

Division of Capital Asset Management

D · C · A · M

Building for the Commonwealth



*Designers
Procedures
Manual*

Commonwealth of Massachusetts

Division of Capital Asset Management

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Designers Procedures Manual



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Introduction

The Designers Procedures Manual replaces Form 9, Instructions for Designers, and reflects a revision to Chapter 149 legislation, Public Construction, which allows the Program Designer to complete the Study Phase of the project and continue into final Design. Through the development and publication of the DCAM Standard Specifications, it is intended that this procedures manual will be devoted solely to the Designer's contractual tasks. These tasks will begin with the award of the contract for study and end with the occupancy of the facility by the User Agency.

The Division of Capital Asset Management (DCAM) is committed to a fair and equitable relationship with the Designer. DCAM will compensate the Designer for all work received, support the Designer's professional goals, and, in return, expect the Designer to adhere to the guidelines in this document and provide the industry's highest standard of service. As a public entity, DCAM is committed to buildings that incorporate universal access, sustainable design and energy efficiency.

Sections concerning Design Phases cover three main categories: the process the Designer uses to gather, disseminate and review information; the product, which is the information the Designer must deliver in specified format to proceed through the milestones; and the performance, DCAM's evaluation of the Designer's and consultant's performance. During each phase of design, progress workshops will be scheduled to determine the following: resolution of the areas and adjacencies; building components and quality; the construction cost; and adherence to the schedule. Check lists are included at the completion of each phase to aid the Designer, the User Agency and DCAM staff in the review process. It is our goal to make this process more efficient, consistent and less bureaucratic.

This document is the collaborative effort of many individuals and professional organizations. We thank them and appreciate their involvement. Any feedback that will clarify or improve the process presented in this manual is appreciated.

Comments may be emailed to Brian Novak, Deputy Director, OPDC at: brian.novak@state.ma.us

The Designers Procedures Manual became effective June 2005 and was last updated August 2008.



1 ***General Conditions for the Designer Contract***

1.1 Designer Access to PMAS

DCAM utilizes a Project Management and Accounting System (PMAS) for all Study and Design project-related activities. One of the functions of this system is the ability to store and search all forms of project-related correspondence contained in the PMAS database.

At the start of the project the Project Manager will have a user identification and password assigned to the Designer so that they will be able to remotely access PMAS. Correspondence, meeting minutes, punch lists, field reports, cost estimates, etc., may be initiated and stored in the system.

The Designer is responsible to review the PMAS contents and, during construction, the Resident Engineer's field reports, on a regular basis. If required, PMAS training for the Designer's project team is available.

1.2 Executive Order 484

DCAM is committed to the conservation of energy and the limitation of water usage. All building projects must meet the requirements of executive order 484, "leading by example clean energy and efficient buildings." All projects must exceed the Mass Energy Code requirements by 20%, meet Mass LEED Plus, use renewable resources, and utilize 20% less water usage. All proposed solutions in the Study Phase must plan for this standard and ensure that adequate allowances are made in design and cost to achieve this goal in the Design phases.

(For additional information, go to:

<http://www.mass.gov/Agov3/docs/Executive%20Orders/Leading%20by%20Example%20EO.pdf>)

1.3 Construction Specifications

The Designer shall utilize the DCAM Standard Specification provided.

1.4 Universal Design

In addition to complying with 521 CMR, The Rules and Regulations of the Architectural Access Board (*For additional information, go to: http://www.mass.gov/aab/aab_regs.htm*), the consultant will review ADA Title II (*For additional information, go to: <http://www.usdoj.gov/crt/ada/reg2.html>*) and the ADA Accessibility Guidelines (*see: <http://www.access-board.gov/adaag/html/adaag.htm>*) to ensure that the proposed design meets the civil rights intent of this act. The requirements of these two laws may differ and the consultant must comply with the more stringent.

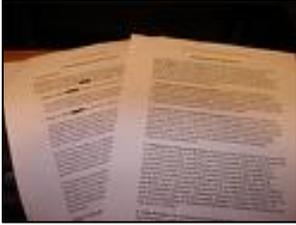
Design solutions will meet the diverse and changing needs of users across age, ability, language, ethnicity and economic circumstance. DCAM welcomes innovative design strategies that are simultaneously equitable, flexible and legible for all and extend beyond minimal compliance with accessibility regulations.

1.5 Cost Estimating

Cost estimates, cost models, and estimator participation in both the study and the design phases shall meet the requirements of the current DCAM Cost Estimating Manual and will be submitted in Unifomat II in the Study Phase and in both Unifomat II to Level 3 and CSI Masterformat in the Design Phase.

The Cost Estimating Manual can be found at:
http://www.mass.gov/cam/dlforms/CEM_Feb06.pdf

The Unifomat II can be found at:
<http://www.bfrl.nist.gov/oe/publications/nistirs/6389.pdf>



2

Selection of the Study Designer

The Ward Commission established the Designer Selection Board (DSB) in the 1980s to provide an unbiased selection of Designers. The DSB is a diverse group composed of architects, engineers, contractors and independent members that recommend Designers for public work. This recommendation is made after the Commission has issued a public advertisement, reviewed the qualifications submitted and has impartially voted and in some cases requested an interview with the finalists. Steps of the process are outlined in the following sections.

2.1 S-DSB-01: DSB Notice Prepared

The DSB prepares an advertisement that outlines the scope, professional qualifications and fee for a project.

2.2 S-DSB-02: DSB Notice Advertised

The DSB advertises the notice in newspapers and the public register.

2.3 S-DSB-03: DSB Selects Finalists

After reviewing Designers' submissions, the DSB discusses and votes to rank the finalists in an open public meeting.

2.4 S-DSB-04: Designer Receives Letter of Notification

The Designer receives a copy of a selection letter from the DSB to the Commissioner of DCAM designating the recipient as one of the Finalists selected by the Board. A copy of the Selection letter is also sent to the User Agency or, in the case of agency-managed House Doctors (see definition in the [Appendix](#)) to the awarding authority.

2.5 S-DSB-05: Designer Receives Letter of Appointment

Based on the recommendation of the DSB, the Commissioner issues a letter of appointment and sends it to the Designer. A copy of this letter is also forwarded to DCAM's contract division for the preparation of a contract. The contract division then issues a "Notice to Proceed letter."

2.6 S-DSB-06: Transmit Contract To Consultant For Review

The Designer receives the contract and assembles the necessary information required for contract signing. The Designer should pay attention to the information sheet attached to the contract regarding insurance, persons having a financial interest in the company, out of state corporations, corporate vote, and MBE/WBE information. DCAM's contract division will notify the Designer in writing specifying the date for contract signing to be held at DCAM. The contract must be signed without alterations. Please note that in addition to this document there is an original DSB advertisement and the Consultant's application which are also part of the contract.

2.7 S-DSB-07: Designer and DCAM Sign Contract

DCAM and the Designer meet to sign the contract. After the contract signing the Program or Study Manager (depending on the phase of the project) will contact the Designer to schedule the "A" Conference to review contract requirements and project procedures.

After the contract signing the Designer will receive a copy on electronic media of the Designers Procedures Manual, the Standard Specification, the CAD seed file, and the Cost Estimate Input Form for use on DCAM projects.

2.8 S-DSB-08: Notification of Designer / DCAM "A" Conference

The Designer receives notification of the initial meeting. The Designer and DCAM meet to review contract requirements and project procedures.



3

Conditions of the Study Contract

A few general requirements of the contract are explained below to ensure they are understood. It is not uncommon for the Designer to misunderstand or misinterpret these general requirements. This clarification does not alter any requirements in the contract; its sole intent is to provide guidance to the Designer.

3.1 Basic Services

The basic services of the Study contract are outlined in the contract.

3.2 Work Products/Deliverables

The Designer shall review the submission requirements and provide all of the information requested in both hard copies and electronic format. All submissions are to be complete, in accordance with the terms of the contract and the project Work Plan. Incomplete submissions may be rejected and will not be eligible for payment. DCAM is under no obligation to detail the missing information contained in partial submissions. The Designer must notify DCAM immediately upon receipt of a rejection of a submission to schedule the delivery of a complete submission.

3.3 Pre-Approval Requirements for Additional Services

No additional service can commence, and will be reimbursed without prior written approval from the DCAM Director of Programming.

The Designer is required to notify DCAM prior to performing any additional service. If DCAM agrees that the Designer should be compensated as an additional service, DCAM will request that the Designer submit a "Request for Reservation of Funds."

3.4 Extra Compensation or Reimbursement

With the written approval of the Director, the Designer shall perform any additional services requested by DCAM as outlined in the contract.

Articles in the contract describe the method of payment for either extra compensation or reimbursement (additional services). It is important that the Designer understand the difference between these two Articles and how to identify these costs before they occur.

Extra compensation involves services performed by the Design team that are not included in the base contract; for example, planning an area of the project *not* included in the original project scope.

Reimbursement occurs when the Designer requests payment for the service of a consultant who is additional to the Design team specified in the contract. Examples of these additional services would include an artist's rendering, a presentation model, geo-technical services, or a site survey. In this case the Designer will be compensated for the direct costs incurred plus a coordination fee of 10% of those costs, if the services do not exceed \$100,000. If they exceed \$100,000 the coordination fee will be negotiated with the Designer.

Scope changes, consideration of Potential Solutions, and documentation of existing conditions during ST-02 may require that additional services be performed during the preparation of a Study. Prior to DSB advertising the project for final design, it may not be feasible to determine the full scope of services required. Certain scopes of work are typically provided by consultants outside the basic design team, such as geotechnical work, or, in some cases, existing conditions surveys.

3.5 DCAM Control and Supervision

The Office of Programming within DCAM has control and supervision of the Study process for all capital facilities of State agencies and building authorities. Master plans for large projects involving multiple buildings are within the jurisdiction of the Office of Programming. Such master plans may result in the subsequent development of separate studies for individual buildings.

3.6 Study Preparation

Studies are prepared by outside consultants, the Study Designer, or by DCAM staff when authorized in writing by the DCAM Director of Programming. The Director of Programming designates a Study Manager representing DCAM to provide administration of the study development. DCAM is the "client" with whom an outside consultant has the contractual relationship. The User Agency designates staff to represent the agency, is responsible for providing relevant information, and works with DCAM staff to develop the study.

The Study Designer is responsible for the overall conduct of the study, technical accuracy, coordination of all work by the Study Designer's staff, and any consultants who may be employed for its preparation. Study submissions are expected to be of such quality and accuracy that the work will be complete and not have to be validated in detail by DCAM or the User Agency. As a basis for study selection, the designer has agreed to continue with the project through final design and construction. However, DCAM is authorized but not obligated to continue the designer's services into final design and construction.

3.7 Conferences

There are two major conferences in a study. They are as follows:

3.7.1 "A" Conference

The purpose of the "A" Conference is to review the conditions and requirements of the study contract. This initial meeting is the "Administrative Conference," held at DCAM with the Study Designer only. Project relationships between the Designer, DCAM and the User Agency are clarified and the project communications and contact information is established. In all studies, the Designer will understand that DCAM is the Client and the User Agency is the tenant. All study project correspondence will be directed to DCAM, the primary contact being the Study Manager. The Study Designer's responsibility and formats for all meeting minutes are reviewed and confirmed. Billing procedures and all milestone payment points are reviewed, and any matters relating to the detailed process of working with DCAM are addressed.

3.7.2 "S" Conference

This meeting is the "Study Conference," the official kickoff meeting for the project attended by the User Agency, the Study Designer, and the DCAM Study Manager. The goals of the project are outlined and in this working session of the project commence. This is an opportunity for the entire project team to identify any further work within the study required to achieve the goals of the project. Based on this new information, the Study Designer will adjust the Work Plan accordingly.

3.8 Progress Workshops

Progress Workshops are conducted on a regular basis every two weeks to review work progress. During a workshop every aspect of a project is considered, progress is evaluated, and activities are set for the next month. Projects are monitored according to the DCAM Study Milestones and to the specific Work Plan schedule. Reports from each Consultant are expected at each Workshop, although it is not necessary that every Consultant be in attendance. Previous progress will be reviewed against the approved Work Plan and any schedule adjustments or planned work modifications will be defined and approved.

3.9 Global Workshop

The Global Workshop presents potential solutions previously developed for the Client Agency and the Awarding Authority. The Designer shall use this workshop to develop and confirm a consensus solution approved by both the Client Agency and the Awarding Authority. All the Designer's Consultants shall attend the Global Workshop. The timing of the Global Workshop shall be such that changes in analysis, corrections of interpretation, and priorities and choices made by the Client Agency can be incorporated into the consensus solution and concept design development.

3.10 Study Work Plan—Milestone ST-01

The Designer is required to submit a detailed Study Work Plan defining tasks, precedences, work products, review meetings, approvals and compensation as outlined in the study contract.

3.11 Study Cost Estimator Participation

During the Study Phase, the Study Designer's Cost Estimator is expected to participate in at least the following activities:

3.11.1 "S" Conference "Kick-Off" Attendance

Study and understand the space and facility problems of the User Agency that the study is expected to address. Include the site and existing building remedial conditions in the cost of any projected work, and in the proposed range of solutions for the project.

3.11.2 Regular Attendance

Attendance at regular Design Workshops, field visits, and cost research into existing conditions and services is required. Provide cost data and high level estimates for conditions and issues found during Milestone ST02 and subsequent analysis. Provide cost data and advise on cost matters for proposed alternative schemes in Milestone ST03. Support interactive

cost comparisons between alternative schemes during Workshops.

3.11.3 Submittal Preparation

For the Approved Scheme in ST04, ST06, and ST09, provide detailed estimates in Unifomat II in both printed and electronic submittals. Electronic submittal is to include an operable spreadsheet. (*Note: PDF format alone will not be accepted.*)

3.11.4 Certification Package (Building Study only)

Estimate summary and detail confirmation in Unifomat II is required for the Certification Package for the project. This will include separate margins for estimating contingency, escalation, general conditions, other loadings, and allowances for utilizations of the CM at Risk procurement method. Refer to the DCAM Consultants Estimating Manual for detailed requirements at:

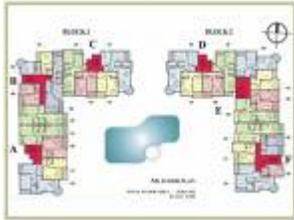
http://www.mass.gov/cam/dlforms/CEM_February06.pdf

3.12 Study Review Stages

During the course of the work, DCAM and the User Agency will review the submittals from the Designer to approve the deliverables and authorize continuation of work by the Designer to perform activities and tasks in the subsequent Milestones. *In particular, the Designer should note that progression to a detailed Program and Consensus Solution is NOT authorized until completion and approval of ST-02, ST-01R, ST-03, and ST-GW.*

The first formal submission of a Concept Design for the Consensus Solution will be at Milestone ST-05. A minimum of 6 sets of the Study's physical products will be distributed to the User Agency and to DCAM. All comments are combined, where feasible, into a single document that is then returned to the Designer.

The Designer is responsible for making all changes required by the comments, and to communicate with DCAM and the User Agency regarding changes that are, in their professional opinion, not suitable, and specific reasons as necessary. When required, hold and manage additional meetings to develop a mutually satisfactory Consensus Solution. All parts of the submission, including all specialist consultant investigations and reports, and alterations following DCAM review, must be incorporated into the Concept Solution before Milestone ST-09 can be approved. Completion and approval of Milestone ST-09 is a prerequisite to Certification of the Study.



4

Study Phase

This section is an overview of the Study Phase and should be coordinated with the specific contract requirements for each study. The process and products in this Section follow Study Phase Milestones. Each Study will have a customized Work Plan approved by the Director of Programming.

In accordance with DCAM's contract for Designer services and the Notice to Proceed from the Director of Programming or the Deputy Commissioner, the Designer shall meet as necessary with the Study Manager and other agents of DCAM and representatives of the User Agency in workshop sessions to develop the Study.

4.1 Definition of a Study

A Study is a document that defines and quantifies a User Agency's space needs and develops alternative architectural, engineering, or operational solutions to meet those needs. Studies have functions beyond the simple architectural and engineering definition of a project. They are also used by DCAM when working with the Executive Office of Administration and Finance, the legislature, and other government agencies to support requests for funding. In some cases, studies reveal that a proposed project is not warranted, or that the need may be satisfied without new construction or extensive renovation of an existing facility.

4.2 Types of Study Projects

DCAM generally undertakes three types of Study Projects:

- **Certifiable Building Study:** The objective of this type of study is usually to lead to a Design and Procurement project. This type of study considers Space Needs, a Study of Existing Conditions, Development of Potential Solutions including new, renovated or alternate construction, and development of a selected Concept Solution.
- **Certifiable Repair Study:** The objective of this type of study is to provide or verify a basis for timely repairs or upgrades to existing

building stock. This type of study considers a repair or the provision of additional services to an existing facility, without consideration of altering the Program Use. These projects are often small, urgent or specific to repair or upgrade a building, and are handled by House Doctor Contracts (refer to definitions).

- **Master Plan:** The objective of this type of study is a comprehensive review of one or more facilities or campuses managed by DCAM. The review may be specific, focused on an aspect of the facility, such as space utilization, or broad, to cover long-range building programs and replacement alternatives. The Master Plan may be used to consider a development policy or to serve as the basis for a program of construction projects.

4.3 Four Principal Elements

Every Study addresses four principal elements, all of which must be in balance for a Study to be Certifiable:

1. Space use, covering functional and relationship requirements
2. Scope and feasibility of site and building construction
3. Capital, operating, and life cycle costs
4. Time frames required for all aspects of project implementation.

4.4 Submissions

The Study submission shall be made in five volumes corresponding to major PMAS Milestones and as defined by the Work Plan:

- **Volume I** covers ST-01, Problem Description and Work Plan.
- **Volume II** covers ST-02, Project Data and Analysis. This becomes the reference manual for the Study and Design.
- **Volume I-R** (if required for revisions) covers ST-01R. Usually the investigations and analysis in ST-02 uncover new information that requires a re-assessment of the original project goals and problem description.
- **Volume III** covers ST-03, Evaluation of Potential Solutions.
- **Volume IV** covers ST-04, Consensus Solution. This documents the basis for design. It is submitted in Draft and Final versions.
- **Volume V** with records of Project Meetings, communications, and relevant administration records.

4.5 ST01— Problem Statement and Work Plan

Duration: 2 weeks

Fee Allocation: 3% of total contract fee

The first work product contains two parts, the problem description and the work plan.

4.5.1 Problem Statement

The Designer will write a detailed understanding of the problems the Study is expected to address. This information will be based on the DSB notice, meetings with the DCAM Director of Programming and the assigned Program Manager, and meetings with the head of the User Agency and any key staff that the agency head decides to include. This description will be reviewed, and commented on as necessary, by DCAM and the user agency to ensure that there is a clear and mutual understanding of the basis for the study.

The description of the problems will cover the following elements:

- *Problems expressed as functional deficiencies:*
Problems should not be expressed as desired building projects. For example, a problem at a college might be expressed as a lack of adequate or appropriate instructional space. That lack of space can then be confirmed, or redefined, during the Problem Analysis stage. The problem should not be expressed as a desired solution, such as “a new classroom building”. It may turn out that the college has an adequate amount of space but that it must be upgraded to better meet the college’s instructional needs.
- *Not just one problem:*
The user agency should feel free to express as many functional problems as it wishes. This will give the Designer a better understanding of the existing circumstances, and can make it possible to propose solutions that might solve several problems with a single project.
- *A parking space for ideas:*
Ideas, or imagined solutions, come up at various stages of the study process. At the start of the study it is usually premature to establish a desired solution. In fact that might cut off the route to a richer more fully developed solution arrived at after completing the Problem Analysis stage. The user agency may even bring several sketches, or fully developed plans, to the initial meeting. These are best reviewed for their intention, and accepted as a tool for better understanding the problems they are meant to solve. They can then be “parked” until more work has been done.

4.5.2 Preliminary Study Work Plan

A detailed study work plan will be submitted by the Designer. It defines the tasks, work products, review meetings, approvals and compensation. The study work plan should include the following:

- Project Directory
- List of tasks and person responsible for each

- Schedule
- Description of the level of detail
- Fee allocation
- List of anticipated reimbursables and additional services
- List of potential obstacles or concerns about unknown information

The DCAM Study Manager will provide the initial draft of the Work Plan using a standard template reflecting the scope of work described in the DSB advertisement. The Designer, working with the Study Program manager, develops and submits this Work Plan after the initial Study "S" Conference. The Study Work Plan should be submitted within 1 week of the "S" Conference.

The Work Plan identifies the scope of work, the sequence of Tasks to follow, schedules, and Deliverables. It also identifies the fee associated with each Milestone and its Deliverables, and forms the basis for the Designer's billing during the Study. The Task sequence identifies which Deliverables must be submitted and approved before work is permitted to commence the next task. This will identify the critical path through the Project schedule which will be used to monitor overall progress. The Study Work Plan is intended as a detailed list of all of the activities required to provide a Certified Study as follows:

- The major milestones for the project, corresponding to PMAS Milestones above, and the specific deliverables attached to each Milestone (refer to the [Appendix](#))
- Planned dates for completing each Milestone and the prior completed Milestones before each activity can start
- A schedule listing all anticipated meetings, including meetings with the User Agency, local regulatory boards, progress workshops, review meetings, and a Global Workshop
- A payment schedule for all of the Submissions defined and due at the completion of each Milestone listed (refer to the [Appendix](#))
- Project Acceptance Procedures for Milestones and Deliverables
- Project Additional Work Procedures including Scope changes
- Project Staffing, including the Project Manager, all Consultants, and full contact information and project responsibilities.

For completion of Milestone ST-01, the Designer will also review the project with the DCAM Project Manager and Client Agency, and compare it to the original DSB advertisement and scope definitions. The Designer shall submit the best understanding of the project scope and goals:

- Scope Specific Inclusions
- Scope Specific Exclusions
- Scope Assumptions
- Project Approach Assumptions or Exclusions
- DCAM Participation and Obligations
- Client Agency Participation and Obligations
- Other DCAM Offices support Requirements
- Proposed Specialty Consultants or Services
- Anticipated testing and additional services required

4.6 ST02—Problem Analysis and Existing Conditions

Duration: 6 weeks

Fee Allocation: 25% of contract fee

Milestone ST-02 is comprised of four Sections referring to the four elements of a Study evaluation. It will document and evaluate existing conditions and provide the following:

- Analysis of Space Needs
- Feasibility Analysis
- Cost Analysis
- Schedule with constraints and limitations

The Feasibility Analysis will include opportunities and constraints identified in Milestone ST-01 for the proposed project, and a comprehensive evaluation and analysis of Existing Conditions. The Designer will analyze and compare the Existing Conditions against the project objectives AND support the conclusions drawn as to the project's feasibility.

The Feasibility Analysis will also address renewable energy and sustainable design goals. The Designer will make initial contact with utility companies to ascertain rebate opportunities.

The Designer will initiate the LEED checklist to be included in the Certified Study.

4.6.1 ST02A—Space Analysis

This Deliverable will provide the following:

- Identification of the functional user groups intended to be served by the project
- Interviews with proposed users
- Preliminary space program and relationship diagrams, including floor plans of the existing facility (if appropriate) with rooms and spaces clearly identified
- Documentation and analysis of the advantages and negatives of the existing spaces
- Space benchmarks by functional grouping based on commonly accepted industry standards; identification of emerging trends that might change how the facility is used over time
- Documentation of appropriate net to gross ratios for the possible building project

4.6.2 ST02B—Feasibility Analysis

This Deliverable will provide the following:

- Plans and sections of existing facilities as required or requested by DCAM.
- A survey, analysis and costing of all service provisions (utilities) to the existing or any proposed building, including but not limited to diversions necessary, capacities, connection issues, local City requirements, or other factors impacting service provisioning.
- A complete building code analysis to include all codes that affect the existing or proposed building at the present time and at the time the building was constructed in the case of an existing building
- An analysis of all relevant building systems, including structural systems and seismic requirements
- An analysis of potential environmental testing required
- An evaluation of the types of construction and materials that this project might employ
- A statement of the architectural quality and image to be incorporated during the design stage
- An analysis of issues, time frames and costs relating to possible site acquisition, change in code use, or impact of historical or other relevant authority requirements.
- A Sampling and Analysis Plan (SAP) that reflects previous use(s) of the Project Site. The assessment of previous activities shall be performed by review of historical plans and directories, and an evaluation of typical compounds used by past industries and businesses. Where feasible, an Environmental Assessment can commence on the Study Managers directive.
- Coordination with local authorities and agencies to determine opportunities for utility rebates.

4.6.3 ST02C—Cost Analysis

This Deliverable will provide the following:

- An estimate for each of the major findings in the existing conditions analysis with implications for the project. This includes but is not limited to special utilities connection requirements, environmental remediation, or essential site or building repairs/improvements.
- A comparison of costs for other similar facilities, analyzed at program level and with “benchmark” costs for buildings based on age, location, style and site factor adjustment.
- A detailed range of construction costs for the proposed project, using the Unifomat II system to Level 1 detail, with compensation for building form factors as necessary for comparison.
- Existing building operating cost analysis from information provided by the User Agency for comparison to expected norms.

4.6.4 ST02D—Implementation Analysis

This Deliverable will provide the following:

- A list of all required permits, regulatory agencies (state and federal), and associated timelines
- Identification of key dates, including critical path items
- A list of potential obstacles or causes for delay that might be anticipated
- A preliminary schedule to complete the building for occupancy, including allowances for all factors identified above. Include risk analysis to provide best and worst case scenarios for the schedule developed.
- Likely solutions for further development and a comparison of these options in terms of benefits, cost and risk
- A schedule of roles and responsibilities to achieve the defined renewable energy and sustainable design goals

4.7 ST01R—Problem Re-Statement and Work Plan Revision

Duration: 1 week

Fee Allocation: 2%

As a result of the findings documented in the Problem Analysis and Existing Conditions, the Work Plan will be revised as necessary to reflect any required adjustments to the scope of work. At this point, DCAM, the Project Manager, and the Design team will jointly determine the best allocation of the remaining fee, including any contingency.

4.8 *ST-EV(P) —Designer Mid-Performance Evaluation*

The Designer will receive an evaluation of performance at the completion of this phase. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the Manager and the Designer for improved performance.

The Designer will assist the Project Manager in a review of the Consultants.

Copies of the final evaluation will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the manager, they may respond with a letter to the Manager and send a copy to the Designer Selection Board.

4.9 *ST03—Alternative Solutions*

Duration: 5 weeks

Fee Allocation: 25% of total

This Milestone may not be formally commenced prior to the signed approval by the Director of Programming of the revised Problem Statement and Work Plan of Milestone ST-01R.

4.9.1 *Cost and Budget Analysis*

The Designer's team will be responsible for estimating the construction cost (ECC) based on the hard costs, general conditions and allowances, and escalation for each alternative. This cost analysis is essential to inform the alternatives selection. DCAM will be responsible for completing the Total Project Cost (TPC) including administrative costs, design fees, contingencies, site costs, facilities furnishings and equipment, etc.

The estimated Cost for any selected building design shall include the following:

- Mass LEED Plus standard as a minimum as required by executive order 484 (Refer to the LEED checklist in the [Appendix](#).)
- Utility rebate analysis and filing
- Any other standards as identified in the project goals

4.9.2 *Deliverables for ST03*

- Narrative
- Alternative Planning Concepts, with a statement of the advantages and disadvantages of each concept
- Alternative Planning Concepts, including a brief commentary on campus configuration and siting considerations
- Space Groupings, including relationship diagrams and block and stack diagrams
- Scheduling/Phasing implications

- Cost Modeling and budget implications during alternatives development
- Evaluate alternatives/identify the preferred concept
- Evaluation of alternatives relative to LEED certification objectives
- Unifomat system Level II Cost Estimates for each alternative
- Preliminary Life Cycle Cost Analysis for each concept
- Preliminary Implementation Schedule for each concept
- Global Workshop Preparation and participation

These components are detailed in the [Appendix](#).

4.9.3 *From Alternatives to Consensus Solution*

The Designer will develop and present the Alternative Solutions to DCAM and the User Agency in one or more Workshops as required. The Alternative Solutions may be iterative or combined through successive Workshops. When one solution is chosen as the basis for developing the Consensus Solution, the Designer will prepare the Global Workshop (ST-GW) to review the selected solution with a broader audience. After this Workshop the Designer will incorporate any recommended changes from the Global Workshop to undertake the development of a final approved Consensus Solution.

