more opportunity for profitability. Profit or reward is a function of risk and responsibility. New procurement techniques may be riskier at first, but if the contractor is given more control, they will be able to control the risk and have more influence on their ultimate reward.
  - Fewer changes. (KTR more profitable with fewer changes.
  - Faster process. Less time exposure. Back in market again quicker.
  - Use contractor building expertise, can answer and design own RFIs.
  - Quicker response to RFIs (A/E works for KTR) = quicker completion.
  - More buildable documents = less cost to owner (less changes).
  - 1/10 dispute ratio (no design interpretation to argue over). *(3a1)*
- Contractor finished by saying that, contrary to popular arguments against procurement reform, the quality of designs would not suffer. He stated that an owner's criteria dictates overall design quality. If quality of design is the primary criteria, design will reflect this. If criteria is to award on price, design will reflect this. He stated further that allowing the contractor to pick the architect (e.g., person) they will ensure the design is the best possible as contractor will always chose the architect that can produce the most "buildable" documents and meet all criteria of owner. *(3a1)*

B.2 - Initial Interview Summary 2

Participant 2: Project Manager, Contractor 1

Areas of risk:

- Contractor stated opinion that the most onerous contract provision is the "intent" or "errors and omissions" provision. It was the contractor's opinion that intent, errors, and omissions are not biddable. He stated that it is only reasonable for an owner to expect the contractor to bid what is in "black and white" as this is the only way any contractor can be competitive at bid time. He further stated that it is unreasonable to expect the contractor to accept losses based on the owner and designer's inability to provide a buildable set of documents. It was his opinion that the documents must stand on their own merit without "safety net" clauses. *(1b2, 1b4, 1d1, 3c2)*
- Contractor stated that unreasonable risk is also placed on the contractor when incomplete drawings are produced and sent out to bid. The contractor must accept unreasonable risk to even bid such a project if the owner and designer expect that the contractor will "complete the design in the field" through shop drawings, requests for information, and submittals. He stated that drawings continue to get worse and owners continue to expect the contractor to complete designs during construction. This costs money that was not bid or could not be bid to remain competitive. He predicted that this trend would eventually backfire against the owner as costly litigation would likely increase to protect contractor rights. *(1a1, 2a, 2b, 2e)*

Recommendation for future risk allocation:

- Contractor stated that fair risk allocation would require procurement reform or a renewed interest by owners to produce highly coordinated buildable documents prior to bid. The contractor stated that "business as usual" contracting places the preponderance of risk on the contractors organization by placing rigid expectations on performance without giving them the responsibility, power, or freedom to "control our own destiny or profitability." The contractor inferred that if allowed, they would bid designs and accept additional risk if they were given additional control. He stated that design risk is controllable as the contractor would have the latitude design buildable systems and would have responsibility commensurate with their risk. *(3c2, 3e, 3f)*

B.3 - Initial Interview Summary 3

Participant 3: Project Manager, Contractor 2

Areas of risk:

- Contractor stated that it is in the production of the contract documents that he is forced to place the highest reliance on the owner. He stated, in fact, that unless an owner produces good, complete, buildable drawings they should expect claims and litigation. He made the point that natural conflict between contractor and owner is set from the outset of the project if the contractor is asked to accept unreasonable risk borne from poor construction documents. The contractor equated reliance on the owner coupled with contractor latitude as the determinant of total risk. He stated that if given responsibility and control they would gladly accept risk as controllable risk equates to opportunity for profit. If, however, they are not given control and are put in the position of heavy reliance, they will look for every opportunity to shift the risk back to the owner as variables beyond their control dictate their success. *(1a1, 1a2, 1b4, 3e)*
- Contractor stated that the trend in "hard bid" or low bid contracts is to produce marginally coordinated drawings and ask the contractor to complete the project at his expense. He stated emphatically that it is the owner's production of poor "final designs" that shifts the preponderance of risk to the contractor as owners rarely accept responsibility for the design and rely on onerous clauses to protect their interests. (Note: The author inferred from the discussion that the contractor was referring to clauses such as "intent", "errors and omissions", and the requirement for highly detailed shop drawings and submittals.) *(1a1, 1a2, 1b6, 1d1, 1f1, 2b, 2e)*

Recommendation for future risk allocation:

- Contractor stated that owner/contractor relationship must become one of partnership. *(3b1)*
- Procurement techniques must be modified such that natural conflicts of interest between owner and contractor are removed. *(3d)*
- Contractor stated that owners are not tapping into contractor building expertise and are relying on "code experts" (e.g., the architect/engineer) rather than construction experts. He listed specific areas of contractor expertise as mechanical, electrical, and structural. He stated that not only would risk be allocated more fairly if the contractor was allowed to use his expertise, but that the owner would also realize cost savings from efficient designs. *(3e)*
- The contractor listed the design/build procurement process as a means to allocate risk fairly, increase contractor ability to profit (e.g., risk + responsibility = controlled opportunity for profit), and decrease conflict between the contractor and owner. *(3a1)*

B.4 - Initial Interview Summary 4

Participant 4: Estimator/Project Manager, Contractor 3

Areas of risk:

- The contractor listed the following clauses as typically shifting the preponderance of risk to the general contractor: submittals and shop drawings, technical specifications and "or equal" specifications, changes, final acceptance, payment schedules, retention, warranty, and differing site conditions. *(1dx)*
- The contractor stated that the most notable recent change in risk allocation has been in the responsibility put on the contractor to finish incomplete designs through shop drawings and submittals. *(2b)*
- Contractor stated his opinion that, in practice, poor specifications and the unstated requirement for detailed shop drawings are the area of largest risk for the contractor. He clarified this statement by adding that these situations force the contractor to complete work that is not biddable and that if the requirement for detailed shop drawings is not explicit in the solicitation this work must go unbid for the contractor to remain competitive. *(1a1, 1b6, 4d, 5b)*
- The contractor stated that he is seeing a movement in design towards fewer details, more information put on complicated and inexact schedules, and the in-field requirement to produce detailed shop drawings in order to complete a project. He stated further that he has inquired about this trend with the local architect/engineer community and was told that the architect's

errors and omissions insurance provider has initiated this movement as a means to mitigate risk of loss on insurance claims. *(1a1, 1a2, 2a, 2b)*

- The contractor stated that responsibility for design is being shifted in practice but that the contractor is not being given the control necessary to allow profitability. *(2a)*
- Contractor stated that the preponderance of present litigation is in differing site conditions as geotechnical reports available at bid time are incomplete and that very detailed site investigations are not practical due to large sunk costs. *(1a1, 1j3)*
- The contractor stated that their firm, as they deal with repeat private owners, must treat warranty work like marketing for future work. That is, the contractor often chooses to do maintenance work under the guise of warranty work in order to ensure the customer will continue to use their services in the future. *(1j1)*

Recommendation for future risk allocation:

- The contractor could not list any specific recommendations but did state that if the goal is to allocate risk fairly that the contractor must be paid for the design completion effort. (Note: The author inferred from conversation that the contractor believed they were not able to manage their risk well when typical procurement techniques are utilized as they have little control of the overall process.) *(3e)*

B.5 - Seminar Summary 1

Participant 5: Owner, Contractor 4

Seminar topic: Running a Construction Firm

Areas of risk:

- The contractor stated that margins are so tight that you can not make a profit in the "construction phase" of project completion. Success and profit can only be realized through business advantages over competitors. He listed possible areas of advantage as: lower insurance, lower bonds, better attorneys, better accountants, networking, association participation, and safety. *(1j5)*
- The contractor implied that safety performance was the most important factor to controlling profitability. Controlling and proactively managing safety performance was the best means to control risk and success. *(1j5)*

Recommendation for future risk allocation:

- While the contractor did not provide any direct recommendations, he implied that risk, profit, and success was most influenced by safety performance and business advantage (e.g., networking, lower EMR, lower insurance premiums, expert personnel for employee and consultants, etc.). *(1j5)*

B.6 - Seminar Summary 2

Participant 6: Owner, Contractor 5

Seminar topic: Alternate Construction Delivery Systems

Areas of risk:

- Contractor choose to specialize in private construction because of the restriction, sociological programs, wage rates, and extreme competitiveness of public work. All these factors added up to approximately "two employees" as additional overhead while public contracting provides less opportunity for profit. *(1f1, 1h, 1j4)*

- Contractor perceived a large area of risk in the procurement method selected by the owner. He stated that "low bid" work was riddled with risk for the contractor and owner for the following reasons:
  - For a contractor to provide a competitive bid they must either make bid errors or look for loop holes in the documents. He stated that awards of low bid contracts most often go to the contractor that made a bid error or did not understand the project.
  - After a contractor gets a "low bid" they must "squeeze" subcontractors and suppliers, look for errors in the documents that can provide an avenue for changes, and claim and litigate changed work that owners do not recognize.
  - The process is confrontational and does not promote teamwork.
  - The process delays projects because of requests for information, posturing, changes, and claims.
  - The process actually makes final price higher than value received because of changes, posturing, and litigation. *(1f1, 1f3)*
- Contractor spoke in length about the faults and risk of a contract driven by a design specification rather than a performance specification. He stated that design specifications do not allow the contractor to use their building expertise and that this rigid form of contracting drives costs up because new innovation is thwarted. *(1d3)*
- The contractor stated that architect-engineers are producing "tighter" design specifications which makes claiming against the owner difficult. This trend has, in turn, allocated unreasonable risk to the general contractor as they must fight subcontractor claims as a routine rather than focus on project completion. *(2d)*

Recommendation for future risk allocation:

- While the contractor did not provide any direct recommendations, he implied that the procurement method used greatly influenced the allocation of risk. It was clear that he felt the owner and contractor were both best served by use of the design/build procurement method. He listed the following items as benefits of design/build when compared to "low bid" contracting.
  - The bidder of system also designs the system. Bid costs are, therefore, "true" project costs.
  - Performance oriented specifications promote innovation. Innovation represents real cost savings to owners and increased profitability to contractors.
  - Claims and changes virtually go away as the contractor is more responsible for the end product. Additionally, the design documents are "more buildable."
  - The design/build system is based on trust which allows contractual parties to form a partnership with a common goal. *(3a1)*

B.7 - Seminar Summary 3

Participant 7: Construction/project engineer, Contractor 6

Seminar topic: Construction Engineering and A Contractor's Perspective on Concrete

Areas of risk:

- The contractor stated that the preponderance of risk in heavy civil work is controlled by the concrete systems design. *(1g)*
- Contractor stated that construction in today's world is ran in a "combat" environment. Owners have become more "savvy," specifications have become tighter, and margins are continually decreasing. *(2d)*
- The contractor stated that unreasonable risk is placed on the contractor when the owner employs abusive contract administrators, "green" contract administrators, or over zealous, unreasonable inspectors. *(1b2)*
- Contractor stated that unreasonable risk is placed on the contractor when the design is of a "research and development" nature. He stated his belief that with shrinking margins and tighter specifications the contractor's obligations in contract performance already outweigh the benefit received (e.g., profit). Adding an untried "research" effort to the equation is, therefore, particularly onerous and unreasonable. *(1d2)*

- Contractor stated that the trend in heavy civil work is to place more risk on the contractor through the drafting of "nearly" impossible requirements. With changing codes and improved chemical compounds, designers are requiring more steel, lower slumps, and more elaborate configurations. All of the risk to make an unreasonably difficult design work lies with the contractor as the owner contends "you bid the documents." Contractor stated that more often than not "making it work" entails lost money through completion of unbid work. *(2d, 4e)*

Recommendation for future risk allocation:

- The contractor did not provide any recommendations for future risk allocation.

