



STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

DESIGN PROCESS

March 15, 2006

PREFACE

In order for the Division of Facilities Construction and Management (DFCM) to be one of the nation's premier facility construction and maintenance managers, it is essential that we consistently provide the best value in the facilities that serve the citizens of the State of Utah.

DESIGN PROCESS

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DESIGN PROCESS

1.0 GENERAL

1.1 General

- A. The Design Process applies to the capital development and capital improvement activities of DFCM. It contains specific information for the preparation of contract documents administered by the Division of Facilities Construction and Management. It delineates and supplements (either directly in the document or indirectly by reference) codes, industry recognized standards, and guide specifications. Many of the criteria are based upon the experience of DFCM and the input of professional and industry representatives.
- B. Each entity which has a contract with DFCM will be evaluated on its performance in accordance with the Design Process which includes both self-performed work and the performance of its subconsultants. As a result, it is critical that the A/E, which is in contract with DFCM, communicate to its subconsultants the requirements of the Design Process and that the subconsultants communicate to the A/E and DFCM any deviations from the Design Process.

1.2 Related Documents

- A. The Design Process (refer to <http://dfcm.utah.gov/>) includes the following documents which are incorporated herein by reference:
 - 1. Programming Standards documents requirements for Facility Program documents. Refer to <http://dfcm.utah.gov/>
 - 2. Design Requirements documents DFCM requirements which have resulted from DFCM's expertise and experience from previous projects. Refer to <http://dfcm.utah.gov/>
- B. DFCM incorporates by reference Codes, Standards, Rules, and Regulations in the Design Requirements document.
- C. Date of Applicable Documents
 - 1. The date of the applicable Design Process, Regulatory, and Standards documents shall be defined as follows:
 - a. For the facility program, this date is usually the scheduled end date for completion of the Facility Program;

- b. For the facility design and construction, this date is usually the date of the design contract.

1.3 Communication

- A. DFCM's Designated Representative shall arrange for implementing an effective process for communicating with Agency for the purposes of determining facility requirements, Agency's inquiries, and concerns related to the project.

1.4 Conflicts, Exclusions, Omissions, and Revisions

A. Conflicts

- 1. In case of conflict between any of the provisions of the Design Process and other requirements, the most stringent requirement shall govern.
- 2. In cases where references in the Design Process have changed or are otherwise incorrect, document issues to DFCM's Designated Representative.

B. Exclusions

- 1. Where any requirement cannot be applied due to project specific requirements that conflict with the Design Process, they will be considered for exclusion. A requirement may be excluded only when the exclusion may not affect DFCM's ability to deliver high quality facilities and does not absolve DFCM, or entities which contract with DFCM, from the responsibility to provide facility realization services that comply with the Design Process.
- 2. DFCM's Designated Representative is responsible for submitting exclusions from the Design Process for a specific project to the Director of DFCM. The Director has the responsibility and authority for examining whether the proposed exclusions are appropriate and for approving them.

2.0 PROJECT SPECIFIC REQUIREMENTS

2.1 Image to Public and Occupants

A. General

- 1. The facility shall be economically efficient considering the function to be performed and the life expectancy of the structure.

2. Provide facilities that are aesthetically compatible with the function and importance of the facility. Obtain permission from DFCM’s Designated Representative to expose facility components which detract from the aesthetic quality of the facility.
3. Review aesthetic features, which are defined as architectural elements other than finishes that are not required for the facility to function efficiently for the Agency, with the DFCM’s Designated Representative. Examples of aesthetic features are: atriums, fountains, skylights, spaces with excessive volume, and exterior free standing architectural elements.
4. Honor the context of the site.

B. Appearance and Image of the Facility

1. Determine, with the DFCM’s Designated Representative, the required appearance and image of the facility.

| Appearance and Image of the Facility | |
|--|---|
| Facility Category | Materials, Finishes, and Entry |
| Prestigious Facility: highly regarded by most people and very welcoming to visitors and staff. | The materials and finishes are prestigious and the best available. The approach and entry have convenient access and many welcoming features and enhancements. |
| Above Average appearance: regarded as attractive, clean, and welcoming to visitors and staff. | The materials and finishes are above average quality for the community. The approach and entry are above average and have some welcoming features and enhancements. |
| Average appearance: basically clean with approaches and entrances that project a standard image. | The materials and finishes are of a quality usually found in the community. The approach and entry present a standard appearance of an office building. |
| Overall appearance of the facility and of the entrance is of minimum significance. | The materials and finishes are of a quality usually found in industrial facilities. The approach and entry present a standard appearance of an industrial building. |

2.2 Budget

- A. Provide Design Services that do not exceed the project budget in the Agreement with DFCM.
- B. The project budget, which must not be exceeded in order to have a successful project, is established prior to the commencement of the design of the project.

1. In projects where the services of an A/E are procured, the A/E with DFCM shall develop a cost model within the budget for the construction of the project. The different portions of the cost model will be assigned to the A/E and the Design Subconsultants for identifiable elements of the project. Refer to the Cost Model Requirements for additional requirements.

C. Alternates

1. Obtain approval from DFCM's Designated Representative for any alternates prior to advertisement. Do not exceed six alternates, unless approved by DFCM's Designated Representative.
2. Describe completely all bidding alternates.
3. Do not increase the scope of the original project with alternates.
4. Specify only additive alternates and only with the intent of keeping the project within the construction budget.
5. Do not include in an alternate work which is an integral part of the project.

2.3 Schedule

- A. Provide Design Services that are completed on schedule as documented in the Agreement with DFCM for the specific project.
1. Written approval of any changes in the schedule is required from DFCM's Designated Representative.