4.10 *ST-GW—Global Workshop*

The Global Workshop is conducted prior to the completion of Milestone ST-03 of the Study Phase to solicit independent views and evaluations of the Consensus Solution proposed by the Designer. The workshop will be organized around the four items essential to the project and reflected in the Consensus Solution and variances. The results of the Global Workshop will be incorporated into the approved Consensus Solution.

4.10.1 *The Parameters for the Proposed Consensus Solution*

At the Global Workshop, the Designer must clearly frame the Problem Statement to allow a proper evaluation the Consensus Solution. The four essential parameters of the Consensus Solution are as follows:

- Space Needs: master plan issues, access issues, adjacencies, and efficiency issues.
- Building Elements: relating to the building enclosure, the building systems, and the general quality and efficiency of construction.
- Schedule: all scheduling associated with design and construction, and any occupancy impacts.
- Comprehensive Cost Factors: the presentation and investigation of alternatives that may impact the building and

operation costs, and ultimately the final cost of the project when all factors are included.

4.10.2 Workshop Structure

At the Global Workshop, attendance by all Consultant Team members is required, along with User Agency representatives and DCAM staff. In addition, other DCAM specialist staff and supervisors will attend, and other outside consultants may be invited to attend. The Designer will lead the meeting, provide an agenda approved by the Study Manager, provide presentation material, and publish meeting notes indicating resolved and unresolved issues for the next workshop.

4.11 ST04—Consensus Solution

Duration: 6 weeks

Fee Allocation: 25%

This Milestone may not formally begin prior to the signed approval by the Director of Programming of the Consensus Solution in Milestone ST-03.

A Consensus Solution has been approved at the completion of Milestone ST-03 will be identified from the alternative designs, or from a combination thereof. In some situations, with the written approval of the Director, the selection of the preferred alternative may be deferred to the User Agency. In the event that a physical solution is not recommended as a means of addressing the User Agency's needs, alternative methods of responding to the agency's needs must be discussed.

4.11.1 Concept Design as Part of Consensus Solution

The Consensus Solution, in projects where new or renovation construction is anticipated, will be illustrated by architectural and site drawings as required to convey a successful organization of spaces that will satisfy the spatial and organizational requirements of the Final Program. The Concept Design provides a preferred architectural and site solution intended as the basis for the Final Design.

In certain cases, DCAM and/or the User Agency may determine a need to reconsider the project's design in the final Design Phase; this can be done, but the project must remain within 10% of the budget certified in the Study Phase, and must remain responsive to the design criteria and program.

It is expected that the Concept Design contained in the Study will be in full compliance with all applicable Codes and Regulatory Standards. It will clearly indicate the type of construction classification and the use grouping of the building, including mixed uses with a building and any required separations between such uses.

The form of the Final Study Submission, and the format of the drawings, must conform to DCAM standard forms.

4.11.2 Consensus Solution Cost Estimate

The Cost Estimate for the Consensus Solution shall be developed using the Uniformat II Elemental Classification to as much detail as the concept drawings and specifications permit. Designers and Estimators are referred to DCAM's Consultants Estimating Manual and [ASTM](#) Document E1557-97 (NISTIR 6389) for a detailed description of Uniformat II elements and components.

The Cost Estimate shall include the following:

- Cost Estimates for all work of the design scheme must be at least to Level 3 of Uniformat II Classification, Sections A through G inclusive, complete with a single line outline specification description for each item.
- Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds and all other items must be included.
- Gross Floor Areas and Net Floor Areas for the design scheme shall be measured in accordance with DCAM's ASTM pro forma.
- The Gross Floor Area and Program Net Floor Areas must be reconciled as determined during the Study Phase, including an explanation of any significant variances.
- The Estimate shall be current at the date of Document Submission, and include factors or amounts for the following:
 - Provisional Allowances for work not sufficiently specified or designed at this Phase.
 - Estimating Contingency and Escalation to projected Bid Date as percentage rates.
- Estimates shall be submitted in both printed and electronic format, with the information summed to project total at each level.
- All estimates shall be provided to DCAM in both PDF and working (unlocked) excel spreadsheets.

4.11.3 ST05 and ST09— Consensus Solution Report Submission

The concept design is the basis for the schematic design following the study. It is submitted in draft (Milestone ST-05) and final (Milestone ST-09) versions. The report includes the following:

- Acknowledgements
- Preface
- Table of Contents
- Executive Summary

- Space Program: Tabular program, Adjacency diagrams, Room Data Sheets
- Proposed Scope of Construction, Concept plans, sections, and elevations, narrative performance specifications organized by Unifomat II
- Cost Estimates
- Implementation Schedule
- Details for these deliverables can be found in [Appendix](#).

4.12 Appendices and Project Communications

Volume V contains the following:

- Meeting Notes
- Project Correspondence and e-mails
- Technical Memoranda
- Regulatory Documents and Correspondence
- Details for these deliverables can be found in [Appendix](#).

4.13 ST-EV(F)—Final Performance Evaluation

The Designer will receive a final evaluation of performance at the completion of this Milestone. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the Manager and the Designer for improved performance.

The Designer will assist the Project Manager in a review of the Consultants.

Copies of the final evaluation will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the manager, they may respond with a letter to the Manager and send a copy to the Designer Selection Board.

4.14 ST-CERT—Study Certification

A Study for a building construction project must be Certified before DCAM can contract for Final Design services. For a study to be certified, all the funding required for construction and all related project costs must be available for spending and must be committed to the project.

Certification constitutes an agreement between DCAM and the user agency that the project described in the study, in particular, the space program and proposed scope of construction, is the project that will be designed and constructed.

The Study Certification has three signatories:

- **The User Agency** certifies in writing to the Commissioner of Capital Asset Management and Maintenance that the Study, Program, or where appropriate both, correspond to the current needs of that agency, including its current long term capital facilities development plan.

- **The DCAM Director of Programming** certifies in writing to the Commissioner that the Study, Program, or where appropriate both, reflect the User Agency's needs as stated, provide an accurate estimate of the project requirements, cost and schedule, and that the project can be accomplished within the appropriation or authorization for that project. This certification also recommends proceeding with Design, Construction, or where appropriate, both.
- **The DCAM Commissioner of Capital Asset Management and Maintenance** certifies in writing to the Secretary of Administration and Finance that the Study, Program, or where appropriate both, are in conformity with the scope and purpose of the appropriation or authorization for the project and legislative intent in regard to long range capital facility plans for the User Agency, and approves proceeding with design, construction, or where appropriate, both.

The Study Designer is expected to support the DCAM Director of Programming in preparation or updating of Study project deliverables for presentation to authorities outside of DCAM, as part of the Certification process. This may include but is not limited to additional scheme models, drawings or presentations, updating or further detailing of the Cost Estimate, responses to detailed questions or requests for information, and analysis of smaller or joined supporting projects necessary to ensure the overall project viability. These services may be negotiated as Reimbursable work if outside the scope of the Basic Services for the original Study.

Checklist—Study Phase

Process

The following items should be reviewed during Progress Workshops based on the approved Work Plan:

- "A" Conference
- "S" Conference
- Project Management to meet Milestones
- ST-01 Problem Statement and Work Plan
- ST-02 Problem Analysis and Existing Conditions
- ST-01R Problem Re-Statement and Work Plan Revision
- ST-EV(P) Designer Mid-Performance Evaluation
- ST-03 Alternative Solutions
- ST-GW Global Workshop
- ST-04 Consensus Solution
- ST-05 Draft Study Submission
- ST-09 Final Study Submission, all components
- ST-EV(F) Final Performance Evaluation
- ST-CERT Study Certification

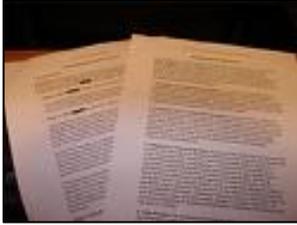
Products / Deliverables

A finalized checklist must be submitted with all materials.

- Volume 1 – Description and Goals; Work Plan
- Volume 2 – Problem Analysis: Existing Conditions, Space Needs, Schedule and Cost Constraints
- Volume 3 – Potential Solutions
- Volume 4 – Consensus Solution, Concept Design and Final Program
 - Cost estimate
 - Permitting
 - Access issues
 - Life cycle cost analysis
 - Design and construction schedule
 - Mechanical, Electrical, Etc.
 - Mass LEED Plus compliance
- Volume 5 – Records of Meetings and Communications, project related reference information

Performance

- ST-EV (F): Final Performance Evaluation must now be complete.
- Designer evaluation
- Continuation of the Designer



5

Selection of the Final Designer

This section covers the formal steps involved in the selection of the final Designer through the Designer Selection Board (DSB). It must be noted that the prerequisite for DCAM's recommendation for Continuation of the Study Designer is a *minimum satisfactory Performance Evaluation at the study phase*.

5.1 D-DSB-01—DSB Notice Prepared Or Continuation Request

The DSB will advertise for Construction projects and continuation requests. In the case of a continuation, the User Agency will provide a letter to the Designer Selection Board (DSB) to recommend continuance or non-continuance of the Designer into Final Design.

5.2 D-DSB-02—DSB Notice Advertised

The DSB will advertise the projects to be considered at a public meeting.

5.3 D-DSB-03—DSB Selects Finalists or D-DSB-03—DSB Approval Of Continuation

The DSB will vote to rank the finalists at a public meeting and recommend approval or continuance.

5.4 D-DSB-04—DSB Notification Letter To Commissioner

The Designer's role begins with the receipt of a copy of a Selection letter from the DSB to the Commissioner of DCAM designating the recipient as one of the Finalists selected by the Board. A copy of the Selection letter is sent to the User Agency or, in the case of agency managed House Doctors (see definition in the [Appendix](#)) to the awarding authority.

5.5 *D-DSB-05—Designer Receives Letter of Appointment*

The letter of appointment is issued by the Commissioner and sent to the Designer. A copy of this letter is also forwarded to DCAM's contract division for the preparation of a contract. The contract division will issue a "Notice to Proceed letter."

5.6 *D-DSB-06—Transmit Contract To Consultant For Review*

The Designer receives the contract and assembles the necessary information required for contract signing. Please pay attention to the information sheet attached to the contract regarding insurance, persons having a financial interest in the company, out of state corporations, corporate vote, and MBE/WBE information. DCAM's contract division will notify the Designer in writing specifying the date for contract signing to be held at DCAM. The contract must be signed without alterations. Please note that in addition to this document there is an original DSB advertisement and the Consultant's application which are also part of the contract.

5.7 *DDSB-07—Contract Signing And Notice To Proceed*

DCAM and the Designer sign the contract. The Program Manager will contact the Designer to schedule a meeting, called the "A" Conference, or in the case of a Final Design Contract, the "D" Conference, to review contract requirements and project procedures.

After the contract signing the Designer will receive a copy on electronic media of the Designers Procedures Manual, the Standard Specification and the Cost Estimate Input Form for use on DCAM projects.



6 *Conditions of the Final Design Contract*

6.1 *General Requirements*

A few general requirements of the contract are explained below to ensure they are understood. It is not uncommon for the Designer to misunderstand or misinterpret these general requirements. This clarification does not alter any requirements in the contract; its sole intent is to provide guidance to the Designer.

6.1.1 *Basic Services*

The basic services of the Final Design contract are outlined in the contract.

6.1.2 *Work Products/Deliverables*

The Designer shall review the submission requirements and provide all of the information requested in both hard copies and electronic format. All submissions are to be complete, in accordance with the terms of the contract and the project Work Plan. Incomplete submissions may be rejected and will not be eligible for payment. DCAM is under no obligation to detail the missing information contained in partial submissions. The Designer must notify DCAM immediately upon receipt of a rejection of a submission to schedule the delivery of a complete submission.

6.2 *Partial Payments*

The Designer has the option to request partial payments of the Construction Administration Phase fee and/or monthly payments if approved by DCAM. (Refer to the Design Contract for specific language.)

6.3 *Pre-Approval Requirements for Additional Services*

No additional service will be reimbursed without prior approval of DCAM.

The Designer is required to notify DCAM prior to performing any additional service. If DCAM agrees that the Designer is due an additional service, DCAM can request that the Designer submit a "Request for Reservation of Funds."

6.4 Request for Reservation of Funds

This document must provide full details concerning the scope justification and cost of the additional service(s). If the Designer requests an additional service and the DCAM manager believes the request is not valid, the manager may direct the Designer to perform the work under the base contract scope without compensation. If the Designer disagrees with DCAM's determination, a letter requesting the Deputy Director review the Designer's claim may be submitted.

In either case the time associated with the additional service shall be recorded separately from the base contract work. If the additional service is substantial, DCAM may elect to modify the contract. Payment provisions for additional services performed by the Designer, the Designer's consultant, or a consultant not part of the original design team are contained in the Design Contract.

6.5 Extra Compensation and Reimbursement

Articles in the Designer contract describe the method of payment for either extra compensation or reimbursement (additional services). It is important that the Designer understand the difference between these two Articles and how to identify these costs before they occur. Extra compensation involves services performed by the Design team that are not included in the base contract (for example, planning an area of the project not included in the original project scope). The Designer must inform the DCAM manager of the services outside the scope of the contract, and upon approval will be compensated either in a lump sum or a multiple of employee pay per the terms of the contract. Reimbursement occurs when the Designer pays for a service of a consultant, not part of the design team, or expends money beyond that included in the contract (for example, an artist's rendering, presentation model, geo-technical services, or a site survey). In this case the Designer will be compensated for the direct costs incurred plus a coordination fee of 10% of those costs, if the services do not exceed \$100,000. If they exceed \$100,000 the coordination fee may be negotiated with the Designer.

6.6 Confirmation of Contract Documents

Upon the award of the construction contract by DCAM, the Designer shall prepare a set of plans and specifications that incorporate all addenda and SK drawings issued during the bidding phase. All changes shall be indicated in a clear manner, by either a revision symbol or bold print, on both the drawings and specifications. Any inconsistencies discovered during this process shall be brought to the attention of DCAM. No additional changes shall be incorporated at this time. All future changes or interpretations shall be incorporated into the drawings and specifications when they are accepted after a Notice to Proceed is issued to the Contractor. It is the intent of the confirmation set to provide clarification to the General Contractor during Construction.

6.7 As-Built /Record Drawings

The Designer is responsible to review and accept as complete the marked-up Contractor's set of drawings on a monthly basis during construction prior to approval of the monthly requisition submitted by the Contractor. At the completion of the project the Designer is responsible to receive and review the drawings which depict the as-built conditions prepared by the Contractor and incorporate all the changes and modifications which have been made to the original contract documents on their electronic CADD files. The Designer shall provide a copy of the record drawings on electronic media to DCAM at the completion of the project. The record drawings shall be submitted in the format provided by DCAM (refer to the DCAM CADD standard format provided).

6.8 Change Orders

The Designer must review and document via letter to DCAM PM all change orders for mathematical correctness, prevailing wage rates, Contractor mark-up on prevailing wage rates, but not union benefits, time and materials charges (if appropriate), schedule impacts and cost of work (R.S. Means or other acceptable labor and material charges). The Designer may charge DCAM, as an "extra compensation," for time spent reviewing and administering change orders on an hourly basis, if the change order is not the result of a Designer error or omission. If the change order resulted from an error or omission the Designer will not be compensated. The Designer should submit the cost for processing the change orders to the manager for review and acceptance as defined in the Contract.

The Contractor can request a time extension that must be substantiated by a critical path schedule. In this event, the Designer must evaluate, by the Contractor's manpower estimate, the time (or determine that this is a concurrent event and does not require additional time) required to perform the work and grant the time on the Change Order.

6.9 Types of DCAM Contracts

Currently there are six types of DCAM Designer contracts:

- Contract for Designer's Services–Study
- Contract for Designer's Services–Design
- Contract for Designer's Services–House Doctor
- Contract for Designer's Services–Design-Build
- Contract for Designer's Services–Modular Construction
- Contract for Designer's Services–Construction Manager at Risk

6.10 CADD Standard Format

All drawings shall be submitted utilizing the DCAM CADD standard format provided by DCAM.



7

Schematic Design Phase

Process

The process used in the Schematic Design Phase is in accordance with the DCAM's Contract for Designer services, and the Notice to Proceed from the Deputy Commissioner. The Designer shall meet, as necessary, with the Project Manager and other agents of the DCAM and representatives of the User Agency in workshops to develop the basic Schematic Design concepts initiated in the certified Study.

It is anticipated that the duration of the Schematic Design Phase will be approximately 3 months. If this duration may be shortened or needs to be extended, a discussion with DCAM and the User Agency should occur. This phase represents 15% of the total Design Fee.

7.1 Purpose

The purpose of the Schematic Phase is to review, develop, and implement the Study and/or Program parameters and further investigate the construction details, mechanical systems, code issues, schedule, and site utilities.

7.2 General

In general, the submission of the Schematic Design Phase shall be structured to review the following at all of the workshops: review of the areas and adjacencies; building components and quality; the construction cost; and adherence to the established schedule.

7.3 Solutions

The Designer's solutions will be reviewed by DCAM and the User Agency. If the final Designer is the same as the Study Designer, DCAM may allow the Designer to develop the preferred Study design solution. It should be understood by the Designer that multiple variations on the preferred solution may need to be investigated during the initial phase of Schematic Design. This investigation may result in only one preferred solution being fully developed as the final Schematic Design. If one preferred solution is not accepted, DCAM reserves the right to have a minimum of three options developed, and will require these options if the final Designer and the Study Designer are not the same.

7.4 Schedule

The Designer is responsible for providing a schedule of the Design and the estimate of construction duration, including all required permits and testing.

7.5 Initial Design Conference—SD-00

After the contract for final design services has been signed the DCAM Project Manager for design will schedule a meeting with the Designer and their consultants to discuss the invoice, submittal, review, and approval process. This is referred to as the "D" Conference.

7.6 Design Work Plan—SD-01

To assist DCAM and the Designer in anticipating major milestones, permit requirements, review meetings and approvals, the Designer is required to submit a detailed Work Plan outlined below.

The Design Work Plan shall expand upon the Work Plan developed during the Study Phase and, if appropriate, prepare the following to include:

- A paragraph confirming the goals and objectives established in the Study for the project. It is DCAM's intention to understand the Designer's goals and objectives and to compare them to the goals and objectives established during the Study for the project.
- A list of tasks anticipated for the duration of the Design Phase of the project. These may be either single sentences or brief descriptions of the activity required. Include with the list of tasks the anticipated hours, individual or individuals that will perform each task, and each individual's hourly rate. It is our intention to understand how the project will be staffed, and if there is a match between the effort expended and the fee allocated to the project.
- A list of all anticipated drawings for the project, including existing conditions drawings, demolition drawings, and all consultant drawings. This requirement is essential to confirm the scope of the project and to determine any additional services that may be required that are not included in the original scope.

- A list of all specification sections anticipated for the project. Refer to the DCAM Standard Specification made available to the Designer during the “S” Conference. DCAM has a precise specification organization in part dictated by the filed sub-bid law. It is essential this be understood at the beginning of the project.
- A schedule indicating the start and finish of all design activities and projected dates of major milestones, permits, Progress Workshops, Global Workshops, quality control reviews, and approvals. A modified CPM is not required, but a determination of both priority events and the inter-relationship between events are an advantage to project management.
- An organization chart indicating all key individuals involved in the project, from the Designer, consultants (all disciplines), DCAM, and the User Agency. Indicate on the chart their telephone number(s), extension, and email address if available.
- A list of all key individuals involved in the project, from the Designer, consultants (all disciplines), DCAM, and the User Agency. Include their title, address, telephone number, and email address if available.
- A résumé of all individuals employed by the Designer and their consultants listed above. Please note: This must be consistent with the names listed in the Design Contract and the Designer Selection Board Submission. Any changes to this list of individuals must be approved by DCAM.
- A description of the Design Phase quality control methods to be employed and when they will occur throughout the design process. This is intended primarily for coordination of the Design/Construction documents.
- An update of the Designer’s Work Plan with each submission or when changes in scope or additional clarity are required.
- An initial draft design Work Plan to be submitted two weeks after the “Kick-Off” Conference with the Designer, DCAM, and the User Agency. DCAM will review the Work Plan, comment, and return the comments to the Designer. The revised Work Plan shall be submitted one week after receipt of review comments by DCAM.
- LEED checklist update, coordination with Commissioning Agent, Utility Rebates, Sustainable Design strategies, Life-Cycle Cost Analysis, and Energy Modeling.

7.7 Progress Workshops

A complete program with adjacencies, square footages and efficiencies is presented in the Study. It is important that the workshops refine the program and provide an efficient building that includes sufficient circulation space and utility space. For example, adding mechanical space in the next phase, after the programmed space has been agreed upon will result in a desire to increase the building envelope and raise the cost.

It is essential that the individuals who attend the workshops are able to present alternative site, architectural, mechanical, electrical, and plumbing schemes to both DCAM and the User Agency to promote meaningful dialogue. For example, if the exterior material choices of the building are the topic of discussion, the life cycle cost of the proposed materials, the energy saving potential, the cost implications, the structural implications, the interior perimeter lighting impact, and any other topic necessary must be included to arrive at a decision to finalize the exterior materials and configuration.

The workshop should also focus on refining the Cost Estimate. During the Study Phase, the Designer, the User Agency, and the Cost Estimator make many assumptions regarding the quality of the building's materials. To provide an accurate Cost Estimate, a frank discussion is necessary regarding the choice of materials and equipment during the Schematic Phase. Early unsubstantiated assumptions may lead to an unrealistic Cost Estimate. Some of the factors that substantially influence the cost and also the choice of materials are the phasing of the project, limited working hours, and working in an occupied building.

A preliminary schedule is proposed during the Study Phase of the project. Based on some preliminary assumptions, the schedule is often the result of an occupancy date desired by the User Agency, and the duration provided by the cost estimator. A detailed construction schedule analysis must be provided, which in some cases allows for occupied buildings, weather conditions, and limited working hours. The User Agency, DCAM, the Designer, and the cost estimator must carefully review the construction duration.

The Designer shall prepare meeting minutes of these workshops and incorporate these comments into the schematic submission.

7.8 Global Workshop—SD-GW

Global Workshops occur during the Study Phase and Schematic Design Phase. The Program or Project Manager will schedule the Global Workshop when they feel it is most beneficial to the design process. This may be at the 50% point of the Schematic Design project phase, and as required at the end of the Phase. The following section details elements of the Schematic Design Global Workshops.

Unlike the Progress Workshops, it is intended that Global Workshops will question some of the basic thinking and the decisions made to date. Input from any stakeholders is encouraged. It is intended that the Designer will justify and promote his or her design in detail.

All members of the design team, including consultants, will attend with members of the User Agency and DCAM staff. The Designer will lead the meeting, provide an agenda approved by the Manager, presentation material, and publish meeting notes indicating resolved and unresolved issues for the next workshop.

Schematic Design Global Workshops incorporate all of the items discussed and resolved in the previous monthly Progress Workshops. Specific Workshops may be held to review the following components, as well as being incorporated into the Global Workshop.

7.9 Environmental Assessment

Guidelines for pre-design environmental evaluation of subsurface, surface, and existing structures can be different depending upon current site conditions. For example, Project Sites containing structures to be demolished may require lead paint and asbestos sampling and analyses; project sites for planned buildings may require comprehensive environmental analyses of soils. As such, an understanding of past activities and practices is critical in assessing environmental conditions that may have major impacts on the budget and schedule.

For pre-design the Designer shall prepare a *Sampling and Analysis Plan (SAP)* that reflects previous use(s) of the Project Site. The assessment of previous activities shall be performed by review of historical plans and directories, and an evaluation of typical compounds used by past industries and businesses. An [Appendix](#) checklist provides additional details and references.

The evaluation of number and type of exploration points, chemical parameters and compounds, detection limits, quality assurance, and quality control procedures shall be developed by the Designer as an SAP, and submitted to DCAM for review and comment. The selection of subsurface sampling and analytical methodologies shall be appropriate for the project and consistent with the Massachusetts Department of Environmental Protection (MADEP) and USEPA policies and guidelines. Please refer to the [Appendix](#) for descriptions of the minimum standards for subsurface explorations and required documentation to be provided to DCAM.

Upon receipt and review of the analytical data by the Designer, a brief memo summarizing the data and potential impacts shall be submitted to DCAM, together with the certified laboratory data sheets.

7.10 Site Exploration

In the Schematic Design Phase the Designer may need to increase the number of borings conducted under the Study Phase to concentrate on areas of detrimental conditions discovered. It is the responsibility of the Designer to determine both the location and number of borings required. DCAM would suggest that a series of borings on a grid in the proposed building area may be necessary with subsurface profiles connecting the borings.

7.11 Building Code Analysis

The certified Study contains an analysis of all codes to determine general characteristics of the building, primarily for planning and cost purposes. It is important the Designer reviews this analysis and expands on it for this phase.

The Designer must determine the impact of all parts of the Massachusetts State Building Code, for example: the energy code, earthquake provisions, fire separation requirements, and sprinkler requirements. This analysis will have a major impact on the cost and layout of the building. Each type of construction has a maximum allowable floor area; if that area is exceeded, the building must be divided into zones with fire separations between zones. These zones may be increased in area by a different type of construction and/or adding sprinklers. Available water pressure provided by the City or Town will impact the addition of sprinklers. The construction type, the requirement for sprinklers, and the availability of sufficient water pressure will naturally affect the cost.

7.12 Universal Design / MAAB/ADA Analysis

The Designer should be aware of DCAM's policy regarding Universal Design that allows "access to all individuals with diverse abilities. Access should be identical to all individuals whenever possible and equivalent when not." "The use of the design should be easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. [It] eliminates unnecessary complexity, is consistent with the user's expectations and intuition, [and] accommodates a wide range of literacy and language skills...." Further:

"The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's abilities. Uses different modes for redundant presentation of essential information, maximizes legibility of essential information, differentiates elements in ways that can be described, provides compatibility with variety of techniques or devices used by people with sensory limitations and minimizes hazards and the adverse consequences of accidental or unintended actions. The design shall promote the use of low physical effort and the use of reasonable operating force."

The policy stated above shall be applied as a minimum specifically to the building site, the building entrances, vertical circulation, bathrooms, surface textures, and signage. For more information, please refer to the [Appendix](#).

7.13 Energy Conservation, LEED Plus and Life Cycle Cost Analysis

The Designer should explore in greater detail the measures of the LCCA proposed in the certified Study. If no measures were proposed in the Study, DCAM will work with the Designer to identify those to consider using LCCA methods during the Schematic Design Phase. The list of measures for which LCCA will be performed may be reviewed or revised by the Designer in consultation with DCAM.

The building design shall incorporate the following criteria:

- Mass LEED Plus standard as a minimum if the building exceeds 20,000 square feet. (Refer to the LEED checklist in the [Appendix](#).)
- Energy model analysis
- Commissioning agent consultant services
- Utility rebate analysis and filing
- 20% less water consumption to similar facilities
- New buildings must also use renewable resources in their construction

7.14 Cost Estimating Activities

During the entire Schematic Design Phase, Cost Modeling and Estimating will be required to ensure the designs developed remain within the Project Budget. The Cost Estimator in the Designer’s team is expected to participate in at least the following activities:

<i>Activity</i>	<i>Cost Estimator Participation</i>
First Design Iteration (following the Study Review, for the Global Workshop)	Cost Modeling for the Designer to allow cost comparisons between alternative building footprints, story structure, layouts, site locations, and major construction systems.
Attendance at Progress Workshops	As above, to allow cost comparison between alternative schemes, provide costing for requirements established in the Progress Workshop, and to advise on cost matters for each proposed scheme until the Preferred Scheme is selected.
Assist the Designer in developing the Preferred Scheme layout and specifications	Cost Measurement for all building elements and components of the Preferred Scheme, including consideration of site related costs, life cycle alternative costs, and any other external factors affecting total project cost.

Incorporation of CM into Project Team	Compare and reconcile with the first CM Estimate at 50%, if available, and 100% SD Phase; advise the Designer on constructability issues suggested by the CM.
Submittal Preparation	Formally document in Unifomat II structure the estimate breakdown in detail as specified for both printed and electronic submittal.

Please see the [Appendix](#) for further details.

7.15 Conservation Commission Submission

Prepare planting and drainage calculations and details for the Conservation Commission if required.

7.16 Coordination with Construction Manager

When DCAM uses Construction Management (CM) at Risk procurement for the construction services, the Designer's responsibilities include coordinating design alternatives and construction cost estimating services with the Construction Manager at all phases of Design. It is likely that design services may be provided out of sequence to expedite early bid packages required by the Construction Manager.

