

[Return to Table of Contents](#)

The following section provides the detailed specific criteria for the basic phases of the construction planning and administration processes:

1. CONCEPTUAL PLANNING PHASE**1.A. CONCEPTUAL PLANNING PHASE: *management team selection***

Organization of construction administration systems vary widely from entity to entity. Ideally, however, the management team should at least consist of the following: a person with significant, first hand, construction knowledge and experience; a representative from the end-user or client-entity; a database manager, which is the person that will be responsible for maintaining the "lessons learned" file; the person that will be in control of coordinating the construction phase of the project (*Improving*, pp. 3-4). Depending upon the size of the project, some of these functions may be performed by the same person. Other team members will be selected according to the entity's normal planning policies and procedures.

1.B. CONCEPTUAL PLANNING PHASE: *establish constructability review program*

At the earliest point in the planning process, a commitment to a constructability program should be made. This program should be in writing and should includes these elements (*Improving*, p. 4):

- Develop a constructability policy statement. Goals and objectives of the program should be spelled out in writing. Make a statement of managements' commitment to the program.
- Executive management should sponsor the constructability review program.
- Assign specific responsibility to members of executive management to play an active, participative role in the constructability review process. Assign a constructability manager, who ideally, should have extensive knowledge of the construction process.
- Periodically evaluate the effectiveness of the constructability review program.

1.C. CONCEPTUAL PLANNING PHASE: *needs assessment*

The needs assessment should align with the entity's strategic plan and construction master plan. Priorities should be determined during the planning process. Management should assess the long-range needs as well as the short-range needs. The needs assessment should be developed jointly by the end-user and the project planning team. This analysis should be presented to the governing or decision making body so that a decision to build can be based on the most pressing needs with the available resources. Projects in the master plan should be ranked according to priority and this should be documented.

1.D. CONCEPTUAL PLANNING PHASE: *define project objectives*

Steps in project objective setting should include (*Project Objective Setting*, pp 1-3):

- *Formation* of the objectives. Management should bring together the entity's goals and the suborganizations', or stakeholders', objectives to form a single set of objectives. This is accomplished by bringing the stakeholders together to negotiate and agree on a set of objectives.

- *Communication* of the objectives. Management should document the project objectives as developed in the formation step and disseminate them to the suborganizations and stakeholders. This is accomplished through a project execution plan, written scope of work, policy and procedure manuals, written objectives and priorities, and constructability.
- *Integration* of the objectives. This step represents the entity's efforts to bring together the stakeholders project objectives with the entity's to form an integrated project strategy. This step is accomplished by developing a method to obtain feedback, provide direction or redirection, and measure agreement between parties as the project proceeds.

These steps will actually overlap into the project development phase. For example, the stakeholders will not only include the entity's key players and the end-user or client, but the project design team as well.

1.E. CONCEPTUAL PLANNING PHASE: *feasibility and project analysis*

Section 5.16 of Article 5, of Article 601b, Texas Civil Statutes, entitled *Building Construction Administration*, requires entities planning construction projects to prepare a project analysis. Although this requirement does not apply to all entities, the principals should still be applied to any project planning process. Justification of the project, including a summary and benefits, should be explained clearly.

The feasibility and project analysis should include, but not be limited to the following criteria (*Project Analysis Procedures Guide*, GSC, 1990):

Architectural and engineering data should include:

- cost estimates which include a detailed accounting of space requirements, both current and projected for the future
- description of the evaluation criteria and methodology used to determine consequences and feasibility of each alternative presented
- description of the significant alternatives considered, including funding
- description of the facility and its proposed site including schematic plans and outline specifications in sufficient detail to establish the general scope and quality of construction
- project schedule, including design time, construction and estimated occupancy

Preparation of an overall estimate of *probable cost* of the project, including:

- an estimate of the construction cost
- an estimate of the cost of fixed equipment
- an estimate of the cost of site preparation
- allowances as appropriate for site acquisition, professional services, project administration costs, moveable equipment, art and graphics, telecommunications, etc.
- allowances for cost escalation and contingency

Preparation of an estimate of *life cycle costs* for the project (expected economic life, annual cost of

utilities, operating and maintenance, staffing and program costs, other benefits or savings resulting from the operation of programs in the proposed facility).

Identify *significant alternatives* explored in the needs assessment.

For a more complete discussion and additional detail on the project analysis, refer to the *Project Analysis Procedures Guide*, 1989 edition, revised March 1990, State Purchasing and General Services Commission, Facilities Construction and Space Management Division. This document is located in the Methodology resources file.

Site selection should be based on a life-cycle cost model to accurately reflect the long-term costs of the proposed facility site (Sharp, pp. 151-152). In selecting a project site, the entity should consider the cost and implication of some of these factors, and go thorough some of these steps (but not limited to these alone) (Sharp, pp. 151-152):

- evaluate soil and drainage conditions
- physically visit the site
- review local codes and ordinances if applicable
- obtain a topographical survey
- evaluate availability of sanitary sewer, storm sewer, water, electricity, gas, telephone, other as necessary
- evaluate adequacy of water supply for fire protection requirements
- prepare preliminary layouts of proposed facilities
- evaluate accessibility to the site
- evaluate cost to bring roads to the site if applicable
- evaluate municipal jurisdiction of utilities if applicable
- evaluate offsite requirements and costs for utilities
- evaluate availability of qualified workforce if applicable
- evaluate long-term cost of location with regard to transportation and logistics
- evaluate adequacy and availability of skilled labor needed for the construction of the project

1.F. CONCEPTUAL PLANNING PHASE: *design team contract considerations*

The entity should consider including these criteria in preparing the A/E contract:

- The professional design team (A/E) should be held *accountable for designing the project within the established budget*. If the construction bids received exceed the available funds, the A/E should be required to redesign to within the budget at no additional cost to the entity.
- The *A/E should be backcharged for gross errors and omissions*. These will be revealed during the course of construction in the form of change orders to the contractor. It is a fact that there is no such thing as a perfect set of plans; something will inevitably be left out and the contractor will expect the entity to absorb the cost. This is a normal part of construction and is to be expected. However, when errors and omissions begin to exceed 1-1/2% of the project cost, the entity should consider backcharging the A/E. The A/E should be expected to pay at least a portion

of the costs the entity incurs as a result of gross errors and/or omissions in the plans and specifications (*Improving*, p. 8.).

- Include a *right to audit* provision in the A/E contract. (See discussion in **contract development phase**.)
- Require the A/E to *break down all labor burden costs* prior to submittal of invoices for work over and above the base fee.
- During the course of construction, *tie the A/E's progress payments (usually monthly) to verification and certification of the record drawings* by the contractor.
- Include in the contract an *intellectual property ownership provision* that clearly defines the entity's ownership interests in the design, plans, specifications, and any other documents prepared by the A/E relative to the project. A statement to this effect should also be incorporated into the bid documents used to advertise the construction contract.

1.G CONCEPTUAL PLANNING PHASE: *design team selection*

Formal, written policies and procedures should be developed and followed for the selection of the design team. Refer to **Relevant Legislation** section for statutes that specifically apply to architects/engineers and /or professional and consulting services. There are several that apply here and they should be reviewed.

An objective ranking and selection process should be used to reduce the risk of errors or improprieties occurring in the process.

