Chapter 3
DESIGN

3.01 INTRODUCTION

A. The Designer, in providing professional services for the project in accordance with the terms and conditions of the Owner/Designer Agreement, should adhere to the following procedures unless specifically approved otherwise by the Office of Facilities Development (OFD).

B. Administration of Design Services: Design the project to meet the authorized scope, budget, and schedule. In general, the authorized budget and scope are defined in the approved State Building Commission SBC-1 form. Upon initiation of the project, arrange to review with the Owner’s OFD-project manager (OFD-PM) the service and administrative requirements. This review will typically be part of a project kickoff meeting.

C. Project Scope: The Designer may proceed only with the authorized scope of work. Scope changes must be approved by the OFD-PM.

D. Project Schedule: The preliminary project schedule will be developed by the OFD-PM. At the completion of the programming phase, the Designer shall submit for approval a schedule for the remaining design phases and construction. The Designer will be responsible for maintaining the schedule and shall immediately notify the OFD-PM when the schedule is delayed.

E. Project Budget: The project is composed of the construction budget and all of the associated administrative and miscellaneous budget items, commonly referred to as “above the line” and “below the line” funding. The above the line funds include building construction, site & utility work, and built-in equipment funds collectively called the Bid Target, along with the contingency, which total to a Maximum Allowable Construction Cost (MACC). Below the line funds include design fee, moveable equipment, administrative and all other miscellaneous funds.

F. Designer’s Estimate and Contingency: The Designer’s estimate is required to be submitted at every design phase submittal. The Designer is to notify TBR if the estimate exceeds the Bid target, at which time modifications to the project will be considered. The Designer’s construction cost estimate shall include any Designer-determined contingency. This is not the same as the Owner’s contingency which is added to the Bid Target to calculate the MACC. The Owner’s contingency is solely designated for the Owner’s exclusive control and use for unanticipated project costs.

G. Project Identification: The exact title of the project and SBC number shall be used on all documents, including invoices and correspondence. Subject lines of email correspondence shall include the exact title of the project. Abbreviations of words or names in project titles may be used on correspondence inasmuch as the complete title is readily understood. When context applies to only a specific portion of a project that has been defined as a “subproject”, then the SBC project number with added “subscript” characters and the narrow-scope subproject title should be used.
H. **Design Phase Identification and Approval:** Design document submittals to the Owner shall be labeled to identify the design phase for which they are provided and shall indicate the date of issue. When providing services for multiple Design Phases request and obtain written approval of the OFD-PM before proceeding with the next phase.

I. **Meeting Notes:** Prepare meeting notes from each project meeting and transmit them to the OFD-PM within seven calendar days of the meeting. This includes meetings with Institution user groups or occupants, regardless of the attendance of a representative of the Owner.

J. **Designer Performance Evaluations:** Evaluations of the Designer’s performance are completed by the Owner. As evaluations may affect future work awards with TBR, Designers should review the Design and Construction phase evaluation forms SBC 7 and SBC 8 to become familiar with the evaluation criteria.

### 3.02 REGULATORY REQUIREMENTS

A. **Building Codes and Regulatory Requirements** used for State Building Commission projects, and their sources, are identified in the Designers’ Manual standard Bidding Documents specification Section 01 41 15 Basic Regulatory Requirements. Depending on the use of the building, other codes or regulations may also apply. Code usage may be revised or augmented, and Designers should keep themselves apprised of current codes and adoption dates. Designers are responsible for designing in accordance with the codes and regulations applicable to the project.

B. **State Fire Marshal’s Office (SFMO)** has responsibility for reviewing construction documents to approve the fire, building, life safety, energy, and accessibility code compliance of state owned facilities. (SFMO review is not required for state leased facilities in exempt jurisdictions, i.e., those jurisdictions that are approved by the SFMO to run their own codes enforcement program). The Owner will cooperate with the Designer and the SFMO to meet the code requirements and user requirements for the project.

1. Rules of Tennessee Department of Commerce & Insurance define construction and require plans and specifications to be submitted to and approved by the State Fire Marshal prior to commencing construction on a state building. The Designer is responsible for determining and/or verifying if the project meets the definition of construction.