7.17 Products

7.18 General

The following provides the minimum requirements for deliverables pertaining to the Schematic Design Phase:

- All drawings shall be ¼" scale or a different scale if approved by DCAM.
- Drawings shall be submitted on a standard DCAM 30" x 42" sheet with a standard DCAM title block. (Refer to DCAM CADD standards.)
- A small-scale, legible key plan adjacent to the title box on all drawings showing section, detail or partial plan locations, when the floor plan to which the sections, detail or partial plans apply, shall be included on another sheet. The key plan shall indicate the drawing number of the sheet where the section was taken.
- Legends of materials, symbols, and abbreviations for each classification of drawings shall be included.
- The date on which the drawings were submitted to DCAM shall be inserted in the title box of all schematic design drawings.
- General Dimensions and Notes shall be indicated.

- Provide submission electronically in addition to paper submission.
- Provide a complete floor plan of the building indicating the area renovated. If the electronic floor plans are not provided by DCAM an additional service may be considered.

7.19 Submission Requirements—SD-03

The Schematic Design Phase submission for new construction, renovation, or demolition projects shall include the following:

- **Design Premise:** Premise upon which the design scheme is based, including sketches which illustrate indoor and outdoor program functional relationships, access, and future expansion.
- **Commissioning Plan:** A scope of the Commissioning Services incorporated.
- **Energy Conservation, LEED Plus and Life Cycle Cost Analysis:** An energy conservation scope plan.
- **Site plans:** Site plans of project addressing impact of handicapped access, zoning, context, utilities, environment, parking, drainage calculations, planting, and other related program criteria.
- **Floor plans—Spaces:** Floor plans of all levels identifying all program spaces.
- **Floor Plans—Levels:** Floor plans of all levels indicating the building's general mechanical, electrical, plumbing, and structural systems.
- **Floor Plans—Demolition and/or Current Conditions:** Demolition and existing conditions floor plans for all trades.
- **Floor Plans—Site Relationship:** The Designer must submit four elevations from the main orientation points of view indicating the relationship to site configurations.
- **Floor Plans—Program Spaces and Site Configurations:** Two cross-sections with floor heights, including basement spaces identifying program spaces and relationship to site configurations.
- **Models—Designer's Studies:** A three dimensional representation, axonometric, perspective drawing or an aerial photographic view of the Designer's Study model to convey the general massing of the project; a computer generated model in context is preferable.
- **Floor Plans—Scales:** The plan, section, and elevation drawings shall be 1/4" = 1'0". If the building is large or irregular in shape and will not adapt to the use of match lines, 1/8" = 1'0" scale may be approved for submission.
- **Title Sheet:** The Title Sheet shall contain all information as indicated at in the DCAM CADD standard.

- **Graphic Scale, Key Plan and North Arrow:** A graphic scale, key plan and north arrow shall appear on all drawings.

7.20 DCAM Standard Specifications

The Designer shall utilize the DCAM Standard Specification provided at the contract signing. The following provides an overview of the specification requirements:

- **Basis of Design:** The Basis of Design shall include all the design parameters that affect the design of the building systems. For example: the hours of occupancy; the design and temperature for heating and cooling; the floor loading; the number of occupants; and the foot-candle readings at desktop in various spaces.
- **Detailed Specifications:** The Specifications shall be as comprehensive and complete as the Schematic Documents permit. They shall address all relevant components/sections of the work and, where required by the scope of the project, include equipment, capacities, and descriptions of structural, mechanical, and electrical and other special systems that impact the project.
- **Section Numbers and Titles:** The Section numbers and titles established at the Schematic Phase shall be the same as the Section numbers and titles for the Design Development and Construction Document Phases.
- **Specification Index:** Provide an edited index of the standard specification.
- **Change Summary:** Provide a summary of all the changes made to the Standard Specifications, indicating all anticipated additions or deletions to the index at this phase.
- **Scope of Work:** Provide the scope of work for each specification section.

7.21 Cost Estimate

The Cost Estimate shall be prepared by a professional Estimator as listed on the Designer's team. Specialist components may be prepared by other consultants and consolidated by the Estimator. The Estimate shall include all margins and allowances necessary to produce a complete ECC (Estimated Construction Cost) or projected GMP (Guaranteed Maximum Price) for a CM at Risk procurement.

- **Requirements:** The Cost Estimate shall be developed using the Uniformat II Elemental Classification to as much detail as the schematic drawings and specifications permit. Designers and Estimators are referred to [ASTM](#) Document E1557-97 (NISTIR 6389) for a detailed description of Uniformat II elements and components.
- **Cost Estimate Level:** The level for all work of the design scheme shall be at least Level 2 of Uniformat II Classification, Sections A

through G inclusive, complete with a single line outline specification description for each item. The detailed unit rate or item cost buildup shall be provided as backup in each case.

- **General Conditions:** Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds, etc.
- **CM General Conditions and Fees:** Where DCAM stipulates a CM at Risk Contract, these components are to reflect costs for this type of procurement.
- **Contingencies and Allowances:** Separate margins or allowances shall be identified for Estimating Contingency, Escalation Contingency, CM Contingency (where applicable), and Design Contingency.
- **Gross and Net Floor Areas:** Gross Floor Areas (GFA) and Net Floor Areas (NFA) for the design scheme must be measured in accordance with DCAM's ASTM pro forma (refer to [Appendix](#)).
- **Unit Rates for Cost Elements:** These shall be derived for the GFA and NFA values provided in the Cost Estimate.
- **Unit User Cost:** The DCAM Project Manager designates this cost, e.g., cost per cell, cost per classroom.
- **Reconciliation with the (GFA) and (NFA):** This will be determined at the Study Phase, including an explanation of significant variances.
- **Reconciliation with the Uniformat II Cost Estimate:** This will be done during Study Phase, including explanation of any significant variances, including Unit User Cost.
- The Estimate: This shall be current at the date of Document Submission and include factors or amounts for:
 - Provisional Allowances for work not sufficiently specified or designed at this Phase
 - Construction Contingency and Escalation to the midpoint of construction as percentage rates
- Cost and Space Estimate: Cost and Space Estimate shall be submitted in both printed and electronic format, with the information summed to project the total at each level in conformance with the electronic formats supplied in the [Appendix](#).

7.22 Work Plan Update

Update the Work Plan schedule and notify DCAM of any personnel changes.

7.23 Code Analysis

The following shall be provided as a minimum:

- An egress path of travel analysis (distance to an exit), and egress capacity analysis (required corridor width and door width)
- A height and area limitation analysis (size of facility per floor for a given construction type)
- A construction type analysis
- A fire separation analysis
- Toilet count analysis
- Sprinkler analysis

7.24 Universal Design / ADA/MAAB Analysis

The following analyses at a minimum shall be provided:

- Site access from parking, related buildings, and public transportation to all entrances
- Entrance access equality
- Vertical circulation
- Bathrooms
- Surface textures
- Signage

Refer to checklist in the [Appendix](#) for full details.

7.25 Energy Conservation, LEED Plus and Life Cycle Cost Analysis

Provide DCAM with a preliminary list of Life Cycle Cost measures, including LEED alternatives and utility rebates. These measures will be the basis for the final LCCA which will become part of the Design Development Phase submission.

7.26 Environmental Review

Provide DCAM with a memo summarizing the analytical data and potential impacts with the certified laboratory data sheets.

7.27 Incorporation of DCAM/User Agency Comments

The Designer shall review the comments prepared by DCAM, DCAM consultants, and the User Agency and incorporate them into the next design phase. If the Designer takes exception to any comment they shall provide a response to DCAM.

The Designer shall provide DCAM with a report indicating the action taken on all comments and indicate where they were incorporated in the next phase.

Performance

7.28 Evaluations—SD-EV

The Designer will assist the Project Manager in a review of his or her consultants.

The Designer will receive an evaluation of performance at the completion of this phase. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the manager and the Designer for improved performance.

Copies of these evaluations will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the manager, they may respond with a letter to the manager and send a copy to the Designer Selection Board.

Copies of the various Designer Evaluations are on the DCAM website.

Checklist—Schematic Design Phase

Process

The following items should be reviewed during this phase:

- General
- Initial Design Conference / "D" Conference
- Design Work Plan
- Design workshops (progress)
- Design workshop (global)
- DCAM comments
- User Agency comments
- Building code analysis
- Environmental assessment
- Universal Design/MAAB/ADA analysis
- Energy Conservation, LEED Plus and Life Cycle Cost Analysis
- Cost estimating
- Conservation commission submission
- Coordination with construction manager
- Coordination with commissioning agent consultant

Products

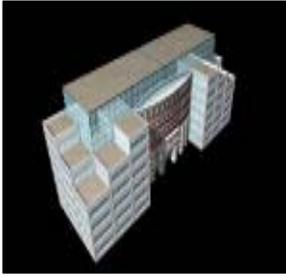
The following items should be reviewed during workshops and submitted at the completion of this phase in both electronic and hard copy:

- Submission checklist indicating contents of submission
- Drawings, concept sketches and three dimensional representation
- Specifications
- Cost estimate
- Work plan update
- DCAM/User Agency comments incorporated
- Building code analysis
- Environmental assessment
- MAAB/ADA analysis
- Life cycle cost analysis (preliminary)

Performance

The performance of the Designer and his or her consultants will be evaluated at the completion of this phase:

- Designer/Consultant evaluation



8

Design Development Phase

It is anticipated that the duration of the Design Development Phase will be approximately 4 months. If this duration may be shortened or needs to be extended, a discussion with DCAM and the User Agency should occur.

This phase represents 25% of the total Design Fee.

Process

8.1 General

The function of the Design Development Phase is to develop and document each part of the Design, including selection of components for architectural and mechanical systems, and detailed layout for all Program and support spaces as outlined below:

- **Completion:** All submissions shall be complete and include all the items referenced below. Incomplete submissions may be rejected.
- **Submission:** In general, the submission of Design Development drawings shall be structured to review the following at all workshops: resolution of the areas and adjacencies; building components and quality; the construction cost; and adherence to the established schedule.
- **Local Inspectors:** Provide a set of plans and specifications to the State plumbing and electrical inspector and the local fire department chief for preliminary review.
- **State-Owned Buildings:** For State projects, the Designer shall submit the Design Development drawings to the Department of Public Safety inspector in whose jurisdiction the project is to be located for a "Tentative Approval" review.
- **County-Owned Buildings:** For County-owned buildings, the Designer shall submit the Design Development drawings to the Building Commissioner of the city or town in which the project is to be located for a "Tentative Approval" review.

8.2 Design Work Plan—DD-03

The Designer shall update their Design Work Plan with this submission to indicate any changes to the schedule of both the design and the proposed project occupancy date. The Designer will also indicate any changes to the project team.

8.3 Progress Workshops

Four elements of this phase must be addressed:

- **Program Finalization:** A complete program with adjacencies, square footages and efficiencies is presented in the study and refined in the schematic phase. It is important that the workshops at this phase finalize the program and provide an efficient building that includes sufficient circulation and utility space. Adding mechanical or electrical space in the next phase, after the programmed space has been agreed upon will result in an increase in cost or a reduction in programmed space, with a severe impact on coordination.
- **Building Components:** It is essential that the individuals who attend the workshops are able to finalize the exterior building components. For example, if the exterior material choices of the building are the topic of discussion, individuals who understand the cost implications of the proposed alternatives, the long-term benefits of the components proposed, and any other topic necessary to arrive at a decision to finalize the exterior materials and configuration should attend.
- **Cost Estimate:** The workshop should also focus on refining the Cost Estimate. During the Schematic Design phase many choices are made by the Designer, the User Agency and the Cost Estimator regarding the quality of materials that make-up the building. It is necessary that a frank discussion regarding materials and equipment is resolved in the Design Development phase to determine which equipment and materials are chosen to provide an accurate cost estimate. Unsubstantiated assumptions may lead to an unrealistic cost estimate. Phasing of the project, weather conditions, limited working hours, and working in an occupied building are factors that substantially influence the cost and also the choice of materials.
- **Schedule:** A revised schedule is reviewed during the Design Development phase of the project. This schedule is based on DCAM, User Agency, and Designer input proposed in the certified Study. This schedule is often influenced by the User Agency's desired occupancy date, and the duration provided by the Cost Estimator. This detailed construction schedule must be analyzed to include work in occupied buildings, seasonal restrictions (construction during winter months), and limited working hours (work in occupied buildings). The User Agency, DCAM, the Designer and the Cost Estimator must carefully review the construction duration. The

schedule has dramatic implications on the project cost. The Designer shall prepare meeting minutes of these workshops and incorporate any resolved issues into their submission.

8.4 Global Workshops—DD-GW

The Global Workshops will occur at the final third of the Study Process, after the completion of Schematic Design phase, and at the mid-point in the Design Development phase.

At the mid-point of the Design Development phase of the project a Global Workshop will be conducted to incorporate all of the items discussed and resolved in the previous monthly progress workshops, and to cumulatively develop and track four items essential to the project:

- **Space Needs:** master plan issues, access issues, adjacencies, and efficiency issues.
- **Building Elements:** relating to the building enclosure, the building systems, and the general quality and efficiency of construction.
- **Schedule:** all scheduling associated with design and construction, and any occupancy impacts.
- **Comprehensive Cost Factors:** the presentation and investigation of alternatives that may impact the building and operation costs, and ultimately the final cost of the project when all factors are included.

Elements of the Global Workshop structure are as follows:

- **Workshop Structure:** All members of the design team, including consultants, will attend with members of the User Agency and DCAM staff. The Designer will lead the meeting, provide an agenda approved by the Construction Project Manager, presentation material, and publish meeting notes indicating resolved and unresolved issues for the next workshop.
- **Purpose:** The Global Workshop in the Design Phase is intended to assure comprehensive integration of all aspects of the design. The Designer will coordinate all consultants' work to date and ensure consensus at all levels of design detail. *(Note: At the completion of the Design Development phase no changes should occur to the finalized program.)*
- **Schedule:** A Global Workshop will be held at the mid-point in the Design Development phase.

8.5 Life Cycle Cost Analysis

The Designer shall perform the LCCA to determine which design decisions related to all energy and water consuming devices and overall building operation and maintenance are the most cost effective. The Designer is to specify for design all systems that present the least cost (in net present value terms) and demonstrate simple payback of 10 years or less. For special considerations, please refer to the [Appendix](#).

MGL Ch. 149 Section 44m and MGL Ch. 164 Section 331 require DCAM considers the life-cycle cost of implementing energy efficient and water conserving technologies, including the use of renewable energy sources, in new construction or major renovations. MGL Ch. 164 Section 331 requires DCAM to “design and construct facility to minimize the life-cycle cost of the facility by utilizing energy efficiency, water conservation, or other renewable energy technologies...” The systems LCCA will analyze include, but are not limited to: systems such as HVAC, heat recovery, renewable energy, and variable air volume; cooling towers; motors and drives; building envelope; lighting; controls; and some sustainable building material.

The Designer should explore in greater detail the measures of the LCCA proposed in the certified Study. If no measures were proposed in the Study, DCAM will work with the Designer to identify the measures to be considered using LCCA methods in the Schematic Design Phase. The list of measures for which LCCA will be performed may be reviewed or revised by the Designer in consultation with DCAM.

DCAM expects the Designer to be familiar with the basic economic analysis required to perform LCCA. Where Designers lack this capability, DCAM will provide guidance on the process expected. For reference, a basic LCCA spreadsheet tool is attached (refer to the [Appendix](#)). All LCCA should be completed not later than by the conclusion of Design Development.

The building design shall incorporate the following criteria:

- Mass LEED Plus standard as a minimum (refer to the LEED checklist in the [Appendix](#))
- Energy model analysis
- Commissioning agent consultant services
- Utility rebate analysis and filing

8.6 Cost Estimating Activities

During the entire Design Development Phase, cost verification and if necessary Value Engineering will be required to ensure that the design as developed remains within the Project Budget. The Cost Estimator in the Designer’s team is expected to participate in at least the following activities listed in the table below.

Activity	Cost Estimator Participation
Attendance at regular Progress Workshop meetings to advise on cost matters for each element or section of work	Cost data and advice to the Designer and other consultants to provide an accurate indication of the cost of each designed element and major specification item.
Attendance at Progress Workshop meetings to advise on LEED and Life Cycle costs	Cost data and advice related to Life Cycle cost analysis, LEED evaluation, and specialist costs.
Assisting the Designer achieve the required cost budget within design and specification requirements, including scheduling needs	Value Engineering of specific elements within the total estimate budget for construction and all specialist consultants, and the impact of the detailed construction work schedule on the total cost picture.
Incorporation of CM into Project Team (when CM commences within Design Development Phase)	Compare and reconcile with the first CM Estimate at 50%, if available; advise the Designer on constructability issues suggested by the CM.
CM Estimate Reconciliation	Reconcile estimates with the CM at 100% DD prior to formal submittal to complete the Phase.
Submittal Preparation	Formal documentation in Uniformat II structure the complete estimate breakdown as specified for both printed and electronic submittal. Integrate costs from other specialist consultants. Provide suitable contingencies where appropriate.

Please see the [Appendix](#) for further details.

8.7 Coordination with Construction Manager

When the Designer is contracted to perform design services as part of DCAM's Construction Management procurement method, the coordination responsibilities will be defined within the Designer's Contract for CM services. In general, it is the Designer's responsibility to coordinate both their Design Deliverables and Construction Cost Estimates with the Construction Manager, at all phases of Design.

It is likely that Design Deliverables may be provided in a custom-tailored sequence to expedite early bid packages required by the Construction Manager. For example, the Construction Manager may be provided with final Construction Documents for the site work, demolition, structural steel, excavation, and foundation work during the Design Development Phase.

Products

8.8 General Requirements

The following provides the minimum requirements for each Drawing Set pertaining to the Design Development Phase:

- DCAM CADD standards file, layers and graphics
- All drawings, specifications and cost estimates shall be submitted both electronically and in hard copy
- All drawings shall be ¼" scale unless approved by DCAM
- Provide a graphic scale and north arrow
- Submit all drawings on a standard DCAM 30" x 42" sheet with a standard DCAM title block and provide a standard Title Sheet (refer to DCAM CADD standards file)
- A small-scale, legible key plan adjacent to the title box on all drawings showing section, detail or partial plan locations, when the floor plans to which the sections, detail or partial plans apply are on another sheet. The key plan shall indicate the drawing number of the sheet where the section was taken.
- Show legends of materials, symbols, and abbreviations for each classification of drawings
- Insert, in the title box of all Design Development drawings, the date on which the drawings were submitted to DCAM
- Indicate general dimensions and notes
- A Title Sheet with facility name, User Agency, consultant names, and consultant registration stamps (use DCAM standard title sheet)
- List of drawings (if small project, include on Title sheet)
- All legends, symbols, abbreviations, and general notes
- Building code and ADA/MAAB analysis on title page or second sheet
- An egress path of travel analysis and egress capacity analysis (graphic)
- Height and area limitation analysis
- Fire separation analysis
- Toilet count analysis
- Commissioning Plan: A scope of the Commissioning Services
- Energy Conservation, LEED Plus and Life Cycle Cost Analysis: An energy conservation scope plan
- LEED checklist

8.9 Design Development Drawings

8.9.1 Site Plans

- All legends, symbols, and general notes
- Existing conditions site plan with borings
- Demolition plan
- Site plan
- Layout and grading plan
- Drainage and sewer plan
- Utility plan

8.9.2 Landscape

- All legends, symbols, and general notes
- The landscape plan

8.9.3 Architectural

- All legends, symbols, and general notes
- Demolition plans
- Phasing plans
- Plans of all floors and the roof
- Reflective ceiling plans of all floors
- Enlarged plans of toilet rooms
- Enlarged plans of stairs
- Elevator plans
- Enlarged plans of specialty rooms (e.g., labs, typical classroom, control room, media room, etc.)
- Elevations of all exterior building faces
- A minimum of two full building sections
- Wall sections
- Roof details
- Stair sections
- Door, window and frame details and schedules; finish schedules

8.9.4 Structural

- Structural legends, symbols, and general notes
- Structural plans and details
- Structural sections
- Column schedule

8.9.5 Fire Protection

- Fire protection legends, symbols and general notes
- Demolition plan/existing conditions
- Fire protection plans

8.9.6 Plumbing

- Plumbing legends, symbols, and general notes

- Demolition plan/existing conditions
- Plumbing floor plans
- Plumbing roof plan
- Plumbing schedules
- Plumbing risers

8.9.7 HVAC

- HVAC legends, symbols and general notes
- Demolition plan/existing conditions
- HVAC floor plans (2 line ducts)
- HVAC roof plan
- HVAC mechanical room enlarged plan
- HVAC piping plans
- HVAC sections
- HVAC controls
- HVAC schedules

8.9.8 Electrical

- Electrical legends, symbols, and general notes
- Demolition plan/existing conditions
- Electrical site plan
- Electrical lighting floor plans
- Electrical power floor plans (indicate telecommunications and fire alarm)
- Electrical roof plan (indicate lightning protection)
- Electrical risers
- Electrical schedules

8.10 Specifications

Provide a draft specification of all the sections required in edited (but not final) form taken from the DCAM standard specification and include an edited General Conditions. Indicate all filed sub-bid sections based on the cost of work.

Provide a summary of all the changes made to the Standard Specifications, indicating all additions or deletions to the specification at this phase.

8.11 Cost Estimate

The Cost Estimate shall be prepared by a professional Estimator as listed on the Designer's team. Specialist components may be prepared by other consultants and consolidated by the Estimator. The Estimate shall include all margins and allowances necessary to produce a complete ECC (Estimated Construction Cost) or projected GMP (Gross Maximum Price) for a CM at Risk procurement.

- **Requirements:** The Cost Estimate shall be developed using the Unifomat II Elemental Classification to as much detail as the schematic drawings and specifications permit. Designers and Estimators are referred to [ASTM](#) Document E1557-97 (NISTIR 6389)

for a detailed description of Unifomat II elements and components. With the DCAM Project Manager's approval, the Estimate format may be CSI, instead of Unifomat II, if the Designer's Estimate and the CM's Estimate are fully reconciled before final submission for this Phase.

- **Cost Estimate Level:** The level for all work of the design scheme shall be Level 3 of Unifomat II Classification, Sections A through G inclusive, complete with a single line outline specification description for each item. The detailed unit rate or item cost buildup shall be provided as backup in each case.
- **General Conditions:** Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds, etc.
- **CM General Conditions and Fees:** Where DCAM stipulates a CM at Risk Contract, these components are to reflect costs for this type of procurement. Where the exact CM Fees and General Conditions are fixed by Contract, these shall be incorporated into the Estimate.
- **Contingencies and Allowances:** Separate margins or allowances shall be identified for Estimating Contingency, Escalation Contingency, CM Contingency (where applicable), and Design Contingency. Where these margins are already fixed by Contract, these shall be incorporated into the Estimate.
- **Gross and Net Floor Areas:** Gross Floor Areas (GFA) and Net Floor Areas (NFA) for the design scheme must be measured in accordance with DCAM's ASTM pro forma (refer to [Appendix](#)).
- **Unit Rates for Cost Elements:** These shall be derived for the GFA and NFA values provided in the Cost Estimate.
- **Unit User Cost:** The DCAM Project Manager designates this cost, e.g., cost per cell, cost per classroom.
- **Reconciliation with the (GFA) and (NFA):** This will be determined at the Study Phase, including an explanation of significant variances.
- **Reconciliation with the Unifomat II Cost Estimate:** This will be done during Study Phase, including explanation of any significant variances, including Unit User Cost.
- **The Estimate:** This shall be current at the date of Document Submission and include factors or amounts for:
 - Provisional Allowances for work not sufficiently specified or designed at this Phase
 - Construction Contingency and Escalation to the midpoint of construction as percentage rates
- **Cost and Space Estimate:** Cost and Space Estimate shall be submitted in both printed and electronic format, with the information

summed to project the total at each level in conformance with the electronic formats supplied in the [Appendix](#).

8.12 Work Plan Update

Update the Work Plan schedule and notify DCAM of any personnel changes.

8.13 Code Analysis

Update the code analysis prepared for the Schematic Design phase with either more detail or any change that occurred during the previous phase.

8.14 Universal Design / ADA/MAAB Analysis

Provide both the meeting minutes from the meeting with the User Agency's ADA/MAAB coordinator as well as a building access analysis, from parking to programmed space.

8.15 Energy Conservation, LEED Plus and Life Cycle Cost Analysis

The Designer shall perform the LCCA to determine which design decisions related to all energy and water consuming devices and overall building operation and maintenance are the most cost effective. The Designer shall submit this analysis in the format outlined in the in the Cost Estimate with their recommendations. These recommendations should be coordinated with the Cost Estimate.

The building design shall incorporate the following criteria:

- Mass LEED Plus standard as a minimum.
(Refer to the LEED checklist in the [Appendix](#).)
- Energy model analysis
- Commissioning agent consultant services
- Utility rebate analysis and filing
- LEED checklist

8.16 Environmental Review

Provide the following:

- A review of all environmental issues that affect the project.
- A list of all testing and permits required.

8.17 Product Requirements

The following are the minimal requirements:

- Two copies of catalogs sheets, brochures, diagrams, schedules, performance charts, illustrations of materials, assemblies, systems specified, MSDS sheets (where applicable), and other standard descriptive data. Assemble in a loose-leaf binder with tabs for each

specification section, and update when a change occurs. Physical material samples of specified materials shall be furnished to DCAM upon request.

- Color boards to illustrate all of the proposed finish materials.
- Coordinate all product choices with the specification, LEED requirements, and the Cost Estimate. The User Agency should approve the product submission.

8.18 Quality Control Review

The Designer shall provide a copy of the quality control review to ensure that all drawings and specifications are coordinated. This review shall address, but not be limited to the space provided between the underside of the roof structure and the ceiling below and the space between the floor structure and the ceiling below on a typical floor to eliminate the conflict of trades. Additionally the size of the mechanical room shall accommodate the equipment with space for access for service. The location and size of vertical shafts for utilities and all roof top equipment shall be addressed.

All file sub-bids shall be clearly identified on both drawings and in the specification. All trades shall be identified on their respective drawings only. For example, plumbing roof vent stacks shall not indicate roofing work. The roof work associated with the vent stack shall be indicated on the architectural roof plan.

All symbols and nomenclature shall be consistent from drawing to drawing, and drawing to specification. For example, do not indicate plywood and sheathing as the same specified item.

Coordinate **all** schedules with the drawings and the specification.

All equipment shall be indicated and connected to a source. Including User Agency supplied equipment.

Do not use typical drawings. Indicate all toilet room interior elevations with wall and partition mounted equipment indicated. *(For example, indicate toilet paper holders and handicapped grab bars and their mounting location.)*

Differentiate between existing and new construction.

Indicate phasing on all disciplines.

8.19 DCAM/User Agency Comments

The Designer shall review the comments prepared by DCAM and the User Agency and incorporate them into the next phase of work. If the Designer takes exception to any comment they shall provide a response to DCAM.

The Designer shall provide DCAM with a report indicating the action taken on all comments and where they will be incorporated into the next phase.

Performance

8.20 Evaluations—DD-EV

The Designer will assist the Project Manager in a review of the Consultants.

The Designer will receive an evaluation of performance at the completion of this phase. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the manager and the Designer for improved performance.

Copies of these evaluations will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the manager, they may respond with a letter to the manager and send a copy to the Designer Selection Board.

Copies of the various Evaluations are on the DCAM website.

Checklist—Design Development Phase

Process

The following items should be reviewed or finalized during this phase:

General

- Program (should be finalized)
- Building components
- Cost
- Schedule
- Design Work Plan
- Design workshops (monthly)
- DCAM comments
- User Agency comments
- Building code analysis
- Environmental assessment
- Universal Design / MAAB/ADA analysis
- Energy Conservation, LEED Plus and Life Cycle Cost Analysis
- Product/finish requirements

Quality Control Review

The following areas of coordination shall be demonstrated:

- Interstitial ceiling space clearances
- Mechanical room size
- Shaft sizes
- Specification/drawing coordination
- File sub-bids
- Schedule coordination
- Equipment and power coordination
- Existing vs. new construction
- Phasing
- Commissioning agent review

Products

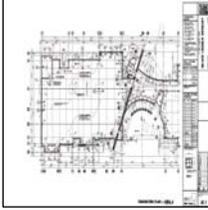
The following items should be reviewed in workshops and submitted at the completion of this phase:

- Submission checklist indicating contents of submission
- Drawings
- Landscape
- Architectural
- Structural
- Fire Protection
- Plumbing
- Site Plans
- HVAC
- Electrical
- Specifications
- Cost estimate
- Work plan update (including schedule update)
- Building code analysis
- Universal Design / ADA / MAAB analysis
- Energy Conservation, LEED Plus and Life Cycle Cost Analysis
- Environmental assessment
- Product requirements
- Quality control documentation
- DCAM/User Agency comments incorporated

Performance

The performance of the Designer will be evaluated at the completion of this phase:

- Designer Evaluation—DD-EV



9

Construction Document Phase

Process

It is anticipated that the duration of the Construction Document Phase will be approximately 5 months. If this duration may be shortened or needs to be extended, a discussion with DCAM and the User Agency should occur. This phase represents 0% of the total Design Fee.