The ranking and selection process should include:

- Every step of the request for proposal (RFP) and selection process should be fully documented with all original documentation included in the file, as far as is practical.
- Procedures for formation of the selection team, including provisions for different selection teams for each stage of the selection process. Generally, one team should be assembled to review written material from respondents to the RFP. This first team assesses and ranks the respondents according to the respondents' reasons as to why they are qualified for the particular project. After assessments have been made, the first team develops a "short list" of respondents the team considers qualified to do the design or consulting work according to the agency's needs.
- The second selection team would perform oral interviews with the firms selected by the first team. In this way, maximum objectivity could be ensured.
- All grading and ranking should be done on grading forms developed by the agency to fit its particular needs. The team members should be required to make all comments about the respondents or interviewees in writing and on these forms. The forms should be signed by the team member and initialed by the team leader.
- An independent estimate of the expected fees should be prepared by the agency prior to any fee negotiation with the top-ranked firm.
- When the top-ranked firm is finally selected, and fee negotiations begin, all records of this negotiation should be documented. The agency should prepare a work sheet to document how the agreed upon fee basis was arrived at.
- Provisions for a conflict of interest disclosure statement should be made in the selection

process. The request for proposals (RFP) should include the requirement for the respondents to disclose any potential conflicts of interest (SAO, *Prison Construction*, 1993, p. 21).

- Disclosure of any financial interest which may present a conflict of interest.
- Include a clause in the contract for services that would discourage conflict and would invalidate the contract in the event that an actual conflict occurred.
- Make a provision in the process for the evaluation team to state that they found no potential conflict of interest.
- Require that the selection process be voided if it is found that the staffing and qualifications of the first ranked firm significantly changes after the selection process. Another process should then be started to ensure that the appropriate selection is made.
- The members of the selection team should sign a conflict of interest statement.

In addition to the process above, entities should ensure that:

- The file for this process contains a written recommendation to the board, governing body, or other applicable authority that will be making the decision to enter into contract with the firm.
- There is a data base of qualified architect/engineer or consulting services firms, including complete Historically Underutilized Business (HUB) listings for these same types of services from which to send initial requests for proposals (RFP).

Note that unlike contracts for construction, which statutes require the entity to accept the lowest and most responsible bidder, the A/E process requires that the most qualified firm be selected. Fee negotiations begin after the most qualified firm is selected. Developing a formal, documented ranking process will facilitate selection of the most qualified firm.

2. PROJECT DEVELOPMENT PHASE

- 2.A.** *programmatic needs development* - generally, the A/E is responsible for holding a series of meetings with the entity and the end-user to determine the space, equipment, facility, etc. needs of the end user. After agreement is reached on the needs, the schematic design phase begins.
- 2.B.** *schematic design* - the first stage of drawing. The programmatic needs of the entity or the end-user are translated into scaled dimensioned rough sketches. The preliminary ideas are put into pictures to determine if the drawn plan aligns with the project objectives. Adjustments are made as necessary.
- 2.C.** *design development* - the second stage of drawing. More drawing detail is added, the drawings are of higher quality, and it becomes easier to determine if the plan as drawn will actually work. More fine tuning occurs.
- 2.D.** *specification development* - occurs during all steps, culminating in a written document that spells out the level of quality and sets performance standards for materials, equipment, and construction methods to be used in the project, and all associated warranties. This document also includes the contract for construction, bidding procedures and requirements, and administrative procedures to be used in the project. Contains the uniform general conditions and the supplemental general conditions.
- 2.E.** *construction drawings* - the stage at which the drawings are sufficiently complete that they can be released for bidding and can be used for the actual construction of the project.

The following specific criteria should be included in each step of this process:

- Prepare detailed cost estimates (cost estimates should become more accurate with each step because the level of plan detail increases with each step).
- Cost estimates should be prepared by knowledgeable people, whether part of the entity's staff, the A/E staff, or an outside professional estimating firm.
- A dollar amount threshold, based on the size and/or complexity of the project, should be established by the entity to determine when to require the A/E to use an outside professional estimating firm to develop cost estimates.
- Care should be taken not to specify any product or equipment that may be considered sole-source, unless there are no other alternatives.
- The entity should communicate all planning decisions or important developments to the end-user of client agency in writing. Confirmation that the recipient understands all developments and subsequent implications should be obtained by the entity.
- The end-user or client agency should participate and provide input into the planning process at each step. In addition, this input should be documented as well as all planning meetings and their results.
- Thorough reviews should be performed at each step and sufficient time should be allowed in the planning schedule to do these reviews. The end-user or client agency should also be given sufficient time to perform reviews and furnish comments.
- All reviews should be documented. Subsequent reviews should include verification that previous comments were incorporated into the current plan.

3. CONTRACT DEVELOPMENT PHASE:

3.A. CONTRACT DEVELOPMENT PHASE: *select type of contract*

Under normal circumstances, construction contracts will be limited to the **fixed-price** type. In state government, this is probably the best type of contract to ensure that there has been no preferential treatment or unfair advantage to the bidders. However, the plans, specifications and scope of work require a high level of detail and thoroughness in this type of contract. If plans are incomplete, a larger amount of change orders will probably result. See the **Contracting** module for a discussion on the various types of contracts.

Use a **unit price contract** when the work is redundant but the quantities or scope are difficult to determine. For example, if the scope of work involves moving a large amount of debris or dirt from one location to another, a contract based on the cost per cubic yard for removal may be the most advantageous to the entity. Generally, the only entity that will use this type of contract is the Texas Department of Transportation.

Cost plus or time and material contracts will normally not be used on contracts for state construction projects. Article 601b, sec. 5.20 spells out the procedure for competitively bidding contracts for construction. Similarly, Title 3, ss 51.907 of the Education Code, states that "All contracts for construction or erection of permanent improvements at an institution of higher education as defined in Section 61.003 of this code are void unless made after advertising for bids thereon in a manner prescribed by its governing board, receiving sealed competitive bids, and awarding of the contract to the lowest responsible bidder by the governing body." An Attorney General's opinion (Op. Atty. Gen. 1985, No. JM-282) further states that "Construction of permanent improvements at institution of higher education, or portion of such work, cannot be undertaken on "time and materials" or negotiated basis"

General Services Commission has a standard contract form entitled *Uniform General Conditions*. This is a baseline contract that all entities under GSC administration are required to use. *The Supplemental General Conditions* are added to the *General Conditions* and permit the entity whose project is to be constructed, to adapt the contract to its special needs, as long as the language does not weaken the *General Conditions*. Copies of these documents are provided in the Methodology file.

3.B. CONTRACT DEVELOPMENT PHASE: *contract language development*

A *right to audit* clause should be a part of every contract. This contract requirement should filter down to include all of the contractor's subcontractors and suppliers (See *Effective Auditing of Construction Activity*, IIA course workbook, for right to audit contract language and more detailed discussion, section 2, pp. 31-37.)

Claims avoidance measures, such as partnering and disputes review boards (DRBs) should be called for in the specifications and the contract (*Improving*, pp 13-15). Partnering can be used on projects of almost any size. It is a tool used to manage disputes, not prevent them. DRBs should be used on projects exceeding \$10 million in construction value, or on very complex projects where many unknowns exist and the potential for disputes is high.