2. The Designer should obtain a concept review early, to allow ample opportunity for early identification of problems.

3. If a review by the State Fire Marshal is required, the Designer shall submit documents at the earliest opportunity, in order to obtain the Fire Marshal’s approval letter before assignment of a bid date.

4. Make submittals directly to the State Fire Marshal. Submit documents in accordance with the SFMO procedures published on the Department of Commerce and Insurance Fire Prevention website.

5. The Designer does not pay the review fee; The Owner pays the review fee internally. In estimating the review fee for the plans review submittal form, pay careful attention to the fee table and exemption provisions on the back of the form.
C. **Tennessee Department of Environment and Conservation (TDEC)** regulates storm water permits for discharges of stormwater related to construction activities. For sites disturbing one acre or more, the Designer shall comply with the requirements in “TDEC’s General NPDES Permit for Discharges of Stormwater Associated with Construction Activities” (CGP) and the accompanying TDEC Erosion and Sediment Control Handbook.

1. The Designer is responsible for determining and/or verifying if the project requires a NPDES stormwater permit and/or is a MS4 regulated site. The Designer shall coordinate with TDEC as necessary to clarify specific requirements.

2. The Designer shall prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP) to be submitted to TDEC. In collaboration with TBR/Institution, the Designer shall prepare a Notice of Intent (NOI) for construction activity – stormwater discharge and submit to TDEC. The preparer’s qualifications shall be as required by the CGP. The approved NOI and SWPP shall be included in the Project Manual.

3. The Designer shall coordinate and perform site assessments at each outfall, as required. The Contractor will be required to perform twice weekly inspections.

4. For MS4 designated campuses, the Designer shall engage a qualified consultant to review plans for completeness and overall Best Management Practices effectiveness. The Plans Review Checklist form F486 *Construction Plan Review Checklist (Stormwater)* shall be completed and submitted to TBR prior to bidding. The Designer shall collect, review and maintain copies of form F686 *Construction Site Audit Checklist (Stormwater)* completed monthly by the Institution or its qualified agent.

5. The Designer shall provide a written statement that the Construction General Permit is ready for termination of coverage and coordinate the Notice of Termination with the owner and TDEC.

6. The Designer shall provide as built certification that the installation is in substantial compliance and provide a Stormwater operation and maintenance plan

D. **Local Authorities** having jurisdiction to provide permits and inspections on similar local and private projects are to also be engaged in TBR projects, regardless of the State’s sovereign immunity. Submit complete signed, sealed, final sets to all local authorities at the earliest appropriate opportunity and before assignment of a bid date. The cost for the plan review fee is paid by the Designer and reimbursed by the Owner.

E. **Federal Construction Regulations** may apply to projects that are partially or fully funded by Federal agencies. When federal funds are included in the project, the Designer shall coordinate with the Owner to incorporate the construction requirements, including but not limited to, the Davis-Bacon Wage Act and the Buy American Act for construction materials.

### 3.03 DESIGN GUIDELINES

A. Discuss with the OFD-PM the application of specific Design Guidelines for the project and any unique performance design standards that may apply. Refer to the Designers’ Manual Appendices.
B. Tennessee Sustainable Design Guidelines: The Tennessee Sustainable Design Guidelines (SDG) are approved by the State Building Commission and are utilized by Tennessee Board of Regents as a minimum standard and guideline for Designers to ensure that the principles of good sustainable design and construction practices are being implemented on State projects.

1. Use a graded approach when evaluating the feasibility of incorporating design criteria, as enumerated and described in the SDG, to select the most cost-effective features among the credits available.

2. Conduct a Pre-design SDG review of the Program, the SDG requirements, and other relevant project information. Meet with the OFD-PM and Institution Facility Coordinator to report on the review results at the earliest opportunity in the design schedule. At this meeting, request of the Owner any needed clarification of the program and provide to the OFD-PM the preliminary SDG Tracking Check list with identification of applicable design features.

3. Based on the Owner’s review and comments from the meeting described above, conduct a Sustainable Design Workshop which shall include the project’s principle designers and all design consultants. At this meeting, provide the OFD-PM and Institution Facility Coordinator with a listing of applicable SDG criteria, an assessment of the feasibility of the options based on the Program and Bid Target, and the Designer’s recommended action.

4. Report on SDG implementation in successive design review meetings and obtain the OFD-PM approval at appropriate milestones.