C - Subsequent Interviews

The data from the subsequent interviews is presented in the order and fashion that it was articulated by the interview participant.

Italicized codes are included at the end of each "bullet". The codes refer to how the information contained under that "bullet" was categorized. The code abbreviations and tabulated results are contained in the tables under Section D of this appendix. An example code interpretation is provided below:

1a1 ----- First Number: *1* = Refers to Appendix B Table 1
Middle letter: *a* = Refers to the subheading "a" (Document Quality)
Las Number: *1* = Refers to the "a" subheading code "1" (Incomplete design)

Company size and nature is contained in the Construction Professional Profile section at the beginning of this Appendix.

C.1 - Subsequent Interview 1

Participant 3: Project Manager, Contractor 2

Risk as a function of procurement type:

- The contractor stated that risk type found in contracts is primarily a function of the type of procurement employed. He commented that in a "hard bid" (low bid) contract the risk is primarily seen in overhead (e.g., making a profit is schedule driven) and labor (e.g., production inconsistent with bid). On a design/build contract risk is a function of subcontractor performance (e.g., sub does not understand scope of project and design and yet prime must still provide product at the budget bid by the sub). *(1f1, 1f2)*

Onerous clauses:

- The onerous nature of each contract is unique to the project and is a function of the owner. The contractor stated that there are many contracts that the owner will not bid solely because of the overall onerous tone of the specifications. The assumption is that a project with unreasonably onerous specifications will be administered in an onerous unreasonable fashion by the owner. *(1d, 4d)*

Drawing quality and effect:

- The contractor stated that the most obvious current trend that has shifted additional risk to the contractor is the production of incomplete or poor drawings. He commented further that he rarely sees a "good" set of drawings. The production of these poor drawings has, in turn, produced a large "gray area" between what is design and what is shop drawings. By producing documents with this larger "gray area" the owner has essentially tried to shift a great portion of the design risk to the contractor. This "gray area" becomes evident and creates conflict when the owner and architect-engineer expectation is for contractors to "finish" the design in the field. The contractor stated it is never the responsibility of the contractor to "finish incomplete designs," it is only his role to coordinate. (Note: Author took this comment to infer that shop drawings need only be complete enough to successfully coordinate the installation of design elements, they should not be the source of design completion.) *(1a1, 1b4, 2a, 2b)*

- The contractor stated all parties must take full responsibility for their role in the construction process. *(3c1)*

Preferred procurement form:

- Contractor stated that design/build (D/B) was better from a risk standpoint for the owner and the contractor. *(3a1)*
- He stated D/B was better for the owner because it allowed owner to clearly "define and assign the gray area" rather than the A/E. He stated that this allowed clear communication and clear understanding of risk allocation between all parties. He also stated that there is no overlap between design and shop drawings and that this saves costs in redesign and all but eliminates conflict as the "gray gap" is minimum. *(3a1, 3b2)*
- He stated that contractor benefited with D/B as he has "control over his own destiny." No posturing due to "gray" is required and the contractor is not required to "find the pitfalls of the documents after the bid." *(3a1)*

Preferred customer:

- Contractor would prefer to do private work as there is less risk since most of the work is negotiated. The contractor stated that the norm in private work is to base negotiations on past performance and trust. Contractor also stated that in private work they have more flexibility to work with the architect-engineer. *(1h)*

C.2 - Subsequent Interview 2

Participant 2: Project Manager, Contractor 1

Risk as a function of document ownership:

- The contractor stated that the biggest risk found in construction completion is in the ownership of the documents. Ownership of documents by his definition meant who had ultimate responsibility for the quality and constructability of the documents. *(1b1)*
- The contractor pointed out that if, in the administration of a final design competitively bid contract, the owner does not take responsibility for "owning" the documents they are attempting to unreasonably shift their ultimate risk to the contractor. *(1b1, 1e)*
- The contractor stated that if the procurement type *formally* shifts the ownership of the documents to the contractor that risk allocation is reasonable as the contractor has more control which allows the control over profitability. *(1f3)*
- The contractor also stated that with contractor "ownership" of documents procurement is much more timely as "problems with the documents" can be coordinated directly between the contractor and A/E. *(3e)*

Risk as a function of procurement type:

- Contractor stated that in a competitive bid environment that the contractor only bids the minimum requirements to stay competitive and that the minimum may be much less than the owner is expecting. He pointed out that the competitive bid environment only requires that what is bid is a reasonable interpretation, not the owner's expectation. *(1f1)*
- Contractor stated that design/build procurement is a means to formally shift ownership of the documents and that the owner would see the benefit of coordination with one point of contact, quicker procurement, and less conflict in contract administration. *(3a1)*
- Contractor warned that design/build is not a panacea. He warned that the owner must still closely monitor quality to ensure the required end function is met and the needs of the end user are met.

Onerous clauses and core responsibility:

- Contractor stated that the owner is responsible to clean up inadequate design documents in a final design, low bid environment. *(3c2)*
- The contractor stated that "errors and omissions" and "intent" clauses are a "crock" as they allocate risk in such an unreasonable fashion. He stated that the owner had the choice of alleviating the problems of poor design prior to procurement. He also stated that the owner controlled the design process and must, therefore, take responsibility for it. *(1d1, 3c2)*

- Contractor stated that he would employ multiple methods to fight unreasonable clauses as long as it made economic sense. He stated that he would not allow a particularly onerous clause to dictate behavior. *(4a)*

Problems with low bid procurement:

- Contractor stated that common owner stances are "you bid it," "bid it as you see it," and "patent defects require clarification at bid time." Contractor stated that the low bid procurement process does not allow clarification of every item and that most defects are not even found during bid. Contractor pointed out that the 2-4 week bid process is not detailed enough to find all the defects and that it would cost to much money to find every latent and even every patent defect. Contract documents have multiple paper trails and one paper trail may be bid and reviewed while the other paper trail may have the defect. *(1b1, 1f1)*
- Contractor stated that to remain competitive the bidding process must be as efficient as possible since lost bids equal unrecoverable expenditures. To survive in the bid environment, the contractor can only bid to rough accuracy.
- Contractor stated that the build process is detailed and is the "opposite" of the bid process. The magnitude of the difference in the process is obvious when you even consider that contractors typically only take four weeks to prepare a bid and two years to build a project.
- He stated that the entire low bid process is unreasonable when the specifications do not "meet" the plans. That is, plans are bid from the material take off stand point and yet most owners say that specifications govern. If the two are not coordinated properly, the owner often interprets "more" than could have possibly been bid. *(1ax, 1f1)*

State of the market and design trends:

- Contractor stated that construction contracting is continually more competitive and that owners are procuring construction in "critical time frames" as quick development is equivalent to economic gain. This has in turn created a trend of less design and planning up front and more requirements on the contractor to "finish" designs through submittals, RFIs, etc. *(2b, 2c)*
- Contractor stated that the owner is essentially requiring more in less time. The owner is essentially allocating more responsibility to the contractor but only allowing the contractor to have the control commensurate with a "truly complete design." *(2l)*
- Contractor sees a trend toward less adequate and miss coordinated design. He stated his belief that this is largely a function of cutting and patching in CAD that continues and magnifies mistakes throughout the documents. *(2a)*
- Contractor stated his belief that design is worse because owners are "squeezing" the A/E community. The owner is giving the designer less time and less money to complete design. The A/E in turn increases their errors/omissions insurance to protect themselves. *(2a)*

Procurement reform:

- Contractor stated that reform must focus on refocusing owner expectations such that they are reasonable. Contractor stated that an example of this would be owners understanding that the low bid process only requires contractor to bid what is minimally reasonable and the owners expectations must come in line with this fact if the low bid procurement is used. *(3f)*
- Contractor stated that procurement reform is not as important as having sophisticated and reasonable owners. Owners that truly understand construction and its risks are required. *(3b3)*
- Contractor stated that in conclusion that future procurement must clearly address ownership of the documents and owners expectations. He stated his belief that in low bid procurement reasonable owner expectations is for the minimum reasonable interpretation, not the maximum as is now the case, and that ownership of the documents must be clearly set on the A/E and owner. The contractor predicted that continued attempts to shift the risk of incomplete design and unreasonable expectations to contractor will only result in late projects, disputes, and litigation borne from natural conflict. *(3f, 5b)*

C.3 - Subsequent Interview 3

Participant 8: Project Manager, Contractor 6

Scope of work:

- Contractor stated that risk allocation starts with how the owner "gives the scope of the contract" to the contractor. *(1i)*
- Contractor made the point that if the owner has a "very straight forward" project and can produce documents with out errors and omissions, the owner will get the best starting price. *(1ax)*
- Contractor stated that if "there are to many variables" the owner is a fool to go with a firm fixed price (FFP) type of contract. The contractor stated that there is too much risk borne from FFP contracting for the owner and contractor when the scope of a project is wide and varied and many variables exist. He stated further that *natural conflict and litigation is almost required* when an owner does not realize the importance of proper scope and uses FFP contracting in a high variable setting. *(1f1, 1i)*
- He made the point very clear that he felt that risk on project starts with the scope and "what confidence level the owner has in their ability to put the true scope on paper." *(1ax, 1i)*

Onerous specifications, Incomplete design, and scope:

- The contractor stated that the owner must ask the question of whether or not they are being "honest" with themselves while drafting onerous specifications and producing poor documents. He stated that onerous specifications *do not* truly shift the risk of proper design and scope to a contractor as the contractor will use multiple means during the project to shift the core risk of scope back to the owner. Means he used include: litigation, requests for equitable adjustment, compensation for delays, requests for information, simply not bidding the project, and bidding the project at a premium. *(4b, 4c, 4d)*

Procurement process:

- Contractor stated that the owner must make a determination before choosing a procurement process whether or not scope can be "expressed cleanly" and expressed in an acceptable time frame. If the scope can not be "expressed cleanly" and the owner is foolish to expect that "intent and errors/omissions clauses" will protect his interests. *(1i, 5f)*
- Contractor stated that the owner must choose between designing and administering a contract with flexibility or procuring with flexibility. *(3b3)*
- Contractor stated his belief that ultimately owners will come to the realization that design/build (D/B) procurement is the best procurement method. He stated owners must first be honest with themselves about who bears the responsibility for scope risk in the FFP system and then they will realize that if they want to shift portions of the scope risk to the contractor in a legitimate, open manner design/build procurements gives them an avenue to do so. He considered the design/build procurement method a legitimate way to shift design risk as it formally allows the contractor to be price design completion. *(3a1)*
- Contractor stated that in the design/build process the owner can facilitate a true project completion team and thereby control their risk. The team approach and owner reviews during the design phase of the project will allow the owner to make sure the design meets specifications, expectations, and is ultimately adequate for the projected needs. *(3a1, 3a2, 3f)*
- Contractor stated that design/build will minimize risk exposure for the owner and contractor. *(3a1)*
- Owners risk will be minimized through communication and because the owner will only have to deal with one party rather than be a referee between the A/E and contractor. Contractor stated that D/B Breaks down natural conflict in FFP. He stated that D/B removes the classic arguments between contractors and A/Es of "bad design" and "bad contractor". The simple removal of this argument, in turn, removes opportunity for conflict, delays, litigation, and risk to the owner. The elimination of the three way communication removes "fire from the flank" for the owner. *(3a1, 3b2)*

Core risks:

- The contractor stated the premise that core risks exist and that the concept of core risk is independent of risk allocation. He stated that each contractual party must be open to accepting their core risk or conflict will occur. *(1e, 3c1)*
- Contractor stated that an owners core risk is to express their need succinctly and stated that this risk is the owners primary obligation to the construction process. It is for this reason that he considers onerous clauses such as intent and errors/omissions as invalid. *(3c1)*
- Contractor stated that if plans and specs are truly adequate than the owner has accepted and managed his core risk and is then open to little risk during project completion. He also stated that good plans and specs removes contractor risk as they know the final scope of their responsibility. If, however, the plans are bad, the owner and contractor are both at risk. He stated that onerous specification are only valid if the plans are perfect and that if the plans are perfect, there is no need for onerous specifications. *(1ax, 3c2)*
- Contractor stated that contractor core risk include things they can control and have influence over (e.g., labor, material, planning, scheduling, etc.). Uncontrollable things should be borne by the owner. The only exception to this is Acts of God (e.g., weather). Risk from Acts of God should be shared. *(1e)*

Risk allocation:

- Contractor stated that risk allocation is generally completed through the general provisions. He said that simply reading the general provisions gives the contractor immediate insight into the owners understanding of core risks. If the owner attempts to deflect risk rather than share the risk through the provisions, the contractor feels that all parties to the contract will lose in the completion process. *(4e, 4f)*
- Shifting core risk can only be accomplished if the owner is willing to pay for the shift in some fashion. *(4f)*
- The largest problem facing the contractor community is that owners do not understand the concept of core risk and do not take responsibility for their portion of risk in the construction completion process. *(1e)*

C.4 - Subsequent Interview 4

Participant 9: Head of Estimating/Project Manager, Contractor 7

Risk as a function of procurement type:

- The contractor stated that risk is primarily a function of procurement type. He specifically stated that hard bid work tries to place the preponderance of risk on the contractor while negotiated procurement actively shares and allocates the risk. *(1f1)*
- Contractor stated that in hard bid work the owner does not have a true handle on the final contract price at bid time as the final price is a function of the award amount plus added costs based on the clarity scope represented by the documents. *(1f1)*
- The contractor stated that the low bid system sets up immediate conflict as the contractor bids what is on the documents, *not intent*. The contractor stated that all to often owners want to enforce intent as opposed to what is actually represented. *(1b4, 1d1, 1f1)*
- Contractor stated that there is a trend towards less complete, less buildable documents in hard bid procurement. He stated that this trend establishes clear conflict as the contractor will always bid the minimum interpretation and that the owner generally expects maximum intent. *(1b4, 2a, 2b)*
- The contractor stated that their firm prefers negotiated procurement. The contractor stated that the initial award price is more than low bid procurement but that the final project price less. He said the final price is less because their are less surprises to the contractor, that the initial price is a truer representation of end costs, that less litigation occurs. *(1f3, 3a3)*
- The following list was provided as benefits to negotiated procurement when compared to low bid: teamwork between contractor, owner and designer, true costs are predicted up front, no litigation, final completion is more timely, and the owner saves money as the design is more buildable by bringing the contractor into the design process as the construction expert. *(3a3)*

Quality of documents:

- Contractor stated that there has been a trend towards worse drawings in the last 15 years and that this trend has been particularly disruptive to the industry. *(2a)*
- Contractor hypothesized that less experienced A/Es combined with the unwillingness of owners to pay for adequate design and scope has resulted in poor document quality. *(2a)*
- Contractor also stated that the industry is seeing the trend of less design being coupled with the owners expectations for design completion through RFIs, shop drawings, and submittals. *(2e)*
- Contractor stated that most design completion is done through the RFI process in low bid contracts. He stated that the simple RFI process does not allow the contractor to recover lost costs in inefficiencies, extra labor, etc. caused by multiple RFIs. Contractor stated that enormous sums of unaccounted money is lost through RFIs with labor in the field sitting idle, changing tasks, and being delayed. *(1a1, 1a2, 1j6, 5f)*
- Contractor stated that completion of design through RFIs would be acceptable if the owner recognized the lost sum of money as an additional cost and compensated the contractor for completing designers work. *(3e)*
- The contractor stated that both contractor and owner are the victim of incomplete design. The contractor only has two weeks to bid a project and assumes the design represented will work. Therefore, when the conflicts are found that can only be discovered through the construction process, the contractor will seek immediate relief. *(5b)*
- Contractor stated that the owner is trying to take advantage of the contractor through not completing designs and expecting uncompensated performance from contractors. *(2b)*

Abusive contract administrators:

- Contractor stated that an unreasonable amount of risk is shifted to the contractor through abusive, inexperienced contract administrators. The contractor stated that such owners place additional risk on the contractor by misinterpreted specs in the owners favor and through inconsistent behavior. *(1b2)*
- Contractor stated that owners who use the documents as a weapon and refuse to apply common sense to the construction process are particularly onerous. *(1b4)*

Onerous clauses:

- The contractor stated that simply no longer bid documents that are to onerous. He stated, for example, that a clause that states "the contractor shall guarantee that the drawings are complete through providing a bid" would make a contract unbiddable as such a guarantee can never be rendered let alone after a two week bid process. Contractor states that his firm has seen such a clause on two occasions. *(4d)*
- Contractor stated that "intent and errors/omissions" clauses are unreasonable. Contractor stated that they view such clauses as a "sign of things to come" and avoid such owners as their expectations likely cannot be met. *(1a1)*

Solution to onerous specifications:

- Contractor stated that their solution to onerous specifications has been to find repeat customers with construction knowledge and common sense. He stated that this is the only way to actively mitigate risk. *(3g)*

C.5 - Subsequent Interview 5

Participant10: Owner, Consultant 1

Risk allocation:

- The consultant stated that more and more work is being brokered and that the contractors are becoming increasingly specialized in order to manage their risk. *(2h, 3h)*
- Stated that risk is being passed down to the lowest level possible (e.g., owner to GC, GC to sub, sub to second tier sub, etc.) in theory but not in practice. *(2h)*
- Stated that the only way to fairly allocate risk is for "each party to assume the risk that is their responsibility." *(3c1)*

- In practice, each party is trying to shift their responsibilities to the parties below in the process. Owners and A/E are not taking responsibility for design and contractors are trying to pass missed bid items, poor performance back to the owner through litigation. *(1e, 2h)*
- Consultant stated that risk is not being assumed as the contract documents allocate it. All parties posture and level the playing the field through disputes. *(2h)*

Solution to better risk allocation:

- Drafting contracts that formally allocate risk through clear statements on who bears which risks and through required communication that would bring risk assessment to the forefront in contracting considerations. *(3b2)*
- Use negotiated procurement techniques due to the up-front communication. Risk allocation is not very controllable in the low bid arena. *(1f1, 3a3)*

Common risks:

- Consultant stated that the owner should accept the common risk of design and scope and that contractors should accept the common risk of construction completion. *(3c1)*
- Consultant stated that in practice their is no clear delineation of who will be responsible for each type of risk. *(2h)*

Expectations:

- Consultant stated that the owner is not sending its expectations to the contractor in an addressable fashion. He believes that this is the case because all to often the owner does not understand its own expectations, that the designer does not understand the owners expectations, and that owner does not understand the "design product". *(2a, 3f)*

Onerous specifications:

- The consultant stated that in practice contractors do not recognize onerous specifications as valid. As such, risk is not truly being allocated to the contractor because the contractor intends on negotiating or litigating over onerous specifications. *(4a, 4c)*
- The result of onerous specifications is that owners expectations are never met and contractor are forced to litigate to remain solvent. *(4c, 4f)*

Risk management:

- Stated that risk management is reactive. He stated that it must be proactive if risk is to be allocated fairly. *(3d)*

Trends:

- The quality of drawings is down, the expectations of owners is up, and contractors are taking less responsibility for the requirements in the bid documents. The combination of these aspects has led to increased litigation and disputes and more unidentifiable risk to all parties. *(2a, 2e, 2l)*

C.6 - Subsequent Interview 6

Participant 7: Project Engineer/Construction Engineer, Contractor 6

Risk types:

- An obvious risk is in ground conditions. *(1j3)*
- Designer to contractor shifts through specifications such as "Contractor to verify dimensions". This risk for dimensional accuracy cannot be bid effectively. *(1a4)*
- A "biggy" is risk shifted to the contractor through "boundary" language. Examples of "boundary" clauses are errors/omission and intent. The language in these clauses state that the owner will not take responsibility for the design, that the contractor must take responsibility for poor design, and that no further compensation will be given for the owner to accept this risk. This language is even hard to price as a contingency because it is hard to predict to what force and extent the owner will rely on these clauses. *(1a4, 1ax, 1b1, 1d1, 1e)*
- Hazardous waste: Contractor will ensure it is never the generator.
- Contractor stated that clear risk allocation is confused today by the production of incomplete, poorly coordinated, un-buildable documents. *(2a, 2b)*

Low bid process:

- The low bid process is to onerous on the contractor. As such, the contractor uses multiple techniques to control their exposure to risk in low bid work. Their typical technique is to immediately enter into good faith negotiations with the owner over their expectations and the possible inadequacy of design. If this fails they will seek disputes resolution for "fair and reasonable" handling of specific issues. If this fails they will go to litigation as a last resort and only when it makes economic sense. They try not to litigate at nearly all costs. *(1f1, 3f, 5c)*

Solutions for fair risk allocation and procurement:

- Owners taking the responsibility to finish designs or pay contractor to finish design. *(3c2, 3e)*
- New procurement techniques such as design build would aid in leveling playing field. Techniques should focus on clear communication of each parties responsibilities. *(3a1, 3b2, 3c1)*
- Procurement should shift to negotiations that establish clear risk allocation or procurement that gives the contractor control commensurate with their responsibility. *(3a3)*
- Contractor cited teamwork, constructability, shorter life cycle costs, designs consistent with owners requirements and expectations and flexibility for all parties as plusses for design build. He stated his belief that design/build procurement is ideal for heavy civil work. *(3a1)*
- Contractor stated that in design/build procurement, the contractor, not the A/E, must lead the process because the contractor must ultimately execute the plan. *(3a1, 3e)*
- Contractor warned that each procurement method has an "Achilles heel" and that careful consideration must be given to the reasons behind and methods for procurement.