2.4 Agency Related Requirements

- A. Provide Design Services, within the constraints of the Design Process and other DFCM specified constraints, which meet requirements specified by the Agency, requirements not stated by the Agency but which are necessary for the intended use, statutory and regulatory requirements, and additional requirements specified by the participants in the Facility Program (if one is prepared).
1. Minimize the disruption of the Agency's mission.
 2. Provide a facility that has a reasonable degree of flexibility to permit future reasonably foreseeable changes in use.

3.0 REGULATORY, STANDARDS, AND DFCM REQUIREMENTS

3.1 General

- A. Document in the Basis of Design the assumptions utilized in the design, including codes and other regulatory requirements (including dates and amendments), consensus based standards, and DFCM requirements.

- B. Comply with all applicable laws, rules, and regulatory requirements. Regulatory requirements include (but are not limited to) the documents referenced in the Design Requirements.
 - 1. A/E shall be responsible to submit the Contract Documents and obtain approval from all Authorities Having Jurisdiction.
- C. Utilize design practices and provide facilities (including products and services incorporated into facilities) that comply with current editions of consensus based standards.
 - 1. Exceptions
 - a. If a proposed system is not designed in accordance with a consensus based standard, notify the DFCM's Designated Representative. This requirement provides DFCM the opportunity to determine whether the risk of an option that does not comply with a consensus based standard is acceptable.

4.0 PROJECT PROCESS

4.1 General

- A. This section defines, in general, the stages in the facility life cycle based upon the Construction Specification Institute's Project Resource Manual. The DFCM's Designated Representative has the flexibility to adapt or combine stages to the needs of the project subject to DFCM processes and procedures.
- B. Meeting Requirements
 - 1. The A/E shall be responsible for arranging for meeting agendas and meeting minutes.
 - 2. Meeting Minutes
 - a. Record attendance, document action items, and document distribution of the meeting minutes. Action items include project related direction given to any project participant during the meeting or prior to the meeting which has not been documented.
- C. Documentation Requirements
 - 1. DFCM encourages document submittals to be submitted in digital pdf format; however, provide paper copies in accordance with agreements and as required to fulfill requirements. Copies in digital format may be

transmitted by email, except for copies which shall become a permanent record which shall be submitted in DVD format.

2. Permanent Record Documents include:
 - a. System Selection
 - b. Schematic Design
 - c. Design Development
 - d. Contract Documents
3. Digital Documents in pdf, DWG, DGN, DOC, XLS, and similar formats.
 - a. Documentation of Virus Free Format: Virus Scanning Software, Version, Date; Scan Date.

D. Verification

1. DFCM expects that each project task can be completed right the first time. In order to meet this expectation, the goal is to eliminate nonconformity by concentrating the efforts of all participants necessary to contribute to proper planning. Without proper planning, rework absorbs resources that often results in compressing the schedule which can increase costs, cause additional schedule compression, and reduce quality. To avoid rework, DFCM requires that each member of the A/E team is expected to verify that their work is complete prior to submitting it for observation by DFCM or its agents. DFCM's verification process shall not be a substitute for the verification process required by the parties in contract with DFCM and shall not relieve these parties of their responsibilities.
 - a. All participants shall familiarize themselves with the existing site and facility conditions as a prerequisite prior to their participation or presentation of a proposal. If the participant does not comply with this prerequisite, changes in the participant's scope of work that could have been avoided by compliance with this prerequisite shall not be accepted.
 - b. Notwithstanding this expectation, it is understood that the planning, programming, and design services develop through an iterative process; however, it is expected that the deliverables required at each phase of the process shall be substantially complete prior to obtaining approval of DFCM's Designated Representative to proceed to the next phase of the process. The reason for this requirement is to avoid compressing the schedule which contributes to poor quality. Major changes in approved documents shall be avoided and require approval of the DFCM's Designated Representative.

- E. Validation. The A/E shall fully cooperate in providing information required to validate the design.
 - 1. DFCM may validate, or arrange to have validated, that the work process and the facility complies with the Design Process, the Facility Program (if prepared), and other Agency Design Criteria. Refer to the related documents for Design Requirements.
 - 2. DFCM may arrange for the validation of the Structural Design by a Structural Engineering Peer Review. The Structural Engineering Peer Review shall be performed by a Utah registered SE experienced in similar project types.
 - 3. DFCM may arrange for the validation of the Energy Design for conformance with DFCM's energy conservation requirements by a Utah Professional Engineer specializing in mechanical engineering.
 - 4. DFCM may arrange for the validation of the Irrigation Design for conformance with DFCM's water conservation requirements by a certified Landscape Irrigation Auditor.

4.2 Project Conception Stage

- A. All DFCM projects start off as a need statement. The need statement can be as short as a few paragraphs, or it can evolve into a full program document. During this phase the scope and budget for the project are established. The program or needs statement is the guide to follow as the design progresses.
- B. DFCM shall assemble a steering committee which includes the appropriate representation from DFCM and the Agency to provide guidance to the design team throughout the process.
- C. DFCM shall allocate the funding in accordance with its procedures and prepare a schedule documenting the major milestones for the funded portions of the project. DFCM shall define project quality by requiring compliance with the Design Process and other specific requirements necessary for project success.