5. Report on SDG implementation and verification in successive construction meetings.

C. Building Envelope Design Criteria: The building envelope design criteria have been developed to set the minimum standard and ensure that good design and construction practices are being implemented on TBR projects.

3.04 SPECIALTY CONSULTANT REVIEWS

A. Drawings and specifications (for applicable projects) require a review by a third party TBR consultant for ADA, building envelope, stormwater and commissioning. Written Designer responses to all consultant comments are required for each third party review. Submit responses to the consultant, TBR Project Manager, and Campus representative. Any drawing revisions required as a result of the reviews must be made prior to bid.

B. Prior to contacting the consultants, verify with the OFD-PM which consultant reviews are applicable.

C. The cost for the services provided by the specialty consultants is paid by the Owner unless the scope of the project would normally require a specialty consultant to be included in the Owner - Designer Agreement.
3.05 PROGRAM PHASE

A. Normally, the Owner will have a sufficiently well developed program for the project, or may authorize the Designer to provide additional services in the development of the program.

B. The project will begin with a Pre-Design Conference. Depending on the complexity of the project and the extent to which the Owner has prepared programmatic information and general requirements for the project, the Program may be confirmed in this meeting, or may require follow-up in a separate Program Phase review meeting so that the Designer may show the progress to date, confirm the remainder of the schedule, and obtain written approval of the Program Phase before proceeding with the Schematic Design Phase.

C. The following is a suggested agenda for meetings during the Program Phase:

1. Procedures
   a. The State as Owner: roles of OFD, the institution, and the State Building Commission
   b. Confirmation of the Designer Agreement
   c. The Designers’ Manual
   d. Supplemental A/E Agreement and additional services
   e. Designer Invoices and Payments
   f. General Procedures (see beginning of this Chapter)
   g. Procedures for design phase reviews
   h. Resolution of conflicting instructions

2. Program
   a. Discussion of Program and Scope constraints
   b. Budget constraints, allocations, and sources of funding
   c. The problem and preliminary concepts for developing solutions
   d. Applicability of and criteria for Energy Budget
   e. Code compliance, Fire Marshal approvals, TDEC permits and ADA issues
   f. Restrictions on use of Site, staging, work hours, and continued occupancy
   g. Utility easements – both existing and new ones needed for the project
   h. Risk assessment of Owner-provided information on existing conditions

3. Team and Plan
   a. Special Consultant(s), if required
   b. Obtaining soils testing, surveys, information on utilities, etc.
   c. Establishment of schedule for design and construction

4. Confirmation
   a. Designer should be able to articulate the general requirements and functional objectives of the project.
   b. Discuss potential matters beyond scope of contract that will be required of Designer.
   c. Confirm schedule
   d. Written approval of Program Phase
3.06 OWNER CONCEPT REVIEW

A. For any new building or major expansion, the Designer will meet with the OFD-PM and OFD administrative staff prior to completion of the SDP Phase. Once the Designer develops a concept Schematic Design, a review meeting will be scheduled at the Tennessee Board of Regents Office of Facilities so that the Designer may show the progress to date, confirm the remainder of the schedule, and obtain written approval of the Schematic Design Phase concept.

B. The Designer should be prepared to present an analysis of the site, conceptual diagrams, visual studies, alternate design concepts, a narrative description of building systems, and an estimate of probable total project cost. Other topics may include: conformance to the master plan, utilities and circulation, topographical features, Code compliance, ADA accommodation and program compliance.

3.07 SCHEMATIC DESIGN PHASE (SDP)

A. Information provided by the Owner and the Institution about existing conditions will be as accurate as possible, but should not be relied upon by the Designer. Designer should verify existing conditions to the greatest extent practicable, and discuss with the OFD-PM the types of additional investigations that are needed to adequately plan the project.

B. Prepare and submit to OFD-PM a proposal for surveying, geotechnical investigation, and other such special services as may be needed. The proposal may recommend preliminary studies, with detailed follow-up studies. Solicit and submit no less than three cost proposals from qualified providers and send a letter to the OFD-PM with a recommendation for a vendor for each special service. Obtain prior approval of the vendor and cost before authorizing work to proceed. In the proposal:
   1. Identify the Designer's recommended provider for the special services.
   2. Identify a timetable which provides adequate time for Owner to review and approve proposal.
   3. Have an attached itemization of direct costs from the provider.
   4. Identify the projected maximum Owner's cost including applicable multiplier.