Early completion incentives should be included in a contract for construction where completion on or before the scheduled date is critical. This element balances the negative effect that liquidated damages can sometimes have on the contractor's attitude and relationship with the entity.

A method to *ensure HUB participation* should be included in the contract for construction. The contract should specify that subcontracts to HUBs will be reported back to the entity. The entity should have procedures for collecting and reporting accurate HUB information on subcontracts and contracts using non-Treasury funds. Construction-related HUB targets for FY96 are Heavy Construction (11.9%), Other Construction (26.1%), and Special Trade Construction (57.2%).

Reasonable *liquidated damages* should be included in the contract. The figure to be used for liquidated damages in the contract should be calculated to represent actual damages the entity would expect to suffer if the project or a portion of the project is not completed within the specified time frame. This figure should not be an arbitrary number used for punitive purposes. Liquidated damages should also never be imposed at milestones in a project schedule unless the work affects another prime contractor's completion schedule with the entity.

Require *non-collusive statement certification* on all bid proposals. Although not required by law, a non-collusive statement could be a tool to aid in enforcement of collusion laws should this situation occur (*Improving*, pp. 15-16). Suggested language by the National Institute of Governmental Purchasing, Inc. (NIGP) in *Public Purchasing and Materials Management*, (1983, NIGP) follows:

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same materials, supplies, or equipment, and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of State and federal law and can result in fine, prison sentences, and civil damage awards. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder.

The language in this statement could be modified to accommodate the type of construction contract to be let. Bidders would perjure themselves if they falsely certified the above statement. NIGP goes on to make the point for including this language "In addition to perjury charges, any bidder who does so would be guilty of fraudulent concealment which vastly increases the bidder's liability in treble damage suits by eliminating protection from the statute of limitations. The certification statement is the most potent tool available for preventing collusive bidding activity."

Develop contract language for *insurance requirements* that provide maximum protection to the entity and the State. All State contracts for construction require contractors to provide proof of insurance. This protects the State against claims involving injuries and accidents as well as property damage that result from the work performed by the contractor and/or its employees, agents, subcontractors or suppliers. Insurance coverage required by State construction contracts include: workers' compensation, employer's liability, comprehensive general liability (which includes bodily injury and property damage), comprehensive automobile liability, owner's protective liability, builders risk, or other insurance as specified. Proof of this insurance consists of certificates of insurance and policy endorsements furnished to the State by the contractors' insurance carriers.

Certificates of insurance should provide protection to the contracting entity. A certificate of insurance is the generally accepted method for demonstrating compliance with the insurance requirements in a contract. Contracting entities usually depend upon the certificate to satisfy all contractual requirements for insurance protection.

Many certificates contain standard "boiler plate" language with reference to notification obligations of the insurance carrier. This "boiler plate" language is worded so that the insurance carrier could potentially be

released from liability of providing notice of cancellation or material change to the policy to the owner or certificate holder.

A cancellation notice on a certificate of insurance, especially the ACORD form which is used by many insurance carriers, typically states (ACORD is a standard certificate form):

Should any of the described policies be canceled before the expiration date thereof, the insuring company will *endeavor* (emphasis added) to mail _____ days written notice to the below named certificate holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the company.

According to the Merritt Company, in *Non-Insurance Transfer of Risk*, a certificate with this language should not be accepted. Merritt goes on to say that the certificate only guarantees "that as of the date it was issued the insurance coverage indicated was in force." The insurance carrier, with this wording, has no obligation to the contracting agency to notify it of cancellation or material change.

To strengthen these certificates, the Merritt Company recommends adopting this language, developed by Insurance Management Consultants, Inc. of Tampa Florida, which reads:

This is to certify that the insurance policies listed below have been issued to the insured and are in force at this time. It is agreed that none of these policies shall be canceled or changed, so as to affect the insurance described by this certificate, until 30 days written notice of such cancellation or change has been delivered to the certificate holder at their address shown below. It is also agreed that 30-day written notice by the insurance companies listed above of their intent not to renew their policies listed below for the same coverages provided in this certificate will be given to the certificate holder at their address shown below.

The Texas Department of Transportation's certificate of insurance form is a good example of a certificate that provides maximum protection. A copy of this form is provided in the Methodology files. This specific form is required for all construction as well as professional and consulting service contracts; the Department will not accept a certificate submitted on any other type of form.

Labor burden should be defined in the contract. Typically, labor burden includes federal and state employment taxes, such as Federal Old Age Benefits (Social Security Tax), state and federal unemployment taxes, and workers' compensation insurance. In addition, it can include employer paid benefits such as holiday and vacation, medical, and retirement programs administered by the employer or others. All other overhead costs, such as insurance and bonds generally are to be covered by the overhead and profit mark-up percentage allowed by the contract. But, it is up to the entity to set these conditions. The cost of all of these benefits and taxes is usually expressed as a percentage of actual wages paid. Actual wages paid plus the benefits and taxes then become the true real cost of an employee, or labor burden.

In addition, the contractor should be required to provide written documentation to back up the labor burden costs it submits on extra work ordered by the entity. These contract requirements should filter down to include all of the contractor's subcontractors and suppliers. See **Construction Administration Phase** section for additional information and analysis.

The construction documents should always state who is responsible for paying for *utility taps, related fees, and permits*.

The construction contract should provide for *one-year back checks* at the project site to review the performance of the specified materials and/or equipment. Unless otherwise stated for specific equipment or furnishings, the typical contract warranty period is one year. Prior to the expiration of the one-year warranty, the entity should require the contractor, representatives from the major subcontractors, the A/E, and representatives of the end-user to meet at the project site and determine if all work that was installed is still operating at the level specified in the contract. The end-user will usually be able to provide most of the feed back necessary to correct problems. This requirement should be applied relative to the size and type of project. It is not a usual industry practice to retain any of the contractor's funds until this procedure is performed.

Project *safety* is a function of quality. Merely requiring the contractor to have a safety plan in the specifications is not enough. The entity should not only require this plan, but it should review and evaluate the plan as well. Some additional elements of a safety program should include (*Improving Construction Safety Performance*, 1982, pp. 18-26.):

- Designating a safety officer by the contractor.
- Require daily or weekly safety inspections, audits and require reports to be issued.
- Require at least weekly safety meetings of the contractor and all its subcontractors working on the project.
- Require the contractor to submit a copy of its records and accident reports as recorded on Occupational Injuries and Illnesses Annual Survey Form No. 200. These forms must be retained by the contractor (or employer) for five years.
- Require that goals be set for construction safety.
- Require the use of permit systems for potentially hazardous activities.
- Require prompt reporting and full investigation of accidents.
- Establish with the contractor lines of communication at all levels so that safe work practices are understood by both the entity and the contractor.

In any case, the entity should take care not to dictate procedures and methods in the contractor's safety plan. Doing so may extend some degree of liability to the entity in case of claims resulting from accidents or injuries on the site.