4.3 Project Delivery Stage

- A. DFCM shall determine the project delivery method and selection procedures. The project delivery method gives direction to the design process. Each delivery method brings with it a different set of expectation and requirements.
- B. Construction Delivery Methods:
 - 1. Construction Management/General Contractor (CM/GC): This method of construction is the preferred construction delivery method for the

development projects. The CM/GC assists the A/E by preparing a project schedule, cost estimating the designs presented at the different stages and different systems/components as required. The CM/GC also provides input on materials selected for availability, cost and constructability. The preferred method of design in this delivery method is the Single Bid Procurement as described below. An alternate to the single bid package is Multiple Bid Procurement.

2. Design-Bid-Build: The basis of this delivery method is that design is completed prior to selection of the contractor. Design is completed using the Single Bid Procurement process.
3. Design-Build: DFCM contracts with a single-entity for the complete design and construction of a project. The selection of this delivery method requires approval of the Director. Either the Single Bid or Multiple Bid Procurement methods are acceptable in this construction delivery method.

C. Design Delivery Methods

1. Single Bid Procurement: Design is complete for each A/E and the contract documents are issued in a single bid package.
2. Multiple Bid Procurement: “The Building Official is authorized to issue approval for the construction of foundations or any other part of a building or structure before the construction documents for the whole building or structure have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code.” The project is separated into two bid packages. Construction can start while the remaining design elements are completed. Design Development shall be completed for all disciplines prior to issuing contract documents for any early bid package. The two bid packages are:
 - a. Site Grading, Utilities, Footings, Foundations, Core and Shell Bid Package: Includes all documents necessary for demolition, relocation, and construction of site utilities, including site grading, overall building layout, excavation, and structural elements for the primary structural framing system, stairs, elevators, major mechanical and electrical equipment and exterior skin. The A/E documents shall include final overall building dimensions including slab edges, slab openings, and all information necessary to prepare the structural shop drawings.
 - b. Final Bid Package: Includes contract documents for all other elements to be incorporated into the project.

4.4 Design Stages

Note: If the project is small and uncomplicated the different design stages may be combined with approval of the DFCM Designated Representative.

A. Definitions:

1. “Basis of Design” Basis of Design and Assumptions for each Design Discipline. This document conveys the essence and important features of the project along with the different options for each of the systems. The document should contain information such as square footage, space efficiency and comparisons with the program requirements. Include a description of any additional spare capacity included in any of the engineered systems. Summarize the codes that will apply and submit a code analysis.
2. “Cost Model” This document refers back to the Basis of Design document and informs the steering group about the cost implications of the different systems. The Cost Model must include appropriate contingency for undocumented design issues.

B Expectations of Design Team.

1. DFCM expects that the A/E, together with its subconsultants, have responsible charge of the Design. The A/E shall designate the person who is in responsible charge of a specific design service for a specific project and through a qualification’s process assure DFCM that the person is qualified legally and by experience to perform the specific design service. This designated person shall be the primary day to day contact for the discipline throughout the project.
2. The goal is a quality coordinated design that minimizes the need for RFI’s or change orders, and achieves a high value for cost. It is necessary that drawings, notes, and specifications be coordinated so as to minimize conflicting provisions. A design that relies upon a preponderance of vendor expertise and design effort, generally, will not accomplish this goal. Include the necessary expertise in your A/E team. Obtain permission from DFCM for the use of any performance specifications which do not show the extent of the work on the drawings and which are significantly a product of vendor input. Coordinate all work between disciplines.
3. DFCM may utilize the services of an independent commissioning agent. The A/E shall coordinate with the selected commissioning agent to incorporate the commissioning requirements in to the specification. The commissioning agent shall provide the information that must be included in the specification. The goal of the commissioning agent is to focus on key systems identified with DFCM that, from past experience, have been

problematic. The commissioning agent validates that the key systems will comply with the Design Process, DFCM's Project Constraints, and the Basis of Design at each phase of the project after their services have been procured.

C. DFCM has established cover sheets for the drawings for each design phase. These are available through the DFCM web site. Utilize these cover sheets for each submittal phase to DFCM.

D. System Selection Design Phase

1. In the System Selection Design phase (at approximately 50% to 75% completion of Schematic Design), the A/E shall confirm the facility program requirements defined in the facility program document or as otherwise defined by DFCM.
2. The A/E shall document its Basis of Design including any design assumptions, and confirm the assumptions with the authorities having jurisdiction, the Agency and DFCM.
3. The A/E shall provide the steering committee with system options and evaluate the impact of each. Adjust the allocation of resources within the cost model, without exceeding the budget, based upon the direction from the steering committee. Obtain mutual agreement in order to proceed.
4. System Selection Submittal Requirements:
 - a. Written Requirements:
 - (1) Basis of Design
 - (2) Cost Model with system narratives for each option.
 - b. Drawings Requirements
 - (1) Use the DFCM provided cover sheets and input the required information.
 - (a) Other Drawing Requirements
 - Plan North/True North Symbol: Show on all plans in the lower right hand corner of the drawings.
 - Plan Orientation: Orient plans consistently throughout the set of drawings.
 - Graphic Scale: Show graphic scale for all drawings or views.

- (b) Comprehensive List of Sheets
- (c) General Sheets
- (2) Civil
 - (a) Civil Drawings: should include information on such items as existing benchmarks, lot lines, distance from existing buildings, existing and new utility lines and proposed footprint of the new structure.
- (3) Landscape
 - (a) Potential landscape areas.
- (4) Architecture
 - (a) Architectural Drawings: should include floor plans and room names, exit pathways and exterior rough elevations to show the essence of the building material types.
- (5) Structural
 - (a) Structural Drawings: should include basic information on grid lines, bay spacing and locations for lateral force resisting elements.
- (6) Mechanical
 - (a) Mechanical Drawings: should include basic information on system locations, connection points and utility sizing and capacity.
- (7) Electrical
 - (a) Electrical Drawings: should include basic information on system locations, connection points and utility sizing and capacity.
- (8) Communications
 - (a) Communications: should include basic information on system locations, connection points and utility sizing and capacity.