9.1 General

During this phase, particular attention shall be paid to the following:

- **Completion:** All submissions shall be complete and include all the items referenced below. Incomplete submissions may be rejected.
- **Submission:** In general, the submission of Construction Document Phase drawings shall be structured to review the following at all workshops: building components and quality; the construction cost; and adherence to the established schedule.
- **Local Inspectors:** Provide a set of plans and specifications to the State plumbing and electrical inspector and the local fire department chief for final review.
- **State-Owned Buildings:** For State projects, the Designer shall submit the Construction Document Phase drawings to the Department of Public Safety inspector in whose jurisdiction the project is to be located for a final review.
- **County-Owned Buildings:** For County-owned buildings, the Designer shall submit the Construction Document Phase drawings to the Building Commissioner of the city or town in which the project is to be located for a final review.

9.2 Design Work Plan

When updating the Design Work Plan, the Designer shall indicate the following:

- Any changes to the schedule of both the bid date and the proposed project occupancy date.

9.3 Progress Workshops

It is necessary that a frank discussion regarding materials and equipment is resolved in the Construction Document Phase to determine which equipment and materials are chosen to provide an accurate Cost Estimate and coordinate with the specification. Phasing of the project, weather conditions, limited working hours and working in an occupied building are factors that substantially influence the cost and also the choice of materials.

Design Workshops will incorporate the following:

- **Program Completion:** No alterations to the building program shall occur at this phase.
- **Building Components:** It is essential that the individuals who attend the workshops be able to finalize the exterior building component details; for example if the roof flashing details are the topic of discussion. The discussion should include individuals that understand the cost implications of the proposed alternatives, the long-term benefits of the details proposed and any other topic necessary to arrive at a final decision.
- **Cost Estimate:** The workshops should also focus on finalizing the Cost Estimate. During the Construction Documentation Phase many details are finalized by the Designer, the User Agency and the Cost Estimator regarding the quality of materials that make-up the building.
- **Schedule:** A Final Schedule is developed during the Construction Documentation Phase of the project. This Schedule is based on DCAM, User Agency, CM (if applicable), and Designer input from previous phases. This Schedule is influenced by the User Agency's desired occupancy date, and the duration provided by the Cost Estimator or CM. This detailed construction schedule must be analyzed to include work in occupied buildings, seasonal implications, and limited working hours. The User Agency, DCAM, the Designer, the CM (if applicable), and the Cost Estimator must carefully review the construction duration. The Schedule must also be incorporated into the Specification.
- **Meeting Minutes:** The Designer shall prepare meeting minutes of these workshops and incorporate these comments into this submission.

9.4 Cost Estimating Activities

During the entire Construction Documentation Phase, cost verification and, if necessary, Value Engineering will be required to ensure that the Design as documented remains within the Project Budget. The Cost Estimator in the Designer's team is expected to participate in at least the activities listed in the table below.

Activity	Cost Estimator Participation
Attendance at Progress Workshops and Attendance at CM Cost Meetings	Provide cost data and an accurate indication of the cost of each design element and major specification, and advise on cost matters for each section of work, including LEED certification or sustainability issues in the documentation.
Assist the Designer in Maintaining the Cost Budget	Provide Value Engineering of specific elements in the estimated budget for construction and all specialist consultants, and the impact construction work schedule has on the total cost picture. For CM Procurement, attend regularly with the CM and reconcile ongoing estimates and packages.
CM GMP Reconciliation (CM Procurement only)	Reconcile estimates with the CM at 100% GMP preparation prior to formal GMP submission.
Submittal Preparation (DBB Procurement only)	Formally document in Unifomat II and CSI Masterformat a detailed estimate breakdown as specified for printed and electronic submittal. Integrate costs from other specialist consultants. Provide suitable remaining contingencies as directed.

Products

9.5 General Drawing Requirements

All General Drawings shall incorporate the following:

- DCAM CADD standards file, layers and graphics
- All drawings shall be ¼" scale unless approved by DCAM
- Provide a graphic scale and north arrow
- Submit all drawings on a standard DCAM 30" x 42" sheet with a standard DCAM title block
- When referring to sections on sheets separate from but applying to a floor plan, provide a small-scale, legible key plan adjacent to the title box of the floor plan showing those section locations; the key plan

shall indicate the drawing number of the sheet from which the section was taken

- Show legends of materials, symbols, and abbreviations for each classification of drawings
- In the title box of each construction drawing, insert the date DCAM approved the drawing as indicated by the approval date on the Title Sheet

9.6 Drawing Set Requirements for State and County Submissions

The Construction Document Phase submission for new construction, renovation, or demolition projects shall include the following:

- A Title Sheet with all consultant stamps
- All legends, symbols, and general notes

9.6.1 State Project Drawing Requirements

The following are the requirements for submitting State Project Drawings:

- Two sets of drawings and specifications shall be stamped "Approved" and signed by the appropriate State Building Inspector from the DPS
- The Plumbing drawings and specifications shall be signed and stamped "Approved" by the Board of State Examiners of Plumbers and Gas Regulations Board. The local Fire Chief shall approve, stamp, and sign the Fire Protection, HVAC, and Electrical construction documents. The local Electrical Inspector shall approve, stamp and sign Electrical construction documents.

9.6.2 For County Projects

The following are the requirements for submitting County Project Drawings:

- Two sets of the construction documents shall be approved and signed by the local building official, the Local Plumbing Inspector, the Local Electrical Inspector, and the local Fire Chief in the same manner as indicated above
- All other approvals of State or Federal agencies having jurisdiction shall also be obtained
- The sets containing the original approvals will be retained by DCAM as the official approved sets
- All documents revised after being stamped shall be replaced and the procedure shall be repeated as described above

9.7 Construction Documentation Drawing Sets

This section provides the minimum content list as it pertains to each specific content requirement.

9.7.1 Site Plans

- Legends, symbols, and general notes
- An existing conditions site plan with borings
- General demolition plan
- Asbestos and HAZMAT demolition plan
- A site plan
- A layout and grading plan
- A drainage and sewer plan
- A utility plan
- A utility profile
- Site details

9.7.2 Architectural

- Legends, symbols, general notes
- General demolition plan
- Asbestos and HAZMAT demolition plan
- Phasing plans
- Plans of all floors and roof
- Reflective ceiling plans of all floors
- Enlarged plans of toilet rooms
- Enlarged plans of stairs
- Elevator plans and details
- Enlarged plans of specialty rooms (e.g., labs, typical classroom, control room, media room, etc.)
- Elevations of all building faces
- A minimum of two building sections
- Wall sections
- Roof details
- Plan and vertical details
- Stair sections
- Door, window and frame details and schedules, finish schedules
- Interior elevations of all toilet rooms, specialty rooms and typical spaces (e.g., classrooms, cells, etc.)
- Interior finish details
- Casework details

9.7.3 Structural

- Structural legends, symbols and general notes
- Structural plans and details
- Structural demolition drawings
- Structural sections
- Column schedule

9.7.4 Fire Protection

- Fire protection legends, symbols and general notes
- Demolition plan/existing conditions
- Fire protection plans

- Fire protection details

9.7.5 *Plumbing*

- Plumbing legends, symbols and general notes
- Demolition plan/existing conditions
- Plumbing floor plans
- Plumbing roof plan
- Plumbing schedules
- Plumbing details
- Plumbing risers

9.7.6 *HVAC*

- HVAC legends, symbols and general notes
- Demolition plan/existing conditions
- HVAC floor plans (two line ductwork)
- HVAC roof plan
- HVAC mechanical room enlarged plan
- HVAC piping plans
- HVAC sections
- HVAC details
- HVAC controls
- HVAC schedules

9.7.7 *Electrical*

- Electrical legends, symbols, and general notes
- Demolition plan/existing conditions
- Electrical site plan
- Electrical lighting floor plans
- Electrical power floor plans (indicate telecommunications and fire alarm)
- Electrical roof plan (indicate lightning protection)
- Electrical details
- Electrical risers
- Electrical schedules

9.7.8 *Building Code Analysis/ADA/MAAB Analyses*

- A graphic egress path of travel analysis and egress capacity analysis
- A height and area limitation analysis
- A fire separation analysis
- Toilet count analysis
- ADA/MAAB path of travel and access considerations

9.7.9 *Landscape*

- Legends, symbols, general notes
- A landscape plan
- Landscape details

9.8 Standard Specifications

The following shall be considered and provided as needed when documenting Standard Specifications:

- A summary of all the changes made to the Standard Specifications, indicating all additions or deletions to the specification at this phase.
- A complete edited copy of the DCAM Standard Specification. This will allow DCAM to concentrate on the revisions without re-reviewing the Standard Specification.
- Information necessary to prepare application for utility rebates, including, but not limited to lighting, motors, variable speed drives, and HVAC efficiency.
- LEED documentation and certification level.
- A complete description of the work in the Scope of Work section of the specification.
- Any information regarding filed Sub-Bids and Sub Sub-Bids (controls, insulation, fire protection, etc.).
- Related work in other sections.
- Items supplied and installed by others.
- Test reports, asbestos, lead, hazardous materials, and borings.
- Utility back charges if required.
- Factory finishes or field applied finishes (usually in the painting section).
- The extent of demolition; the standard is that abatement work occurs first, then utility disconnects, and then general Contractor demolition.
- An indication of whether the Subcontractor or the General Contractor supplies the staging or lifts, and which one supplies the temporary enclosure.
- Steel fire proofing tests for density and adhesion (the "pull" test).
- An indication of whether the cutting and patching is provided by the Subcontractor or General Contractor.
- Determine if the HVAC controls, the fire alarm system, and the security system are compatible with the existing type (digital or analog) and manufacturer; if there are compatibility issues, request a proprietary specification.
- Type in the date on which the Specifications were approved by DCAM in the lower right hand corner of the Title Sheet. *(Note: This date corresponds to the approval letter date for contract documents.)*

- Describe the extent of the work, the materials and workmanship, and include the work under the proper Section. If any portion of the work included in a Section of the Specifications is to be performed by a trade covered by another Section, there shall be clear and distinct cross referencing between the Sections. Merely to state "by others" is not acceptable.
- Provide for competitive bidding for each item of material to be furnished. Bidders shall not be required to submit proposed "or equal" products for approval prior to the bid date.
- Provide for either a minimum of three manufacturers of material or a description of material that can be met by a minimum of three manufacturers. If this is not possible, request a proprietary specification.
- Add the words "or equal" after at least three manufacturers and each acceptable trade name, plate, or catalog number.
- Specify materials mined or manufactured in Massachusetts whenever possible.
- Do not use general clauses intended to be all-inclusive in lieu of complete descriptions.
- Do not duplicate standard requirements that are contained in the contract form.
- Use consistency throughout. Use the word "will" to designate what the Commonwealth or the Designer can be expected to do and the word "shall" to designate what is mandatory for the Contractor to do.
- Use the same term throughout for the same subject, and ensure that each term is consistent on the drawings as well.
- Do not use the term "etc."
- Avoid such terms as "to the satisfaction of the Designer," "as directed by the Designer," "as approved," and "as required."
- Specify work in appropriate Sections according to local trade jurisdiction.
- In Sections for which filed sub-bids are required, refrain from using such terms as "the Contractor," the "Heating Contractor," or "the Plumbing Contractor," but where necessary for clarity refer to the "HVAC Subcontractor," the "Plumbing Subcontractor," or other Subcontractor.
- Do not give numbers both in words and figures. Numbers 10 and under shall be written in words; 10 and higher shall be written in figures. In expressing dimensions, figures such as 2 in., 16 in., 7 ft. 6 in., shall be used.
- Do not use Federal Specifications numbers without approval of DCAM.

- Each filed Sub-bid Section shall detail all labor and materials required by that particular sub-trade and list, by number, those drawings indicating work of that sub-trade. In addition, list drawings indicating work of a particular trade that appears on drawings that are not customarily included in the work of that trade.
- Do not specify that a product or system shall require pre-qualification for use prior to bidding.
- Do not use words that preclude the use of recycled materials, i.e., "virgin materials."
- Specify that the Contractor shall provide inventory information for all major mechanical and HVAC, electrical, and special equipment, which includes the following:
 - Equipment type
 - Equipment description
 - Manufacturer
 - Model Number
 - Serial Number
 - Building and Location of the Equipment
- Specifications **must** be modified to the specific project. **Delete** sections and references **that do not apply**. **All** sections **must** be reviewed and **edited** to remove products **not used**.

9.9 Special Specification Requirements

The following shall be taken into consideration when documenting "special" or "non-standard" Specifications:

- Proprietary products shall not be specified except as provided by Chapter 30, Section 39M, of the Massachusetts General Laws. The law states that a proprietary specification may be written for sound reasons in the public interest, and shall be written in the public record of the awarding authority, after a reasonable investigation is conducted. Patented or proprietary products, if approved in writing by DCAM, may be part of the base specifications or may be specified as an alternate. *(Note: HVAC controls, elevator controls, and lock hardware are common proprietary items specified.)*
- Alternates, if approved in writing by DCAM, shall be properly described and cross-referenced in the specifications and drawings.
- The use of Allowances is not permitted under Massachusetts's public bidding law.
- Unit price items, if permitted or ordered by DCAM, shall be properly described in the specifications. A unit price proposal sheet shall be prepared for the General Contractor's proposal. When a unit price item is the work of a Filed Sub-Bidder, information shall be included in the applicable section with instructions for the Sub-Bidder to insert the unit price amounts in the proposal sheet.

9.10 Estimator Deliverables Design/Bid/Build (DBB) Procurement

Estimator deliverables shall incorporate the following:

- The Cost Estimate shall be prepared using the Uniformat II Elemental Classification to Level 3 as the final drawings and specifications are developed, and provided for review at 60% Drawing Complete stage. Designers and Estimators are referred to ASTM Document E1557-97 (NISTIR 6389) for a detailed description of Uniformat II elements and components.
- A second and final Cost Estimate shall be prepared at 100% Drawing Complete as part of the final Bid Document submission. This estimate shall be in both Uniformat II Elemental Classification and CSI Masterformat.
- Both estimates shall be of the same total and percentage allowances for OH&P, and any further allowances for escalation or other contingencies.

9.11 Estimator Deliverables, CM at Risk Procurement

- **Trade Packages:** The Estimate shall be in CSI Format, aligned with the actual and projected Trade Packages let by the CM.
- **CM General Conditions and Fees:** The exact CM Fees and General Conditions are fixed by Contract and shall be incorporated into the Estimate.
- **Contingencies and Allowances:** Where CM margins are fixed by Contract, these shall be incorporated into the Estimate.
- **Reconciliation:** The Designer's Estimate shall be reconciled to the CM's Estimate.

9.12 Cost Estimate Components for Final Design/Bid/Build Submission

Cost Estimate components shall incorporate the following:

- Cost Estimates for all work of the design scheme to Level 3 of Uniformat II Classification, Sections A through G inclusive, complete with a single line outline specification description for each item; the detailed unit rate or item cost buildup shall be provided as backup in each case.
- Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds, and all other items included in the Bid Documentation Package.
- Gross Floor Areas and Net Floor Areas for the design scheme measured in accordance with DCAM's ASTM pro forma.
- Unit Rates for Cost Elements shall be derived for the GFA and NFA values as provided by DCAM for both Uniformat II and Masterformat CSI formats.

- Reconciliation with the Gross Floor and Net Floor Areas determined at the Design Development Phase, including explanation of significant variances.
- Reconciliation with the Unifomat II Cost Estimate done at Design Development Phase, including explanation of any significant variances.
- The Final Estimates shall be current at the date of Document Submission, and include factors or amounts for:
 - Provisional Allowances for work not sufficiently specified or designed at this Phase
 - Construction Contingency and Escalation to projected Bid Date as percentage rates
 - The Cost Estimate and Space Estimate shall be submitted in both printed and electronic format, with the information summed to project total at each level, in conformance with the electronic formats supplied by DCAM

9.13 Work Plan Update

Update the Work Plan schedule and incorporate the following:

- Revise the project completion date if necessary
- Notify DCAM of any personnel change

9.14 Environmental Review

For the Environmental Review, please provide the following:

- A review of all environmental issues that affect the project
- A list of all testing and permits required

9.15 Quality Control Review General Information

The Designer shall provide complete coordination of all drawings and specifications including those of his consultants. This coordination shall be within the architectural drawings, between the architectural drawings and specification, between the architectural drawings, specifications, and the consultants' drawings.

The quality control review shall address, but not be limited to the space provided between the underside of the roof structure and the ceiling below, and the space between the floor structure and the ceiling below on a typical floor to eliminate the conflict of trades.

Additionally the size of the mechanical room shall accommodate the equipment with space for access for service and future expansion. The location and size of vertical shafts for utilities and all roof top equipment shall be addressed and coordinated with LEED requirements.

Minimal quality requirements are as follows:

- All filed sub-bid items of work shall be clearly identified on both drawings and in the specification. All trades shall be identified on their respective drawings only. *(For example: Plumbing roof vent stacks shall not indicate roofing work. The roof work associated with the vent stack shall be indicated on the architectural roof plan.)*
- All symbols and nomenclature shall be consistent from drawing to drawing and drawing to specification. *(For example: Do not indicate plywood and sheathing as the same specified item.)*
- All schedules shall be coordinated with the drawings and the specification.
- All equipment shall be indicated and connected to a source.
- All toilet room interior elevations showing all wall and partition mounted equipment shall be indicated. Do not use typical drawings. *(For example: Indicate toilet paper holders and handicapped grab bars.)*
- All existing and new construction must be differentiated.
- All discipline drawing sets shall indicate phasing.

9.16 Site Drawings

Site drawings shall indicate the following:

- Layout and location, with details, of all proposed work, including: buildings, structures, retaining walls, and other site improvements.
- Existing and proposed grades and contours, including: floor elevations, existing structures and topography, survey base line, bench marks, boring and test pit locations, and site profile sections.
- Landscaping and planting, including contract limit line and storage area for construction materials.
- All utility service lines, systems and structures for electricity, gas, oil, water, steam, telephone, sanitary and storm drainage including size, composition, grades, and directions of flow. *(Note: Use a separate site drawing to show utilities on projects with extensive layouts and details.)*
- The Designer shall certify, in writing, to DCAM that all applicable local and state officials have been contacted regarding each utility connection and that the department responsible for permits or connection approval has agreed to the system's use.
- Provide curb cuts to allow access for the physically handicapped. Indicate handicapped parking and signage when required to provide an accessible path of travel.
- Erosion control and sedimentation control drawings shall include:

- Engineering drawings, stamped by a professional engineer indicating the work
- Erosion control plan consistent with DEP's best management practices

9.17 Architectural Drawings

Architectural drawings shall indicate the following:

- Floor plans of each floor, with room and corridor dimensions, wall thickness, column locations, floor elevations, mechanical and electrical openings, door and window designations, and schedules.
- Room finish schedules that clearly designate types of finish and substrate materials and limits. Abbreviations may be used to indicate the materials.
- Roof plan showing openings, drainage, pitch, expansion joints, lightning protection, and all projections and penetrations, including equipment.
- Key plans on all floor plans and section drawings.
- Reflected ceiling plans, perimeter details, and support details.
- Legend of materials, abbreviations, and symbols.
- Wall sections indicating dimensions, flashing, anchorage, reinforcing, coursing, cladding, and other details showing all conditions.
- Exterior and interior elevations and cross-sections including floor to ceiling heights. Designate all materials and coordinate with the specification; use the same terminology in both places.
- Details for roofing, flashing, insulation, windows, doors, entrances, interior and exterior walls, expansion, control or construction joints, water stops, stairs, handrails, millwork, and built-in equipment.
- Locations of all major mechanical and electrical penetrations through walls and floors.
- Access provisions for servicing mechanical and electrical equipment in mechanical rooms. Provide metal walkways, catwalks, ladders, etc., as required to provide access. *(Note: The installation of all metal walkways, catwalks, ladders, handrails and stairways shall be furnished and installed by the Miscellaneous and Ornamental Iron Subcontractor.)*

9.18 Structural Drawings

Structural drawings shall indicate the following:

- Coordinate the following items with the site plan: Boring plans with dates, ground elevation, water level, and bottom grades of footings and slabs.

- Foundation plan with bottom grades showing layout of all footings, walls, slabs on grade including reinforcing, grade beams, and columns; include design soil bearing pressures and live loads for each area.
- Floor and roof plans of structural systems including framing, elevation of finished floors and depressed areas, with locations and dimensions for all openings. Indicate design floor loads.
- Complete foundation wall elevation and typical sections with reinforcing, indicating location, dimensions, and grades for all footings, steps, and wall openings.
- Complete details and sections with dimensions for all construction including expansion and construction joints, reinforcing and other embedded items.
- Schedules (with dimensions) for all lintels, beams, joists, and columns.
- Unless detailed on the drawings, the following information shall appear in the general notes: class and 28-day strength of concrete for each portion, structural steel, and concrete reinforcing design stresses for each type of structural member; concrete cover for each type of structural member; shrinkage and temperature steel requirements; reinforcing laps for main reinforcing; and temperature steel, bend point, cutoff, and hook locations for all members; minimum beam and lintel bearing. Reinforcing steel fabrication shall be in accordance with most recent ACI, "Manual of Standard Practice for Detailing Reinforced Concrete." Structural steel fabrication shall be in accordance with the AISC "Manual of Steel Construction."
- Roofs shall not be dead level. They shall have a minimum slope of $\frac{1}{4}$ " per foot to roof drains. This may be accomplished by either sloping the structure or by using sloped insulation. Two roof drains are preferable to one (in case of blockage of one drain), and, if a parapet is used, relief scuppers should be employed to limit the height of water build-up.

9.19 Fire Protection Drawings

Fire Protection drawings shall indicate the following:

- Fire protection drawings shall indicate standpipe systems, sprinkler systems, access panels, fire pumps, and accessories.
- Fire Protection work, other than site work, shall not be combined on the same sheets with the Plumbing, HVAC, Electrical, or other drawings except with the prior approval of DCAM.
- Fire protection system calculations and narrative report, as required by 780 CMR, shall be provided.
- Coordinate with "Commissioning Agent."

9.20 Plumbing Drawings Shall Indicate the Following

Plumbing drawings shall indicate the following:

- All work done by the Plumbing Subcontractor shall include all water, gas, air, vacuum, sanitary and storm wastes, and accessories. Foundation drain lines are the work of the General Contractor, shall not be indicated on the plumbing drawings, and are required to be performed by a licensed plumber. Site utilities shall be indicated on the utility drawings.
- Plumbing work, other than site work, shall not be combined on the same sheets with the Fire Protection, HVAC, Electrical, or other drawings except with the prior approval of DCAM.
- Trapping and venting of all plumbing fixtures including floor drains.
- Water and gas supply sources, storm and sanitary discharge mains.
- All piping shall be carefully sized, and all sizes shall be indicated on drawings and riser diagrams. Indicate all directions of flow and pitch on piping.
- All accessories, valves, and fixtures, including all drinking fountains, grease traps for kitchen waste, and all necessary panels, identified as to type and size.
- Acid waste and vents for laboratories conforming to the requirements of the latest issue of the State Plumbing Code.
- Plumbing Legend and/or graphical symbols on the first sheet of the plumbing drawings in accordance with the National Standards Institute (ANSI).
- Plumbing riser diagrams for structures two or more stories in height above ground level.
- Domestic water booster pumps, boiler feed water, meter location, hose bibs.
- Hot water storage tanks, piping material, hanger details.
- Back-flow preventors in accordance with requirements of Department of Environmental Protection (DEP).
- Clean-outs in accordance with the Massachusetts State Plumbing Code.
(Note: Typical illustrations are available at the office of the Board of State Examiners of Plumbers.)
- Coordinate with "Commissioning Agent."

9.21 Heating, Ventilating & Air Conditioning Drawings

Heating, ventilating and air conditioning drawings shall indicate the following:

- Site utilities on the utility drawings.

- HVAC work, other than site work, shall not be combined on the same sheets with Fire Protection, Plumbing, Electrical or other drawings except with the prior approval of DCAM.
- The location and size of all piping and ductwork systems.
- All systems sized at all reductions, as well as all riser diagrams of piping and duct systems.
- All directions of flow, pitch on piping, and volumes for duct systems.
- Sufficient servicing and/or replacement space of all large items of equipment.
- All equipment, accessories, valves, and dampers with all necessary access panels identified as to type and size. Access panels, where required for access to valves and dampers, etc.
- All cooling system pumps, chillers, cooling towers, air handling units, ductwork systems, dampers, fan details, temperature control system, air and hydronic balancing equipment, and schedules.
- The cooling tower design on the drawings showing site location, elevations and floor plan of equipment layout and typical flow diagram as related to the total HVAC system.
- That adequate ventilation is provided in utility tunnels and for exterior utility tunnels on the utility drawings.
- That all fire and smoke dampers, access panels, and doors are installed in accordance with the latest edition of NFPA Code 90.A.
- Mechanical room designs, including the following details:
- Vent pipes for safety valves, relief valves, backpressure valves and tanks shall be extended above flat roofs in accordance with all governing authorities.
- Motor starters: Who provides? Who wires?
- In all designs for boiler and refrigeration plants, include a complete floor plan indicating location of all major mechanical equipment and sufficient service space.
- In all designs of new and/or replacement boiler and refrigeration plants, provide a flow diagram detailing steam or hot water distribution systems, return systems, including all existing equipment and their function, as well as any proposed expansions with all necessary instrumentation and controls.
- All ductwork shall be shown double line unless otherwise approved in writing by DCAM.
- Coordinate with "Commissioning Agent."

9.22 Electrical Drawings

Electrical drawings shall incorporate the following elements:

- Indicate temporary power needs on the drawings when applicable.
- Site utilities shall be indicated on utility drawings.
- Electrical work, other than site work, shall not be combined on the same sheets with Fire Protection, Plumbing, HVAC, or other drawings except with the prior approval of DCAM.
- General arrangement: Outline layout of each floor. Typical sections through the structure, floor and ceiling heights and elevations, and type of construction, including concrete pads shall be indicated.
- Motor starters: Who provides? Who wires?
- Interior lighting system: type of wiring, light fixture schedules, location and mounting heights of all fixtures, cable trays, receptacle and switch outlets, sizes and types of all lamps, conduits, all other accessories and riser diagrams shall be indicated on the drawings. Indicate details and method of supporting electrical fixtures, cable trays, and conduits. Designer shall specify that all electrical lighting fixtures be supported from the building structure, and shall be independent of ducts, pipes, ceilings, and their supporting members.
- Power system: locations, types, and method of control for all motors, heaters, appliances, controllers, starters, branch circuits, feeder conductors, and conduits. Indicate riser diagrams. Show details and indicate method of supporting electrical conduit. For larger projects, thermostats and control wiring are normally covered under the HVAC contract.
- Signal systems: locations and types of all outlets and equipment, service connections, wiring diagrams, and all other essential details.
- Services: location and details of all services, whether overhead or underground, feeder sizes, plans and elevations of switchgear and transformers, metering and service switchboard arrangements, wiring and ground fault diagram, and bus ducts.
- Generator and sub-stations: Provide the location, size, method of connection and protection of generators, transformers, exciters, rotor generators, switchgear, and associated equipment, along with current characteristics and equipment capacities. Indicate equipment connections by means of one line wiring diagrams, and schedule all major items of equipment and all instruments.
- Underground work: the sizes and locations of manholes and types of cables, number, size and location of ducts, locations, sizes and types of cable supports, fireproofing, duct line profile, and one line diagram of connections. All underground chambers, including manholes and pull-boxes, shall be constructed of cast-in-place or one-piece pre-cast concrete.
- Pole line work: location, length, treatment and class of poles, guying, cross arms, insulators, circuiting, transformers, protective and

switching devices, lighting arrestors, special structures, diagrams, current characteristics, and grounding.