C. Once the Designer finalizes a Schematic Design, the Designer shall show the progress to date, confirm the remainder of the schedule, and obtain written approval before proceeding with the Design Development Phase.

D. The following is a suggested agenda for an SDP review:
   1. Consideration of Program Requirements.
   2. Confirm the owner concept review is complete when applicable.
   3. Analysis of site.
   4. Relationship to master plans, land use, local zoning, permits, environment, circulation, mass transportation, traffic, parking, telecommunications, utilities, fire & life safety.
   5. Discussion of Sustainable Design Guideline (SDG) requirements.
   6. Review conceptual energy analysis, if required.
   7. Functional Relationships.
   8. Visual studies in diagrammatic form or in model form.
9. Determine if the project requires review now by regulatory authorities or State coordinating authorities (i.e., State Fire Marshal and TDEC, Local Authorities).
10. Unit Costs and Cost Estimate.
11. Selection of a Design concept and completion of schematics.
12. Consideration of the need for third-party Scheduling or Commissioning.
13. Confirm schedule.
14. Consideration of restriction on and effects of use of Site (i.e., noise, vapors, schedules of institution’s routine and special event activities, closures, etc.).
15. Consideration of existing and newly needed utility easements.
17. Written approval from the OFD-PM.

3.08 DESIGN DEVELOPMENT PHASE (DDP)

A. Develop and submit to the Owner a fully developed design concept based on the approved Schematic Design Phase. Develop the contractually required Construction Cost Analysis and summarize it on the form F388 Designer’s Cost Estimate.

B. Once Design Development is considered by the Designer to be complete, the Designer shall submit documentation thereof to the OFD-PM, and arrange a concept review with the State Fire Marshal's office.

C. Following receipt of the Designer's DDP submittal (and after the concept review with Fire Marshal) a review meeting will be scheduled, so that the Designer can show the progress to date, confirm the remainder of the schedule, and obtain written approval before proceeding with the Construction Document Phase.

D. The following is a suggested agenda for a DDP review:
   1. Site plan, with contours and applicable cross-sections.
   2. Elevations, exterior perspectives, model, or renderings, as required.
   3. Floor plans, net area, circulation, building sections, design details.
   4. Preliminary furnishings and equipment list and plans, if required.
   8. Operational energy analysis, if required.
   9. Preliminary quantity survey cost estimate, with escalation features to projected bid date.
   10. Discuss external coordination to be completed, such as for land acquisition, telecommunications, equipment, furniture, etc., effects of staging, utility connections, building and site closures, and disruptions in normal operations of the institution.
   11. Discussion of alternate delivery methods for construction services.
   12. Discuss special quality controls
   13. Discuss the requirements for specialty consultants reviews (ADA, building envelope, stormwater, commissioning)
   14. Review the project Scope, to confirm inclusions and exclusions and expected functional results of project, including possible use of alternates and unit prices.
15. Review scope and status of related work to be provided by the institution

16. Construction Timetable
   a. Determine whether there is need for separating the Master Project into distinct
      subproject construction contracts, distinct GMPs of a single CM/GC construction
      services contract, or distinct phases of Work within a single contract.
   b. Determine what separate time requirements (phases) are needed for various portions of
      the project.
   c. Confirm intended release date, bid date, commencement, delivery deadline, Contract
      Time, probable effects and costs of delay, and liquidated damages. If the project is
      divided into portions, there may be several of these timeline considerations.

17. Bidding and Contract Documents
   a. Confirm that Designer has applicable campus-specific requirements, addressing such
      topics as smoking, attire, coordination with campus safety and operations authorities,
      interaction with students, employees, and the public.
   b. Confirm that Designer has accurate information on acceptable access points, staging
      areas, and work boundaries.
   c. Confirm that Designer has accurate information on campus academic calendar and
      special scheduled events, continuing occupancy during construction, and restrictions
      on work hours, systems interruptions, and use of site.