E. Schematic Design Phase

1. Continue to develop and refine the system selection requirements.
2. In the Schematic Design phase, the A/E documents the general extent, scale, and relationship of the project components, the type of construction and incorporates the systems selected in the previous phase.
3. The A/E shall be responsible to communicate with the State Fire Marshall's Office to receive any direction required to move to the next phase of design.
4. Schematic Submittal Requirements:
 - a. Written Requirements.
 - (1) Updated basis of design and assumptions for each Design Discipline
 - (2) Updated Cost Model
 - (3) Project Manual (refer to CSI Project Resource Manual)
 - b. Drawing Requirements. Continue to refine the previous drawings and add the following information.
 - (1) General
 - (a) Key Plans: show key plans on all drawings where one element requires two or more drawings to delineate a level.
 - (b) Column Grid Lines: show on all views, except that they may be omitted on Civil, Landscape and Site Plans.
 - (2) Civil
 - (a) Symbol Legend and Abbreviation List
 - (b) Site Demolition Plans
 - (c) Civil Site Utilities Plans
 - (d) Civil Utility Profiles
 - (e) Civil Utility Sections
 - (f) Civil Utility Details and Notes
 - (3) Landscape
 - (a) Concept landscape areas.

- (4) Architecture
 - (a) Symbol Legend and Abbreviation Lists
 - (b) Roof Plan
 - (c) Floor Plans
 - (d) Penthouse roof plan: Show on the same drawing if possible. Skylights.
 - (e) Exterior Elevations
 - (f) Sections

- (5) Structural
 - (a) General Structural Notes/Design Criteria
 - (b) Foundation Plans and Slab-On-Grade Plans
 - (c) Floor and Roof Framing Plans

- (6) Fire Protection
 - (a) Symbol Legend and Abbreviations List

- (7) Mechanical
 - (a) Mechanical Plans
 - (b) Mechanical Equipment Schedules (Boiler, Chiller, Cooling Tower, Air Handlers, etc.)

- (8) Electrical
 - (a) Lighting (Area, Horizontal IES category, Horizontal IES task illuminance, Design Issues): Site Lighting (Area, Illuminance, Design Issues).
 - (b) Power Quality {Design (%), Design Approach}; Neutral Conductor sizing for non-linear loads (Type, Design Approach).
 - (c) Symbol Legend and Abbreviations
 - (d) Electrical Site Plan
 - (e) Electrical Power Plans
 - (f) Electrical Schedules and Diagrams

- (9) Communications
 - (a) Structured Cabling Plans (Tt-1nn)
 - (b) Other Submittals

F. Design Development Phase

1. Continue to Develop and Refine the Schematic Design Requirements
2. After written approval of Schematic Design has been obtained from DFCM's Designated Representative, the A/E shall proceed with the design development phase of the project upon receipt of written confirmation to initiate the next phase of design. The design development phase fixes and describes the size and character of the entire project. In order for the project design to be considered successful, only minor modifications to the location of the facility on the site, the floor plans, and facility sections should be required during the Construction Documents Stage.
3. The A/E shall be responsible to communicate with the State Fire Marshall's Office to receive any direction required to move to the next phase of design.
4. Design Development Plan Review
 - a. The design professional shall meet with the building official to review the building code requirements of the proposed project.
 - b. A dimensioned site plan with distances to property lines, grades and location of new and existing buildings on the lot.
 - c. Complete code analysis which shall include the occupancy classification, type of construction, allowable area calculations and actual building area, height allowed in feet and stories, sprinkler requirements, exit width required and exit width provided, fire assemblies, and accessibility requirements.
 - d. Elevation drawings showings grades and height of building.
 - e. Typical floor plans
5. Design Development Submittal Requirements:
 - a. Written Requirements:
 - (1) Updated basis of Design and Assumptions for each Design Discipline.
 - (2) Updated Cost Model.
 - (3) Project Manual (refer to CSI Project Resource Manual)
 - (4) Code analysis and plan review

- b. Drawing Requirements: Continue to update and refine what was previously shown and add the following information.
- (1) General
 - (2) Landscape
 - (a) Concept Landscape Areas and Plans
 - (3) Civil
 - (a) Symbol legend and abbreviation
 - (b) Site demolition plan
 - (c) Site plan
 - (d) Grading plan
 - (e) Paving plan
 - (f) Civil site utility plan
 - (g) Civil utility profiles and sections
 - (h) Typical details
 - (4) Architecture
 - (a) Architectural Demolition Plan
 - (b) Layout of existing architectural elements identifying items to be demolished, relocated, or to remain.
 - (c) Building dimensions
 - (d) Floor Plans
 - (e) Roof elevations
 - (f) Exterior building elevations
 - (g) Wall sections
 - (h) Material selections
 - (i) Typical details
 - (5) Structural
 - (a) Classification for fire rated construction
 - (b) Special Inspection
 - (c) Lateral elements
 - (d) Typical details
 - (e) Structural Demolition Plans
 - (6) Fire Protection
 - (a) Fire Detection and Alarm Plans
 - (b) Fire Detection and Alarm Schedules and Diagrams
 - (c) Fire Suppression Details