4. BIDDING PHASE

4.A. BIDDING PHASE: *solicit bids*

Article 601b, sec. 5.20, V.T.C.S., spells out the procedure for soliciting competitively bid contracts for construction. Similarly, Title 3, ss 51.907 of the Education Code, addresses the procedure for institutions of higher education. Article 601b prescribes a minimum 30 day notice from the time bid documents are released and advertised to the day bids are opened, unless the project is an emergency and must be bid sooner. However, on complex and large projects, 30 days may be an inadequate amount of time to allow the contractor to put together a bid price. The entity should *evaluate the complexity and size of the project to ensure enough time is allowed to adequately bid the project.*

The entity should actively seek *qualified contractors* to bid on the planned project. Contractors desiring to bid on projects should be required to submit to a *contractor prequalification* process established by the entity before it is allowed to submit a bid proposal. The entity should ensure as far as is possible that it only contracts with capable firms.

A list of factors to help ensure that the entity will be dealing with capable firms include:

- Bonding capacity and capability should be determined. Capability could be tied to the firm's credit rating as well as its financial ability to complete a project.
- Bid solicitations should include a provision allowing the entity to reject bids based on the firm's capability (Sharp, pp. 192-194).
- Proof of adequate financial resources should be required by an audited financial statement. An audited financial statement will provide information the contracting entity can use to develop key financial ratios such as the total value of construction to working capital. This ratio gives an indication of how much more work the contractor could realistically be expected to handle adequately. The audited financial statement would show what commitments the firm is already obligated to.
- Determine the firm's ability to comply with proposed delivery and schedule dates by contacting previous clients the contractor has worked for who had similar projects (Sharp, pp. 192-194).
- Establish the degree of technical expertise the entity believes the firm must possess to meet the project objectives and use this as a factor in evaluating bid proposals (Sharp, pp. 192-194).
- Determine if the firm has ever defaulted on a contract and if so, find out why. Find out what the firm's performance record has been (Sharp, pp., 192-194).
- Determine if the firm has a satisfactory record of integrity and business ethics (Sharp, pp. 192-194).
- Determine the adequacy of the firm's organization: determine the experience level of the key employees and particularly those that will be assigned to the project; determine if the firm has adequate accounting and operational controls; determine if the firm has the necessary technical skills and adequate construction equipment and facilities to perform competently (Sharp, pp. 192-194).
- Ensure that the firm has an adequate HUB plan in place and is effectively using it.
- The entity should request the contractor to supply a copy of its safety record as a condition of being awarded a construction contract. A safety record is an indicator of a contractor's

probable performance. The information requested should include: the contractor's experience modification rate for workers' compensation; and Occupational Safety and Health Act (OSHA) incidence rates for recordable injuries and illnesses. Consider the contractor's safety attitudes and practices from previous projects. (*Improving Construction Safety Performance*, 1982, pp. 17-21.) Also, note Appendix, page 27-31 of *Improving Construction Safety Performance*, for a list of items to include in qualifying a contractor based on safety considerations.

These evaluation factors could be used to prequalify a contractor before it is allowed to bid or to determine capability before letting a contract to the low bidder. Currently, the Texas Attorney General considers the entity in a stronger legal position to reject a bid based upon evaluation criteria rather than to not allow a contractor to bid a project. By contrast, the Texas Department of Transportation (TxDOT) relies almost exclusively on a prequalification process. TxDOT probably has one of the most thorough prequalification processes of any construction administration system in the state, and TxDOT reports a high success rate with this system.

To be sure, a public entity is in a much more precarious legal position than an owner in private industry is when deciding whether to allow a firm to bid or to reject a bid. The more that evaluation criteria can be quantified, the stronger the entity's position will be. Similarly, the probability of project success will be greater.

4.B. BIDDING PHASE: *award bids*

Complete documentation of the entire **bidding phase** is essential. The project bidding and contract award files should contain key documents. Complete documentation of the bidding and award process is necessary to ensure maximum accountability in case a contract award is ever challenged. Documentation of all activities related to the pre-bid, bidding, and bid award stages of the process should be maintained.

At a minimum, the contract award files should contain the following documentation (*Improving*, pp. 29-30):

- Checklist of all documentation required to be placed in the front of each contract award file.
- Documentation of the project authorization and the board/commission approval to expend the funds on the project.
- Project budget, signed and approved by the appropriate entity contract administration official.
- Bid advertisement, in accordance with state bidding for construction laws.
- List of qualified potential prime bidders requesting bidding documents.
- Correspondence with potential bidders.
- One entity official should be designated as the official presiding officer at each bid opening. Other entity officials present serve as witnesses and attest to the bid opening proceedings.
- Original sign-in sheet of all attendees at the public bid opening should be included in the file. This document should be signed and certified by the designated entity official at the bid opening.
- Original documentation of attendee list of any pre-bid conferences, if applicable, and notation whether mandatory attendance was required or not.
- Bidder proposal submittals, each one initialed by the presiding entity officer.
- Original bid tabulation sheet, signed and certified by the presiding official.
- Recommendation to the board/commission for award of contract.
- Board/commission action documenting authorization to enter into contract with the recommended bidder.
- Notification letter to apparent successful bidder (this is different from the notice to proceed letter).

- All of the above should be included in the entity's bidding procedures and should be in writing.

If the project is determined to be *over budget after bid openings* and the entity chooses to negotiate cost with the lowest and best bidder rather than rejecting bids, ensure that scope changes and price changes do not exceed 25% of the original base bid. Although there is no law regulating this for state agencies, ethical considerations may indicate that if a project decreases or increases in scope and/or cost at the contract negotiations stage by more than 25%, the project may no longer be able to be considered the same project for bidding purposes. Therefore, rejection of all bids would be in order. The agency should then rebid the project after consultations with the governing board and the contracted design consultant or architect/engineer (*Improving*, p. 46).

If the project scope is reduced due to budget constraints, the entity should *set priorities for the remaining items in the scope*, ensuring that they are absolutely necessary to meet the program needs.

See **Contracting** module, *procurement phase: selection of contractors*, page 8, for a discussion of contractor selection criteria, and the **Procurement** module also.

These criteria should be followed during the bid award process, after the entity has determined the low bidder (all of this documentation should be in the contract files):

- Applicable performance and payment bonds, executed, should be obtained before the contractor is allowed to move onto the site or start any work.
- Bonds should be checked to ensure that they are on forms approved by the Department of Insurance. Carefully review any riders and exclusions. (NOTE: Until November 1994, the forms had to be approved by the Attorney General's office.)
- The surety company that underwrites the bonds should be approved to do business in the state of Texas. This should be verified with the Department of Insurance.
- The authenticity of the bonds should be verified with the underwriter. The entity should call the underwriter named on the bonds.
- All required insurance coverages should be obtained before the contractor is allowed to move onto the site or start any work.
- Policy endorsements to the entity should be required and reviewed by the contracting entity. Policy endorsements are the mechanism to name the contracting entity as additional insured, that is, insured in addition to the contractor. By including the entity as additional insured, the insurance carrier must provide the same notifications to the entity as it does to their insured, the contractor. Endorsements should be required because certificates by themselves only provide information and are not contractually binding. (*Improving*, pp. 10-12.)
- In addition to requiring policy endorsements, the entity should ensure that it is in fact receiving the proper endorsements. Again, the entity personnel responsible for insurance verification should be familiar with the contract requirements for endorsements. There should be an insurance checklist for each project identifying each type of insurance coverage required by the contract. Staff should initial each required coverage as it is received and filed in the contract file. This simple procedure should be incorporated into every construction administration system; nevertheless, it is often overlooked. (*Improving*, p. 12.)