Solutions to onerous specifications:

- Price contingencies, allocate additional staff to solve problems, or do not bid and seek relief later if required through disputes. *(4b, 4c, 4h)*
- Contractor stated that onerous specification only drive the final cost up in heavy civil work. He said he could state with conviction that there are so few competitors in the heavy civil market that they are all competent just to stay in business. As such, all contractors bid contingencies in some sense and competitive edge is not compromised to price correctly. The owner only compromises the final price. *(4f)*

Trend of bad drawings:

- Contractor stated that there is a visible trend towards less quality design at bid time. *(2a)*
- Contractor stated that all parties lose when inadequate designs are sent to bid. The contractor loses efficiency that is hard to track or be compensated for during the construction process. The owner loses because at some point the contractor must make them responsible for the bad design to stay solvent. The contractor makes the owner responsible through multiple RFIs followed by requests for inefficiencies. *(5b)*
- The contractor stated that writing "boundary" clauses in place of good design will never work as the contractor will not willingly accept the responsibility for things they cannot control. RFIs, changes, and disputes will always shift the risk of clarity back to the owner. *(4c)*
- The contractor stated that less quality design is evident when "cut and paste" CAD techniques are used. Contractor stated that CAD has made better computer users and worse design understanding on the part of designers. *(2a)*
- Contractor stated that there is also a trend for more drawings, more paper trail, and less coordination between disciplines. The organization and sequencing of the volumes of drawings is worse making construction follow through tougher. *(2f)*
- Contractor stated that they must react to unconstructable details as a norm. They do so by pricing and then negotiating with the A/E and owner to recognize their interpretation. In this sense, the trend toward poor design has shifted great risk to the contractor. *(1a2, 5b)*

C.7 - Subsequent Interview 7

Participant 11: Owner, Consultant 2

Note: The consultant warned that he only saw problem cases as he is a claims consultant.

Arena with most risk:

- Consultant claimed that the public arena has substantially more risk for all parties as risk is a function of procurement type. *(1h)*
- Consultant stated that most risk is borne from the low bid process as this process does not provide any margin to contractors. In the low bid arena contractors are forced into bidding no profit and looking to make up the difference through disputes. *(1f1)*
- Consultant stated that it his experience that contractors do not add in contingencies for onerous specification in building construction. They will, instead, bid the minimum on the documents and claim whatever is beyond this minimum. *(4c)*

Trends and risk allocation in actual practice:

- Consultant stated that owners shift unreasonable risk to contractors through unfair administration of the contract. He cited the inclusion of the unforeseen conditions clause as an example of an often abused clause by the owner. The example cited was a contractor hitting an unforeseen condition that is compensable under the contract but the owner not recognizing it as a differing site condition. *(1b3)*
- Consultant stated a *trend* of owners putting risk allocation clauses in contracts but not accepting or acknowledging their risk when the condition addressed by the clause exists. Examples of clauses where owners are not "stepping to the plate" are: changes, unforeseen, differing site conditions, impacts, RFIs, and time extensions. *(2c)*
- Undue risk is shifted to the contractor when rigid, short, time frames are placed in the contract for contractors to price changes, inform owners of differing site conditions, etc. He said that the rigid time frames forces the contractor to chose between providing inaccurate information to the owner or risking no reimbursement. *(1d2)*
- Consultant sees trend towards less design coupled with higher owner expectation. See incomplete design below. *(2b, 2e)*

Onerous clauses:

- Consultant stated that clauses such as the owner "owning float", intent, complementary design, etc., place unreasonable risk on contractors and that litigation is borne from enforcement of these clauses. *(4c)*
- Consultant stated that owners should be judicious in their treatment of contractors and should leave float for the benefit of the project, pay for changes, pay for delays, pay for impacts, and pay for inefficiency from RFIs. *(3b3)*

Incomplete design:

- Consultant stated that all contractors tell him design quality continues to get worse. *(2a)*
- Consultant stated a designer recently told him that designs are not as thorough as in past years because owners are not will to pay for complete, well coordinated design.
- Consultant stated belief that owners are not taking responsibility for design and seek to "push" this along with all other risk to the contractor and yet not pay them for it. *(2h, 2l)*
- Consultant stated that disputes and claims are borne from the owner not accepting design responsibility as the contractor will "fight" to make the owner accept this risk as they have no control over it. Contractors state emphatically to him that they will never construe "coordination as design completion." *(1b1, 5b)*

Conclusions and solutions:

- The consultant has concluded that practice and eventual litigation will not allow any party to shift a basic responsibilities such as proper scope from owners and construction completion by contractors. He stated that onerous specifications do not protect the owner and that if an onerous spec. is costing the contractor money he will seek a means to level the risk. *(3c1, 4f)*
- Consultant stated that the only solution is for all parties to communicate openly and accept the basic risk assigned to them by the process. *(3b2, 3c1)*

Procurement reform:

- Reform is required. Most important is getting away from the low bid process. He stated that less that 99% of the claims he works on are borne from the low bid environment. *(1f1, 3a4)*
- The process selected must have a means to provide adequate margin and allow profitability. Immeasurable talent and energy is lost in disputes rather than construction. This lost energy equates to unaccounted millions in losses to the construction industry.

C.8 - Subsequent Interview 8

Participant 12: Owner, Contractor 8

Risk as a function of market:

- The contractor views risk as a function of the market served. The contractor stated that in the public market the contract is used as a weapon while in the private market it is a guide to behavior. *(1h)*
- Contractor stated that in the public arena you must bid the market, not the actual cost of construction. In this arena, the market and behavior of other contractors determines revenue structure. *(1h)*
- In the private market the owner and contractor work together to set criteria. As such, the owner can influence design and is given more responsibility in the whole process. The contractor can actively determine what is or is not enough design to meet the owners expectations. *(1h, 3b2)*
- Contractor stated that the public market has hidden, uncontrollable risks that cannot be planned for as there is no up front communication. *(1h)*

Mitigation of risk:

- The contractor determined that the best way to control his risk is to control which market he is present in. *(3g)*
- The contractor chose to work solely in the private market as open communication and repeat customer can be the norm. *(3b2, 3g, 3h)*
- The contractor mitigated risk by implementing a process that includes a owner/contractor team approach. This process allows the contractor to price schematics based on final expectations of the owner and then allows the owner and contractor to work towards the best possible design within the owner budget. *(3a2)*
- Contractor stated that participation with the owner and in the design process controls risk. *(3b2)*

Contractor behavior:

- Contractor stated that contractors in general are not risk takers. If an owner puts unreasonable, uncontrollable risk on the contractor through onerous specifications they will bid contingencies. If the contingencies do not materialize, the owner has paid an unnecessary premium for the work and the contractor makes more money. *(4b, 4f)*

Quality of design:

- Contractor stated that owners are attempting to get out of providing quality designs through onerous clauses. *(2a, 2c)*
- Contractor stated that the *most glaring problem* in the construction process is that the A/E community does not know how to design constructable details. The A/E community is most concerned with the "art" rather than the function and constructability of a design. *(1a2, 1c, 2a)*
- Contractor stated that the result of designers unable to produce buildable documents is a trend toward "miserable design that is getting worse." The contractor stated that little effort in school or in practice is being devoted to detailing and constructability. *(2a)*
- Contractor stated that the A/E community is presently ignoring the industry they are serving as they refuse to spend adequate effort on constructability and detailing. He views this as self serving behavior that does not serve the student or the final customer. *(1c)*

Risk management:

- Contractor stated that owners are best served when they hire contractors to manage their risk rather than A/Es. Contractors want to work with the owner and are professional risk managers.

The contractor's approach is to tell the owner we can manage your construction risk better than the A/E as we are responsible for the ultimate product. *(3e)*

- Contractor stated that risk must be managed through teamwork of the contractor, owner, and A/E and that the contractor is the most appropriate candidate to head the construction process team. He stated his belief that the A/E community is not prepared to manage risk as their focus is on guarding the integrity of their design rather than serving the owners ultimate need. *(3a2)*
- Contractor stated that A/E are uncomfortable with risk as they have little true exposure to risk.

C.9 - Subsequent Interview 9

Participant 13: Claims Engineer, Owner 1

Risk allocation as a function of construction type:

- The owner viewed risk as a function of construction type. He stated his belief that risk in linear heavy construction (e.g., roads and highways) outweighed the risk encountered in building construction as you are "never free of weather constraints and you are subject to the uncertainty of geotechnical conditions." *(1g)*
- Owner also stated that owners in linear construction are better at sharing risk with the contractor than building construction owners. *(1g)*

Effect of general provisions and standard specifications:

- Owner felt that DOT standard specifications allocated risk clearly and fairly. He cited clauses that allowed contractor to recover "time only but no money when they encountered utilities not represented." *(4i)*
- Owner stated that the specifications were clear enough to allow contractors to plan and bid contingencies for both patent and latent defects. Examples of risk that can be clearly planned for with due to the clarity of the standard specifications are: weather, third party damages, traveling public, and vandalism. *(4i)*

Quality of design:

- Owner saw the quality of design as a function of the designer used and the time allowed for design and design review. He stated that some designs are better than the past norm and some are worse due to tighter time constraints.

Procurement:

- The owner saw little flexibility outside of low bid in the public arena. He stated that only some highway construction was straight forward enough to allow design/build procurement in DOT work. He felt the owner must control the process with "complicated design" to ensure the integrity of the process is maintained and that the best interests of the public is served.