- Exterior lighting: location, size, and types of transformers, luminaries, poles, light standards, cables, ducts, and manholes, details of control equipment, and connection diagrams.
- Emergency system: details including transfer switch and type of fuel.
- One line diagram indicating load in KVA, and available short circuit amperes at each transformer, switchboard, distribution panel board, branch circuit panel board, and at major pieces of equipment.
- Riser diagrams for all systems.

9.23 DCAM/User Agency Comments

The Designer shall review the comments prepared by DCAM and the User Agency and incorporate them into this Design Phase. If the Designer takes exception to any comment they shall provide a response to DCAM. The Designer shall also provide DCAM with a report indicating the action taken on all comments and indicate where they were incorporated into this phase.

Performance

9.24 Designer/Consultant Evaluations—CD-EV

The Designer will assist the DCAM Project Manager in a review of the Consultants following these procedures:

- The Designer will receive an evaluation of performance at the completion of this phase. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the DCAM Project Manager and the Designer for improved performance.
- Copies of these evaluations will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the DCAM Project Manager, they may respond with a letter to the manager and send a copy to the Designer Selection Board.
- Copies of the various Evaluations are contained on the DCAM website.

Checklist—Construction Document Phase

Process

The following items should be reviewed during this phase:

- Building components (should be finalized)
- Cost (pending bid confirmation)
- Schedule (should be finalized)
- Design Work Plan
- Design workshops (monthly)
- DCAM comments implementation
- User Agency comments implementation
- Building code analysis and implementation
- Environmental assessment implementation
- Universal Design / MAAB/ADA analysis implementation
- Energy Conservation, LEED Plus and Life Cycle Cost Analysis implementation
- Quality Control

Deliverables

The following items should be reviewed during workshops and submitted at the completion of this phase:

- Drawings
- Specifications
- Cost estimate
- Work plan update (including schedule update)
- DCAM/User Agency comments incorporated
- Building code analysis incorporated
- Environmental assessment incorporated
- Testing results incorporated
- Universal Design / MAAB/ADA analysis incorporated
- Utility rebate documentation incorporated
- Product requirements incorporated
- Quality control documentation

Performance

The performance of the Designer will be evaluated at the completion of this phase:

- Designer evaluation



10

Bidding Phase

10.1 General

The Designer shall be responsible for the following:

- Bid documents
- Estimate sheet (refer to [Appendix](#))
- Conduct a Pre-Bid Conference and prepare meeting minutes
- Respond to all questions; prepare all addenda
- Attend the filed sub-bid and general bid openings
- Review all bids; advise DCAM on all bid protests
- Advise DCAM on all matters pertaining to the public bidding of the project

10.2 Bid Documents

- Bid Documents shall be dated with the Construction Document approval date.
- Provide one paper or a 5 mil Mylar copy (DCAM option) of the approved contract documents (plans and specifications) with original stamps and signatures.
- Provide one copy of the contract documents on electronic media (drawings in CADD format and specifications/addenda in MS Word format) to DCAM.
- At the completion of bidding process and before the award of the contract, the Designer is to incorporate all addenda into the contract documents and provide two electronic copies to DCAM.

10.3 Pre-Bid Conference

- A Pre-Bid Conference is usually set-up by DCAM to allow the bidders an opportunity to view the site prior to bidding. The Designer shall attend the Pre-Bid Conference, solicit questions from the attendees, and refrain

from providing answers to any question asked.

- The Designer shall take meeting minutes listing all questions asked. The Designer should inform those in attendance that only questions received in writing may be answered if they are relevant to the bidding process. The Designer shall review the questions asked and, if required, issue the answers as an addenda after review and approval by DCAM.

10.4 Contact with Bidders During Bidding

The Designer may respond to bidders in the following two ways:

- Direct the bidder to read the specification completely. If their question is not answered after a complete read, the Designer may direct the bidder to the section in the documents that clearly answers the question asked.
- No verbal opinions regarding the documents may be given regarding any question asked.
- Require the bidder to put the question in writing. If the question(s) is/are relevant, the Designer will then issue a response as part of an addendum (by stating each relevant question and its associated answer).

10.5 Issuing Addenda

- If either a bidder or sub-bidder asks a question that requires clarification, the Designer must respond in writing in the form of an addendum.
- If the clarification involves a filed sub-bid section during the general contract bidding, DCAM may elect to not issue the clarification and issue a change order after the contract has been awarded. If the clarification is substantial, DCAM may elect to re-bid the effected sub-bid section, or extend the bid date, or have the general contractors carry an amount for that section of work.
- Bidder's questions may be submitted up to ten calendar days prior to opening of bids. The Designer shall review any questions received after the deadline for relevance. If questions have minor impact on bids, no further addenda will be issued.

10.6 Attendance at Filed sub-bid Openings

- The Designer is required to attend the filed sub-bid opening.
- The Designer is required to review all file sub-bids, compare them to the approved final estimate, contact the sub-bidder if required for clarification, and make a recommendation to DCAM to award, reject, or re-bid. If no bids are received for a filed sub-bid section, the Designer may recommend to DCAM that this section of work may be included with the work of the General Contractor.

10.7 Attendance at General Contract Bid Opening

- The Designer shall attend the general contract bid opening.

10.8 Review and Award

- The Designer shall review all general contract bids, unit prices and alternates, compare them to the final estimate, contact general contractors if required for clarification, check references, and make a recommendation to DCAM to award, reject or re-bid.

10.9 Advise DCAM on Bidder's Protests

- The Designer shall review the contract documents and advise DCAM in writing regarding the protest of a bidder. If required the Designer shall attend a hearing regarding the bidder's protest.

Checklist—Bidding Phase

- General
- Bid documents
- Pre-Bid Conference
- Contact with bidders during bidding
- Issuing addenda
- Attendance at Filed sub-bid openings
- Attendance at General contract bid openings
- Review and Award
- Advise DCAM on bidder's protests



11

Construction Administration Phase

11.1 General

Contract Documents: the Designer shall prepare a set of plans and specifications that incorporate all addenda and SK drawings issued during the bidding process. All changes shall be indicated in a clear manner, by either a revision symbol or bold print, on both the drawings and specifications. Any inconsistencies discovered during this process shall be brought to the attention of DCAM. No additional changes shall be incorporated at this time. All future changes or interpretations shall be incorporated into the drawings and specifications when they are accepted after a Notice to Proceed is issued by a DCAM Director or Deputy Commissioner and during construction.

- The Designer shall review information supplied by the Resident Engineer, the Contractor and testing agencies.
- The Designer shall chair and conduct weekly meetings, distribute copies of meeting minutes, and have their consultants in attendance when work of their discipline is ongoing. The Designer shall assemble a list of all email addresses along with phone, cell, and fax numbers for all contractors, consultants, DCAM contacts, and User Agency representatives involved in the project.
- The Designer shall determine when the services of a testing agency are required and review the results of their tests for compliance with the contract documents.
- The Designer shall prepare and update logs for all submittals and changes to the contract.
- The Designer shall review and approve the schedule of values, shop drawings, samples, substitutions, monthly requisitions, Change Orders, and equals to the contract requirements.

- The Designer shall review the construction schedule, the construction progress and construction quality, review "As-Builts" on a monthly basis, and make recommendations to DCAM for payments to the Contractor.
- The Designer shall review the project and recommend occupancy for substantial completion.
- The Designer shall review, modify, and recommend approval of all record drawings, accept all warranties, and prepare a punch list of all items necessary for completion.
- The Designer shall review the Resident Engineer's daily reports.

11.2 The Resident Engineer (RE)

- The RE is an employee of DCAM.
- The RE is required to have copies of all correspondence and an updated set of contract document plans and specifications that incorporate all addenda and SK drawings (Designer supplied sketches). Two sets of documents are required. One set is the bid set with all addenda added to the plans and specification. This is the legal contract set. The other set is a confirmation set prepared by the Designer with all of the addenda and SK drawings incorporated into the plans and specifications.
- The RE shall report on the number of all Contractor and sub-contractor employees by trade, race, and gender.
- The RE shall report on the scope of work, material deliveries, and the weather conditions at the site.
- The RE shall review the monthly requisition and change orders submitted by the Contractor and provide a signature acknowledging approval, rejection, or make modifications as required.
- The RE may report on stored material at the site.
- The RE may observe the work and notify either DCAM or the Designer that the work is, or is not in conformance with the contract documents. The RE may stop the work of the Contractor in an emergency situation **only** or as directed by DCAM.
- The DCAM PM will provide the DCAM RE Manual for all RE responsibilities.

11.3 Submittal Logs

- The Designer shall request a list of all proposed contract submissions from the Contractor and these submittals shall be indicated on the construction schedule.
- The Designer shall prepare and update weekly submittal logs for the following items:
 - Shop drawings and samples
 - Requests for information (RFI)

- ❑ Notice of intent (NOI)
- ❑ Proposed change orders (PCO)
- ❑ Change orders (CO)
- ❑ SK drawings (SK-)

11.4 Review and Approval

Refer to the Designer's or Contractor's contract for review period time.

- The Designer and their consultants shall review all shop drawings and samples within the contract time limit.
- The Designer and their consultants shall review and comment on the schedule of values and the progress schedule promptly.
- The Designer shall reject all Contractor substitutions or equals not named in the specification unless the Contractor provides sufficient technical information indicating that the product meets or exceeds all of the criteria in the specification. If the product specified is no longer manufactured then the Designer must review the Contractor's submission for compliance to the contract documents and confirm this to be fact. If the selection and delivery of the product will delay the project, the Designer must determine this to be fact and inform DCAM.
- The Designer and their consultants must review all coordination drawings promptly.
- The Designer shall inspect the mock-up/sample panel to determine compliance with the contract documents regarding quality, workmanship, aesthetics and weather-tightness. The mock-up/sample panel must be approved prior to any incorporation of these materials. The Designer shall instruct the Contractor to stop work on the installation of these materials until approved.
- As-Built drawings
- The Designer and their consultants shall respond promptly to any request by the Contractor to inspect or clarify work.
- If the Contractor requests payment for work not installed, the Designer shall refer to the contract regarding payment for stored materials.
- The Designer shall review the results of all tests and determine compliance with the specifications promptly. The Designer needs to supervise the testing agency on-site, and review the documentation and ensure that it is provided in a timely manner.
- The Designer shall review and respond to all change orders (refer to the contract for appropriate language).
- The Designer shall review and coordinate with the commissioning plan.

11.5 Testing Agencies

- The Designer shall prepare a request for testing services from three testing agencies to meet the requirements of the contract specifications and the Massachusetts State Building Code. *(Note: The structural engineer may also provide inspection services.)*
- The Designer shall recommend to DCAM which testing agency they feel provides the requested services at the most competitive price.
- The Designer shall review the scope of work of the commissioning agent and coordinate the work of the commissioning agent and their consultants.

11.6 Construction Schedule

- The Designer shall review the initial construction baseline schedule and determine that all activities are present. The Designer shall require that the construction schedule be cost and manpower loaded if possible (this *is not necessary for smaller projects*). *(Note: This will allow the Designer to determine the cost and delay associated with changes to the contract).* The Designer shall correlate the construction schedule with the actual construction progress on a monthly basis. The Designer shall review all revisions and variances from the original construction baseline schedule proposed by the Contractor and recommend acceptance to DCAM.
- Contractor may delay finalizing the construction schedule until they have completed signing their sub contracts. It is important that the Designer not accept this delay. It is recommended that no requisitions be approved until a final schedule is submitted and approved. Partial approval of requisitions and prolonged review of the schedule by the Designer will result in the delay of submission and approval of the progress schedule.
- The schedule must be submitted in the format outlined in the contract specifications.

11.7 Environmental Conditions Assessment

- Assessment during construction is as follows: The data collected during Pre-Design/Design Phase will be used to develop the appropriate testing program for use in construction. There are two types of environmental analyses that can occur during construction, management of potentially contaminated fill and groundwater and post-excavation sampling to verify residual conditions. The analyses and frequency of sampling of stockpiles for determining off-site disposal options focus on required analyses by the disposal facility (landfill, asphalt batch plant, etc.). These requirements are specified in the operating permit of the disposal facility. Typical permit requirements are presented in the [Appendix](#).
- Collection and analyses of samples from excavations is necessary to verify acceptable residual contamination. The selection of the analyses, sample locations, and cleanup criteria are functions of the data collected during

the Pre-Design/Design Phases. As these samples will be used in assessing potential risks associated with the residual contamination, the types and detection limits of analyses are different than those required by disposal facilities.

- Latent Conditions: The most-difficult condition to address is encountering latent conditions during the Construction Phase. The latent conditions may include an unknown underground storage tank, pockets of ash from power plants, and debris from historic demolition of earlier structures. Upon encountering these conditions, the field representatives of the Designer should immediately contact the DCAM Project Manager to discuss what has been encountered together with possible options. Typically, the DCAM Project Manager will have a member of DCAM's Environmental Staff join him/her in a conference call with the field representative. Please refer to the [Appendix](#) for a checklist of the minimum information the field representative should have available for the conference call. In no instance shall the Designer contact MA DEP without DCAM's concurrence.

11.8 Evaluations

- The Designer will receive an evaluation of their performance at the completion of this phase. It is DCAM's intention that this evaluation will either acknowledge the good performance of the Designer or initiate a dialogue between the DCAM Project Manager and the Designer for improved performance.
- Copies of these evaluations will be sent to the Designer Selection Board and may be viewed by Cities and Towns for future work. If the Designer disagrees with the evaluation given by the DCAM manager, they may respond with a letter to the DCAM Project Manager and send a copy to the Designer Selection Board.
- Copies of the various Evaluations are on the DCAM website.

Checklist—Construction Administration Phase

- General
- Resident Engineer
- Submittal logs
- Review and approval
- Testing agencies
- Construction progress schedule
- Environmental conditions assessment
- Designer evaluation



12

Project Closeout Phase

12.1 General

The Project Closeout Phase must ensure construction quality and that the State Inspector accepts all health and safety issues prior to substantial building occupancy.

12.2 Procedural Requirements Prior to Use and Occupancy

- At the final stage of the project, the Contractor shall make frequent inspections with Subcontractors, the Designer, the Designer's consultants, and the DCAM Resident Engineer to check for and correct faulty work.
- During the course of construction of the project, the Contractor shall procure and maintain test records and certificates that will be required prior to issuance of the Department of Public Safety (DPS) Certificate of Occupancy and the DCAM Certificate of Agency Use and Occupancy.
- When the Contractor determines that the project or a portion of the project is Substantially Complete, he shall submit to the Designer a list of items to be completed or corrected. Failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. The Contractor's list shall be accompanied with certificates that will be required as prerequisites for applying for a DPS inspection. Please note that "Substantially Complete" means less than one percent (1%) of all contract work, including change orders, remains to be done, and that none of the remaining work will affect health, safety, or function.
- Upon receipt of the Contractor's list of items to be completed or corrected, the Designer will promptly make a thorough inspection, together with representatives of DCAM and the User Agency, and prepare a "punch list," setting forth in accurate detail any items on the Contractor's list and additional items that are not acceptable. Concurrently, the Contractor will arrange for all inspections, fire, plumbing, electrical, and DPS inspection.

- When the punch list has been prepared, and all DPS Inspector's comments have been included, the Designer will arrange a meeting with the Contractor and Subcontractors, and the DCAM Project Manager, to identify and explain all punch list items and answer questions on the Work that must be done before Final Acceptance. *(Note: If a DPS inspector—including, but not limited to AABA, boiler, elevator, wiring, plumbing, or any other authorized inspector—requires modifications and/or additions that were not included in the construction documents, the Designer should review the applicable code(s) and provide written interpretation to the DCAM Project Manager together with recommendations.)*
- The Contractor shall immediately correct all punch list items that effect health, safety, or function (as determined by the Designer, completion of which is required before issuance of a DCAM Certificate of Agency Use and Occupancy).
- Designer should prepare a monetized punch list.
- Upon receipt of the DCAM Certificate of Agency Use and Occupancy (E1), and its attached monetized punch list, the Contractor shall begin the completion of all the other punch list items within the timeframe required by the certificate.
- Some of the items frequently overlooked when preparing for a Use and Occupancy Certificate are as follows:
 - Properly colored and positioned exit signs
 - Properly located emergency lighting fixtures
 - Complete or, by agreement, schedule personnel training
 - Final building cleaning
 - Designer and consultant affidavits
- Ventilating system cleaning issues:
 - Clean permanent filters and replace disposable filters if units were operated during construction
 - Clean ducts, blowers, and coils if units were operated without filters during construction
 - Leave pipe and duct spaces, plenums, furred spaces, and the like clean of debris and materials subject to decay
- Provide a properly working lock for the medical environmental closets (if applicable).
- Assure that exterior and interior egress doors are operating properly and have the proper hardware.
- Assure all doors and frames that require fire-rating labels have been labeled.
- Assure that smoke barriers are properly installed and located.

- Assure a spare set of each type of sprinkler head along with a head removal tool have been provided.
- Assure that floors drain properly.
- Assure that proper hot water temperatures are provided. Unless otherwise specified or required by a User Agency, the temperature set on building master controllers of hot water shall apply as follows:
 - Hot water shall be: toilet rooms (110°F) and janitors closets (140°F)
 - Hot water to individual tubs or showers shall be controlled, in addition to the master controller above, with thermostatic valves set to furnish hot water at a temperature not exceeding 110°F and equipped with anti-scald feature
 - Hot water rinse water to dishwashers shall be controlled at 180°F
- Assure that proper water pressure is provided for the sprinkler system
- Assure that low-consumption (LC) toilets have been installed (1.6 gpf or less)
- Re-lamp if permanent lighting system was used during construction
- As-built marked-up drawings should be completed and transferred over to the Designer

12.3 General Contractor Closeout Submittals

- The Contractor shall provide (via transmittal to the DCAM Resident Engineer) the following “closeout submittals”:
 - Project record documents and as-built marked-up drawings
 - Approved operating and maintenance (O & M) data
 - Extended guarantees and warranties
- General Contractor’s Guarantees:
 - A written guarantee, for one (1) year from date of Substantial Completion of the project, against defective workmanship, material, installation, and equipment for all work of the project
- During this period the Contractor shall:
 - Repair or replace defective workmanship, material, installation, or equipment that develop within this period; this shall be accomplished promptly upon notification to the Contractor, to the satisfaction of the User Agency and/or Operating Agency, at no cost.
 - The replacement or repair of material or equipment that requires excessive service during the guarantee period. The guarantee shall include 24-hour service of complete system(s) during the guarantee period at no additional cost.

- When necessary, provide the manufacturer's engineering and technical staff's prompt appearance at site to analyze and rectify problems that develop during guarantee period. If problems cannot be rectified promptly to the satisfaction of the User Agency, the Designer must be immediately advised in writing, with a detailed description of efforts taken to rectify the situation, along with an analysis of the cause of the problem.
- Regarding the Manufacturer's guarantee or warranty: In addition to guarantee requirements above, obtain manufacturers' written installation, equipment, and material warranties for time periods indicated in the various Specification Sections of the Contract Documents. Such manufacturers' warranties contained within the Specification Sections, together with any other warranties offered in manufacturers' published data, are to be transferred to the User Agency.
- Keys and keying schedule.
- Spare parts and maintenance materials.
- Evidence of compliance with requirements of governing authorities including, without limitations, the following:
 - Certificate of Inspection, in form of signed permits from the electrical, plumbing, gas, fire department, boiler and any other required inspectors.
 - Certification from the local fire department to the effect that all detection, alarm and suppression systems, and other equipment or systems under fire department jurisdiction are approved.
 - When carpeting and/or draperies are provided, a flame, smoke and fuel-rating certificate provided by the supplying contractors.
 - Elevator certification(s) from the elevator inspector obtained through the General Contractor's elevator Subcontractor.
 - A letter from the Plumbing Subcontractor that the potable water supply has been sanitized and a back-flow preventor test report.
 - Septic system certification obtained from the town by the General Contractor (when applicable).
 - Pressurized vessel certifications from the boiler inspector obtained through the Mechanical Subcontractor.
 - When air balancing is required, the air balancing report prepared by the Mechanical Subcontractor (or commissioning agent, when applicable), **and accepted** by the design Registered Professional Engineer.
 - When smoke control/fire emergency ventilation system is required, the test report prepared by the Mechanical Subcontractor (or commissioning agent, when applicable), **and accepted** by the design Registered Professional Engineer.

- Evidence of test and approval for Department of Environmental Protection (DEP) and Department of Public Health (DPH), when applicable.

12.4 Designer's Closeout Submittals

- The Designer shall provide (via transmittal to the DCAM Project Manager) the following "closeout submittals":
 - Certification, from the design Registered Professional Engineer, stating that the fire protection systems have been installed in accordance with the approved fire protection construction documents and meet the requirements of 780 CMR 903.1
 - Review and acceptance of the HVAC balancing report
 - The Structural Engineer-of-Record's (SER's) final report, as required by 780 CMR 1705.3
 - Certification from the Design Registered Professional Engineer, stating that the emergency lighting and power systems have been installed in accordance with the approved electrical construction documents
 - List of deficiencies noted by the Commissioning Agent during functional performance tests on all building systems and the resolution of these deficiencies.
 - LEED documentation for certification.
 - Utility rebate submittals and approvals.

12.5 Final Inspection

- Upon completion of the Work for which a permit has been issued, the DPS building official shall conduct a final inspection pursuant to 780 CMR 115.5.
- Temporary (Beneficial) Occupancy as follows:
 - Temporary occupancy is allowed under 780 CMR 120.3. Temporary occupancy is frequently granted to allow a User Agency to set up and test its own equipment in select building areas. It does not allow for use and/or occupancy of the general public when, in fact, the building cannot function for the use(s) it is intended to accommodate, nor when there are outstanding items that affect health, and/or safety.
- Partial (beneficial) occupancy as follows:
 - Partial (beneficial) occupancy of building areas will initiate the guarantee period for completed work of Divisions 2 through 14 of the Contract Documents for those building areas so used and occupied, exclusive of remaining work indicated on associated punch lists. Use of systems provided under Divisions 15 and 16 of

the Contract Documents for temporary services and facilities shall not constitute Substantial Completion, or Final Acceptance of work by the User Agency, and shall not initiate the guarantee period.

Please note that it is DCAM policy to disallow beneficial occupancy if fire alarm and suppression systems are inoperative.

12.6 DCAM Certificate of Use and Occupancy

Prior to requesting a DCAM Certificate of Use and Occupancy (E-1 Form) the DCAM Resident Engineer should procure and have ready and available the following approved items (referred to as Closeout Submittals):

- O & M manuals and written operating instructions for the various systems
- The DCAM RE should be provided with all closeout submittals from the Contractor and approved by the Designer.
- Catalog data sheets for each item of mechanical or electrical equipment actually installed including performance curves, rating data and parts lists
- Catalog sheets, maintenance manuals, and approved shop drawings of all mechanical and electrical equipment controls and fixtures with all details clearly indicated, including size of lamps
- The Balancing Report
- The names, addresses, and telephone numbers of repair and service companies for each of the major systems installed under the construction contract
- A signed DPS Certificate of Occupancy per 780 CMR 120.0
- Licensed Builder Final Affidavit/Report
- Designer and Consultants Affidavit of Compliance
- Monetized punch list of the remaining Work that must be done before Final Acceptance
- Record drawings should be completed (both electronic and Mylar files if required) and ready to be transferred over to the DCAM Project Manager. As-built documents shall consist of, but not be limited to, the following:
 - Drawings (in AutoCAD ver.14 or latter format)
 - Contract drawings, for all disciplines, marked-up clearly to indicate the as-built condition
 - All clarification and/or changed condition sketches
 - Specifications (in MS Word format)
 - All construction specifications
 - All addenda
 - Shop drawings, submittals, etc. (electronic format)
 - All approved shop drawings, submittals, etc.

- The DCAM Project Manager shall attach the monetized punch list to the DCAM Certificate of Agency Use and Occupancy, indicate the official date of Use and Occupancy, establish the date upon which all remaining punch list items must be completed (normally 30 calendar days), and procure appropriate signatures on the original and seven (7) copies.
- After receipt of signatures, the DCAM Project Manager shall distribute the signed copies with a copy to the Designer.

12.7 DCAM Certificate of Final Inspection

- Prerequisites for (DCAM) certificate final inspection, release and acceptance (E-2 Form):
 - Upon receipt of the DCAM Certificate of Agency Use and Occupancy, and the monetized punch list, the Contractor shall complete all of the punch list items within timeframe required by the certificate.
 - If the Contractor fails to complete the remaining monetized punch list work within the timeframe required by the certificate, DCAM may, after seven (7) calendar days written notice, elect to complete the work with separate forces and charge the Contractor.
 - At the end of the Contractor's one (1) year guarantee period, the Contractor shall transfer manufacturers' equipment and material warranties that are still in force to the User Agency and/or Operating Agency.

Checklist—Project Closeout Phase

- Closeout requirements and submittals
- Punch list (monetized if required)
- Substantially complete item list
- Test records and certificates
- DPS Certificate of Occupancy
- DCAM Certificate of Occupancy E1
- DCAM Certificate of Final Inspection
- As-built drawings from Contractor
- Operating and Maintenance manuals
- General Contractor's Guarantee
- Keys and keying schedule
- Spare parts and maintenance material
- Signed permits for electrical, plumbing, gas, elevator, fire (detection, alarm and suppression)
- Structural engineer of record certification
- Designer certification
- Record drawings from Designer
- DPS certificate of inspection/ certificate of occupancy
- Designer evaluation



13

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A *Study Work Plan and Payment Schedule*

Work Plan Template

Project Name: _____

Agency _____

Agency Head _____

Agency Contact: _____

DCAM Manager _____

*May 11, 2007
OPDC- Programming Group
Michael Williams, Director*

PROPOSED PROJECT SCHEDULE

Pre-Study Completion	_____
DSB Advertisement	_____
Earliest date for DSB Selection	_____
Work Plan Complete	_____
"Information Gathering" Complete	_____
"Ideas and Options" Complete	_____
"Consensus Solution" Complete	_____
Earliest Date for Certification	_____
Earliest Design Start	_____
Earliest Construction Start	_____
Earliest Occupancy	_____

Approved by Director _____

Date: _____

Introduction

This document is to be used as a workbook by DCAM Study managers as an aid in developing studies. It is by no means exhaustive. The program manager should use it as a checklist to create a first draft of a Work Plan and as a guide for sequencing the work of the study.

The work is organized by Milestone, five altogether. The first milestone is “Pre-Study” and covers the information that the Program Manager must compile prior to advertising for a consultant (in most cases the study consultant will be an architectural firm). Each Milestone has the same four categories of information:

1. Space: this has to do with who will be using the building and what types of spaces are needed. “What’s needed.”
2. Facilities: scope and quality of construction, buildings and site. “What gets built.”
3. Costs: all expenses that must be carried in the initial project budget, and in the agency’s operating budget going forward (operating costs, life cycle costs). “What it will cost.”
4. Implementation: Timelines for all activities that are required to complete the project. This includes not only the study and design activities, but also permitting, outside reviews and approvals, and regulatory processes. "How it gets done."

These four categories will have titles that change somewhat from phase to phase.

Studies are an iterative process. Each of these four topics is addressed in increasing specificity as the development of the project progresses. They are all inter-related so it is wise not to let one progress ahead of the others. The end goal of a study is to have gathered all the information and get agreement with the User Agency on the design requirements for the project. It is an information intensive process. Design should be done sparingly at this stage, principally to test concepts for feasibility and workability.

0.0 Pre-Study

This section is prepared by the study manager prior to advertising for a study consultant. The intention is for the program manager to become as familiar with the project as the facility head and staff so he or she can manage the project effectively.

The program manager will do a quick inventory of documents, drawings, and previous studies, and other materials that are available in order to avoid having the consultant do unnecessary work. These materials will be listed in the DSB ad.

Study Phases

1.0 Goals: Framing the Problem

2.0 Inventory & Analysis

3.0 Potential Solutions

4.0 Consensus Solution

0.0 Pre-Study

The Program Manager will collect and verify the information below for inclusion in the DSB advertisement.