As soon as possible after the contract is executed, the entity should set up a *pre-construction meeting* with the

prime contractor, the major subcontractors, major material and equipment suppliers, the end-user, the A/E project representative, the entity's project management and inspection personnel, and any other party that will be intimately involved in the process. This will be the initial coordination meeting between all parties involved and will lay out the ground rules of how the project will be managed and what the expectations are of each participant. Documentation of this meeting should be kept in project files. Written procedures should already be in place for this process.

5. CONSTRUCTION ADMINISTRATION PHASE

5.A CONSTRUCTION ADMINISTRATION PHASE: *development of written policies and procedures*

In every construction administration system, there should be a written *policies and procedures manual* outlining the objectives of the process and expectations of the various staff involved in the process. This manual should be dynamic, and continually updated.

Monthly project reports should be prepared by the entity's construction administration staff for management's review. The governing board or decision making body should receive copies of these reports on a timely basis, while the information is still current. If there are multiple projects, all should be included in the monthly report. These reports should include, at a minimum, the following information:

- Project budget summary showing current costs compared to original budget, and percentage complete compared to percentage of schedule used.
- Schedule status, showing milestones.
- Problems encountered that haven't been resolved yet or significant events that transpired on the project
- Change order summary and status.
- Contingency consumption.
- Cash flow projections.
- Request for information (RFI) log status.
- Field orders approved.
- Change proposals pending and rejected.
- Submittals log status.
- Safety report, including injuries and accidents.

The internal *pay application process* should be in writing in the policies and procedures. (The pay application procedure for the contractor is already in the general and supplemental conditions of the construction contract.) This process should include the following:

- Establish who within the entity will review and approve the applications for payment.
- Inspection staff are responsible for verifying that the work the contractor is billing for has actually been installed and that the installed work is not deficient. This verification should be documented.
- The project manager should then approve the application, making adjustments as necessary. Adjustments to pay applications should always be discussed with the contractor, though not necessarily agreed upon.
- The A/E should certify and sign the application for payment. (Article 601b requires this.)
- The final signature on the application should at least be the highest manager in the entity's construction

administration department.

5.B. CONSTRUCTION ADMINISTRATION PHASE: *documentation and filing systems*

The entity should maintain a *thorough documentation system* for every aspect of the construction planning and administration process. Project management staff is generally responsible for this. The primary reasons for keeping accurate, up to date records are to guard against improprieties occurring in the process, and to protect the entity against claims.

Project documentation should include at a minimum the following: (Thompson, Townsend, *Effective Auditing*, 1993, Sec. 1, p. 56.)

- daily inspection reports
- job meeting minutes
- job photographs/videos
- updated schedules
- material and equipment delivery schedules
- drawing revisions made to record drawings
- daily job progress reports/logs
- documentation of settlement meetings and resolutions
- non-conforming report or log
- testing and lab reports documented and filed

As an additional measure to ensure that accurate records are maintained on the project, the entity should require that the contractor *update the record drawings* monthly and tie the contractors' progress payments to this.

Ensure that all *deviation requests* are properly documented. These are requests from the contractor to substitute, omit, or modify a material or method from what the plans and/or specifications require. Deviation requests should be filed, along with the written disposition of the request.

Contract *filing methods* should be orderly and easy to track, from information about the bidding of the project to contract award, contract execution, and change order status. All approved changes should be secured in the contract file in chronological and numerical sequence. Executed and approved change orders should not be filed with other items that are unresolved, unpaid, or otherwise not yet part of the official contract. A change order log or tracking system should be in place to be able to constantly monitor the status of all change orders on all projects. Access to the contract files should be restricted, and a file checkout system should be in place to determine who has what file. (See Fiske, *Construction Project Administration*, pp. 60-63 for a typical set up of a construction filing system. These pages are located in the Methodology Project Information File.)

5.C. CONSTRUCTION ADMINISTRATION PHASE: *claims review*

Management should ensure that the following procedures are in place before any claims are made on the project. (*Effective Auditing*, 1993, Sec. 1, p. 57.) These steps can be used on a project with or without Partnering:

- Establish a claims review team consisting of project management, legal and audit staff. (Everyone responsible for construction project management and inspection should be trained in how to avoid claims or how to minimize the claim by taking immediate action on the item in dispute.)
- Thoroughly review the basis for the claim.
- Thoroughly review contract documents.
- Ensure that all claimed costs are properly supported with documentation.
- Check the arithmetic on claim documentation.
- Prepare chronological analysis of the sequence of events.
- Interview the appropriate job personnel.
- Develop a negotiating strategy and plan.

5.D. CONSTRUCTION ADMINISTRATION PHASE: *statutory compliance monitoring*

Prevailing wage compliance - V.T.C.S.A. Art. 5159a, as revised September 1, 1993, applies to all work done under contract with a public body, for construction or repair work which is paid for in whole or in part out of public funds. This statute requires a public entity to either conduct their own survey of wage rates applicable to construction trade classifications in the geographical location of the proposed construction project and develop their own classification of wage rates, or to adopt the U.S. Department of Labor rates published under the Davis Bacon Act.

The entity should monitor the contractor's payroll for *prevailing wage compliance*. The entity should be taking these steps to ensure compliance:

- Verify that wage rate classification is current.
- Require all payroll reports to be submitted as a condition of payment.
- Perform spot checks by interviewing the contractor's and subcontractors' employees.
- Spot check contractor's and subcontractors' weekly payroll reports.
- Enforce the statutory penalty to the contractor or the subcontractor in violation. The penalty is currently \$60 per day per employee.

If penalty funds are being collected against the contractor, the funds should be going directly to the entity. (Required by V.T.C.S.A. Art. 5159a, effective September 1, 1993.)

Monitor HUB participation in each project. HB 2626, 73rd Legislature, sets the state goal at 30%. Monitoring should include the following:

- Require the contractor to break out contract costs of all HUB subcontractors and material suppliers as part of the contract progress payments. Progress payment applications should include how much each HUB contractor or supplier is paid, and this should be expressed as a percentage of the total contract. At the end of the contract, an accurate percentage can be obtained of HUB participation.
- Document reasons why HUB goals are not being met.
- Obtain assistance from General Services Commission as necessary.

5.E. CONSTRUCTION ADMINISTRATION PHASE: *inspections*

The *inspection* function of the process is critical to help ensure that the specified quality of the project is

attained as the facilities are being constructed. Inspection staff should be well trained and professional training should be ongoing. The inspector is a vital member of the construction management team. He/she is the " . . . eyes, and ears of the architect or engineer and the owner . . ." on the project (Fiske, p. 21). A number of training options are available, both formal, in the classroom, and self-study courses from recognized organizations and institutions. Entities should take advantage of these opportunities to keep their staff up to date on the most current developments in this field.