C.10- Subsequent Interview 10

Participant 5: Owner, Contractor 4

Actual practice and trends:

- Contractor stated that if a contract is to onerous they will not bid the contract. *(4d)*
- Contractor stated that all risk represents a dollar value to the owner whether it be in bid contingency, dispute costs, etc. *(4b, 4c)*
- Contractor stated that it is his practice to always add some contingency based on past experience with the owner or the nature of the specifications. *(4b)*
- Contractor stated that if the owner allocates to much risk to the contractor they risk not getting a good value as more risk equates to more profit when bid contingencies do not arise. *(4f)*
- Contractor stated that a new alarming practice employed by owners that is placing additional risk on small specialty contractors is to have general contractors insure entire projects. This takes away competitive advantage of contractors with better safety records, lower EMRs, etc. and limits. He stated that this practice will also level the playing field between safe and unsafe contractors and the owner may in fact be accepting additional risk through having contractors with poor safety records win bids over contractors with good records. *(1j2)*

- The contractor stated that owners are attempting to save money by not completing design and requiring contractors to finish the design in the field. This practice places unreasonable risk on contractors and additional financial burden as the owner typically refuses to pay the contractor for design completion based on general onerous specifications. *(2b)*

Recommendations for risk allocation and solutions:

- Contractor stated that an educated owner will clearly take as much risk as possible and manage it themselves. This will allow them to have more control over the final cost and value received. *(3c1)*
- Clearly identify risk in the contract. *(3c2)*
- Provide adequate designs that minimize changes and RFIs. All disputes and claims are borne of poor design. *(3c2)*
- Owners must take responsibility for design or lack there of (e.g., no soils reports, unbuildable details, etc.). The tactic of avoidance may, in fact, cost the owner twice: once in bid contingency and once in dispute resolution. *(3c1, 4f)*
- Partnering is a valuable technique to allocate risk as it is based on clear communication of accepted responsibilities. *(3b1)*
- Design/build is good for private, but not public. The public must use low bid to protect taxpayers and guard against favoritism and collusion. Additionally, design build will drive the "little contractor" out of business as they will not have the capital to perform design. *(1f2)*

C.11 - Subsequent Interview 11

Participant 14: Owner, Contractor 9

Incomplete design: Largest single element of contractor risk:

- The contractor stated that the largest single risk element contractors are exposed to in construction completion today is the risk of building with incomplete, unbuildable documents. *(1a1, 1a2)*
- Contractor stated his belief that A/E firms get less money and do not, therefore, complete adequate constructability reviews.
- Contractor cited the example of a building that is improperly dimensioned on the drawings and can not be closed due to the ordering of the wrong size steel. The contractor said that such an event may look minor to an owner but it will cost the contractor money in overhead, delays of crews, motivation of worker, and efficiency. (Note: Contractor implied that there is a trend of poorer quality design.) *(1a1, 1a2, 2a, 5f)*
- Contractor stated that owners expectations are not realistic or in tune with the quality of design being produced for procurement in the low bid public market. *(1b4)*
- Contractor stated that his solution to mitigate "poor drawing risk" is to bid more people and more money. *(5d, 5e)*
- Contractor stated that he can only bid contingencies because he maintains a large enough presence in the market worry about getting "every job."
- Contractor stated that bidding contingencies also allows him to react to the owner rather than fight with the owner. It is his policy to avoid litigation at all cost. As such, his firm has the policy to bid enough contingency to feel comfortable that litigation will never be required.

Alternate procurement:

- Contractor stated that while unique ideas are being tried in procurement, no one method will be the "savior" of the industry. Each method has opportunity for abuse (e.g., low bid - onerous specification and owners, contractors bidding the minimum).
- He stated that alternate procurement methods have been borne from the litigious past of owners and contractors.
- He stated that the best solution to proper risk allocation is the use of *communication techniques* such as partnering to stop unfair contracting practice and even risk allocation. *(3b1)*
- Contractor stated that design/build procurement is the best means for owners to ensure that designers are responsive and that designs are buildable. Buildable designs coupled with designs

based on requirement rather than "A/E artistic license" will also ensure owners receive the best value. *(1c, 3a1)*

- Contractor stated belief that use of partnering and design/build will deliver construction to the owner at a lower overall cost. *(3a1, 3b1)*
- Contractor stated that outsourcing inspection and project completion after 30% documents are complete is another possibility for effective risk allocation. *(3a5)*

Responsibilities and expectations:

- The contractor listed taking responsibility for proper scope as the key to an owners success. He gave the examples of doing the right soil testing and completing design prior to bid. He stated that an owners expectations can only be met if they are sophisticated enough to line their expectations with what was bid based on the "owner's documents." *(3c1, 3f)*
- Contractor stated that a contractor should accept the responsibility of construction completion. *(3c1)*
- Contractor stated that contractors should be the construction team leader not the architect. He stated that contractors apply "utilitarian logic" to project management as opposed to an A/E that apply "artistic integrity". This "utilitarian" approach will provide function to the owner at the best value. *(1c, 3e)*
- Contractor stated that owners and agencies must be sophisticated enough to understand the risk of all contractual parties if disputes and litigation is to decrease. *(3b3)*

C.12 - Subsequent Interview 12

Participant 15: Project Manager on Alternate Procurement Projects, Contractor 1

Risk in procurement type:

- The contractor stated risk is a function of procurement type. *(1f3)*
- He stated that all parties to a contract have less exposure to risk in design/build procurement when compared to design/bid/build (D/B/B) procurement. He stated that design/build clearly allocates risk, partnerships are formed, teamwork is commonplace between the contractor owner and designer, and the owner has only one point of contact. *(1f1, 3a1)*
- Design/build allows more opportunity for profitability as contractor control is in line with contractor responsibility. *(3a1)*
- The contractor warned, however, that the quality of a design/build project and whether or not owner expectations are met is based on the clarity of the criteria specifications. *(1i)*

Trend towards less design:

- Contractor stated that there is a trend towards less design in design/bid/build procurement. *(2b)*
- Contractor stated that owners asking for more bidder design systems in design/bid/build procurement and yet are not ensuring that basic systems specified will be compatible. For example, a contract may require a specific exterior building panel that is not compatible and cannot be incorporated with an also required bidder design imbed and concrete wall scheme. A second example is bidder design stairwells and yet a structural design that cannot support the stairs. *(2b)*
- The contractor stated that owners are often not sophisticated enough to realize that they are paying for design twice in D/B/B procurement that requires bidder design systems. Expectations will never be met in this scenario as it not even clear to the owner what was bid. *(1b4, 3b3, 3f)*
- He stated that often incomplete designs are borne from owners that do not have clear expectations and from owner pressure to pay less in design fees. *(1a1, 1b4, 2e)*

Trend of owner not taking responsibility for design:

- Contractor stated that owners rarely take responsibility for design and clarity of scope. He stated that conflict, RFIs, and REAs will always occur in this sort of low bid, onerous environment. *(2l)*

C.13 - Subsequent Interview 13

Participant 16: Pre-construction Business Manager, Contractor 1

Risk allocation trends:

- Contractor stated that A/E firms are being given less fee and time to provide adequate design. This has resulted in a risk shift of design completion to the contractor in design/bid/build procurement. He was concerned that this "shift" is not formalized by the contract and that this informal treatment increases contractor exposure to risk without providing additional money. *(1a1, 2a, 2e)*

Preferred procurement type:

- Contractor stated that his firm prefers design/build procurement as it promotes teamwork, fair treatment, and eliminates disputes and litigation. These factors add up to more easily controlled profitability for the contractor. *(3a1)*
- Contractor stated that his firm preferred the design/build documents to be approximately 30% complete prior to proposal as it provides clear aesthetic expectations to the contractor. Contractor also stated that good criteria specifications are a must for owner expectations to be met. *(1i, 3a1)*
- Contractor recognized the following as negative aspects of design/build when viewed from the A/E perspective: A/Es do not like to work for contractors and large up front costs for an A/E to propose.
- Contractor stated that the A/E community would be best served by owners limiting the proposal design to schematics and by the owner providing a honoraria to each of the firms proposing.

Onerous specifications

- Contractor recognized a trend towards more onerous, exculpatory specifications in public work and in design/bid/build (D/B/B) procurement. *(2g)*
- Contractor said that onerous specification force them to choose between not bidding or bidding and seeking immediate relief in the event of lost revenue when compared to the bid budget. *(4c, 4d)*
- Contractor stated that he will not bid contingencies as it will surely preclude award. If risk exists that was not bid they will simply see how the contract is administered and fight for the difference between the minimum requirements bid and the owner's expectations. *(4c)*
- Contractor stated that unreasonably onerous specification such as "no damage for delays", "no time extensions" are often employed by school districts. Such clauses have, in fact, hurt the owner as many contractors will no longer bid such work. Contractor that such "stingers" can never be planned for up front and are a guaranteed source of dispute. *(4c, 4d)*

C.14 - Subsequent Interview 14

Participant 17: President, Contractor 10

Sources of risk in actual practice:

- Contractor states that his largest exposure to risk is in the contractual handling of geotechnical information. He stated that the typical owner position is to use exculpatory language to disavow responsibility any underground information provided. Most owners look to shift all "underground" risk to the contractor through exculpatory language with the changes clause. *(1a4, 1j3, 2g)*
- Contractor stated that he has encountered the alarming trend of owners being less willing to recognize change when they are encountered. *(1b3)*
- The current owner position in subsurface work is a "double edged sword" used against the contractor: the owner say do not bid risk because we will put the changes clause in and pay for the risk when it occurs; the owner then will not step up to the responsibility when the change does occur. *(1b3)*
- Biggest risk encountered is owners being abusive of their own specification and not administering in a fair and reasonable manner. *(1b3)*

Trends:

- Contractor is seeing trend towards "carefully crafted" specifications that seek to hide how the owner plans on allocating risk during contract administration. This particularly alarming as such contingencies cannot be planned for. *(2g)*
- Owner see a trend towards owners purposely not clearly communicating how risk is allocated by the documents and in practice. He sees this in the use of new procurement techniques (e.g., design/build), "carefully crafted" specifications, and abusive administration. He referred to this trend as "sellers beware". *(2g)*
- Contractor noted a trend towards voluminous specifications. He stated the specifications have actually become worse with growth because they are less clear. More specification means more opportunity for ambiguity and litigation. If owner wanted better specifications less open to interpretation they would decrease the volume, hidden agendas, and make expectations clearer. *(2f)*

Onerous specifications

- Contractor stated that when specifications are clearly onerous he will bid a premium of 50%. *(4b)*
- He stated that clearly onerous specifications can be dealt with through bidding, extra people, etc. *(4h)*
- His primary concern in the arena of specifications are the clauses that are "carefully crafted" to hide their true nature. He is seeing an increasing number of such specifications and these specifications *truly* shift the risk to the contractor because they go unbid and are uncontrollable. *(1b4)*

Procurement techniques:

- The contractor does primarily small design/build (D/B) work. He feels has some benefits (e.g., control over design, quicker delivery, buildability, etc.), but he also sees untold risk in this system. *(1f2, 3a1)*
- Contractor stated belief that owners are purposely using D/B procurement as a form of insurance. He feels that owners have realized that the $500K-1M insurance policies held by A/Es for errors/omissions insurance may not be sufficient to cover claims made in future years. The owner then goes D/B because the contractor has deep pockets and then goes after contractor for design failure in the outlying years. Owners are using procurement type as a long term insurance policy and yet not overtly telling contractors of their intention to do so. *(1f2)*
- Contractor stated tactics to use D/B as insurance by the owner is unreasonable as they are not paying a premium for the risk they are shifting to the contractor and this risk is, in effect, uncontrollable. *(1f2)*

Fair risk allocation solution:

- Clear communication through techniques such as partnering. The communication makes expectations clear and allows risk to be allocated fairly. *(3b1, 3f)*
- Partnering provides an environment where owners and contractors can be honest and take responsibility for their risk rather than posture. *(3b1, 3c1)*

C.15 - Subsequent Interview 15

Participant 18: Owner, Contractor 11

Sources of risk in practice and trends:

- Contractor stated that there is a trend towards impossible performance specifications. *(1a2, 2d)*
- Contractor stated that the impossible specifications are coupled with unsophisticated owner to produce unreasonable owner expectations. *(1b4, 1d2, 2e)*
- Contractor stated that there is a trend towards overdesign in the public sector. She stated that owners required function is generally well exceeded by the requirement in the specification. *(2e, 2f)*

Risk management and solutions to onerous, unreasonable specifications:

- Contractor stated she makes a business decision between: 1) not bidding, 2) bidding at a premium, 3) bid specifications with planned changes based on what criteria can be accomplished. *(4b, 4c, 4d)*
- Contractor said she will never underbid the risk allocated in the contract, she will always bid at some form of a premium. Contractor stated that she had this luxury as she is a competent WBE and that general contractor will often need to use her to meet quotas. Her special position as a WBE allows risk mitigation at bid time. *(4b)*
- Contractor controls risk by ensuring that each subcontract she signs is written in her best interest. If "pay when paid clauses", "highest standards of industry", etc. will not be removed from the contract she will remove her bid on most occasions. *(4d, 4j)*
- The contractor sees risk as a function of the general contractor they are working for. The company aim is to work only with reasonable, professional general contractors. *(3g)*
- The contractor mitigates risk by being increasingly specialized. *(3h)*
- Controls risk by controlling means and methods of work. If a general contractor intends to force her to do work in an inefficient manner she will price contingencies in the bid. *(3h)*

C.16 - Subsequent Interview 16

Participant 19: Executive Vice President, Surety 1

Primary areas of risk in practice:

- The surety views the MWBE programs in the public arena as an enormous risk for general contractors. Risk is borne from: 1) higher quotas (e.g., levels as high as 30% combined), 2) shortage of quality contractors, 3) bid mistakes as contractors try to work in the MWBE at the end of the bid process, 4) losses to make up for unprofessional MWBE and misbid by MWBE. *(1j4)*
- Contract documents that shift and pass down risk through onerous clauses are a primary form of risk. *(1dx)*
- Risk for the surety and the contractor that are unwillingly assumed are: delays in progress payments, long retainage (up to 18 months after completion), delays in changes, and delays in responding to RFIs, REAs, and shop drawings.
- The surety stated that the biggest area of risk present today is project completion with inadequate plans. The inadequate plans has lead to confusion, delays, and disputes. All parties lose with incomplete designs and contractors must fight just to stay even. He stated his belief that designs are not adequate because A/E firms are not being paid on very thin margins. *(1a1, 1a2, 5b, 5c)*
- Safety is a primary area of risk. Individuals are not held accountable for their actions but rather owners and contractors are held responsible. This trend has already begun to drive subcontractors out of business. *(1j5)*
- Indemnification: The surety stated that state law and legal precedence is still not clear enough to adequately plan for this risk. *(1j7)*

Trends:

- The surety saw a trend towards contracts being drafted such that all rights and responsibilities are being redefined against the contractor. He see fewer owner willing to share risk or even take responsibility for design, scope, etc. *(2h)*
- Surety stated his belief that trend of less risk acceptance by the owner will not benefit them. He said the owner will always pay for onerous specifications through litigation, delays, bid contingencies, etc. *(2l, 4b, 4c, 4g)*
- Surety stated that the imbalance in risk will only create more litigation and disputes and ultimately result in losses for owners and contractors. *(4c, 4e, 4f)*

Procurement:

- Surety stated that the most important issue in future procurement is to clearly communicate so all parties can succeed through leveling expectations and ensuring each party takes responsibility for

their risk. He suggested the partnering technique as a means to set up this communication. *(3b1, 3b2)*

- The surety liked the idea of design/build procurement as it eliminates conflict. He also stated that with the A/E and contractor being on the same team the quality and thoroughness of design will improve which may lead to higher margins for all. *(3a1, 3a2)*
- He noted that each procurement method will have negatives. He said the negative for design/build would be that there would not be an independent inspector unless the owner hired a consultant.

C.17 - Subsequent Interview 17

Participant 6: Owner, Contractor 5

Risk as a function of procurement:

- The contractor stated that his business is formed on the premise that risk can be controlled by using proper procurement techniques to reach the end goal. He stated that the goal of his firm is to eliminate risk and give the client the project they want through design/build procurement and CM/GC procurement. *(1f3, 3a1)*
- Contractor stated that by being the owners expert and representative from conceptualization to life cycle builds trust and allows the owner to control their true "monthly mortgage" cost for a project. *(1f3)*
- Contractor stated that the goal of design/build and GC/CM is two fold: 1) allow contractor to control risk, 2) eliminate the owner risks loss through final designs not being in budget. *(3a1)*
- Contractor views the biggest risk in construction as adversarial relationships between the owner/A&E team and the contractor. D/B eliminates this risk. *(1e)*
- Contractor stated that D/B process allows clear communication of expectations with the possibility for flexibility and change in the process. The process allocates risk actively and fairly. He stated that all this results in the owner getting the true value for the dollars spent and the contractor can control profitability. *(3a1)*
- The contractor listed the following as other benefits of D/B: teamwork, no litigation, contractor knows what fee is, the owner is actively involved in the entire process, it promotes new methods, it promotes value engineering, the process is based on trust, the design in performance driven, the party responsible for performance is the party that designed and bid the system, the process allows the freedom for owner expectations to be met rather than just meeting the minimum, claims from subs and suppliers are eliminated as they designed the system, no changes occur, no RFIs occur, and no delays occur. *(3a1)*
- The contractor stated that the D/B and CM/GC processes allows the owner and contractor to eliminate their risk and still allows the subcontractors and suppliers to control their risk. *(3a1)*

C.18 - Subsequent Interview 18

Participant 20: President, Contractor 12

Risk in construction completion:

- In practice the contractor tries to share risk with the owner. If the owner is unwilling to share risk, the contractor will look for every opportunity to shift any uncontrollable event back to the owner. *(1b, 1e)*
- The contractor stated that he is willing to accept risk that can control: labor, material, estimates, etc. He is unwilling to accept risk that he cannot control: design, inaccurate geotechnical reports, utilities that are not marked or not located where shown, weather, etc. *(1e)*

Onerous specifications:

- If specifications are onerous, the contractor will: 1) not bid the job, or 2) pen and ink changes to the clauses prior to signing the subcontract with the owner or general. The contractor stated that if the owner will not accept the changed language, he simply removes his bid. *(4d, 4j)*
- The contractor stated that if the language that allocates risk to the contractor is *very clear and spelled out*, then he can plan and deal with it. What cannot be dealt with is contradicting,

exculpatory language. Such language in specifications open all parties to the contract to extreme risk. *(1d4)*

Trends:

- The contractor stated that he has seen a negative trend towards the completion of lesser quality designs. He stated his belief that this trend is a function of less time and money being given by the owner up front to develop the project. *(2a, 2b)*
- He views the trend of less quality design as alarming as it has forced contractors to complete the design as they build. *(1ax, 2b)*
- Contractor stated that there is a trend towards more onerous specifications. He stated that this practice does not truly shift risk and may, in fact, breed more litigation, disputes, and lost time. He stated contractors will always look to level the playing field and the ones that are successful will always find a way. *(2g, 4c, 4g)*

Solutions for risk allocation:

- The contractor stated that the only way to manage risk is to clearly communicate. Owners must do adequate analysis and planning up-front and then clearly communicate to contractor which party holds which risk. He also warned that assigned risk must be consistent with each parties basic responsibilities. *(3b2, 3c1, 3c2)*
- Contractor stated that the terms design/build and partnering are overused and that they are just synonyms for up-front communication, parties taking responsibility for their risk, and clear, fair risk allocation. *(3b2, 3c1)*

C.19 - Subsequent Interview 19

Participant 21: President, Contractor 3

Risk as a function of market:

- The contractor stated that risk allocation is a function of the market. He stated that the public market was very competitive and that the low bid procurement system allocates unreasonable risk to the contractor. He stated that all contingencies listed in public contract documents must go unbid if a contractor is to be competitive. *(1h, 4a)*
- Contractor stated that his firm is unwilling to accept the risk of the public market. They will only do private work and seek to get repeat business and referrals through good performance. *(1h, 3a3, 3g)*

Risk controlled by procurement technique:

- The contractor stated that his firm has instituted a system where the owner heads a construction team made up of the owner, contractor, and designer. The team approach is used with repeat customers as the owner can chose to use the same designer and contractor based on their past performance together. *(3a2, 3g)*
- Contractor stated that the team system allocates risk fairly between the owner and the contractor as their is clear communication. The team approach still requires the owner to hire and manage the design firm, the difference is that the contractor is in the process from the beginning and makes active contributions to the design by reviewing the details and the design from conceptualization to ensure the best construction methods can be used and that the drawings are constructable. *(3a2)*
- Contractor stated that this team approach ensures that the owner gets the best value and that the contractor's risk is mitigated through the production of an adequate design. *(3a2)*

Trends:

- The contractor recognized the positive trend of a movement towards contractors, designers, and owners working increasingly together to make documents more buildable. *(2j1)*
- The negative trend toward onerous, exculpatory specifications was, however, also noted. He stated that his firm will not bid an unreasonably onerous specification. *(2g, 4d)*

Effect of onerous specifications:

- Contractor warned owners that an onerous specification does not help there cause because: 1) contractors chose not to bid such contracts, 2) if they do bid them, they will seek every

opportunity not accept risk and shift it back to the owner, or 3) if they do bid the contract they will do so at sufficient overhead to have some margin. Contractor stated his belief that onerous specifications actually result in more cost to the owner. *(4b, 4c, 4d, 4f)*

Solution for fair risk allocation:

- Contractor stated that the best thing an owner can do is to produce good plans, fair specifications, and clear scope. The contractor stated the belief that the contractor accepts all the risk other than clear direction. He felt that owners and designers should accept the risk of giving clear direction without reservation. *(3c1, 3c2)*
- Contractor stated that a "team approach" to construction helps allocate risk fairly. The team approach promotes repeat business, allows plans to only be complete enough to build, allows contractors to understand their responsibility in design completion during construction, provides the best value to the owner, and provides construction on time and on budget. He stated that the sophisticated owners he works with would never go back to the low bid, adversarial approach. *(3a2)*

C.20 - Subsequent Interview 20

Participant 22: Construction Attorney

Past litigation:

- In the late 70s and 80s the primary construction risk was borne of multiple changes. The changes lead to impact claims based on the cumulative impact. He believes that the changes based on incomplete designs still exist, he simply feels that owners and contractors have opted for avoiding litigation through partnering, ADR, and mediation. *(1j6, 2j2)*

Present trends in litigation:

- He noted a trend of owners and contractors avoiding litigation at all cost through partnering, ADR, and mediation. *(2j2)*
- He stated that the trend in litigation actually occurring today is towards suits outside of historic lines. *(2j3)*
- Examples of suits "outside" the lines are: 1) A/Es being sued in increasing frequency for defective drawings, defective design, etc., 2) third party safety suits *(2j3)*

Risk:

- Attorney stated that the function of the entire industry is determined by risk allocation.