0.1 Space Needs

Describe the situation that has resulted in the need for this project. Describe the space deficiencies as conveyed by the user agency. If available, compare existing space vs. ideal or commonly accepted standards for similar agencies or organizations to illustrate the extent of the shortfalls or poor fit. Include numbers of staff, users (students, customers, inmates, etc.), visitors that are served by the institution. Include parking and other vehicular needs or shortfalls.

- List any previous DCAM Studies for similar facilities with a brief summary of each.
- List similar state facilities that might be used for comparison and evaluation.

(Notes by DCAM Program Manager)

0.2 Facilities Needs

Document all available information on the facility or building in CAMIS, MASSETS, and PMAS.

Describe deficiencies in buildings *and site* that this project is expected to correct. Make a note of sub-consultant disciplines that will be required on the designer application. Include all relevant facility information such as building square footages, size of footprints, numbers of stories, dates of construction; also include site information: total acreage, site improvements, parking, utilities, known environmental conditions (wetlands, or other protected areas, steep topography, known hazardous materials, etc.), traffic issues, known community issues that will be addressed in the project, etc.

(Notes by DCAM Program Manager)

0.3 Preliminary Budget

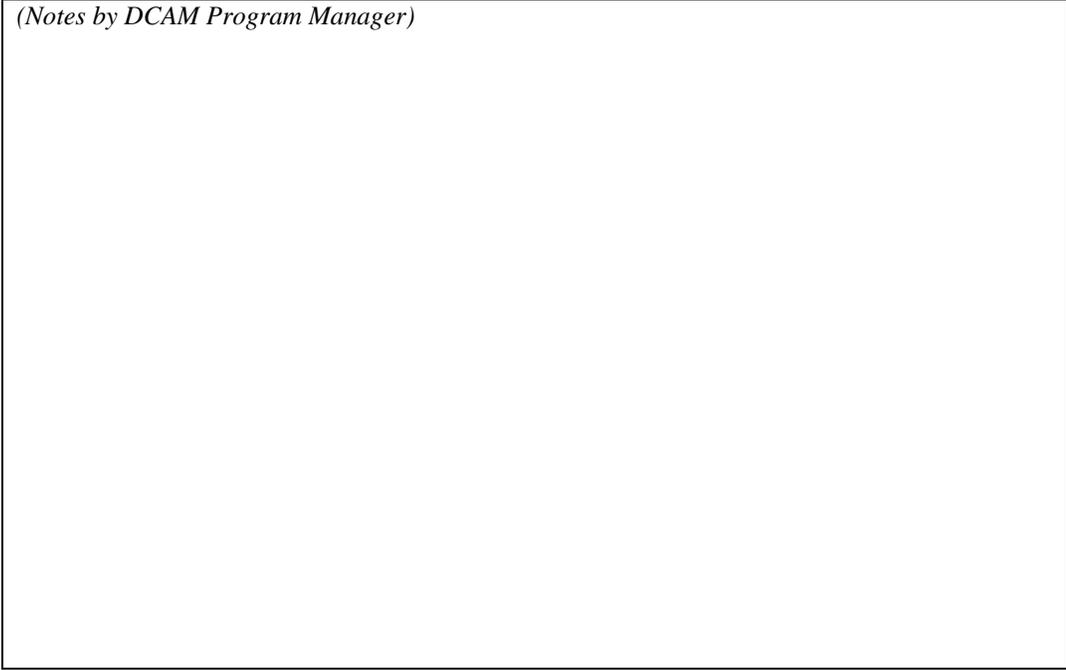
Refer to DCAM Cost Estimating manual. Base preliminary budget on Unit Costs (e.g. cost per bed, per cell, per courtroom, etc.) with an appropriate multiplier for soft costs and escalation. Or base on available funding set aside if that will determine the scope of work. List funding sources and amounts available for this project. If a G.O. bond authorization, list the citation (Chapter #, Acts of [year] followed by eight digit account number). If funded through an ISA, be sure funds have been received by DCAM prior to advertising the project.

(Notes by DCAM Program Manager)

0.4 Key dates and Implementation Issues

In the advertisement list all of the milestone dates that are to be met. Note that by signing the DSB application, the consultant agrees to meet those dates. Note any special conditions that might affect the schedule, such as regulatory reviews (environmental, historical, etc.).

(Notes by DCAM Program Manager)



1.0 Goals: Framing the Problem

This section should be written by the consultant and reviewed by the user agency to ensure that the agency's needs are clearly understood. All information will be based on meetings with DCAM, and the User Agency chief decision-maker and key staff. This section should be the introduction to the consultant's Work Plan.

This effort begins when the study consultant is under contract. The DCAM Program Manager and the Study Consultant meet with the Agency Head, key staff, and facilities director to hear first hand what the expectations are for the project. This is an opportunity to clarify issues that may not be clearly understood. In some cases it is an opportunity to do a reality check of expectations vs. available budget. The intention is that everyone begins the project "on the same page".

During this stage the DCAM study manager and the Study Consultant complete the scope of work, proposed work products/deliverables and fee allocation in the Work Plan.

The goals should be stated in functional terms rather than as construction solutions. For example, the goals for a college might be to improve the quality of its classrooms, provide more opportunities for student-teacher interactions, and to consolidate the liberal arts programs in one location. A new academic building might be the best solution. But if it is determined that the college already has an adequate amount of space, but that space is poorly organized and in need of upgrade, then perhaps a better solution might be a comprehensive renovation program.

1.1 Space Issues

Space issues are best initiated as a discussion of people, activities, and relationships. If a project is first described as "10,000 sf addition", the programmer must determine what activities that number encompasses. Space standards change over time, so that beginning a discussion with square footage overlooks the principal reason for a building project, that is, to improve the ability of an agency to meet its mission.

- What is the mission of the user agency and how does this project support it?
- Explain how the proposed project will improve the organization's ability to meet its mission.
- Who are the key stakeholders?
- What are the space deficiencies
- What is the best possible outcome for this project for the User Agency? What is the least expected?
- Prioritize the goals from "critical to the mission" to "highly desirable if achievable". The purpose for establishing this range is to be able to recognize opportunities when they present themselves, and conversely to have flexibility in the event of limited resources.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

1.2 Facility Issues (Buildings and site)

This project should be evaluated in the context of all known facility deficiencies in at the institution. There might be an opportunity for this project to propose a more comprehensive and long term solution within the same, or a slightly increased budget.

- List all available material relevant to this study. Include as-built drawings, site plans, previous studies and reports, CADD files, traffic studies, MEPA filings, etc.
- Is there under-utilized space elsewhere at this facility?
- Document any solutions that the user agency has already developed on its own, or as the result of previous studies. Explain how each solution attempts to meet the agency's mission goals.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

2.0 Inventory and Analysis

This is the most important of the study as it provides the reference materials for all future decisions. Many studies run into trouble when the designer begins designing and getting support for solutions before all of the issues are clearly understood. Because a study is a progressive process of achieving consensus, many good ideas can prove to be infeasible upon further examination. This part of the Work Plan should strike the balance between too much information, and not enough. Use this time to determine what is "just enough".

2.1 Programmatic Information

The consultant will develop a preliminary space program and relationship diagrams. Room data Sheets will not be developed in this stage. They will be developed during the Consensus Solution stage.

- Meet with all of the departments or user groups to be served by the project to get an understanding their space needs;
- Get a clear understanding of what works and what doesn't.
- List all existing spaces to be replaced: organized by functional group and listed by room number, use description or name, number of occupants, SF area.
- Include a floor plan of the existing space with rooms and spaces clearly identified.
- Develop analysis of the positives and deficiencies of the existing spaces.
- Interview agency user groups, including facilities staff
- How do they compare to peer institutions in terms of space?
- Plan to visit similar facilities. Report should include color photos of the facilities with captions, names and titles of personnel interviewed.
- Think about the future: what effect will technology and current advances be expected to have over the next 10 years.
- Compile space benchmarks by functional grouping based on commonly accepted industry standards;
- Description of emerging trends that might change how a facility is used over time (new technologies, changes in codes, regulations, or industry standards). In particular note the lag between the present and the first 5-10 years of the new facility's life.
- Determine appropriate net to gross ratio for the building project. This is important because a space program does not usually describe or document spaces carried in the building gross area (e.g. structure and wall thickness', circulation, public bathrooms, mechanical areas, house keeping, etc.)

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

2.2 Building and Site Information

- Prepare plans and sections of existing facilities as required or requested by DCAM. If this information already exist, plan to reproduce them *legibly* within the report. If the consultant must measure and draw the existing facilities then this effort should be clearly identified as an Additional Service.
- Code Analysis. If the project is a renovation include a Chapter 34 review (Massachusetts State Building Code). For both new construction and renovation include all applicable code requirements for the building type. This should not just list what sections are applicable but rather summarize the requirements of those sections.
- MEP Engineers: Analyze all relevant building systems. Identify all systems by size, capacity, age, and, where appropriate, manufacturer nameplate information (Boilers, chillers, generators, switch gear, etc.)
- Structural Engineer: Determine what analyses and testing must be done. At a minimum confirm required loading and requirements to meet seismic codes.
- Determine if and when geotechnical reports and soil borings will be required. At a minimum, for new construction soil borings should be done prior to closing on the Consensus Solution
- Include locus plan showing location of the facility within the region and the state.
- Include site plan(s) including all roads, walkways, parking, building footprints, site utilities, site lighting, site features, topography at mutually agreed upon intervals (1' to 10"), metes and bounds, municipal boundaries if they cross the site.
- Determine potential need for Environmental Analyses: wetlands, agricultural land, hazardous materials, both in the buildings or on site,
- Determine types of construction, materials, and systems that this project will employ, and those that should be avoided, and why. This analysis should include the pros and cons of structural systems, building envelope assemblies, roofing structures and systems, HVAC, special electrical systems, plumbing systems, etc. Particular attention should be paid to life cycle, energy efficiency, ease of maintenance, etc. This analysis should be developed in close consultation with the lead architect and the appropriate sub-consultants, and with DCAM's Commissioning agent.
- Determine range of architectural quality and image to be incorporated during the design stage.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

2.3 Cost Information

- Develop table of costs of built facilities similar to the proposed facility
- Develop preliminary range of construction costs for the proposed project based on analysis of similar built facilities
- Estimate probable annual operating cost including anticipated additional staff that might be required
- Costs should be escalated to an agreed upon date so that escalation rates can be the likely mid-point of construction.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

3.0 Potential Solutions

At this point the space needs of the project are well documented. So have the physical constraints and opportunities, the likely costs, and the projected time lines for implementation. During this phase the consultant will develop and test a variety of physical solutions and program groupings. These ideas and concepts are should be developed as block diagrams rather than as detailed architectural drawings. The ideas should be kept fluid and flexible so that numerous concepts can be proposed, evaluated, and either discarded or kept for further development. Often a solid idea evolves from testing several impractical ideas.

3.1 Space Groupings

Show various combinations of program that might best meet the agency's goals. Often this exercise is an opportunity to explore different mixes of functions that reflect the evolving nature of the institution. It can also be used to evaluate options that include a mix of renovation and new construction. Some uses might fit best in existing space, while other spaces might be more suitable for new construction because of their specialized requirements.

3.1.1 Relationship Diagrams

Relationships between departments or key groups of spaces;
relationships of individual spaces within a department or grouping.

3.1.2 Block and Stack Diagrams

If the proposed building is likely to be multi-story, this exercise will show how groups of spaces might be distributed across several levels. Care should be taken to have the same approximate area on each floor to allow the construction of a regular floor plate. In some cases it will cost no more to provide additional growth space to round out a floor area rather than build a single floor that is smaller than the one below or above.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

3.2 Construction Scenarios

This exercise will explore different ways that the required space might be provided. In many cases it will involve looking at different combinations of renovation and new construction. If the project is all new construction, the consultant will develop alternative configurations that might provide different inter-actions between users in the building or set of buildings. Detailed floor plans are not required in this stage, unless the project is limited to the renovation of an existing space and no other alternatives are available.

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

4.0 Consensus Solution

This section is contains the final approved Design Requirements for the project.

4.1 Space Program

All space requirements will be documented in this section.

4.1.1 Tabular Program

List of spaces organized by department. Each space in the spreadsheet has an identifying code, Room name, and net area.

4.1.2 Relationship Diagrams

Relationship of departments or key groups of spaces; relationships of individual spaces within a department or grouping.

4.1.3 Room Data Sheets

One sheet for each net area space listed in the tabular program. Identify each by space code and space description (e.g., " AF1.0 Office - Vice President A & F) a use description, maximum number of occupants, special requirements, adjacencies, etc. Also include a list of all required Furnishings and Moveable Equipment for costing. Do not specify manufacturer or models names. (E.g. Desk with box drawers 30" x 72"; Book Shelves 15 lineal feet)

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

4.3 Budget

Document all costs to be incurred by this project, including increases to the user agency's annual operating budget.

4.3.1 Construction Cost Estimate

Produced in electronic format according to the DCAM Cost Estimating Manual

4.3.2 Total Project Cost (TPC).

Reproduce the approved DCAF at time of Certification. Include narrative text highlighting potential issues with any of the budget allocations in the form.

4.3.3 Life Cycle Cost Analysis

Document expected life span and replacement/repair dates for major building components.

4.3.4 Operating Cost Estimate

Develop using state budget appropriate codes. This information will be used

<i>Proposed Work Product:</i>	
<i>Consultant Team Member Responsible:</i>	
<i>Fee:</i>	<i>% of Total</i>

Appendix

Include the following items in the Study Appendix. This information will be bound in a separate volume.

1.0 Meeting Notes

All meeting notes that were distributed to the client agency, from the start of the project. Meeting notes intended solely for DCAM will be kept in the central files.

2.0 Project Correspondence and e-mails

Any contract related correspondence such as requests for additional services, fee increases, etc will be kept in the DCAM central files but not included here.

3.0 Technical Memoranda

Typically these are produced by sub-consultants to the architect, and will include soil borings logs, structural analyses, mechanical reports, Traffic Studies, etc.

4.0 Regulatory Documents and Correspondence

3.1 MEPA: Environmental Notification Form (ENF) and related correspondence

3.2 MAAB: All access related issues including requests for variance

3.3 DPS: Department of Public Safety: Building Inspector

3.4 MHC: Project Notification Form filed with Mass Historical Commission and related correspondence.

3.5 (continue list as necessary)



B

Life Cycle Cost Analysis

LCA-NPV General calc sheet_2										
	A	B	C	D	E	F	U	V	W	
1	Life Cycle Cost (LCC) [in Net Present Value (NPV)] Calculation Spreadsheet									
2										
3	0.06	interest/discount rate								
4	0.05	energy cost escalation rate								
5	20 yrs.	life expectancy (full depreciation)								
6	(yellow)	=input required								
7										
8	Equipment/Scheme name	Option X								
9	YEAR	0	1	2	3	4	...	19	20	
10	(installed) capital cost \$	\$100								
11	utility rebate \$	\$20								
12	annual energy \$	-	\$50	\$53	\$55	\$58		\$120	\$126	
13	annual O&M \$	-	\$10	\$11	\$11	\$12		\$24	\$25	
14	total outlay \$	\$80	\$60	\$63	\$66	\$69		\$144	\$152	
15	Cash Flow (NPV)	\$80	\$57	\$56	\$56	\$55		\$48	\$47	
16	LCC in NPV Total \$	\$1,069								

LCA-NPV General calc sheet_2										
	A	B	C	D	U	V	W			
1	Life Cycle Cost (LCC) [in Net Present Value (NPV)] Calculation Spreadsheet									
2										
3	X%	interest/discount rate								
4	X%	energy cost escalation rate								
5	20 yrs.	life expectancy (full depreciation)								
6	(yellow)	=input required								
7										
8	Equipment/Scheme name	Option X								
9	YEAR	0	1	2	...	19		20		
10	(installed) capital cost \$	\$X								
11	utility rebate \$	\$X								
12	annual energy \$	-	\$X	=C12*(1+\$A\$4)		=T12*(1+\$A\$4)		=V12*(1+\$A\$4)		
13	annual O&M \$	-	\$X	=C13*(1+\$A\$4)		=T13*(1+\$A\$4)		=V13*(1+\$A\$4)		
14	total outlay \$	=SUM(B10-B11)	=SUM(C12:C13)	=SUM(D12:D13)		=SUM(V12:V13)		=SUM(W12:W13)		
15	Cash Flow (NPV)	=B14	=C14/(1+\$A\$3)^C9	=D14/(1+\$A\$3)^D9		=V14/(1+\$A\$3)^V9		=W14/(1+\$A\$3)^W9		
16	LCC in NPV Total \$	=SUM(B15:V15)								



C ***Summary of Environmental Permits***

This section will be replaced at a later date.



D ***MAAB/ADA Accessibility Checklist***

Every DCAM design Consultant must review their drawings and specs to make sure these common errors have been addressed before submitting plans to DCAM. These items are required by law.

Exterior Areas

- Plazas with non-compliant grading. No part of a plaza may exceed 2% grade in any direction at any point in the plaza. (Will be checked in field with 2 foot Smartlevel.) Steeper grades may be used when the direction of travel is clearly delineated by walls and edges.
- Temporary routes during construction. Paths of travel to and from an existing building must be accessible during construction.
- ALL walkways must be accessible (except existing sidewalks on public ways). If steps are used in a walkway, the accessible path of travel must be adjacent. Be aware that carefully graded walkways are preferred by DCAM over steps and ramps because they are less costly and easier to maintain.
- An accessible walkway must be provided from the public way to the accessible building entrance.

Curb Ramps

- Curb ramps must have detectable warning. Detectable warnings shall consist of raised truncated domes with a diameter of 0.9 inches, a height of 0.2 inches, and a center-to-center spacing of 2.35 inches and shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light. The material used to provide contrast shall be an integral part of the walking surface.
- Curb cut cannot be on the apex of the corner at an intersection.

- Curb cut must have sufficient landings at the top and bottom so that the sloped area does not compromise the required width of walkways.

Parking

- At least one parking space must be designed and designated as accessible, if ANY parking is provided (ADAAG). It must be a van accessible space. Additional spaces must be provided according to the scoping requirements in AAB.
- The loading zone between accessible parking spaces must connect to an accessible walkway so that a person disembarking from a vehicle does not have to travel in the vehicular area or behind vehicles.
- Side slope of parking spaces may not exceed 2%. Longitudinal slope cannot exceed 5%.

Protruding Objects

- Stairs that “float” above the floor where the underside is exposed. A detectable edge must be provided beneath the stairs so that people cannot walk in the area where the underside of the stair is between 27” and 80” above the floor.
- Counters or wall-mounted shelves that cantilever more than 4 inches beyond a detectable edge. Be careful to look at wide surfaces installed on counters, transaction desks, and other public interaction areas, including systems furniture.
- Wall sconce lights and wall-mounted signage cannot protrude more than 4 inches unless mounted higher than 80”.
- Common protruding objects: standpipe connections in stairwells, fire extinguisher, and fire hose cabinets; exterior fire hose connections along walkways; reception counters; telephones; and especially drinking fountains.

Doors

- ALL entrance doors to the building must be accessible, unless they are restricted to employees.
- ALL doors that are in a path of travel, including doors into private offices, must be accessible in terms of width, maneuvering space, hardware, thresholds, and closers.
- Maneuvering spaces at doors must meet side door clearance requirements on both the push and pull sides of the door. Ensure correct side clearance. Maneuvering space must be provided at stairwell doors.

Ramps

- Ramps should be avoided in new construction and used judiciously in renovation. DCAM expects consultants to present an analysis showing that no other options exist.
- Exterior walkways should be graded to avoid needing ramps, including consideration of lowering (or raising) the building floor elevation to diminish the slope or changing the grade around the building.
- Ramps must be designed AT THE LEAST POSSIBLE. If there is space in plan for a longer ramp, which minimizes the stamina required to use it, the ramp should be longer.
- No construction tolerance is allowed by the regulations for any section of a ramp that exceeds a 1:12 slope in steepness. DCAM's experience is that ramps specified at 1:12 generally exceed that slope in some places. A slope of 1:13 is recommended as the maximum slope to be specified on drawings.
- A ramp's slope will be measured after completion with a 2 foot Smartlevel for compliance. Shooting top and bottom elevations is no longer a sufficient measure.
- All ramps must be 4' wide and will be measured between the handrails.
- Specs should contain language that identifies to the contractor the stringent standards used for determining code compliance with slope requirements.
- Landings onto which doors swing must meet maneuvering space requirements for doors. Ensure sufficient landing size and configuration.

Stairs

- Any step and all stairs, interior and exterior, must have handrails as required by MAAB. A stair is construed as any single step. This is different than the MA Building Code.
- Handrails must be installed on BOTH sides of stairs. A center railing does not meet the requirements of the MAAB.
- On interior stairs, provide sufficient contrast in material colors that people can see the steps and landing clearly.

Elevators and Lifts

- The use of lifts is discouraged by DCAM and will be considered only in renovations to existing buildings. The design consultant must demonstrate that no other options exist and show that the lift use meets the exceptions in MAAB.

- If a lift is installed, it must be designed so that it can be operated independently and can be used by someone who does not use a wheelchair.

Bathrooms

- Public buildings should have at least one companion toilet or single user toilet to serve people who cannot use multiuser toilet rooms. (This toilet room may not be considered in the plumbing fixture count by the plumbing inspector.)
- The 30" x 48" clear floor space required at the sink cannot overlap the maneuvering space required at the door. The maneuvering space at the door includes 18" at the latch side on the pull side, extending back 60" from the door frame.
- Toilet flush valves must be located on the maneuvering side of the toilet.
- Bulk toilet paper dispensers must be located so that they do not interfere with the use of grab bars at the toilet but are within an acceptable reach range from the toilet. The same applies to sanitary disposal boxes.
- All public toilet rooms that contain 6 stalls or more are required to have an "alternate stall" – a 36" wide stall with grab bars on the side walls for people who have difficulty getting up.

Drinking Fountains

- Drinking fountains must provide for high and low use. Provide a combination hi-lo fountain or a high fountain for people who have trouble bending and a low fountain for people using wheelchairs.
- Drinking fountains may not protrude more than 4 inches beyond a corridor wall into a path of travel unless the protruding edge is installed at 27 inches, no tolerance. If they are located in an alcove or protected with wing walls that extend below 27 inches, the only height requirements are knee space and spout height.

Counters

- Counters where service is provided, transactions are conducted, or public computer terminals are provided must have an equivalent accessible area or component. If a knee space is provided it must be at least 36 inches wide, 27 inches high, and 19 inches deep. The counter surface must be between 28 inches and 34 inches high above the floor.

Employee Areas

- Common use areas for employees must be fully accessible including kitchen counters, lockers, and restrooms.

- All other employee areas, including offices and conference rooms, must be accessible so that a person with a disability can enter, turn around, and exit.

Assistive Listening Systems

- Any assembly area or meeting room that has either 50 or more seats OR an amplification system and fixed seating must have a permanently installed assistive listening system. Review all meeting rooms carefully for obligations of owner and architect for construction requirements and NIC equipment requirements.

Means of Egress

- All spaces or elements which are required to be accessible must have at least one accessible means of egress.
- Where more than one means of egress is required by MA Building Code, that space must have at least two accessible means of egress.
- Areas of Rescue Assistance can be used where an accessible means of egress is not provided.
- Each exit discharge shall provide a continuous path of travel from an exit to a public way by means of a walkway or a ramp.

Signage

- Informative signage is especially important for people with disabilities who may have limited stamina for finding their way.
- Signage must conform to all the standards in MAAB. Pay particular attention to character height and proportion.
- Permanent rooms, where Braille and raised lettering are required, include room numbers, stairwells, and toilet rooms. Other signage, including directories, is not required to include Braille or have raised letters.
- The international Symbol of Accessibility should be used only to designate the following:
 - Parking spaces reserved for people with disabilities
 - Accessible passenger loading zones
 - Accessible entrances when not all entrances are accessible (inaccessible entrances shall have directional signage to indicate the route to the nearest accessible entrance)
 - Accessible toilet and bathing facilities when not all are accessible

- Emergency egress signs, which are required to be illuminated
- Signs should be installed on the wall adjacent to the latch side of the door, not on the door itself.
- Lower case characters are permitted.
- Braille should be located below the text at the bottom of the sign.
- Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram.
- Characters and symbols shall contrast with their background and all surfaces should be matte or non-glare.
- Where text telephones and assistive listening systems are provided, signage is needed to indicate the location or who to contact.



***E** Sample List of Asbestos Containing Materials*

The following is a partial list of asbestos containing material. It is intended that this list be used to identify the possibility that asbestos may be present. If any of these items are present, a certified asbestos inspector is required to test all of the suspect areas.

Cement pipes	Elevator brake shoes
Cement wallboard	HVAC duct insulation
Cement siding	Boiler Insulation
Asphalt floor tile	Breeching Insulation
Vinyl floor tile	Ductwork flexible fabric connections
Vinyl sheet flooring	Cooling towers
Floor backing	Pipe insulation
Construction mastics	Heating and electrical ducts
Acoustical plaster	Electrical panel partitions
Decorative plaster	Electrical cloth
Textured paints/coatings	Electric wiring insulation
Ceiling tiles and lay-in panels	Chalkboards
Spray applied insulation	Roofing shingles
Blown-in insulation	Roofing felt
Fireproofing materials	Base flashing
Taping compounds (thermal)	Thermal paper products
Packing materials	Fire doors
High temperature gaskets	Caulking/putties

Laboratory hoods/table tops

Laboratory gloves

Fire blankets

Fire curtains

Elevator equipment panels

Adhesives

Wallboard

Joint compound

Vinyl wall covering

Spackling compounds



F

Bid Estimate Sheet

DCAM Estimate Summary Sheet

Mass. State Project Number	_____	Estimator	_____
Contract Number	_____	Date Submitted	_____
Title and Location of Project	_____	Construction Duration (days)	_____
Designer	_____	Anticipated Bid Date	_____

	Base Bid	#1	Alternates #2	#3
SITE COST	_____	_____	_____	_____
BUILDING COST	_____	_____	_____	_____
ESTIMATED BID COST (include overhead and profit)	_____	_____	_____	_____
WORK OF GENERAL CONTRACTOR (ITEM 1)	_____	_____	_____	_____
WORK OF FILED SUB-BIDDERS (TOTAL OF ITEM 2)	_____	_____	_____	_____
GROSS SQUARE FOOTAGE OF BUILDING	_____	_____	_____	_____
COST PER GROSS SQUARE FOOT OF BUILDING	_____	_____	_____	_____
NET SQUARE FOOTAGE OF BUILDING	_____	_____	_____	_____
NET TO GROSS SQUARE FOOTAGE	_____	_____	_____	_____
UNIT USER COST (PER PUPIL, PER BED, ETC)	_____	_____	_____	_____
GENERAL CONTRACTOR'S OVERHEAD AND PROFIT	_____	_____	_____	_____

(Note to Designer: If alternatives are used then line numbers 3, 4, 5, and 11 shall be filled in for each alternate)

DCAM Estimate Summary Sheet

FILE SUB-BIDS BY SECTION

		Base Bid	#1	Alternates #2	#3
040001	Masonry	_____	_____	_____	_____
050001	Miscellaneous and Ornamental Iron	_____	_____	_____	_____
070001	Waterproofing, Dampproofing, and Caulking	_____	_____	_____	_____
070002	Roofing and Flashing	_____	_____	_____	_____
080001	Metal Windows	_____	_____	_____	_____
080002	Glass and Glazing	_____	_____	_____	_____
090001	Lathing and Plastering	_____	_____	_____	_____
090002	Tile	_____	_____	_____	_____
090003	Acoustical Tile	_____	_____	_____	_____
090004	Marble	_____	_____	_____	_____
090005	Resilient Floors	_____	_____	_____	_____
090006	Terrazzo	_____	_____	_____	_____
090007	Painting	_____	_____	_____	_____
140001	Elevators	_____	_____	_____	_____
210001	Fire Protection	_____	_____	_____	_____
220001	Plumbing	_____	_____	_____	_____
230001	Heating, Ventilating, and Air Conditioning	_____	_____	_____	_____
260001	Electrical	_____	_____	_____	_____
	Total of Item 2 Work	_____	_____	_____	_____

SUB SUB-BIDS BY SECTION

Plumbing		
	Pipe Insulation	_____
HVAC		
	Temperature Controls	_____
	Sheet Metal	_____
	Duct Installation	_____
	Balancing	_____
Electrical		
	Lightning Protection	_____
	Sound Systems	_____
Elevators		
	HC Lifts	_____



G

Cost Estimating in Design Phase

- DCAM procures the CM as soon as possible when a project moves into SD. The first pre-construction task for the CM is to prepare a baseline estimate with latest possible design documents, defined below.
- The Designer selects a suitable midpoint during the SD process where an estimate can be prepared. The estimates will be approximately the same detail level as the Study, but with a much firmer definition of footprint, envelope, major area relationships, and probable HVAC systems.
- Both the CM and the Estimator price this out, independently, using the Unifomat II structure to Level 3, much as was done in the Estimator's original Study estimate and presentation.
- A cost reconciliation is then done between the Estimator and the CM, followed by a comparison of the result against the DCAM budget. This provides the Design team with any target adjustments and budget expectations to accommodate, well before the end of SD.
- For the CM, this budget is the baseline to which all subsequent estimates must relate. The CM is expected to bring all subsequent estimates, cost and construction matters into line with adjustments to this baseline. Eventually, subsequent estimate versions become the basis of his GMP. There is an always an audit trail of estimates and design adjustments.
- The Design team with their Estimator leads the second half of SD (and repeated similarly in DD) to keep the current design work within the expected trade level budget.
- At the end of the phase, the Cost Estimate and thus the total budget is updated by both Estimators. If they are regularly participating in meetings, etc. this is an ongoing process and not something to look at after all the work is done. DCAM expects that both Estimators will make plus or minus adjustments to their mid point estimates to come up with a new budget, and these adjustments will match the changes or narrative of intended changes to the mid point design to make up the end of SD/starting DD design. Thus, the budget changes and narrative changes are part of the SD certification. DCAM does not need a complete resubmission with a 100% complete Design and Estimate.