The entity should consider some of the following measures to enhance the quality of its inspection staff and its inspection function:

- Assess the need for additional and continued training of inspection personnel. Identify the needs of the agency and of the inspection staff. Determine where the training is needed, what the trainee should learn so that they may be more effective, and who needs what kind of training. Then, evaluate the training program for its effectiveness (Tenah, pp. 24-25).
- Develop a training policy in writing and make available to all employees. Include the purpose of training and the objectives to be obtained by the training.
- Consider self-study training programs for inspection personnel. The Bureau of Reclamation has developed the Comprehensive Construction Training Program, a self-paced, job site focused training program that covers the full range of construction skills and knowledge for its field inspectors. This program has proven to be extremely cost effective compared to classroom training sessions. It has also been shown to be more effective in developing the inspectors' skills and knowledge than traditional classroom training methods (Pecarich, pp. 32-33). The Southern Building Codes Congress, International (SBCCI) also offers a number self-study courses which lead to certification.
- Consider sending inspection personnel to attend training courses sponsored by the Texas Engineering Extension Service. Numerous training courses are offered in nearly all disciplines of the inspection field.
- Require annual formal training updates of all inspection personnel to ensure they are informed of the latest technological developments in quality control.
- Establish written policies and procedures for the inspection process. A comprehensive manual explaining the entity's expectations of and job duties for the inspector should be developed, used, and periodically updated.
- Periodically, (at least annually) all inspection staff should meet with the project managers and upper level management to discuss what was effective and what procedures could be improved. Discuss expectations of each group toward the other. Use this session to suggest updates to be added to the inspection manual. Follow up on all ideas and suggestions presented and communicate the disposition of ideas to staff. (The University of Texas System Office of Facilities Planning and Construction does this annually with their construction administration staff.)
- Exchange information about inspection techniques, methods and other processes that have proved effective with other agencies that have similar inspection functions. Perform this process on an annual basis.
- Evaluate inspection personnel on current code knowledge, construction methods and procedures, plan reading and specification interpretation.

In addition to the above, entities should also *consider code certification in one of the more commonly used model building codes*. There are three basic models for building codes in the United States, but no one code is standard for use by State agencies. Generally, an agency, such as General Services Commission, will instruct the

architect/engineer to design a project according to the building code in force where the proposed project is to be located, or, to the *Uniform Building Code* (UBC), whichever is more stringent. The State, however, is usually not subject to plan reviews, permitting or inspections from code enforcers representing local governmental entities where the project is located.

The three basic building codes, referred to as the model code groups, include:

- International Conference of Building Officials (ICBO). This group, the oldest of the three, publishes the *Uniform Building Code* (UBC). Many of the larger cities in Texas use this code or base their codes on the UBC.
- Building Officials and Code Administrators International (BOCA). Many states in the Midwest and northeast use this model code.
- Southern Building Codes Congress, International (SBCCI). This code is widely used in the south and southwestern parts of the United States. It is also used by many of the smaller municipalities in Texas.

Entities with inspection staff should consider the following:

- Setting career achievement goals for inspection personnel and include certification in his/her respective discipline. As inspectors move towards achievement goals, with appropriate incentives, they would be motivated to enhance their skills and knowledge. For example, the City of Austin requires all of its inspection personnel to become code certified in their particular area within two years of starting the position. Incentives are provided as motivation.
- Code certification for inspectors is increasingly being recommended as an incentive to improve the quality of inspectors and, ultimately, the quality of the construction process. According to Lionel W. Vincent, P.E., M. ASCE, in his article *The Origin, Training, Evaluation and Status of Construction Inspectors* for the American Society of Civil Engineers publication *Quality of Inspectors - In Search of Excellence*, "We need to recognize the practice of construction inspection in a higher context of professional activity. Mandatory certification of building inspectors should be actively perused - on a national basis; it would be analogous to registration for architects and engineers." Similarly, The Business Round table reports that in reference to states that require code certifications of all inspection personnel "The model code organizations support the concept of certification as an essential step in upgrading the qualifications of code enforcement officers. Many states, too, have found that certification of code-enforcement personnel improves the level of service" (Business Roundtable, *Administration and Enforcement*, 1982, page 19).

Demonstrated competency in an area of the code most commonly used by the entity would help to ensure the effectiveness of the inspection function in the field. Although budget dollars for training always seem to be scarce, this critical area should not be neglected. It has far-reaching effects and financial implications in terms of future maintenance costs on buildings and facilities which the state must maintain for years to come.

5.F. Construction planning and administration process: *change order processing*

The *change order process* should include a high degree of analysis and documentation. Exposure to the risk of overcharges is high when change orders occur if comprehensive controls are not in place to verify and analyze the proposed changes.

Change orders consist of two types: directed changes and constructive changes. Directed changes are easily identified, as the owner, or the State, directs the contractor to make the change. It is generally a mutually agreed upon change. Also, it may result in an addition to the original contract, a deduction, or no change to the original contract, either in cost or in contract time. Sources of directed changes include design changes, obvious errors and omissions by the architect/engineer, or a request from the end-user.

Constructive changes are the result of ". . . an informal act authorizing or directing a modification to the contract caused by an act or failure to act. In contrast to the mutually recognized need for a change, certain acts or failure to act by the owner that increases the contractor's cost and/or time of performance may also be considered grounds for a change order" (Fiske, 1988, page 444). These types of changes could include (Fiske, p. 444):

- Defective plans and specifications Architect/engineer errors and omissions.
- Architect/engineer interpretation of plans and specification.
- Impossibility or impracticability of performance - it can not be constructed as the plans show.

Key areas where management should ensure adequate controls are in place to analyze change orders include:

- Verification of labor overhead rates to ensure that the entity is not being overcharged by the contractor.
- All change order pricing submittals should be fully supported in detail to permit adequate analysis.
- The cause and source of all change orders should be identified and categorized.

There is a potential for overcharges and contract abuse to occur in labor burden costs, since many contractors tend to take an average overhead burden cost and apply the percentage across the board, adjusting for workers' compensation classification rates, and apply it to all wages paid rather than using actual costs.

The risk is that overcharges from the contractor may occur on change orders containing unverified rates. Figure 1 on this page illustrates the potential cost impact of an unverified labor burden rate used in a hypothetical change order. Similarly, Figure 2 shows a breakdown of each labor burden rate in the hypothetical case.

Hypothetical Case

Assume a change request involving carpentry labor, at \$12 per hour, requires 10 carpenters and 100 hours of work. The total number of labor hours is 1,000 x \$12, or \$12,000.

**Figure 1
Labor Burden Overhead Rate For Change Order Pricing
Hypothetical Case**

	Unverified	Verified	Difference
Direct labor	\$12,000	\$12,000	0
Burden rate*	46.38%	32.85%	13.53%

Labor burden	\$5,566	\$3,942	\$1,624
Total	\$17,566	\$15,942	\$1,624

* Labor burden rate: See Figure 2, on the following page, for a breakdown of these overhead percentage rates.

**Figure 2
Breakdown Of Contractor's Labor Burden Overhead Rate
For Use In Change Order Pricing - Hypothetical**

CATEGORY	AS SUBMITTED	ACTUAL/VERIFIED	OVERCHARGE DIFFERENCE/EXPLANATION
Payroll Taxes:			
FICA	6.20%	6.20%	
Medicare	1.45%	1.45%	
Federal Unemploy.	0.80%	0.0%	Cap of \$7,000 in annual wages exceeded.
State Unemploy.	2.70%	0.0%	Cap of \$9,000 in annual wages exceeded.
Subtotal	11.15%	7.65%	
Fringe Benefits:			
Vacation/holidays	5.80%	0.00%	This benefit is only for contractor's supervisory personnel.
Subtotal	5.80%	0.00%	
Insurance:			
Workers' comp.	29.43%	25.2%	Experience modifier results in lower than book rate.
TOTALS	46.38.%	32.85%	Potential overcharge in labor overhead rate of 13.53% .