Design quality:

- Attorney stated his belief that the industry is seeing a trend toward less design in some instances. He believed this is a function of owners not knowing what they want and not properly providing clear direction on scope. He also stated that owners are paying design professionals less. *(2b)*
- The result of the poor scope is changes, multiplicity effect, and owners expectations going unmet. *(5b)*

Procurement:

- Attorney stated that his A/E clients are excited about design/build because of what the team concept can offer security and mitigate the A/E risk. *(3a1, 3a2)*
- Attorney stated that in the public design/build arena owners must move towards caps on dollars spent on the proposal, should only take the proposal to schematics, and should provide an honoraria when possible. *(3a1)*
- Attorney stated that public work would benefit from the privatization of many of its process' (e.g., design, inspection, consulting, etc.). *(3a5)*

C.21 - Subsequent Interview 21

Participant 23: Senior Project Manager, Contractor 13

Nature of risk:

- Contractor stated that the nature of risk is such that ½ of the risk encountered by contractors is controllable and ½ of the risk is uncontrollable. The contractor listed controllable risk as: labor pool, productivity, assumptions that determine budget amount, and material costs.

Uncontrollable risk includes: how well a project is described or scoped, weather, soil conditions, etc. *(1a, 1i)*

How to mitigate and allocate risk fairly:

- Contractor stated that his firm tries to mitigate risk and ensure it is allocated fairly by communicating openly and clearly with the owner. He said you take control of your destiny through negotiated procurement, partnering and other contracting techniques that require communication. *(3a3, 3b1, 3b2)*
- Risk can be allocated fairly in negotiated work as the contractor is open to working as a team member and showing owner where and why costs are occurring. *(3a3)*

Quality of drawings:

- He stated that it is a fact of construction today that designs are not complete prior to construction. He said, however, that the owner always pays to complete the designs no matter what type of procurement is used. He stated that in negotiated procurement you: 1) note that the design is "lousy" in negotiation and get compensated up front to complete it, or 2) employ more efficient means and methods than originally anticipated in negotiation. He stated that in low bid procurement contractors structure their bid for REAs, RFIs, and claims. *(1f1, 2a, 2b, 3a3)*

C.22 - Subsequent Interview 22

Participant 24: Construction office head, Owner 2

Actual practice:

- Owner stated his belief that owners maintain the responsibility for design in spite of clauses such as intent and errors/omissions. He stated that as a rule his office did not enforce onerous clauses and took responsibility for incomplete design. *(1d1, 1e, 1i, 3c1)*
- Owner stated his belief that it is an owner responsibility to make sure documents are "biddable and buildable" prior to award in a design/bid/build (D/B/B) procurement system. *(3c1, 3c2)*

Procurement:

- Owner stated that the Navy is leaning towards more design/build. The primary reason for this shift is to "put all our eggs in one basket and only have one point of contact in the construction completion process." By doing this the Navy believes they will be best controlling and mitigating their risk. *(3a1)*
- He stated that design/build is a formal means of shifting the risk of design to the contractor. He stated that the Navy does not employ construction experts and that the contractors are the construction experts who are best suited to ensure design is adequate. *(3a1, 3e)*
- Owner stated that in a D/B/B procurement system the owner maintains the risk of faulty design, RFIs and incomplete design. He said legal precedence does not allow this risk to be shifted back to the A/E as negligence in design is nearly impossible to substantiate in straight forward construction and an A/E need only show due care in design. *(1a1, 1a2, 1f1, 1i)*
- Owner concluded by saying that he expects design/build will be the preferred procurement method in the future for public owners as there will be one point of contact, the risk of poor design is eliminated, claims for poor design will be eliminated, and because it will take less personnel to manage. *(3a1)*

Quality of design:

- Owner said that the quality of design has decreased and that this is likely because owners want design quicker at lower budgets. *(2a)*
- Owner stated, however, that less design need not be a detriment or worse as contractors can control means and methods during project completion on their terms rather than on the terms of a design produced by a non-construction expert (e.g., the A/E). *(3e)*
- The owner noted that his agency has started to formally state that "major detailing and shop drawings will be required during construction completion" in each specialty section. The owner hopes that this will fairly allocate this design risk to the contractor and promote the bidding of the extra design effort. *(2b, 4i)*

C.23 - Subsequent Interview 23

Participant 25: Principal, Architect-Engineer 1

Abbreviations: D/B = design/build procurement, D/B/B = design/bid/build procurement, KTR = construction contractor, A/E = architect-engineer firm, M & E = Mechanical & Electrical

Questions and answers:

1. Does design suffer in D/B?
   - Yes, but it doesn't have to. Owner can be leader in process and level of sophistication of owner dictates this. In fact, the only part that suffers is the "Art" portion or the look and the feel. The D/B process lends itself to getting better M & E designs.
   - The owner must force the issue with the KTR or the aesthetics will suffer as the KTR would lead the design to improve ensure it is done in a manner that optimizes his return (need sophisticated, lead oriented owners).
2. Solicitation effect?
   - It, with owner leadership, dictates quality of design.
3. D/B documents more buildable?
   - Definitely. All issues are sorted out in the design process. The D/B/B scenario has two pitfalls: writing documents generic enough to allow full and open competition and secondly, writing generic documents clear enough to bid (to generic makes unbiddable).
4. Do you have a specific D/B branch?
   - No. Form a team for each effort. Team is determined by the expertise required in design.
5. Fee changed?
   - Cost change is that owner may in effect pay twice for design. For the owner to ensure that aesthetic requirements are met, the documents must be taken to very far level. Not to do so would take away "shell aesthetic" control. The second architect would then need to duplicate effort to finish documents. (He inferred that this duplication would be substantial but did not put a number to it.)
6. Do you form relationships that would continue through D/B projects (e.g., are you the specific designer for some KTRs or are you on KTR short lists for design)?
   - Yes/no. The project and or owner dictate the appropriate match. In practice, however, relationships are formed through previous work. These relationships are relied on in D/B procurement.
7. Problems with D/B?
   - Aesthetics suffer unless owner is proactive, sophisticated, and leads process.
   - KTR must get professional liability insurance for the design as he controls the designer and is contractually responsible for designer's work. ($200K on $15million project. This is an added cost to owner.)
   - Up-front cost are large for firms losing D/B competitions.
   - Is price really best as additional risk by KTR means more bids in contingencies (e.g., complete documents get best price theory)?
   - Some duplication of design.
   - To control quality you must put out near complete documents or similar effort (e.g., design it twice).
8. Advantages D/B?
   - KTR can not claim or can not come to owner with design claims.
   - Reality: D/B/B winner is person who misses most or interprets documents the most to their favor. D/B gets rid of this with active process that controls expectations requirements for entire project (e.g., design and build).
   - KTR on board early. More coordinated effort and design for real needs.
   - M & E design is better (e.g., KTR knows better than A/E what really needs to be done to make M & E systems work).
   - Not second guessing what KTR will do to make detail work.

- Fewer changes (interpretation is not necessary, it is understood from team design process).
- Fewer RFIs. Proper building questions asked and answered during design. (Note: He commented that D/B/B requires sophisticated owner to ensure that RFIs and changes are handled properly and to combat KTRs who use RFIs and claims as an avenue to receive compensation for "improper/incomplete interpretation.")
- Less litigation. Interpretation is not a problem. (Most claims stem from KTR interpreting documents different from designer. Caution: litigation is still a risk in D/B if owner does not lead but has exact expectations for the end product.)
- As design is not a perfect process, D/B potentially helps make it better and insulates owner from common pitting between A/E and KTR.

9. Litigation?
   - See above. D/B less. Less interpretation required, designer and builder are team rather than parties with separate goals (A/E stated that owner will always get what the documents require. That is, a KTR may have a completely different interpretation of documents from A/E and owner, but it is always a legitimate interpretation as that is what their offer is based on. D/B removes interpretation conflicts to a great extent.)
10. Innovation with A/E, KTR partnership?
    - Yes on M & E, no on aesthetics.
11. Other thoughts:
    - Would like to see A/E as prime on D/Bs. Knows this may "never" happen because A/E firms do not have capital or assets to get construction bonds.
    - Private sector already does a lot of D/B that is not competitive. Big developers give up competition for known quality, fair prices based on long term relationships, and assumption that more value coupled with more process control repays money lost through not utilizing "low bid" procurement.
    - Best process would be owner controlling aesthetics quality and KTR doing M&E design as they are experts in function and construction of these systems. Best technology and methods would be used on M&E work and owner would still get the "feel" they want.
    - Ideal: Bring KTR in at 30% to complete "enclosure" aspects. Win/win.

D - Tabulated Results of the Interviews and Seminar Lectures

Specific trends and insights that organize the data contained in the following tables is provided in the Results section.