(7) Mechanical

- (a) Symbol Legend and Abbreviations List
- (b) Mechanical Demolition Plans
- (c) Equipment schedules
- (d) Single line duct drawings
- (e) Mechanical piping plans
- (f) Plumbing general piping arrangements
- (g) Flow diagrams
- (h) Plumbing fixture schedules
- (i) Large Scale Mechanical Room Plans

(8) Electrical

- (a) Electrical Large Scale Plans
- (b) Electrical Details
- (c) Electrical Lighting Plans
- (d) Electrical Diagrams and Schedules
- (e) Electronic Security System, General
- (f) Electronic Security Sheets, Plan

(9) Communications

- (a) Communications Demolition Plans
- (b) Audio Visual Plans
- (c) Audio Visual Diagrams And Schedules
- (d) Structured Cabling Plans, Large Scale Views
- (e) Layout of communication rooms showing all components in the room. Show plan view layout of racks and equipment complying with TIA/EIA requirements.
- (f) Structured Cabling Schedules and Diagrams

(10) Interior

- (a) Interior Drawings
- (b) Interior Demolition Plans
- (c) Interior Plans

G. Construction Documents Phase

1. After written approval of the Design/Development Documents has been obtained from the DFCM's Designated Representative, the A/E shall proceed with the construction documents phase of the project. The construction documents are the written and graphic documents prepared or assembled by the A/E for communicating the project design for construction and administering the construction contract. The documents

are reviewed by the authorities having jurisdiction, members of the steering committee, and others selected by members of the steering committee.

2. Coordinate requirements for the following items with the DFCM's Designated Representative and assist DFCM as needed.
 - a. Project Identification
 - b. Description of Work
 - c. Type of Bid
 - d. Obtain list of contractors from DFCM's Designated Representative, if applicable.
 - e. Time of Completion
 - f. Liquidated Damages.
 - g. Pre-Bid Meeting
 - h. Evaluation and consideration of bids.

3. DFCM will initiate and prepare, with assistance as required from A/E, the following standard documents.
 - a. Notice to Contractors
 - b. Bid Form
 - c. Bid Bond (DFCM)
 - d. Bidder's Proposed Subcontractors (DFCM)
 - e. Contractor Agreement Form (DFCM)
 - f. Payment Bond (DFCM)
 - g. Performance Bond (DFCM)
 - h. Certificate of Substantial Completion (DFCM)
 - i. General Conditions (DFCM)
 - j. Supplementary Conditions

4. Construction Documents Submittal Requirements
 - a. Written Requirements:
 - (1) Updated basis of Design and Assumptions for each Design Discipline.
 - (2) Updated Cost Model
 - (3) Specifications: In written form on drawings or separate book, covering the following:
 - (a) Masterformat 2004; all divisions used on project.
 - (b) Material description.
 - (c) Installation description (when not shown on drawings).

- (4) Fault current calculations and coordination study.
 - (5) Project Manual: (refer to CSI Project Resource Manual)
 - (a) Energy model report
 - (b) Code analysis
 - (c) Inspection requirement
 - (6) Source of Specifications Identified. If A/E incorporates any proprietary specifications or any proprietary portion of its work from a source other than A/E, then such original source must be clearly identified in the A/E's work in order for DFCM to be aware of its identity and to be able to accept or reject such use of said proprietary source. Only those items specifically approved for "sole source" in writing by the Director of the Division of Facilities construction and management may be used as a "sole source" specification. In all specifications, the provision of Utah code, Title 63, Chapter 56, the Utah Procurement code, and all applicable rules enacted pursuant thereto, must be fully complied with the A/E.
- b. Drawing Requirements: Complete, coordinated drawings ready for final review and comment by DFCM, the Agency and Authorities having jurisdiction include the following:
- (1) Project Title Page: Template provided by DFCM.
 - (2) Seals Page
 - (3) List of Drawing Sheets
- c. The A/E will provide the following documents required for Building Official review and approval.
- (1) Site Plan.
 - (a) Property description:
 - Written "Legal Description" of property boundaries.
 - Survey information
 - Geotechnical/soils report, stamped, signed and dated by a P.E.
 - Existing hazardous materials information
 - (2) Construction Description Table
 - (a) Use or occupancy
 - (b) Type of construction

- (c) Square footage allowed.
 - (d) Actual square footage of proposed structure.
 - (e) Height of proposed structure in feet and stories.
 - (f) Area increase allowances for:
 - Yards
 - Stories
 - Fire walls
 - Automatic fire sprinkling system
 - (g) Occupancy separations
 - (h) Means of egress. Show the location, construction, size and character of all portions of the means of egress. Construction documents shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.
 - (i) Design occupant loads
 - (j) Accessibility requirements
- (3) Structural Calculations: Stamped, signed and dated by the engineer of record.
- (4) Fire Assemblies: Detailed on the drawings for walls, floor/ceiling assemblies and roof/ceiling assemblies as per “design number” or “file number” of one of the current publications of the following:
- (a) Fire resistance tables of Chapter 7 of the International Building Code.
 - (b) “Fire Resistance Directory,” Underwriter’s Laboratory.
 - (c) “Fire Resistance Design Manual,” Gypsum Association.
 - (d) ICC evaluation reports.
- (5) Flood Control/Drainage Drawings: As required, stamped, signed and dated by a professional engineer.
- (6) Special Inspection: The registered design professional in responsible charge shall submit a statement of special inspection. The statement shall include a complete list of materials and work requiring special inspection and the inspections to be performed.
- (7) Performance Based Design: Include any performance based design which has been approved by the building official.