This is an example of what one relatively small change could include. The potential overcharge to the entity by the contractor on labor burden in this example is approximately 13.5%. The risk of potential overcharges multiplies

quickly when the total dollar amount of change orders is calculated on an annual basis.

Change order and contract costs should be fully supported and documented. The change order analysis process should include:

- Standard forms for breakdown information relating to all of the costs associated with the change order - these forms should be required of the general contractor on all pricing submissions as well as all subcontractors' pricing submissions to the general contractor.
- Forms should include at a minimum a complete breakdown of all labor required, with actual pay rates of contractor's personnel and a complete breakdown of all materials and equipment showing unit costs with all quantities itemized. In addition, all trade discounts should be disclosed and passed on to the entity. All subcontractors should be subject to these same documentation requirements on the same forms. (See sample forms in [Construction](#) Module file.)
- Quantification of the change by identifying and documenting what initiated it. The change could be initiated by the architect/engineer in the form of errors and omission or design improvements, design changes made at the request of the entity, or other unforeseen conditions.
- The architect/engineer should verify the cost submitted on the change order.
- The entity should verify the cost with its designated qualified staff person, as well as verifying that the proposed change is not supposed to be included in the base contract.

At the pre-construction conference, the contractor should be made aware of all its pertinent documentation requirements. The pre-construction conference is where the entity introduces the successful contractor to the administrative procedures that will be used on the project as well as letting the contractor know what the entity expects. Discussion of these requirements should be made part of the agenda for the conference.

Staff should also be made aware of the necessary documentation required from the contractors to verify the labor burden rates. A list of all documentation needed from the contractor and its subcontractors should be compiled for the preconstruction meeting. The list should then be given to the contractor or incorporate it into the pre-construction agenda.

The cause and source of all change orders should be identified. Once the cause and source of a change order has been identified, it should be categorized and recorded for subsequent evaluation. The source classifications would include owner generated (initiated by the state agency) or architect/engineer generated (initiated by the architect/engineer). Each classification could then be further broken down into the following categories:

- *Owner generated change order:* unforeseen conditions, design change request, function (or end-user), and miscellaneous changes.
- *Architect/engineer generated change order:* errors, omissions, improvements, and coordination.

← TYPES OF CHANGE ORDERS →

Directed Changes	Constructive Changes
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← SOURCES OF CHANGE ORDERS →

Owner Generated	Contractor Generated	Architect/Engineer Generated
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← CATEGORIES OF CHANGE ORDERS →

OwnerGenerated(includescontractor)	Architect/Engineer Generated
<ul style="list-style-type: none"> • <i>Design change</i> Changes requested by the owner, usually for design reasons. • <i>Unforeseen</i> Things not anticipated or able to be anticipated, that were not visible or evident as the design was completed. • <i>Function</i> Changes requested by the end users of a building or space. 	<ul style="list-style-type: none"> • <i>Errors</i> Mistakes in the plans which must be corrected to adequately complete construction. • <i>Omissions</i> Design elements which the architect/engineer failed to include in the plans but which are necessary to the successful completion of the project. • <i>Improvements</i> Additions to the plans during the construction which improve the project. • <i>Coordination</i> Errors resulting from failure by the architect/engineer to coordinate the design across disciplines (architectural, mechanical, plumbing electrical, teledata and communications, etc.), thus rendering the plans unconstructable without redesign.

It is essential to quantify these areas in any major construction project in order to help evaluate the success of meeting the design objective of the project. Quantification of change orders will also identify gross errors and omissions in the design by the architect/engineer.

Reasons why identification of the sources of a change order should be made include:

- For future planning purposes - a "lessons learned" data file should be kept to be used in the planning process for future similar buildings, so that some of the same mistakes will be less likely to be repeated.
- Hold the architect/engineer accountable for gross errors and omission - track the total amount attributable to errors and omissions by the architect/engineer. When these amounts exceed 1%-1½% of the total construction contract, the contracting agency should consider backcharging the architect/engineer contract for the additional costs incurred. These could also include coordination errors.
- Track changes requested by the end-user, if applicable, to document additional costs and time expenditures not in the original project budget or scope.

The project procedures manual should address the internal change order process. This process should include, but not be limited to:

- A set dollar limit of approval authority at different management levels involved in the project. The staff levels, might typically include project manager, the project manager's supervisor, and the director of the construction administration department.
- A mechanism should be in place that will require board/commission approval for changes initiated that result in a change from the original design or project objectives.
- Document justification for the scope change on the change order.
- Assign the source of the change order, such as: owner; A/E, end-user; improvement of design; afterthoughts; mis-coordination of drawings; errors and omissions; or unforeseen condition.
- After the source has been identified, quantify it. Track the cost in all categories throughout the project and analyze the costs regularly. These costs should be included in the monthly reports to management and the governing body.
- Ensure that the change order procedure that is spelled out in the general and supplemental conditions is followed consistently.
- Check change order pricing format with requirements in supplemental general conditions for consistency and conformance. Require outside review if necessary.
- Perform a technical review by the entity's qualified staff of the change order proposal from the contractor. Determine its reasonableness.
- Perform a cost analysis and verification of the contractor's pricing.
- Include the A/E in the review and verification process if the A/E's contract requires this.
- Ensure that all labor burden rate breakdowns from the contractor and all subcontractors have been obtained and verified.
- Verify that there is sufficient supporting documentation from the contractor for the additions/deletions to the cost of the work.
- Document all of the steps used in analysis of the change order and how the reviewing team arrived at the conclusion.
- Ensure that the arithmetic on all pricing submitted by the contractor is checked. This seems too simple to

- include but it is amazing how often these mistakes go undetected.
- Ensure that all allowance items in the original bid quotation are accounted for and properly analyzed to ensure the entity has received what it paid for or received a credit for work that was not performed.

5.G. Construction planning and administration process: *monitoring the schedule*

Continually *monitor the schedule* to identify potential problems so appropriate action can be taken as quickly as possible. The entity should include the following as it manages the schedule:

- Require printed monthly schedule updates from the contractor. Tie this requirement directly to the monthly progress payment made to the contractor.
- Assess the impact on the schedule of all proposed changes to the contract.
- Consider measuring quantities of work in progress and recording the results in a monthly report; quantify in terms of labor and materials expended on the project in the time period of one month.
- Track all submittals from the contractor and measure the turn around time from the appropriate parties. Take appropriate action to resolve any potential delays. Ensure that the contractor is delivering its submittals as soon as possible and that the A/E is not taking too long to review and return the submittals.
- Agree upon a set time period to turn around submittals if it is not already spelled out in the contract.
- Ensure that someone has been given responsibility for monitoring the schedule.
- Ensure that equipment and material deliveries are coordinated with the construction schedule.
- Resolve quality control issues immediately.
- Continually monitor the backlog of unresolved items in the non-conformance log. A specified time period should be established for the resolution of these issues. For example, five days should be allowed for the contractor to either correct the problem or respond in writing what plan of action it intends to take to correct the problem.
- Ensure that any unresolved issues on the non-conformance log are not holding up any other part of the construction work, which in turn could jeopardize the schedule.
- The inspection process should not unnecessarily delay the contractor.
- Ensure that the entity is doing everything it can to prevent the contractor from claiming additional time due to owner caused schedule delays.
- Enforce and collect liquidated damages (LDs).