18. Confirm status of reviews by regulatory authorities (i.e., State Fire Marshal TDEC and
    Local authorities).

19. Discuss special requirements if Federal funds are included.

20. Request written approval from OFD-PM.

3.09 EARLY DESIGN STAGE PRESENTATION (EDP)

A. For any new construction, the Designer shall make a presentation of the "Early Design Stage" to
   the State Building Commission during one of its regular meetings, which also includes a
   rehearsal presentation to the TBR Chancellor and staff, normally on the day before the SBC
   meeting. This is typically done upon completion of DDP, so that the design is fairly
   established, estimates have been confirmed, and DDP drawings can be used for the
   presentation.

B. Presentation requirements are specific to each project, but may include the following.
   1. Brief oral comments on any project aspect in response to questions from Commissioners.
   2. Drawings listed below, which communicate design concepts accurately and simply.
      Renderings, perspective studies, and models are not normally required.
      a. A vicinity map showing the relationship of the project to the surrounding campus.
      b. A site plan showing relationships to major site features and adjacent structures.
      c. Floor plans
      d. Elevations
   3. A one or two page summary report describing the building and related features which
      includes the following information.
      a. The project function and program.
b. Site information including location and results of geotechnical investigations and other relevant test reports.

c. The project’s relationship to the current Master Plan.

d. The project’s functional plan arrangement.

e. The systems used for structure, exteriors, finishes, MEP, energy conservation, and to meet regulatory requirements.

4. The Designer’s Construction Cost Estimate with reference information for GSF, NASF, ER, and the Bid Target. Site work costs should be separated from building costs.

5. An energy analysis or summary of sustainable design features.

3.10 SPECIAL QUALITY CONTROLS ON CONSTRUCTION

A. At the end of DDP (an item is included in the DDP Review agenda) there should be a discussion of whether to specify any special quality controls. The Project Manual Guide instructs the designer in the normal practice of specifying quality requirements (in the 01 40 specs) wherein the Contractor will hire and control the testing subcontractors.

B. In some cases, an alternative, “third party” delivery method may be used, such as:

1. Testing by a consultant to the Designer, for which the Owner reimburses the Designer, requiring a coordinating specification.

2. Testing by an assigned subcontractor, pre-selected by the Owner and Designer in the same manner as a Designer’s consultant, but whose contract terms are developed into a specification of services to engage the pre-selected test company.

3. Testing by a consultant selected and paid directly by the Owner.

C. If special quality controls are in the project’s best interest, the process of selecting the testing company may need to begin with or before CDP, in order that the necessary specifications can be adequately developed into the final bidding documents without delaying the project.

D. Commissioning is a requirement of the Sustainable Design Guidelines, and will be incorporated in the construction contract for all applicable projects. The Designer, Consultants, Contractor, and Subcontractors all have a part in the commissioning process.

E. In some cases, there may also be a need for enhanced commissioning, wherein a third-party consultant is provided by the Owner or required of the Contractor, to oversee and ensure the quality of the equipment and systems start-up, testing, balancing, and training of the Institution’s operating personnel. This does not in any way diminish nor replace the responsibilities of the Designer, Consultants, and Contractor for inspections, testing, operations, training, and demonstrations. If the Owner provides a Commissioning Agent, that Agent will provide commissioning specifications, which may require specific participation and activities by the Designer, Consultants, and Contractor, to complete the commissioning process directed by the Commissioning Agent.
F. In some cases there may be the need for independent surveys to locate underground utilities. This service may be performed by local utility companies, their vendors, or an independent provider of these services. It is the Designer’s responsibility to minimize the risk to the Owner when underground utilities may be disturbed.

3.11 CONSTRUCTION PHASING, ALTERNATES AND UNIT PRICES

A. At the end of DDP (an item is included in the DDP Review agenda) there should be a decision of whether to include construction phasing, alternates, and/or unit prices.

B. Construction Schedule and Phasing:

1. Whenever possible, construction Contract Time should be allowed to run uninterrupted and without imposed sequences and dependencies. If such an approach is necessary, it should be carefully planned in the early stages of preparing Bidding Documents.

2. Phases may be necessary to limit down-time or to create a dependent sequence. Phases require Designer control of commencement and/or acceptance through Phase-specific notices to proceed, substantial completion inspections, and final inspections.


C. Alternates:

1. When necessary, alternates are used to protect the Target and improve the chance for an awardable bid.

2. Alternates are best justified when the entire work to be bid is estimated within Target, and clearly defined. Optional elements are identified in DDP review to protect against a volatile market, resulting in a Base Bid and up to three alternates, for which the total estimate is within the Bid Target.