H. Contract Documents Phase

1. After the construction documents have been modified to comply with requirements of the authorities having jurisdiction and requirements of the steering committee written approval by the DFCM's Designated Representative is required to issue the Contract Documents.
 - a. Provide two complete and corrected sets of drawings. Drawings shall be wet-stamped, signed and dated by a State of Utah licensed Architect or Engineer and submitted for approval by the State Building Official. One set to be retained by DFCM, the other set to be given to the General Contractor and kept at the construction site.

I. Pre-Construction Stage

1. General

- a. Each system or group of systems shall be integrated with other system components prior to release of the shop drawings by the A/E team and the Contractor team for construction. Pre-installation meetings are normally required for:

- (1) Site and Infrastructure
- (2) Facility Structure and Skin, including curtain walls and masonry.
- (3) Building Systems (Mechanical, Electrical, Plumbing, Building Automation, Fire Alarm)
- (4) Life Safety and Security Systems (Fire Protection, Fire Alarm, Security Electronics, Door Hardware)
- (5) Roofing

2. Pre-Construction Meeting

- a. DFCM's Designated Representative shall arrange for a preconstruction meeting. Shop drawing scheduling shall be coordinated so that the information is available for each discipline and trade to review and coordinate prior to the Pre-installation conference.

3. Pre-Installation Conference

- a. During the pre-installation conference, the A/E team and the contractor team (all members required to coordinate a system or group of systems) shall meet and resolve any issues related to shop drawing coordination and RFIs.

- b. Within 10 working days, after the pre-installation conference, responses to RFIs and construction modifications shall be issued by the A/E.

5.0 DFCM QUALITY ASSURANCE REQUIREMENTS

5.1 General

- A. DFCM has determined that many of the Quality Control problems can be reduced by a structured approach to interdisciplinary coordination and integration. The A/E shall integrate the drawings and specifications of all disciplines. The A/E shall inform DFCM of the process they will implement with the design team for dimensional control and comprehensive coordination of all elements of each of the following:
 1. Site Plan
 2. Floor Plan
 3. Reflected Ceiling Plan
 4. Exterior Elevations
 5. Selected Interior Elevations with cabinets or other types of complexity in the elevations.
 6. Sections at locations where above ceiling systems are congested shall delineate all building systems (e.g. Structural elements, Mechanical piping and ductwork, Electrical conduit and cable trays, and Fire Protection piping).
 7. Division 1 sections of the specifications.

- B. DFCM has determined that the functionality of systems can be improved and the costs reduced by the integration and convergence of building systems. The A/E shall implement a process with the design team for the comprehensive coordination of all elements. Elements that are typically a concern include:
 1. Communication Systems (structured cabling, audio-visual systems, other similar systems, and structured cabling connections to other electronic systems).
 2. Integrated Automation Systems (HVAC control, lighting control, electrical monitoring, monitoring of equipment, fire alarm).
 3. Security and Life Safety Systems (security systems, fire alarm systems, fire protection systems, door hardware, and similar systems).
 4. Equipment Connections (HVAC, electrical, plumbing).

6.0 COST MODEL REQUIREMENTS

6.1 General

- A. The goal of the Cost Model Requirements is to provide clear criteria which the cost models and bids for a facility must meet to achieve DFCM's requirements for the project to be considered successful.
- B. The DFCM's Designated Representative shall define in the "Agreement between the DFCM and A/E" the Cost Model submittals required by the A/E. Unless otherwise indicated in the "Agreement Between DFCM and A/E," Cost Models are submitted at the following phases:
 - 1. Programming
 - 2. System Selection
 - 3. Schematic Design
 - 4. Design Development
 - 5. Construction Documents
- C. The A/E shall prepare a Cost Model at each phase of the Design which identifies a sub-cost model for each discipline. Based upon this Cost Model, the A/E with each of the Design Subconsultants shall summarize in the Cost Model narrative what can be constructed in accordance with the Cost Model. Document any variances that do not comply with the Design Process, Facility Program, or Agency Requirements. Prepare design document submittals that comply with the Cost Model.

On projects where a CM/GC has been selected the CM firm will be responsible for providing an additional cost estimate. The CM/GC and the design team must work together to reconcile any differences between the two cost estimates. The project may only proceed once the cost estimate is agreed upon.
- D. If the Steering Committee determines that the design for an element of the project does not comply with the project requirements, the cost model shall be adjusted and documented; however, the project budget shall not be exceeded.
- E. At each cost model submittal, the Cost Consultant (member of the A/E team) and/or Contractor shall independently review that the cost model for the A/E team shall not be exceeded based upon the narrative and supporting documents provided at each phase of the design.
- F. DFCM defines Construction Contingency as funds for unforeseeable conditions and design errors and omissions after the time of contract award. Reasonable allowance for all foreseeable work items must be made in the cost model.

6.2 Standards

- A. The Cost Model shall be prepared according to the Construction Specification Institute's uniform classification of construction systems and assemblies.
 - 1. RS Means is an acceptable source of cost information as long as it is adjusted to local market conditions and project requirements.
 - 2. Exception: a proprietary Cost Estimating data base may be utilized when validated by objective evidence and approved by DFCM's Designated Representative.