Requests for information (RFIs) received from the contractor should be closely monitored and managed. These are a potential source for claims for additional schedule time and/or cost reimbursement by the contractor. The entity should establish guidelines for dealing with RFIs. Some of the criteria include:

- The contract should require a certain maximum turn around time in which the entity must respond in writing to the contractor. (A set time period, such as 5 days, should be spelled out in the specifications)
- The response time for resolution should be measured and recorded to determine if it falls within the contract time.

All *submittals should be tracked* and monitored so appropriate action can be taken to avoid schedule delays or claims for time extensions by the contractor. Submittals are documents describing materials, equipment, or processes that are required by the specifications. Submittals are the formal documentation that the specified quality or method are being incorporated into the building project. They are submitted to the A/E and the owner for written approval and acceptance.

- A submittal log should be kept and all submittals recorded and tracked until returned to the contractor.
- A prescribed submittal turn around time should be established and adhered to. Delays should be resolved as soon as possible.

5.H. Construction planning and administration process: *communication with end-user*

The entity should regularly *hold budget meetings with the end-user* throughout the project. (This presumes the end-user is a client agency.) These meetings should occur at least monthly, in addition to the regular project meeting, with assurance that the end-user's decision makers are fully informed of what is taking place on the project with respect to budget, schedule, and any problems. In many cases the designated representatives of the end-user will be a party to the weekly or monthly project meetings with the contractor, the entity, and the A/E. This should be encouraged to maximize communications between the end-user and the entity.

6. CONTRACT CLOSEOUT PHASE

6.A. CONTRACT CLOSEOUT PHASE: *closeout procedures*

The entity should *have a thorough closeout procedure* spelled out in the specifications. Procedures should be followed, and if not, documentation maintained as to why they were not. Following are some of the typical items that the entity should receive before releasing final payment to the contractor:

- The entity should have obtained all operating and maintenance manuals with evidence that these documents have been reviewed and approved by the A/E and its respective consultants.
- The record drawings, or the "as-builts" should be certified as accurate by the contractor and approved by the A/E.
- The end-user should have input into the monthly updating of the "as-builts" and should agree with the recorded information on these documents before they are certified as complete by the A/E and the responsible construction administration staff.
- The equipment and furnishings warranties furnished by the contractor should all be approved by the A/E.
- The entity should obtain verification that any training of end-user personnel required by the contract has satisfactorily taken place.
- The entity should obtain all executed liens and final waivers from the contractor.
- The entity should contact the major subcontractors and suppliers to see if there are any outstanding balances owed them by the contractor, besides the final payment and retention. If there are disputes or potential claims, take measures to resolve them, if possible, before the final payments are made.
- In addition to closeout procedures in the specifications, the entity should have a written set of procedures for project closeout and centralized filing of completed projects. All field files should be returned to the designated central filing location within a specified time period.
- As part of the closeout procedure on all contracts, the contractor should be required to furnish complete

finish schedules of all areas included in the project. A finished schedule should include a detailed listing of all finish materials used stating the manufacturer, product series or grade, color, and supplier where additional stocks can be obtained by the entity. This is essential for the entity's use in maintenance, repair and future additions or remodeling to the completed project.

- Final payments to contractors should always be conditioned upon the satisfactory completion of all required closeout procedures.

6.B. CONTRACT CLOSEOUT PHASE: *final accounting*

A careful review should be performed prior to releasing final funds owed to the contractor. Reviews should be continuous throughout the project, but the final accounting should be closely looked at. The following items should be included, but not limited to, this review:

- Summarize all of the contract alternates and allowances that were accepted by the entity and verify their inclusion in the payment process.
- Verify that all credits due the entity have been accounted for.
- All of the allowance items in the contract should be reviewed again to check for unused balances. If there are balances on the allowances, these need to be deducted from the contractor's application for payment or the final payment.
- Check for supporting documentation for the costs charged against the contract.
- Ensure that the approved alternates in the contract plus the base contract amount reconcile with the total the contract-to-date amount on the payment application.
- Ensure that all backcharges to the contractor are deducted before final payment is made.
- Obtain all final inspection reports from the quality control staff as well as the A/E and ensure that the specified quality level of the project has been met.
- Obtain all executed final lien releases.

6.C. CONTRACT CLOSEOUT PHASE: *project evaluation*

Evaluate the design to determine if project objectives were met. Record pertinent information in the "lessons learned" database. The evaluation should be in writing and should be performed some time after the facility has been occupied. Historical data including costs, schedule completion time, methods, designs, problems encountered, and resolutions should be maintained for all completed projects. This data should be regularly updated and accessible for use in planning future projects.

A model for the evaluation of a facility could be adapted from using the *Guide for School Facility Appraisal* (Hawkins, Lilley, *Guide*, 1992) This document is published by the Council of Educational Facility Planners, International (CEFPI), Columbus, Ohio. The purpose of this publication is to objectively evaluate public school facility design; nevertheless, the principles in this model apply to most types of facility construction. This criteria could be modified as necessary to evaluate the design effectiveness of the particular category of building to be constructed. The usefulness of the *Guide* depends upon whether or not the type of facility planned, or a similar type facility, will be duplicated in the future. However, the *Guide* may not be an effective tool for the planning and construction of a one-of-a-kind facility. In any case, the results of the evaluation should be filed and used in future planning.

According to the authors, the purposes of the *Guide* are (Hawkins, Lilley, *Guide*, pp. 2-3):

- To perform a post-occupancy review. This should be done six months to one year after the facility has been occupied. It is also to grade the facility on whether or not the design objectives were achieved and construction materials are functioning as intended.
- To formulate a permanent record. This record is used in the planning and development of future, similar, facilities *so that problems encountered will not be repeated*. Subsequent evaluations over the next several years can be performed to see how effectively the design is functioning for its intended use. This is also useful in providing trend information on defects and deterioration of specified materials and equipment.
- To highlight specific appraisal needs. Each area of the appraisal criteria can be used separately from the others as needed. Separate reports can then be made as necessary.
- To examine the need for new facilities. It could serve as an indicator of the adequacy or inadequacy of present facilities.
- To evaluate the need for renovation. Depending on the rating from grading the facilities, it can be a tool to indicate whether the facility should be renovated or abandoned.

These purposes apply to all types of facilities, not just primary and secondary educational buildings.

The authors state that a written report could be made for any of the above uses and that this should be done " . . . to help administrators and board members make decisions regarding the future of the specific facility" (Hawkins, Lilley, *Guide*, p. 4).

The *Guide's* appraisal criteria is broken down into several categories. Four of these categories are important to most state facility construction projects. The four categories that should be formally evaluated are:

- site
- plant maintainability
- building safety and security
- building environment

A detailed discussion of these categories, as well as others, can be reviewed in the *Guide* on pages 7-51. In order to quantify the evaluation, numerical weighted values are assigned to each factor listed in each category. The categories have a maximum number of points; the closer the scores are to the maximums, the more successful the design is considered to be. A similar evaluation system, tailored to fit a particular need, could be developed from these principals.