- This process is repeated at DD. Once the mid-point DD Estimate is agreed on and reconciled within the budget, DCAM will allow the CM to produce subsequent budgets in the CSI format, which is well structured to suit packages as they are released. (By the end of DD, there should be no need for Unifomat analysis to significantly change any of the building elements.) Strictly, the Estimator does not need to do a full CD estimate, as the GMP would normally predate this role. However, having the Estimator participate in the GMP estimate discussions often has value to DCAM as the Owner.
- A further complicating factor to a combined new construction/renovation project is that there may be actually two sequential projects: the new building and the renovation. The work for these will soon split and be out of sequence: i.e., there will not be one consistent level of estimate for the entire project at the end of each phase. Both the Estimator and the CM will have to run two estimating threads after SD, one for each of the projects. Any time when the costing considerations for this fall significantly out of sequence, work probability should be reflected in costings and costing proposals. Both Designer and Estimator need to consider this appropriately.
- The Estimator is involved in the following: meetings, a full mid-phase estimate, reconciliation, subsequent estimate adjustments to make up the final SD product, and reconciliation of the final SD product. The goal is to approximate private industry design build regular budget controls to the extent possible.
- DCAM has the responsibility to manage differences between estimates, and differences in proposed allowances and margins. Generally, DCAM expects to get agreement between CM and Estimators on these margins. If necessary to achieve a common budget, DCAM will enforce as the Owner, a common value set for margins for budget controls, and assessment of risk which is acceptable to DCAM. The CM does not solely provide or manage cost margins or contingencies without DCAM approval.
- From time to time, we would also expect the Estimator or the CM to do sub-estimates for alternative solution pieces, e.g. HVAC configurations, or verification of structural material alternatives. Some of this would be expected to be within the normal range of duties for Estimators. If a substantial effort for a particular sub-project is necessary, then a request for extra reimbursable services would be considered, when submitted in advance.
- It is expected that the Estimator will become familiar with the DCAM TPC Cost Management spreadsheet and where his estimate components fit into the totals. This requirement applies to the whole team, as DCAM is building down from a fixed budget, not upwards from a design. Some Designers and Estimators, as well as other consultants, have been slow to understand this fundamental shift in the approach to achieving budget control. It is necessary to follow this process until at least the end of DD where the CM is ready to release early packages. The CM's estimates in trade packages, totaling the GMP, become the Budget. Therefore, DCAM expects both the Estimator and CM to provide their early estimates in working XLS format, with a logical structure, that can be used by DCAM with the TPC spreadsheet. The exact format is not crucial, so long as it is in a malleable XLS format. Note that formal submissions with design or cost documentation done for deliverables and progress payments should be presented in PDF format. These are the official deliverables. DCAM does not use these in our own computations or extracts of data. Any XLS provided by the Estimator is understood to be a working document only and DCAM is responsible for the application of data therein.



H Area Measurement Pro Forma Entry Worksheet

	B	C	D	E	F	G	H	I	J	K	L
10			B2 - Restricted Area Service Rooms			1,100	n/a		1,100		
11			B3 - Support Rooms and Wet Areas			3,100	n/a		3,100		
12			B4 - Tenant Storage, Workshops, Docks			2,500	n/a		2,500		
13											
14			C - Assignable Area Factors			n/a	n/a	0%	0	0	63,200
19											
20			D - Net Useable Area Components (Sum to this point =NFA)			(Enter SF or PCT)		26%	16,600	16,600	79,800
21			D1 - Secondary Circulation			13,000					
22			D2 - Columns			1,400					
23			D3 - Partitions and Removeable Walls			2,200					
24											
25			E - Gross Interior Area Components			(Enter SF or PCT)		34%	27,132	27,132	106,932
26			E1 - Mechanical and Electrical					14%			
27			E1-1 - Mechanical Areas				7%				
28			E1-2 - Electrical Areas				2%				
29			E1-3 - Telecommunications Areas				1%				
30			E1-4 - Vertical Penetrations and Chases				4%				
31			E2 - Primary Circulation and Access					15%			
32			E2-1 - Primary Circulation				9%				
33			E2-2 - Stairwells				1%				
34			E2-3 - Elevators				1%				
35			E2-4 - Escalators				2%				
36			E2-5 - Non-Assigned Public Areas				2%				
37			E3 - Facility Common Services					5%			
38			E3-1 - Toilet Areas				3%				
39			E3-2 - Facility Maintenance Areas				1%				
40			E3-3 - Facility Management Areas				1%				
41											
42			F - Gross Exterior Area Components (Sum to this point = GFA)			(Enter SF or PCT)		4%	4,277	4,277	111,209
43			F1 - External Walls and Projections				3%				
44			F2 -Attached External Walkways				1%				
45											
46											



I Elemental Cost Entry Pro Forma Instruction Sheet

DCAM_Element.xls														
	A	B	C	D	E	F	G	H	I	J	K	L		
2					DCAM PROJECT COST DATABASE									
4					ELEMENTAL COST ITEM ENTRY									
6					INSTRUCTIONS TO ESTIMATORS									
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
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31														
32														
33														
34														



J Elemental Cost Entry Pro Forma Input Worksheet

	C	D	I	J	K	L	M	N	O	P	Q	R	S
1	ElmID	ElmDesc		L3 Qty	L3 Rate	L3 Calc	L3 Entry	L3 Amount	L2 Qty	L2 Rate	L2 Calc	L2 Entry	L2 Amount
2	A	Substructure											
3	A10	Foundations									\$0		\$0
4	A1010	Standard Foundation				\$0		\$0					
5	A1020	Special Foundation				\$0		\$0					
6	A1030	Slab on Grade				\$0		\$0					
7	A20	Basement Construction									\$0		\$0
8	A2010	Basement Excavation				\$0		\$0					
9	A2020	Basement Walls				\$0		\$0					
10	B	Shell											
11	B10	Superstructure									\$0		\$0
12	B1010	Floor Construction				\$0		\$0					
13	B1020	Roof Construction				\$0		\$0					
14	B20	Exterior Enclosure									\$0		\$0
15	B2010	Exterior Walls				\$0		\$0					
16	B2020	Exterior Windows				\$0		\$0					
17	B2030	Exterior Doors				\$0		\$0					
18	B30	Roofing									\$0		\$0
19	B3010	Roof Coverings				\$0		\$0					
20	B3020	Roof Openings				\$0		\$0					
21	B3030	Other Roofing				\$0		\$0					
22	C	Interiors											
23	C10	Interior Construction									\$0		\$0
24	C1010	Partitions				\$0		\$0					
25	C1020	Interior Doors				\$0		\$0					
26	C1030	Fittings				\$0		\$0					
27	C20	Stairs									\$0		\$0
28	C2010	Stair Construction				\$0		\$0					
29	C2020	Stair Finishes				\$0		\$0					
30	C30	Interior Finishes									\$0		\$0
31	C3010	Wall Finishes				\$0		\$0					
32	C3020	Floor Finishes				\$0		\$0					
33	C3030	Ceiling Finishes				\$0		\$0					
34	D	Services											
35	D10	Conveying									\$0		\$0
36	D1010	Elevators & Lifts				\$0		\$0					
37	D1020	Escalators & Moving				\$0		\$0					
38	D1090	Other Conveying Systems				\$0		\$0					
39	D20	Plumbing									\$0		\$0
40	D2010	Plumbing Fixtures				\$0		\$0					
41	D2020	Domestic Water				\$0		\$0					
42	D2030	Sanitary Waste				\$0		\$0					
43	D2040	Rain Water Drainage				\$0		\$0					



K *Hazardous Materials Inventory*

REQUEST FOR RESPONSE

Site name

Site location, Massachusetts

The Consultant shall submit a draft proposal to the Commonwealth of Massachusetts, Division of Capital Asset Management (DCAM), to identify and quantify hazardous materials associated with the proposed project at the above-referenced site. The Consultant shall review the proposed project scope, identify potential areas that may be impacted by the project, collect and analyze representative samples of building materials, identify materials that may be problematic (i.e., mercury in fluorescent light bulbs), and assess the effect of these materials on the proposed project scope, schedule, and budget.

Hazardous materials to be assessed under this scope of services will include, but not be limited to asbestos-containing materials, polychlorinated biphenyls (PCBs), mercury, lead paint, refrigerants, containerized wastes and raw products storage.

BACKGROUND

{TO BE COMPLETED BY THE DESIGNER OR DCAM PROJECT MANAGER}

Must identify the total building square footage;

The square footage of the building footprint; and

The age of the building.

AVAILABLE DOCUMENTS

The following documents are provided for the Consultants use in preparing a response for the anticipated scope of services:

{TO BE COMPLETED BY THE DESIGNER OR DCAM PROJECT MANAGER}

- A brief synopsis of the proposed construction;
- Previous asbestos and/or lead paint survey assessment; and

- Previous removal and abatement reports.

These documents are for informational purposes and as such, details of the project may be modified during development of schematic-level options. The supplied information is considered confidential and conceptual in nature, and is not to be shared or discussed with others without DCAM's written permission.

COORDINATION

The Design Team selected by the DSB will be responsible for developing design and construction specifications and plans for the proposed project. However, assessment and quantification of potential hazardous materials may have significant impact on the potential costs, schedule, specifications, and qualifications of the construction workforce. Therefore, close coordination between the Design Team and the Consultant is critical for the success of this project. DCAM will facilitate the interaction of the parties but is requiring regular communication from the Consultant to minimize miscommunication and to create prompt responsiveness.

SCOPE OF WORK

The Consultant will perform an evaluation of the project program to identify the presence of hazardous materials that may impact the construction, quantify the volumes and locations, provide options for addressing the hazardous materials, and provide permitting obligations, cost estimates, coordination issues and abatement timelines. Specified details regarding the proposed scope of services are presented below. The Consultant shall identify in their response any other tasks that should be included and shall identify the scope and costs associated with these additional tasks.

Task 1: Background Review

The Consultant shall evaluate the existing proposed project information provided by DCAM and the Design Team. This information includes programmatic data for the proposed rehabilitation and/or demolition. The Design Team shall supply information on areas of proposed work as well as information on the mechanical systems and materials to be addressed. The Design Team shall provide floor plans for the building that are clearly marked as to room numbers, uses of the various rooms, and anticipated work in these areas. The floor plans shall be provided in an electronic format.

The previous reports on assessment and abatement, if available, shall be reviewed as to potential impact on the proposed construction.

Task 2: Phase I Site Reconnaissance

The Consultant shall implement a two-phase approach. The initial phase will consist of developing an inventory of materials and their locations within the area to be impacted. The second phase, described in Task 4, consists of sampling and laboratory analysis of suspect hazardous and contaminated materials.

The Consultant shall contact and interview the facility manager with regard to storage of cleaning supplies, raw products, and waste materials. The Consultant shall inquire about locations, quantities, and work practices regarding the aforementioned information. The Consultant shall field verify the provided information during the site reconnaissance.

The initial phase will include a room-by-room walk through visual observation and documentation of the contents of the room together with the type of building materials present. The Consultant shall use floor plans provided by the Design Team. The initial phase will concentrate on inventorying visibly accessible building materials and indicating this information on the building drawings, particularly the type of walls, floors and ceilings, the presence of encapsulating materials, the condition of the material, (good, fair or poor) and the material's potential to become disturbed. Pipe insulation and window caulking (interior) will also be noted and assessed.

As part of the site reconnaissance, potentially hazardous or contaminated materials or systems will be identified and quantified within the project limits. These materials and/or systems include, but are not limited to: drums; PCB-containing transformers; capacitors; switchgear; light ballasts; and refrigeration equipment, including air conditions and freezers.

The Consultant shall compare conditions reported in the previous documents with existing conditions to verify the accuracy of the previous documents.

The Consultant will document all Phase I findings on the Room Data Inventory Sheet, attached as Table 1, or a similar format approved, in advance, by DCAM. During the field survey, both digital and conventional photographs will be taken of significant building features for physical documentation purposes.

In the event that the roof systems may be impacted by the proposed construction, the Consultant shall examine the roof systems and identify construction materials and the likelihood of these materials being ACM.

Task 3: Coordination Meeting

The Consultant shall attend a coordination workshop/meeting to be held at DCAM's Boston offices with the Design Team. The Design Team will present the basic thinking and the decisions made to date (in the overview).

The Consultant will provide a brief summary of the efforts taken to date, identify data gaps and suggest methods to address these gaps, discuss impacts associated with the anticipated hazardous materials, propose conceptual methods to mitigate these impacts, and establish "what if" scenarios.

The objectives of the discussion will be to resolve and/or clarify issues and to stimulate thought-provoking considerations that may require further design development study. The meeting will be an opportunity for the Design Team to understand data gaps and implications of the conceptual design components.

Task 4: Phase II Field Sampling and Analyses

The second phase of the site evaluation will include a survey of individual building materials and the contents of certain containers and equipment.

A. Media Potentially Hazardous and/or Contaminated Containers or Systems

Hazardous and/or contaminated materials will not be sampled during this scope of services. The Consultant shall make every effort to obtain as much information on the materials present within containers, heating and cooling systems, and electrical and mechanical systems. The minimum information expected is an estimate of the potential quantity, any indications of the contents, and potential sampling locations. Due to the variable integrity of building systems, sampling and analysis the contents will be performed as a separate reimbursable task with properly trained and equipped teams.

Asbestos Containing Material (ACM)

Based on the material inventories developed under Task 2 and the results of the meeting in Task 3, the Consultant will develop a work plan that clearly identifies the number of representative potential ACM samples that need to be collected in accordance with the sample frequency presented in the Asbestos Hazard Emergency Response Act (AHERA) regulations and described later in this Plan.

The Consultant will collect representative samples of all accessible building materials with additional samples of materials suspected to be ACM. Suspected ACM will be quantified and classified according to:

- Type (e.g. surfacing, thermal system insulation and/or miscellaneous);
- Encapsulated material, condition (good, fair or poor), and
- Potential to become disturbed.

The Consultant will document all findings on the attached Table 2, Potential ACM Inventory Sheet.

All building materials, including those believed to be non-ACM, will be sampled and analyzed using standard procedures and methodologies. Sample locations, conditions, and accessibility will be documented in bound field books and Chain-of-Custody form(s) will accompany each sample package.

During this phase of the survey, the Consultant will collect bulk samples of building materials that have the potential to become disturbed during the subsequent phases of the survey (e.g. acoustical ceiling tiles, gypsum wallboard or plaster surrounding access panels etc.). Analysis of these samples will be used to determine the methods to be used in accessing areas above suspended ceiling tiles and inside plumbing / mechanical chases.

The types of materials to be assessed include, but are not limited to:

- Interior window caulking/door caulking;
- Thermal insulation associated with mechanical systems;
- Expansion joint material;
- Gypsum wallboard;
- Joint compound for gypsum wallboard;
- Paint and various interior wall and ceiling finish materials;
- Smooth and textured wall and ceiling plasters;
- Various types of flooring materials;
- Mastic/adhesive associated with flooring materials;
- Baseboards and associated mastics;
- Ceiling tiles; and
- Fireproofing on structural steel.

In addition, bulk samples will be collected of dust and debris that may be present above acoustical ceiling tiles.

A more expansive description of the components of the Phase II activities is provided in the following subsections, together with sampling procedures, sample frequency, analysis, schedule quality assessment/quality control procedures, and documentation.

Lead Paint

All painted surfaces within the area to be impacted by the proposed construction will be screened using a XRF detector. The XRF detector is described in a subsequent subsection.

B. Sample Strategy / Frequency

Upon completion of the building material inventory, the Consultant will commence collection of representative samples. The following illustrates the sampling strategy to be employed by the Consultant:

ACM

- (a) Surfacing materials - In a randomly distributed manner, collect bulk samples of surfacing materials, representative of each homogeneous area.
 - (1) Collect at least three bulk samples from each homogeneous area that is less than or equal to 1,000 ft².
 - (2) Collect at least five bulk samples from each homogeneous area that is greater than 1,000 ft² but less than or equal to 5,000 ft².
 - (3) Collect at least seven bulk samples from each homogeneous area that is greater than 5,000 ft².
- (b) Thermal systems insulation.
 - (1) In a randomly distributed manner, collect at a minimum, three (3) bulk samples of thermal systems insulation material, representative of each homogeneous area.
 - (2) Collect, at a minimum, one (1) bulk sample of patched thermal systems insulation, representative of each homogeneous area, providing the section of patch is less than 6 linear or square feet.
 - (3) Collect, at a minimum, three (3) representative bulk samples of each insulated mechanical system, including, but not limited to cementitious material used on pipe fittings such as tees, elbows, or valves. Representative sampling will be conducted in a manner sufficient to identify whether each homogenous area is either asbestos or non-asbestos containing.
 - (4) Bulk samples are not required to be collected from any homogeneous area where the accredited asbestos inspector has determined that the thermal systems insulation is a non-suspect material (i.e., fiberglass, foam glass, rubber, or any other non-ACM).
- (c) Miscellaneous materials - Collect, at a minimum, one (1) representative bulk sample of each miscellaneous material, including, but not limited to ceiling tiles, floor tiles, associated floor tile mastic, etc. Representative sampling will

be conducted in a manner sufficient to identify whether each homogenous area is either asbestos or non-asbestos containing.

It is the intention that all suspect materials be sampled and analyzed for asbestos content to the extent that suspect materials can be classified as ACM or non-ACM, and that minimum materials will have to be assumed ACM.

Lead Paint

The Consultant will analyze the walls at a minimum frequency of one analysis every 1000 square feet for each painted surface. In addition, a minimum of one door and one window casement will be screened per room. The resulting data will be recorded together with the approximate sample locations.

C Sampling Procedures

Sampling is not envisioned for containerized wastes, aboveground storage tanks, transformers, capacitors, switchgear, and refrigeration units (including air conditioners and freezers), and light ballasts. Equipment or containers associated with the preceding systems will be examined to obtain and record manufacturer data on fluorescent light ballasts, transformers, HVAC equipment and other systems suspected of containing potential hazardous materials.

Lead-Paint

The Consultant will perform field screening of painted surfaces to identify the potential presence of lead. Testing for the lead-based paint will be conducted using a portable XRay fluorescence analyzer (XRF) which uses a radioactive source to excite the electrons of lead atoms (if present) in the paint. The XRF measures the x-rays emitted by the atoms as they return to their normal state. The measurement data is processed and the results converted to milligrams of lead per square centimeter of sampled surface area.

Asbestos Containing Materials

The asbestos survey will be performed by EPA-accredited and Massachusetts licensed asbestos inspectors. The Consultant's inspectors will conduct a thorough inspection of all accessible areas within the designated survey area. The Consultant will attempt to identify multiple layers of flooring systems. Suspect asbestos-containing materials located within wall chases, plenum chases, and plumbing chases will be bulk sampled wherever access can be made without damaging wall and ceiling finishes. Bulk samples, representing individual homogenous areas of suspect materials, will be collected in a randomly distributed manner, in accordance with those methods outlined below.

E Analysis

Lead Paint

Samples of painted surfaces will not normally be collected during this phase. Based on the type of proposed construction, DCAM may consider Toxicity Characteristic Leaching Procedure (TCLP) analysis of composite materials,

Costs associated with these sample collection and analyzes will be considered as a separate reimbursable.

Asbestos Containing Material

The majority of the bulk samples will be collected and analyzed for asbestos content in accordance with the AHERA Method (40 CFR Part 763, Appendix A to Subpart E). The analysis will be performed using Polarized Light Microscopy (PLM) With Dispersion Staining. Samples that indicate an asbestos content between 1 and 10 percent asbestos will be re-examined using point count techniques.

Transmission Electron Microscopy (TEM) analysis will be used in conjunction with PLM analysis when analyzing non-organically bound materials. TEM analysis will be performed on non-organically bound materials when PLM analysis indicates the asbestos content to be less than 1 percent.

All bulk samples will be submitted to the laboratory for the necessary turn-around based on the Project's needs.

Task 5: Quality Assurance/Quality Control

The draft floor plans provided by the Design Team will be field verified by the Consultant during the Phase 1 component of this project. Any modifications of the floor plans will be provided to the Design Team for revision. The Room Inventory Data Sheets (see Table 1) will be field verified during the Phase II sampling program.

Bound, field logbooks will be used to maintain field documentation. At a minimum, the following information will be recorded during the daily screening and collection of samples:

- Sample identification, location, and description;
- Sampling area sketch showing the sample location;
- Sampler's name(s);
- Date and time of sample collection;
- Type of sample (discrete or composite sample);
- Type of sampling equipment used;
- Field observations and details related to analyses or integrity of the sample (e.g. interior contractor placing carpet in the adjacent room); and
- Sample identification numbers.

In addition to the sampling information, the following specific information will also be recorded in the field logbook each day of sampling:

- Team members and their responsibilities;
- Time of arrival and time of departure;
- Other personnel on-site;
- Summary of any meetings or discussions with other parties; and
- Deviations from written procedures.

Both digital and conventional photographs will be taken at every sample location to document conditions at the completion of sample collection. Photographs will also be taken at every entry above the ceiling. These photographs will be taken in a panoramic manner showing all directions, where possible.

A Chain-of-Custody form (COC) will be provided with every sampling set sent to a laboratory for analysis. The COC will be kept to provide documentation linking the collection of the sample to the performance of the analytical method. The COC will include the location of the sampling, the date and time of the sampling, and the names of the individuals who transported the sample from the field to the laboratory. The completed COC will be shipped inside the sample-transporting container with the samples. The final COC will be attached to the laboratory report providing the analyses to DCAM.

Task 6: Report Preparation

The information and data generated from the above-noted tasks will be reviewed, compiled, and presented in a Hazardous Material Summary Report (the Report). The Report will include, at a minimum, the following:

- A summary of the proposed project identifying the scope, location, and systems to be impacted by the proposed construction/rehabilitation;
- A summary of previous assessments and/or removal and abatement activities;
- Procedures used in collecting and analyzing samples;
- Summary of information regarding ASTs, containers, transformers, mercury lights, and potential PCB light ballast. The summary shall include, in tabular form, locations by room number, media, type of contamination, and estimated quantity;
- ACM information shall be provided in tabular form including sample results, type, sample locations, integrity, friability, and quantity of all ACM identified,;
- A potential exposure assessment of ACM to building occupants and the public;
- Recommendations concerning additional sampling, if necessary;
- Copies of completed Tables 1 and 2;
- Estimated costs for removal and/or abatement;
- Figures showing all sample locations;
- Figures showing approximate locations of all materials identified as ACM; and
- Provide conceptual recommendations for mitigating adverse impacts.

Six copies of the draft document shall be provided to DCAM for internal review and comment. The Consultant will include in the Report, all plans and photographs collected or taken during Tasks 2 and 4. The final deliverable will consist of six (6) copies of the bound Report, and an electronic copy of all text, tables, figures, appendices, and attachments, plans, and photographs.

PROJECT PERSONNEL

The Consultant shall identify the personnel assigned to the project. The Consultant will ensure that only personnel with the appropriate experience will be assigned to the project. Any change in personnel assigned to the project will be identified to and approved by DCAM prior to any work commencing.

SCHEDULE

Following DCAM's written authorization to proceed, the Consultant will commence work. All work will be completed in approximately eleven weeks, as shown below. This schedule has assumed timely completions of certain tasks and DCAM realizes actual conditions and/or project constraints may vary the schedule.

Week 1:	Information review;
Week 2:	Site reconnaissance;
Week 3:	Coordination Meeting;
Weeks 4 & 5	Sampling and Analysis;
Weeks 6 thru 8:	Preparation and submittal to DCAM of a draft report;
Week 9:	Review and comments on the draft report; and
Weeks 10 & 11:	Finalization and submittal to DCAM of the final report.

The site reconnaissance process will be conducted during normal business hours such that all rooms can be accessed. The sampling of suspect building materials will be conducted after normal business hours to minimize inconvenience to the occupants. Sampling in each room will be completed on the same night it commences.

COST OF SERVICES AND CONDITIONS OF ENGAGEMENT

The Consultant will provide a spreadsheet with the proposed cost of services. The Consultant will perform the work in accordance with the Commonwealth Terms and Conditions as part of the Environmental Consulting and Engineering Services Contract. Unforeseen additional efforts beyond the scope of this proposal that would be required or that would become necessary must be agreed to, in writing, by both DCAM and the Consultant prior to commencement of additional efforts. All additional efforts beyond the scope of this Response will be completed on a time and materials basis in accordance with the referenced Terms and Conditions

TABLE 1
ROOM DATA INVENTORY SHEET

Room #	Room Type	Ceiling Type	Floor Type	Wall Material	Pipe Insulation	Missing Ceiling Tile	Comments
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		
	<input type="checkbox"/> Interior	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Carpet	<input type="checkbox"/> Plaster/Sheetrock	<input type="checkbox"/> Present	<input type="checkbox"/> Number:	
	<input type="checkbox"/> Exterior	<input type="checkbox"/> Acoustical Tile	<input type="checkbox"/> Vinyl Tile	<input type="checkbox"/> CMU		<input type="checkbox"/> Type:	
	<input type="checkbox"/> Open	<input type="checkbox"/> Spline Tile	<input type="checkbox"/> Vinyl Linoleum	<input type="checkbox"/> Concrete	<input type="checkbox"/> Intact	<input type="checkbox"/> Size:	
	<input type="checkbox"/> Office	<input type="checkbox"/> None	<input type="checkbox"/> Terrazzo	<input type="checkbox"/> Brick	<input type="checkbox"/> Minor Damage		
	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Encapsulate	<input type="checkbox"/> Concrete		<input type="checkbox"/> Damaged		

TABLE 2
POTENTIAL ACM INVENTORY SHEET

Room Number	Material Description	Material Class	Sample Number	Friability & Access	Condition Assessment	Estimated Quantity	Accessibility
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.
		<input type="checkbox"/> Thermal System Insulation <input type="checkbox"/> Surfacing <input type="checkbox"/> Miscellaneous		<input type="checkbox"/> Friable <input type="checkbox"/> Non-Friable <input type="checkbox"/> Encapsulate <input type="checkbox"/> Accessible <input type="checkbox"/> Non- Accessible	<input type="checkbox"/> Intact <input type="checkbox"/> Minor Damage <input type="checkbox"/> Damaged		<input type="checkbox"/> Public <input type="checkbox"/> Tenant <input type="checkbox"/> Maint.



L Environmental Site Assessment (ASTM: E 1527-05)

REQUEST FOR RESPONSE

SITE NAME

Site Location, Massachusetts

The Consultant will submit a draft proposal to the Commonwealth of Massachusetts, Division of Capital Asset Management (DCAM) to complete a Phase I Environmental Site Assessment (Phase I ESA) to be conducted at the above-referenced site. The Site is located at XXX. The Area is bordered by XXX Street, etc. The Site is currently used for XXXX. Figures 1 and 2 are a Site Locus Map and a Site Orthographic Photograph.