6.3 Cost Model Report Table of Contents

- A. Executive Summary
 - 1. Project Summary: Brief summary of overall project, including total square footage (current vs. program), net square footage (current vs. program), and space efficiency (current vs. program);
 - 2. Funding
 - 3. Total Construction Cost Model: Facility Cost (Lump Sum, Cost/gross sf), On-site Cost (Lump Sum, Cost/gross sf), and Off-site Cost (Lump Sum, Cost/gross sf);
 - 4. DFCM Furnished Cost Model (Lump Sum, Cost/gross sf);
 - 5. Delivery Method
- B. Project Narrative
 - 1. Site Narrative
 - 2. Facility Narrative
- C. Construction Cost Model summarizing costs in the following categories.
 - 1. Footing and Foundation
 - 2. Structural Core and Shell
 - 3. Exterior Cladding
 - 4. Interiors
 - 5. Mechanical
 - 6. Electrical
 - 7. Fire Protection
 - 8. Special Demolition
 - 9. Civil/Site Work
 - 10. General: General Conditions, Fee, Design Contingency, Escalation Contingency, Construction Contingency

- D. Assumptions and Qualifications
 - 1. Market Conditions
 - 2. Project Assumptions

6.4 Scope of Estimate

- A. Facility Program preliminary cost model requires a mixture of costs per functional space (such as office, classroom, etc.), cost per cubic foot, cost per square foot, and cost per linear foot (for items where the cost is not easily forecast by a cost per square foot model such as site utilities). In some cases, design options shall be selected to reduce the range of costs for the program. These design options shall be defined as assumptions.
- B. Schematic Design Cost model requires a mixture of cost per cubic foot, cost per square foot, and cost per linear foot (for items where the cost is not easily forecast by a cost per square foot model such as site utilities). The cost model shall be based upon the design options selected and other assumptions identified in the narrative.
- C. Design/Development Cost model shall be developed based upon unit costs for approximate quantities of materials and installation shown on the design development documents or identified in the assumptions.
- D. Construction Documents Cost model shall be developed based upon unit costs for actual quantities of materials and installation shown on the construction documents or identified in the assumptions.

7.0 PROJECT MANUAL REQUIREMENTS

7.1 General

- A. The Project Resource Manual published by The Construction Specifications Institute serves as a reference document covering a wide range of information required by those involved in the Facility Development Process. As a generic standard, it informs the A/E about industry-wide expectations which must be adapted to the constraints of the Design Process and to specific project requirements.
- B. Apply CSI MasterFormat 2004 for organizing the numbering of sections, the SectionFormat for the organizing individual sections and the PageFormat for each individual page. (Note: MasterFormat 1995 may be utilized for projects with A/E agreements dated before January 1, 2006.)

- C. The only parties to the construction contract are the DFCM and Contractor. The A/E shall therefore address all instructions to the Contractor. Do not address individual subcontractors or trades.
- D. Provide an orderly and logical arrangement by complying with the CSI requirements that establishes a standard location for specific information and to state that information only in that location.
 - 1. Index all documents in the Project Manual.
- E. Edit guide specifications carefully to convey the necessary requirements for each project discipline. Avoid elaborate and expensive requirements for items that are not critical to the success of the project. Delete from guide specifications irrelevant items. Modify guide specifications to add clarity and special requirements to conform to project requirements.
 - 1. Coordinate Project Manual with Drawings.
 - 2. Carefully coordinate Structural General Notes with the specifications.
 - 3. Do not use lump sum allowances in any specification sections.

7.2 Preferred Source Documents

- A. DFCM requires written disclosure and project manager approval if specifications are prepared by a manufacturer. Manufacturer written specifications generally should not be used in order to avoid unfair influence by a manufacturer in the procurement process.
- B. DFCM requires that specifications be prepared in compliance with CSI requirements and that the specification masters be prepared using a documented quality process.
- C. DFCM does not require, but accepts the Full Language version of ARCOM Masterspec or BSD SpecLink Construction Specifications as the specification template. They are derived independently from the manufacturers and because they follow a quality and tested process.

7.3 Construction guarantees and warranties shall:

- A. Protect DFCM against faults, defects, or failure, in spite of technical compliance with the terms of the contract.
- B. Extend the manufacturer's responsibility beyond the end of the one year guarantee period on selected items as approved by DFCM.
- C. The one year guarantee period shall not limit the effect of warranties provided in or required by the contract. The Contractor shall correct failures during the one year guarantee period after substantial completion.

7.4 Product and Service Life Cycle Requirement:

- A. Assure there is a high value for the cost by:
 - 1. Maximize competition consistent with the purpose. In addition, minimize sole source procurements (Refer to <http://www.rules.utah.gov/publicat/code/r023/r023-001.htm>). Provide a minimum of three manufacturers for each material or installation, except where authorization from the Director of DFCM has been obtained for sole source procurements. The use of an “or equal” clause in the specifications shall define a process for determining “equal products or services” which requires approval by the A/E and shall not leave it to the vendor to make this determination.
 - 2. In order to avoid excessive addition and replacement costs, use open source and open protocol systems when possible.
 - a. Where proprietary software and service organizations are required to service a component, obtain price information for DFCM and the Agency identifying the long term cost (10 years) in order to include this in the evaluation.
 - 3. Provide facility components which are durable, with low failure rates, and low cost to maintain.
 - 4. New Technologies: Reduce life cycle costs by incorporating proven technologies in facilities, and by performing “due diligence” prior to procuring new technologies.

7.5 Materials

- A. Specify materials which are new, unless approved by DFCM’s Designated Representative. Provide certification or label with the name of the manufacturer or supplier and the approved testing laboratory where consensus based standards have been developed.

8.0 CAD REQUIREMENTS

8.1 General

- A. The goal of the CAD Standards is to provide clear criteria which the Drawings for a facility must meet to achieve DFCM’s requirements. Comply with the requirements of the National Cad Standard as supplemented by this standard.