3. If the CDP cost estimate confirmation reveals the Work to be substantially over Target, the Work should be evaluated for reductions to bring the Base Bid plus up to three alternates back within Target.

4. The work specified as alternates must be optional. SBC policy and standard OFD bidding documents provide rules for consideration and award which may preclude acceptance of a particular alternate under certain conditions, regardless of availability of funds.

5. Alternates, when allowed by the OFD Project Manager, are to be additive, limited to three, and placed in priority order.

6. Alternates can only be included in the General Work bid form of standard OFD bidding documents. Limited Work and Non-Construction bid forms do not accommodate alternates.
D. Unit Prices:
   1. Use of Unit Prices is discouraged, and should not be chosen as a substitute for proper investigations and planning. If such an approach is necessary, it should be carefully planned in the early stages of preparing Bidding Documents.


3.12 CONSTRUCTION DOCUMENT PHASE (CDP)

A. Upon approval of DDP, and authorization to proceed with the Construction Documents Phase, proceed to prepare preliminary Bidding and Contract Documents.

B. Prepare the project manual in accordance with the Project Manual Guide, utilizing the standard Bidding Documents.

C. Prepare the drawings with a title sheet, location map, and list of drawings matching that in the Project Manual.

D. Complete Form F490 Bid Document Submittal, F388 Designer’s Cost Estimate, the Tennessee Sustainable Design Checklist and preliminary Credit Verification Form, and when applicable Form F486 Stormwater Plan Review Checklist.

E. Compare the specific documents in the Project Manual with the document requirements in Form F475 Front-End Review Checklist. Check off each document required for the project manual paying careful attention to the document date and when/if the document is required.

F. Submit at least 2 sets of preliminary Bidding and Contract Documents to the OFD-PM for review and transmit the following documents in electronic PDF format:
   1. SFMO approval letter or a no review letter
   2. Completed form F490 Bid Document Submittal
   3. Completed form F475 Front-End Review Checklist
   4. Completed form F388 Designer’s Cost Estimate
   5. Completed Tennessee Sustainable Guideline Checklist
   6. Preliminary Tennessee Sustainable Design Credit Verification Form
   7. Completed form F486 Stormwater Plan Review Checklist when applicable
   8. Preliminary Stormwater O & M plan when applicable

G. The following is a suggested agenda for a CDP review:
   1. Confirm DDP cost estimate and energy analysis; advise OFD in writing of any change.
   2. Verify that submittals have been made to proper authorities, such as State Fire Marshal, local building authorities, and TDEC Storm Water, and that approvals are in-hand or are due prior to release for bids.
   3. Review of final draft bidding documents.
   4. Review the status of utility easements, related work by the Institution, and other external coordination.
   5. Determine timetable for completion of CDP as outlined below. Designer is to make revisions identified by Owner prior to printing.
6. Review construction staging, phasing, and coordination with work by the institution, accommodations required of the institution, effect upon other campus activities, and expectations for completion.
7. Confer and agree on construction timetable and liquidated damages.
8. Confer and agree on cost and number of bid sets of documents.
10. Review information required in the Invitation to Bid and Advertisement for Bids for completeness (except establishment of bid date).
11. Review Instructions to Bidders.
12. Discuss Bidding Phase with particular emphasis on public advertisement, document distribution, pre-bid conference agenda, bid opening procedures, bid tab completion, notifications, and recommendations.
13. Review scope, budget, alternates, and contingency plans.
15. Confirm Design Team's Representatives through Construction Phase.

H. Transition to Bidding Phase: The following is a typical sequence of events for the transition from the Construction Document Phase to the Bidding Phase.
1. The Designer incorporates comments from the final review.
2. The OFD-PM forwards a Wage Rate Determination to the Designer for incorporation into the Bidding Documents.
3. The Bidding Phase begins with the assignment of the Bid Date by the OFD bid coordinator.
   a. The OFD bid coordinator sends formal notice with bid envelopes to the Designer.
   b. The OFD bid coordinator places the bid advertisement.
   c. The Designer adds the Bid date and wage rates to the Bidding Documents, and sends the final bidding documents to plan rooms and to the OFD bid coordinator.