D.1 - Appendix B, Table 1: Areas of Risk

Appendix B, Table 1: Areas of Risk

Participant # and type	Typical Cust. & Proc.	a Document Quality	b Onerous Admin.	c A/E "Ego"	d Onerous Provisions	e Acceptance of Basic Resp.	f Procurement Type	g Work Type	h Market Dependent	i Function of Scoping	j Misc.
1 (GC)	P/LB	1, 2	5	x							6
2 (GC)	P/LB	1, 2, x	1, 4		1	x	1,3				
3 (GC)	P/LB	1, 2	4, 6		1		1,2		x		1,3
4 (GC)	A/NEG	1, 2	6		x						2, 5
5 (SUB)	A/LB						2				4
6 (GC)	A/D-B				3	x	1,3		x		3
7 (GC)	P/LB	2, x	1,2		1, 2, 4	x	1	x		x	
8 (GC)	P/LB	x				x	1				6
9 (GC)	P/A/LB	1, 2	2, 4		1		1, 3				
10 (CON)	NA					x	1		x		
11 (CON)	NA		1,3		2		1		x		
12 (GC)	A/NEG	2		x				x			
13 (OWN)	LB										
14 (GC)	P/LB	1,2	4	x							
15 (GC)	P/LB	1	4				1, 3			x	
16 (GC)	P/LB	1	3		4		2			x	3
17 (SUB)	P/LB		4		2						
18 (SUB)	P/LB										4, 5, 7
19 (SURE)	NA	1, 2			x						
20 (SUB)	A/NEG	x	x		4	x			x		
21 (GC)	A/NEG										6
22 (ATT)	NA						1			x	
23 (GC)	A/NEG	x									
24 (OWN)	LB	1, 2	1		1	x	1			x	
25 (A/E)	NA										

Abbreviations and Codes:

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GC = general contractor
LB = low bid
NA = not applicable
NEG = negotiated
OWN = owner
P = public
SUB = subcontractor
SURE = surety

a) Document Quality:
1 = incomplete
2 = poorly detailed
x = general mentioning

b) Onerous Contract Administration:
1 = owner non-responsibility for design, no "drawing ownership"
2 = inexperience, lack of construction knowledge
3 = non-recognition of changes or improper clause interpretation
4 = unreasonable expectations (maximum "intent", finish design in field : RFIs, shop drawings, etc.)
5 = "micromanage" process, strict process control
6 = over administration of shop drawing requirement
x = general mentioning

c) A/E "Ego"
x = general mentioning

d) Onerous Provisions:
1 = intent, errors/omissions
2 = nearly impossible criteria spec., rigid time frames, R&D spec
3 = design or prescriptive specification
4 = exculpatory language, hidden agenda
x = general mentioning

e) Acceptance of basic contractual responsibilities:
x = general mentioning

f) Procurement Type:
1 = low bid adds risk
2 = D/B adds risk
3 = Type determines contractor risk

g) Work Type:
x = general mentioning

h) Market dependent:
x = general mentioning

i) Function of scoping:
x = general mentioning

j) Miscellaneous types:
1 = warranty
2 = whole project insurance
3 = geotechnical information
4 = sociological programs
5 = safety
6 = multiple changes
7 = indemnification

		Appendix B, Table 2: Risk Trends									
		a	b	c	d	e	f	g	h	i	j
Participant # and type	Typical Cust. & Proc.	Poorer Doc. Quality	Incomplete Design	Clause "Abuse"	Impossible Specifications	Unreasonable Owner Exp.	Voluminous Design	Exculpatory Language	Risk "Passing"	Non-respons. by Owner & KTR	Misc.
1 (GC)	P/LB										
2 (GC)	P/LB	x	x			x				x	
3 (GC)	P/LB	x	x			x					
4 (GC)	A/NEG	x	x								
5 (SUB)	A/LB		x								
6 (GC)	A/D-B				x						
7 (GC)	P/LB	x	x		x		x				
8 (GC)	P/LB										
9 (GC)	P/A/LB	x	x			x					
10 (CON)	NA	x				x			x	x	
11 (CON)	NA	x	x	x		x			x	x	
12 (GC)	A/NEG	x		x							
13 (OWN)	LB										
14 (GC)	P/LB	x									
15 (GC)	P/LB		x			x				x	
16 (GC)	P/LB	x				x		x			
17 (SUB)	P/LB						x	x			
18 (SUB)	P/LB				x	x	x				
19 (SURE)	NA								x	x	
20 (SUB)	A/NEG	x	x					x			
21 (GC)	A/NEG							x			1
22 (ATT)	NA		x								2, 3
23 (GC)	A/NEG	x	x								
24 (OWN)	LB	x	x								
25 (A/E)	NA										

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a) Poorer document quality (i.e. poorly detailed, etc.)
b) Incomplete design
c) Clause "abuse" (i.e. owners not recognizing changes, not recognizing differing site conditions, etc.
d) Impossible specifications (i.e. unmeetable criteria, "overdesigned" criteria, "tighter" requirements, etc.)
e) Unreasonable owner expectations (i.e. expect contractor to complete design in field through RFIs, submittals, shop drawings, etc.)
f) Voluminous design (i.e. more documents of lesser quality, etc.)
g) Exculpatory language (i.e. "carefully crafted" language with multiple interpretations)
h) Risk "passing" (i.e. passing risk to lowest level through onerous specifications)
i) Owner and contractors less willing to take responsibility for core or basic risks
j) Miscellaneous:
1 = Teamwork (i.e. more teamwork between owner, contractor, and de
2 = Less litigation (i.e. more partnering, ADR, etc.)
3 = Litigation outside historic lines (i.e. contractor sue designer, third party suits, etc.)

		ppendix B, Table 3: Fair Risk Allocation Techniques							
		a	b	c	d	e	f	g	h
Participant # and type	Typical Cust. & Proc.	Procurement Technique	Communication	Accept Basic Responsibility	Remove Conflict	Use Contractor Expertise	Level Expectations	Choose Market	Increase Specialization
1 (GC)	P/LB	1							
2 (GC)	P/LB	1	3	2		x	x		
3 (GC)	P/LB	1	1, 2	1	x	x			
4 (GC)	A/NEG					x			
5 (SUB)	A/LB		1	1, 2					
6 (GC)	A/D-B	1							
7 (GC)	P/LB	1, 3	2	1, 2		x	x		
8 (GC)	P/LB	1, 2	2, 3	1, 2			x		
9 (GC)	P/A/LB	3				x		x	
10 (CON)	NA		2	1	x		x		x
11 (CON)	NA	4	2, 3	1					
12 (GC)	A/NEG	2	2			x		x	
13 (OWN)	LB								
14 (GC)	P/LB	1, 5	1, 3	1		x	x		
15 (GC)	P/LB	1	3				x		
16 (GC)	P/LB	1							
17 (SUB)	P/LB	1	1	1			x		
18 (SUB)	P/LB							x	x
19 (SURE)	NA	1, 2	1, 2						
20 (SUB)	A/NEG		2	1, 2					
21 (GC)	A/NEG	2		1, 2				x	
22 (ATT)	NA	1, 2, 5							
23 (GC)	A/NEG	3	1, 2						
24 (OWN)	LB	1		1, 2		x			
25 (A/E)	NA								

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SURE = surety

a) Procurement technique:
1 = Design/build or contractor "owns responsibility for documents"
2 = Team approach
3 = Negotiated
4 = Will not do "low bid" work
5 = Outsourcing, privatization

b) Communication:
1 = "Partnering"
2 = General communication between contractors, owners, and designers
3 = Reasonable, educated owners

c) Accept basic responsibilities:
1 = All parties accept basic or "core" responsibility (i.e. owner: design, contractor: construction completion, etc.)
2 = Owners complete design prior to bid

d) Remove conflict, proactive

e) Use contractor expertise in design, as construction team leader, etc.

f) Level expectations

g) Contractor choose market

h) Contractor increased specialization

		Appendix B, Table 4: Onerous Clause Effect									
		a	b	c	d	e	f	g	h	i	j
Participant # and type	Typical Cust. & Proc.	Ignored at bid time	Priced as contingency	Disputed, neg. at performance	Contractor does not bid proj.	Lost $ to contractor	Lost value to owner	Late performance	More staff bid	Owner: "Allocates risk"	Pen and ink clause change
1 (GC)	P/LB										
2 (GC)	P/LB	x									
3 (GC)	P/LB				x						
4 (GC)	A/NEG				x						
5 (SUB)	A/LB		x	x	x		x				
6 (GC)	A/D-B										
7 (GC)	P/LB		x	x		x	x		x		
8 (GC)	P/LB		x	x	x	x	x				
9 (GC)	P/A/LB				x						
10 (CON)	NA	x		x			x				
11 (CON)	NA			x			x				
12 (GC)	A/NEG		x				x				
13 (OWN)	LB									x	
14 (GC)	P/LB										
15 (GC)	P/LB										
16 (GC)	P/LB			x	x						
17 (SUB)	P/LB		x						x		
18 (SUB)	P/LB		x	x	x						x
19 (SURE)	NA		x	x		x	x	x			
20 (SUB)	A/NEG			x	x			x			x
21 (GC)	A/NEG	x	x	x	x		x				
22 (ATT)	NA										
23 (GC)	A/NEG									x	
24 (OWN)	LB										
25 (A/E)	NA										

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a) The clause is ignored and has no effect
b) The clause is priced at a premium or contingency price
c) The clause is not bid and then disputed, negotiated and added as a contingency through a contract change depending on actual damage
d) The contractor will not bid the contract
e) The contractor loses money
f) The owner loses value in extra dollars spent, expectations not met, etc.
g) The project is delivered later due to disputes, confusion, etc.
h) More staff is included in the overhead portion of the bid
i) The owner believes they allocate risk fairly and allow the contractor to price all contract costs
j) The contractor "pen and inks" changes in the clause as a condition of contracting with owner

		Appendix B, Table 5: Effect of incomplete/poor design					
		a	b	c	d	e	f
Participant # and type	Typical Cust. & Proc.	Ignored at bid time	Unbid then: disputed, neg.	Late proj. completion	Bid more staff	Bid contingency $	$ Lost for Contractor
1 (GC)	P/LB						
2 (GC)	P/LB		x				
3 (GC)	P/LB						
4 (GC)	A/NEG		x				
5 (SUB)	A/LB						
6 (GC)	A/D-B						
7 (GC)	P/LB		x				
8 (GC)	P/LB						
9 (GC)	P/A/LB		x				x
10 (CON)	NA						
11 (CON)	NA		x				
12 (GC)	A/NEG						
13 (OWN)	LB						
14 (GC)	P/LB				x	x	x
15 (GC)	P/LB						
16 (GC)	P/LB						
17 (SUB)	P/LB						
18 (SUB)	P/LB						
19 (SURE)	NA		x	x			
20 (SUB)	A/NEG						
21 (GC)	A/NEG						
22 (ATT)	NA		x				
23 (GC)	A/NEG						
24 (OWN)	LB						
25 (A/E)	NA						

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a) The quality of drawings is ignored at bid time.
b) If poor quality is noted, it is not bid and then disputed, negotiated, litigated, depending on actual damage.
c) The project is delivered late.
d) Additional staff is bid as a contingency.
e) Additional dollars are added to bid as a contingency.
f) The contractor loses money.