- B. Coordinate with DFCM's Designated Representative to determine the drawing format.
- C. The performance requirements are given as appropriate as minimum criteria to allow flexibility within the constraints of the CAD Standards. If a variance from the standard is desired, the approval of the DFCM's Designated Representative is required.

8.2 Standards

- A. CAD Standards
 - 1. National CAD Standard, current version.
- B. CAD Software
 - 1. AutoCAD, current version
 - 2. Microstation, current version

8.3 Guidance

- A. Assumptions
 - 1. Any CAD information that will be shared between multiple sheets, such as floor plans, should be contained in a separate CAD file. For AutoCAD the file would be an XREF.
 - 2. All disciplines shall use the same title block for all drawings submitted for the same project. For AutoCAD, create the title block as an X-ref.
- B. Other Design Tools
 - 1. Isometric and perspective views may be used to supplement and explain the design.
 - 2. Models and renderings may be used to supplement and explain the drawings.
- C. Quality of Drawings
 - 1. These documents shall convey to all participants the graphic information necessary for the required work. It is essential that the documents be accurate and explicit.
 - 2. All elements of the Contract Documents shall be properly coordinated to minimize conflicts between drawings and specifications.
 - 3. Include the extent, size shape and generic types of materials, and the relationship to other materials.
 - 4. Avoid duplication of items in Contract Documents. If items are duplicated, the A/E and Subconsultants shall carefully coordinate to prevent conflicts.

5. List all drawings in the index, including the cover sheet as the first sheet of the set.
- D. Project CD: A/E shall prepare Project CD that establishes the project setup for the other members of the A/E Team. Distribute Project CD at the kickoff meeting to all members of the project team. Include:
1. Title Block
 2. Common CAD Layers
 3. Common Fonts
 4. Model Files, such as floor plans
 5. Sheet files including title block information that varies with each sheet.
 6. Initial sheet index

8.4 CAD Layer Guidelines - Supplemental Requirements

- A. Layer Name: Use Mandatory Level 1 Discipline Designator, Mandatory Major Group, Optional Minor Group.
- B. Identify user-defined layers using standard alphanumeric format.

8.5 Uniform Drawing Standards - Supplemental Requirements

- A. Drawing Set Organization
 1. Reference the border/title block and model files into a sheet file.
 2. Include a “ready-to-plot” sheet tab for both full size plotting and reduced size plotting.
 3. File Naming Convention: DFCM’s preference is to use two character discipline designators. One character discipline designators may be used for sheets that apply to all the drawings in a discipline or if the project is small. For small projects, the use of one character discipline designators must be approved by DFCM’s Designated Representative for the project.
- B. Sheet Organization
 1. Use a common sheet size for all sheets for a specific project to facilitate filing hard copy documents, plotting capabilities, and to maintain a consistency for Facility Management users. Use Architectural Standard “D size” (24” X 36”) or “F size” (30” X 42”).
 2. Obtain written approval, prior to submitting sheets that vary from this standard, from the DFCM’s Designated Representative. Request shall be in writing and include a justification for the variance.

3. Sheet Margins:

| Sheet Margins | |
|-----------------------|--------|
| Top and Bottom Margin | 1/2" |
| Left Margin | 1-1/2" |
| Right Margin | 3/4" |

C. Schedules: Comply with National Cad Standards Module 03.

D. Drafting Conventions: Comply with Drafting Conventions Module 04

1. AutoCAD users should choose either the architectural (feet and inches) or engineering (feet and tenths).
2. Global Origin: The origin of a drawing file is important because it serves as the point of reference from which all other elements are located. Origins are typically defined (located) in a drawing file by the Cartesian coordinate system of x, y, and z or for AutoCAD users 0, 0, 0.
3. Title Block: For DFCM projects the title block area will be placed on each sheet in the NCS horizontal text format with the title block placed in the right hand margin of the border sheet. DFCM requires additional information in the standard blocks of the NCS format using a horizontal layout. Utilize the DFCM provided cover sheet template.
4. All revisions to the Contract Documents shall be accomplished using the delta symbol placed adjacent to the revised element with the most current revision number. The portion revised shall be clouded on the drawings encompassing the delta symbol. Only the current revisions shall have the clouded area depicted. Previous revision delta symbols shall remain, but the clouded line shall be erased or frozen. If an entire drawing is revised or a new drawing is added to the set, place the revision delta in the issue block. Include revision block with change order numbers, dates and descriptions.
5. Text/Fonts: For drawing content, use standard fonts provided with the CAD software. If specialty fonts are used in the title block, provide specialty font to DFCM.
6. Scale: Scale shall be expressed both numerically and graphically. For building project plans, use 1/8" or 1/4" scale, unless approved otherwise by DFCM's Designated Representative. Large scale views may use standard scales larger than 1/4". For Site plans, use 1/1, 1/10, 1/20, 1/30, 1/40, 1/50, 1/60, or 1/100 scale, unless approved otherwise by DFCM's Designated Representative.

7. Sheet Types: Comply with the requirements of the sheet types section of this module. Comply with the descriptions of requirements for plans generated by each discipline.
- E. Terms and Abbreviations: Comply with Terms and Abbreviations National Cad Standards Module 05.
 - F. Symbols: Comply with the Symbols Module 06. Standard symbols ensure clear and concise communication.
 1. Exception No. 1: Lighting fixture symbols may be added to the symbol list which more graphically describe the lighting fixture, if identified on the symbol schedule.
 2. Exception No. 2: Fire alarm symbols that comply with NFPA 170 are preferred.
 - G. Notations: Comply with Module 07.
 - H. Code Conventions. Provide the code information as required in the design process and in the DFCM cover sheet templates.