PHASE I ENVIRONMENTAL SITE ASSESSMENT SCOPE OF WORK

The Phase I ESA will be completed in general accordance with the guidelines set forth in the American Society For Testing and Materials ([ASTM](#)) publication E-1527-05, “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”. The purpose of the Phase I ESA is to identify “recognized environmental conditions” in connection with the Site. Recognized environmental conditions, as defined by the ASTM E-1527-05, means “the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or a material threat of a release of hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.”

The Consultant will provide a professional opinion regarding recognized environmental conditions at the Site based upon the following, as available: (1) information obtained from interviews with people knowledgeable about the Site regarding the current and former operations/uses; (2) from the records/files reasonably available for review from federal, state, and local sources; and (3) from visual observations of Site-specific and surrounding features and conditions.

Task 1: Federal and State File Review

The state and federal records, listed below, shall be reviewed using available computer database resources in an effort to identify recognized resources environmental conditions at and near the Site. The approximate search distances from the Site are also noted below. These search distances are those that are indicated as the standard search distances in Section 7.2.1 of the [ASTM](#) guidance.

- Federal National Priorities List (NPL) (1.0 mile);

- Federal Resource Conservation and Recovery Act (RCRA) corrective action (CORRACTS) and non-CORRACTS Treatment, Storage and Disposal (TSD) facility list (1.0 miles and 0.5 mile, respectively);
- Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) listing (0.5 mile);
- Federal RCRA generators list (property and adjoining properties);
- Federal Emergency Response Notification System (ERNS) list (property only);
- State-listed hazardous waste disposal sites (1.0 mile);
- State listing of oil and/or hazardous material spills (0.5 mile);
- State listing of landfills and/or solid waste disposal sites (SWL) (0.5 mile);
- State registered leaking underground storage tanks (LUSTs) (0.5 mile); and
- State registered underground storage tanks (USTs) (property and adjoining properties).

The Consultant will also review available Sanborn and other Fire Insurance Maps from a computer database service company. Fire insurance maps typically illustrate historic property uses, operations, and potential environmental features of concern. Historic aerial photographs or mapping must be reviewed to identify/confirm historic property uses.

Information generated from this computer search will be evaluated and used to determine which state-listed sites, if any, should be further reviewed at the Massachusetts Department of Environmental Protection (MADEP). If a MADEP file review is warranted to review the site-specific information on the state-listed sites near the subject Site, the Consultant will contact the MADEP to schedule a file review. The primary purpose of the MADEP file review is to determine if contaminant conditions on nearby state-listed sites have the potential to adversely impact environment conditions at the subject Site. The Consultant shall assume for purposes of estimating their costs, that three files will be reviewed. If additional file reviews are required, the Consultant shall contact DCAM and request additional funding. This request is to be made during Task 2 and not upon completion of the report.

As part of this task, the Consultant will also generate a Site-specific Geographic Information Service (GIS) map(s) from the data layers available from Massachusetts' Executive Office of Environmental Affairs (EOEA). The GIS map(s) will help to identify the physical setting and sensitive environmental receptors on or near the Site. GIS information, to be shown as applicable, includes:

- Color ortho imagery;
- USGS topographic;
- Hydrographic features;
- Bedrock and surficial geology;
- Conservation areas;
- Regulated areas (MADEP regulated, FEMA); and
- Other features as applicable.

Task 2: Local File Review

Supplementing the information obtained from federal and state sources, the following local agencies will be visited in order to review available records regarding site history and oil and/or hazardous material (OHM) releases/spills (or potential for) to the environment at and in the vicinity of the Site:

- Tax Assessors/Clerks office (e.g., property ownership);
- Fire Department (e.g., registered aboveground and underground storage tank information);
- Building/Planning/Zoning Department (e.g., building permits and zoning information);
- Water and Sewer Department (e.g., source and distribution systems);
- Health Department (e.g., environmental issues); and
- Historic Commission (site history/past uses).

Task 3: Site Observations and Interviews

The objective of the Site reconnaissance is to identify and document the pertinent features and conditions at and surrounding the Site with particular focus on those areas, which may indicate the likelihood of an OHM release. The Site reconnaissance will include the following activities:

- Observations of the exterior grounds to identify periphery conditions, surrounding properties and their uses, abutting roadways, stressed vegetation, on-Site wells, potential contamination pathways (i.e., underground storage tanks and utilities, septic systems and leach fields), and known and suspect oil and/or hazardous material waste storage and disposal areas;
- Observations of accessible building interiors, if existing and/or necessary, to identify general building layout/construction, maintenance/electrical/mechanical rooms (e.g., boiler rooms), floor drains/trenches, heating and cooling systems, superficial staining; and
- Observations of on-Site and surrounding environmental features and conditions, including surface water bodies, wetlands, and drainage ditches.

During the Site reconnaissance, photographs will be taken of significant Site and surrounding features for physical documentation purposes. The Consultant will also interview, if available, people knowledgeable about historic Site operations and uses in an attempt to gain and document more detailed information on potential handling and disposal of OHM. DCAM will identify a contact person and make this person available during the reconnaissance to assist in answering any questions and to provide copies of any documents which exist for the Site (i.e., building plans, environmental reports). The Consultant will not contact local or state agencies, the Site user agency, or any agencies other than those listed in Tasks 1 and 2 without approval of DCAM. Based on field observations, supplied and ascertained Site plans, and obtained assessor maps, a plan will be generated to illustrate the primary Site and pertinent surrounding features/conditions.

Task 4: Report Preparation

The information and data generated from the above-noted tasks will be reviewed, compiled, and presented in a Phase I Environmental Site Assessment Report (the Report). A typical table of contents is attached. The Report will include a findings and conclusions section that renders one of the following professional opinions:

- The assessment has revealed “no” evidence of recognized environmental conditions in connection with the Site; or
- The assessment has revealed no evidence of recognized environmental conditions in connection with the Site (s) “except” for the following [i.e., a list of specific conditions of concern identified on the Site will be presented].

If recognized environmental conditions are identified at the Site during the Phase I ESA, a listing of each identified condition will be provided in the Report. The Consultant will also provide recommendations in a letter separate from the Phase I ESA report for addressing any identified, recognized, environmental conditions. The Consultant will send four (4) copies of a draft version of the Report to DCAM for review and comment prior to finalization. The final deliverable will be six (6) copies of the bound Report, and one recommendations letter, if appropriate, for the Site.

PROJECT PERSONNEL

The Consultant shall identify the personnel assigned to the project. The Consultant will ensure that only personnel with the appropriate experience will be assigned to the project.

SCHEDULE

Following the written authorization from DCAM to proceed, the Consultant will commence work. All work will be completed in approximately six weeks as shown below. This schedule has assumed timely completions of certain tasks and DCAM realizes actual conditions may vary the schedule.

Week 1:	Information review;
Week 2:	Site reconnaissance and state file review if applicable;
Week 3:	Preparation and submittal to DCAM of a draft report;
Weeks 4 and 5:	Review and comments on the draft report; and
Week 6:	Finalization and submittal to DCAM of the final report.

COST OF SERVICES AND CONDITIONS OF ENGAGEMENT

The Consultant will provide a spreadsheet with the proposed cost of services. The Consultant will perform the work in accordance with the Commonwealth Terms and Conditions as part of the Environmental Consulting and Engineering Services Contract (MSA DCP0507 HD1). Unforeseen additional efforts beyond the scope of this proposal that would be required or that would become necessary, would be agreed upon in writing between the Consultant and DCAM and would be completed on a time and materials basis in accordance with the referenced Terms and Conditions.



M

Subsurface Explorations

1.0 INTRODUCTION

The purpose of this Appendix is to provide concise direction to DESIGNERS with regard to DCAM's expectations related to conducting and documenting subsurface explorations. These explorations include, but are not limited to, those conducted for geotechnical engineering programs (i.e., building foundations) as well as those conducted for environmental assessments. Subsurface explorations with regard to this Appendix include but are not limited to, soil borings, test pits, monitoring wells, piezometers, and geoprobes.

This Appendix is not designed to specify the number and type of explorations that may be necessary for a project. DCAM understands that each project is unique and may have special requirements based on the proposed purpose and type of structure under consideration. However, DCAM has received documents that vary substantially in the quality and usefulness of the end product, the report. This Appendix provides requirements on the minimum level of quality and types of information expected to be provided by all DESIGNERS under contract to the Commonwealth.

It is assumed that the DESIGNER will contract with either a geotechnical engineer and/or environmental professional (hereafter "CONSULTANT") to perform these services. However, these standards are also applicable to documents generated by DESIGNERS using in-house expertise. The geotechnical and environmental professionals (including staff under their direct supervision) are referred to as the CONSULTANT for purposes of this Appendix.

The CONSULTANT shall contract with a drilling contractor, backhoe contractor, and/or material physical or analytical testing laboratory to perform necessary technical tests in the field and in the laboratory. These entities are collectively referred to as the Subcontractors for purposes of this Appendix.

2.0 OBJECTIVES

The objectives of this Appendix are:

- To identify the minimum quantity of property background information that the CONSULTANT shall obtain and use in determining that appropriate type, number, and locations of explorations are performed and that appropriate physical, engineering, and chemical analyses are performed;
- To prescribe that the DESIGNER ensure that the collection of subsurface information

can be interfaced with investigations by others, such that a database of subsurface conditions is readily available to DCAM for use on future projects;

- To provide the minimum requirements for subsurface investigations including sampling intervals and types of samples, such that subsurface conditions that may impact excavation and off-site disposal options of fill materials can be assessed;
- To prescribe that the DESIGNER obtain sufficient information of surrounding structures that may be impacted due to excavation, dewatering, and vibrations associated with new construction; and
- To prescribe that the DESIGNER provide DCAM with quality documentation that can be used by DCAM in making informed decisions on foundation options and environmental condition assessments.

3.0 SCOPES OF WORK

The DESIGNER shall in writing request written authorization from DCAM to either obtain the services of a CONSULTANT or to perform the necessary exploratory work with its own employees. This request shall be at the appropriate point in the study and/or design process and shall follow DCAM's standard procedures.

If CONSULTANT services are required, and not offered by the DESIGNER's in-house staff, or by a member of the DESIGNER's team, a detailed description of the proposed services shall be prepared by the DESIGNER and submitted for approval to the DCAM Project Manager. The DESIGNER is then responsible for obtaining a minimum of three proposals for the work required, after which she/he shall submit a letter to DCAM requesting a reservation of funds with the description of services, the total notto-exceed amount requested with its fee, if applicable, and its recommendation on the proposals to the Deputy Commissioner for approval before any work is authorized.

When preparing a description of the work to be performed, the DESIGNER shall comply with the provisions of Chapter 149 Sections 26 and 27 of the General Laws by including the prevailing wage rates when required. Subcontracts shall also be instructed to have adequate public liability and property damage liability insurance along with worker's compensation insurance.

PRICING

The Consultant shall provide a lump sum to perform all pre-field activities including procuring quotes from subcontractors, previous data review, preparation of work plan and health and safety plan, if needed. Day rates shall be provided for field activities for the Consultant and for the Subcontractor on drilling projects having less than five borings and/or less than 100 linear feet of drilling. Footage based costs shall be provided for projects where the total drilling quantity is greater than 100 linear feet for the Subcontractor and day rates for the Consultant. Laboratory tests shall be provided on a unit cost basis. Report preparation shall be provided on a lump sump basis.

When preparing their proposal, the Consultant shall comply with the provisions of Chapter 149 Sections 26 and 27 of the General laws by including the prevailing wage rates when required.

The CONSULTANT shall provide a minimum of 8 hours of technical assistance during the schematic design phase to assist the DESIGNER. The CONSULTANT shall provide an hourly and a per diem rate for additional services.

The DESIGNER shall be responsible for coordinating the work prepared by its CONSULTANTS and shall review, analyze and evaluate the results.

4.0 PRE-FIELD ACTIVITIES

Prior to initiating field activities, the CONSULTANT shall review and evaluate historical information including, but not limited to, aerial photographs, historical maps, city atlases, and Sanborn Fire Insurance Maps to identify past uses of the Subject Property. A copy of the Massachusetts Geographical Information System Natural Resources Map should be evaluated. Copies of all reviewed information shall be included in the report provided to DCAM.

DCAM will furnish the CONSULTANT whatever site information is available. This information shall be included in the design of the investigation program and in the subsequent final report.

The historical information shall be used to determine the previous use of the Subject Property and to assess the potential presence of foundations associated with former structures on the Subject Property. Determining the previous uses of the property may also indicate the presence of environmental issues, such as, underground storage tanks, manufactured gas plants, or businesses that may have used and/or discarded chemicals at the Subject Property.

The CONSULTANT shall assess and provide local physical conditions including topography, surficial geology, and flood insurance information, based on the review, at a minimum, of the following:

- Elevation Contours (1:5,000) topography maps representing contours at 3-meter intervals created from MASSGIS's Digital Terrain Model (DTM) data points collected during the production of the 1:5,000 Black and White Digital Orthophoto images;
- Surficial geology as mapped by USGS;
- Underground Storage Tank (UST) locations and information compiled by the U.S. Environmental Protection Agency and from the Massachusetts Department of Public Safety's Division of Fire Protection Tanks database.
- Published soils surveys as provided on various media by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS);
- Digital geologic information obtained from the U.S. Geological Survey (USGS), that may be applied to the analysis of water-quality characteristics of surface water and shallow ground water, and soil and stream sediment characteristics based on bedrock lithogeochemistry; and
- Data available on the paper Flood Insurance Rate Maps (FIRM) as provided by the Federal Emergency Management Agency (FEMA).

Depending upon the purpose of the subsurface investigation, it may be necessary for the CONSULTANT to visit the local building authorities and fire department to assess utility locations, building permits, underground storage tank locations and use, and the local historical commission.

The CONSULTANT shall propose a combination of test borings, piezometers, geoprobes, and monitoring wells to characterize the subsurface conditions subject to construction and

environmental assessment activities. The number and locations of the test borings, piezometers, and monitoring wells are to be selected by the CONSULTANT. However, a minimum of four (4) soil borings shall be drilled for each project. The CONSULTANT shall select termination depths based on the type and anticipated loads of the proposed structure. The CONSULTANT shall factor into designing his program to account for specialty components such as subsurface parking areas, and encountering boulders and bedrock. The CONSULTANT shall develop sampling depth intervals that are consistent with the anticipated depths of excavation and expected foundation systems.

The CONSULTANT shall assess the applicability of geophysical investigative techniques for the required scope. Detection of unknown buried underground storage tanks and utility trenches can be performed with some of these techniques. However, confirmation of these anomalies shall be conducted by intrusive measures.

The CONSULTANT shall contract with qualified subcontractors to provide drilling, test pit, and analytical services. For monitoring well installation, the Subcontractor shall be licensed through DCR. Selected Subcontractor shall have the following minimum insurance requirements:

- Workers Compensation: In accordance w/ M.G.L. Chapter 153
- Liability Insurance: \$1,000,000 per occurrence; \$3,000,000 aggregate
- Vehicle Insurance: \$500,000 per occurrence

The CONSULTANT shall contact DigSafe at the following toll free number:

888-DIG-SAFE (344-7233)

The CONSULTANT shall provide, at a minimum, the information specified at http://www.digsafe.com/company_whatisdigsafe.htm. The pre-marking shall comply with the requirements specified at: <http://www.digsafe.com/premarkingguildlines.htm>. In Massachusetts, state law requires advance notice to DigSafe at least 3 business days before beginning excavations.

It is important to note that only utility companies that have joined Dig Safe will mark their utility lines. Municipalities are not required to join the DigSafe system (Cities and towns who own water, sewer, drainage facilities). All non-member companies must be also contacted.

5.0 FIELD INVESTIGATIONS

1. The CONSULTANT shall select the appropriate drilling and excavating methods applicable for anticipated subsurface conditions and the proposed project. The CONSULTANT shall ensure that the proper drilling, excavating, and sampling equipment is brought to the Subject Property and that failure by the Drilling Subcontractor to do so will not be considered a claim for additional compensation.
2. Percolation tests to assess infiltration capacities shall be performed in accordance with 310 CMR 15.00. Information and data shall be provided on the applicable MADEP forms.
3. Drilling and test pit excavation equipment shall be carefully examined by the CONSULTANT upon reaching the Subject Property to document leaking or poorly maintained equipment. Any releases from said equipment to the ground surface will be the sole responsibility of the Subcontractor including notification obligations to the Massachusetts Department of Environmental Protection. In addition, all

assessment and remediation costs shall be borne solely by the Subcontractor.

4. Exploration locations shall be laid out in the field by taping or pacing distances from site features, and approximate ground surface elevations shall be relative to the first floor elevation of the existing building or to a mutually agreed upon temporary benchmark (i.e., fire hydrant.)
5. A geologist or geotechnical engineer shall provide technical monitoring of subsurface explorations so that depths and locations of subsurface explorations can be varied to meet the subsurface conditions encountered. The geologist and/or geotechnical engineer shall be an employee of the CONSULTANT and under the direct supervision of a professional engineer or Licensed Site Professional.
6. Soil borings shall be continuously sampled to the water table using a split-spoon sampler. Once the water table is encountered, samples should be collected on five-foot intervals to the termination depth of the borings. Depth to first water and at completion of the boring will be recorded on a standard soil-boring log.
7. For areas where groundwater is expected to be greater than 25 feet (i.e., Cape Cod), continuous samples shall be collected to 10 feet below ground surface and then at five-foot intervals to the proposed termination depth. Depth to first water and at completion of the boring will be recorded on a standard soil-boring log.
8. If refusal is encountered above the anticipated termination depths, then all borings shall extend to refusal with a 10-ft rock core retrieved from a minimum of one borehole to confirm and identify bedrock.
9. All samples should be collected by a subcontractor in accordance with ASTM D1586, latest revision. Samples will be field screened using either a flame-ionization detector or photo-ionization detector and the results recorded on a standard soil-boring log.
10. All samples from drilling activities shall be examined and logged by a qualified CONSULTANT field representative and all samples shall be retained by the CONSULTANT. All logging of subsurface materials shall be performed in the field on an appropriate form and shall describe each sample in detail as well as other conditions encountered. The boring log form shall contain, at a minimum, the following information:
 - Weather conditions;
 - Drilling Rig Type and Manufacturer;
 - Rod diameter;
 - Casing diameter and type;
 - Sampler diameter, type, weight, and drop;
 - SPT values for sampling interval;
 - Sample depth;
 - Penetration (in inches) for each sample;
 - Recovery (in inches) for each sample;
 - Depth to first water at first encounter and upon completion of the boring;

- Sample description in either modified Burmister Soil Classification System or Unified Soil Classified System (USCS)¹; and
 - Flame-ionization or photo-ionization detector readings.
11. All projects in urban environments shall have a minimum of five test pits excavated in potential former structures and/or along anticipated utility corridors. Similar to the requirements for drilling activities, subsurface materials shall be collected and logged by the CONSULTANT. The logging of the sample shall be similar to that used for drilling samples and will include detailed photographs of the excavations. Depth to first water and at completion of the test pit will be recorded.
 12. If fine-grained soil is encountered within 10 feet below the anticipated foundation-bearing surface, the CONSULTANT should consider collecting an undisturbed sample using a Shelby Tube. This tube sample should be tested in the laboratory for undrained shear strength and consolidation characteristics. (Section 7.1 provides information on the minimum requirements for soil testing laboratories.)
 13. Soil borings are to be grouted upon completion of the borehole.
 14. The CONSULTANT shall perform sufficient environmental testing of shallow soil samples (less than 10 feet) to generate sufficient information to assess impacts to design, handling and disposal options for excavated materials, and potential Massachusetts Contingency Plan (MCP) obligations. At a minimum, the CONSULTANT shall test at least four shallow (less than 10 feet) representative soil/fill samples for the following:
 - Extractable petroleum hydrocarbons with target analytes;
 - CAM metals; and
 - Other compounds selected based on the former use of the Subject Property.(Section 7.2 provides information on the minimum requirements for analytical testing laboratories.)
 15. The CONSULTANT shall examine and document each soil sample for the presence of coal, coal ash, wood, and wood ash.
 16. If groundwater is encountered within 15 feet of anticipated final grades, the CONSULTANT shall install a minimum of three groundwater-monitoring wells. The monitoring wells shall be designed and installed in accordance with appropriate DEP-approved procedures and guidelines.
 17. Groundwater shall be sampled and analyzed using appropriate DEP-approved procedures and guidelines. The CONSULTANT shall use this information to assess impacts to design and options for construction dewatering. At a minimum, the Consultant shall test the groundwater for the following:
 - Extractable petroleum hydrocarbons with target analytes;
 - pH;
 - Hardness;
 - Sulfates;

¹ Explorations for use in Title V evaluations shall use USDA- Soil Classification Service soil classification system in addition to either Burmister or USCS systems. The USDA -Soil Classification Service soil classification shall be used for the first 15 feet of the boring or test pit.

- Specific conductivity;
 - Temperature;
 - Dissolved CAM metals; and
 - Other compounds selected based on the former use of the Subject Property.
18. DCAM will use the analytical data generated from soil and groundwater samples to assess notification obligations under the Massachusetts Contingency Plan (310 CMR 40.0000). The DESIGNER shall use this information in assessing compatibility of building materials with contaminants and potential for vapor intrusion from the contaminated groundwater.
19. The CONSULTANT shall document the presence, size, height, type of construction, and estimated age of adjacent structures within 100 feet of the anticipated structure or investigation.
20. All subsurface exploration locations are to be located using GPS with a horizontal accuracy of one meter or conventional territorial surveying techniques.
21. Vertical accuracy should be one meter for test pits, soil borings and geoprobes. Monitoring wells elevations shall be within 0.003 meter for interior and outer well casings.

6.0 WASTE MANAGEMENT

The CONSULTANT is required to identify, in his/her proposal, how drilling spoils, test pit excavated material, monitoring well purge water will be handled. This material must be properly handled in accordance with all federal and state regulations and policies.

Samples transported to a laboratory for engineering or chemical analyses shall be retained by the laboratory 60 days from receipt to allow for additional analyses to be performed if required.

7.0 TESTING

7.1 Geotechnical Engineering Parameter Testing

The CONSULTANT shall engage the services of a soil-testing laboratory as required to perform grain-size distributions, moisture contents, and other common analyses used to classify and characterize soil properties. The Laboratory shall meet the requirements specified in ASTM D3740-04a *Standard Practice for Minimum Requirements for Agencies Engaged in the Testing of Soil and/or Rock as Used in Engineering Design and Construction*.

Representative samples from the split-spoon sampler should be tested for moisture content, plasticity (Atterberg Limits), and grain-size distribution. This testing should focus on samples collected from directly below the foundation bearing depth and to a depth approximately 10 feet below the anticipated bearing depth.

Representative samples from undisturbed samplers (i.e., Shelby tubes) shall be tested for required strength and settlement parameters. Testing shall be conducted in accordance with applicable ASTM standards, or the Naval Facilities Engineering Command (NAVFAC) methods

7.2 Chemical Laboratory Testing

The analytical testing requirement described in Section 5 and in the following paragraphs

are intended to identify potential environmental issues and quantify these issues such that potential notification obligations to regulatory authorities can be assessed. The program in Section 5 and below is not designed to provide all parameters that may be specified in disposal facilities' permits. If off-site disposal is required or selected, additional analyses may be required that can be determined at the appropriate decision point in the design and construction project.

The CONSULTANT shall engage analytical laboratories that are qualified to perform the required services. The results of chemical analyses can have major impacts on public perception, regulatory implications, constructability, schedule and costs. Due to the potential ramifications of the quality of the data, the analytical laboratory(ies) must possess the appropriate certification for those analyses specified in this Plan.

In addition to the laboratory having the required certification, the analytical laboratory(ies) shall be required to provide the following documentation for review:

- Quality Assurance (QA) Program;
- Listing of Method and general Standard Operating Procedures; Certification Documentation;
- Recent Audit Reports from Certifying Agencies;
- Ethics Policy (if existent);
- Resumes of Key Technical Personnel; and
- Examples of Analytical Reports.

The purpose of the QA program is to describe the internal processes within the laboratory which are used to ensure that valid data are generated for all samples. If a laboratory cannot produce a document describing its QA program, an alternative source of analytical services will be required.

The use of written standard operating procedures (SOPs) for analytical methods and various other procedures conducted within the laboratory is a basic requirement. Examples of general laboratory procedures that can affect the ultimate quality of the data include sample preservatives, sample receipt, sample storage, sample container and glassware cleaning, detection limits, and analytical holding times; and data review and approval. Experience has shown that many laboratories that are deficient in their SOPs also lack general organization and discipline. This manifests itself through difficulty in retrieving supporting documentation including instrumentation calibration, traceability of standards, raw instrumentation data, and chain-of-custody.

Certification documentation will verify the status of the laboratory and when the certification must be renewed. For those laboratories whose certification will expire during the duration of a Project, a written commitment to renew the certification must be provided in the CONSULTANT's submission. The laboratory must also provide the results of proficiency programs including copies of audit reports from the certifying agencies. For those analyses that do not have certification program, the selected laboratory must have some form of certification in environmental testing.

8.0 REPORTS

Reports prepared for DCAM shall be prepared in a professional manner and shall be peer-reviewed by a principal of the firm to ensure the accuracy of the information, conclusions, and recommendations presented therein. Independent of the type of investigation performed

(foundation design and/or environmental condition assessment); all reports submitted to DCAM shall contain the following:

- Summary of the Subject Property surface conditions;
- Proposed Project description;
- Summary of all written materials reviewed in connection with preparing the reports; Summary of adjacent structures;
- A table of subsurface locations in State Plane coordinates and elevations based on North American datum using NAD 83;
- A summary of all field and laboratory testing;
- Identification of compounds that exceed the Reportable Concentrations specified in 310 CMR 40.1600. This shall include all impacted media;
- Description and graphical presentations of inferred subsurface conditions;
- Description of subsurface conditions including fill, soil, bedrock and groundwater.
- A minimum of two subsurface cross-sections;
- Identification of resource areas that may impact future investigation and/or construction or remediation activities;
- A map of the area showing test pit, soil boring, geoprobe, monitoring well locations and piezometers together with a summary table of GPS coordinates and elevations; and
- Copies of all reviewed information shall be included in the report provided to DCAM.

For borings and test pits, prepare logs of the explorations suitable for including in the Contract Documents. The logs shall include but are not limited to exploration location, elevation, groundwater depth, soil strata, soil description, blow counts in 6-inch increments, sample penetration and recovery. These logs are to be prepared by the CONSULTANT on his letterhead. Logs provided by the Drilling or Excavation Subcontractor are not acceptable. Reference datum for elevations shall be described.

For structures within 100 feet of the proposed construction area, the CONSULTANT shall perform an inventory of foundation support systems for these structures and discuss possible concerns from the construction of the new structure onto the existing structures. These concerns may include vibration, soil displacement, and/or dewatering impacts.

1. Detailed foundation design recommendations including potential total and differential settlement, lateral earth pressures on foundations.
2. Allowable bearing capacity of the strata at the proposed bearing depth;
3. Potential for liquefaction based on the Standard Penetration Test (SPT) values and Chapter 18 of the Massachusetts Building Code;
4. Soil profile type in accordance with the Massachusetts State Building Code 6th edition and site class in accordance with the 2003 International Building Code.
5. Identification of subsurface conditions that might result in a premium cost;

6. Evaluation of groundwater conditions and recommendations concerning groundwater flow, proposed treatment of lowest structure in consideration of basement waterproofing and infiltration characteristics of storm water;
7. A discussion of soil management and disposal options including anticipated costs;
8. Assess potential settlements due to seismic activity at Code-specified accelerations;
9. A discussion of foundation construction and utility installation considerations (such as excavation, temporary lateral earth support, dewatering, and protection of surrounding buildings and roadways; and
10. Recommendation for the scope of a supplemental exploration program for final design to resolve identified geotechnical engineering issues.

The CONSULTANT shall provide an electronic file of all contents of the report including, but not limited to, drawings, text, appendices, and exploration logs. Provide all electronic files in PDF, DWG and MS Word.

The CONSULTANT shall review the draft specifications and provide comments to the DESIGNER.



N *Designer Turnover Requirements*

DOCUMENT TYPE	REQUIRED FORMATS	TOTAL SETS	DISTRIBUTION	
			DCAM	Client Agency
Record Drawings NOTE: All record drawings must be dated and stamped RECORD DRAWING directly above the title box.	Paper Copy (white bond paper / black lines / paper size 30"x42")	3	1	2
	TIFF files of dated / stamped Record Drawings on CD	3	1	2
	Auto CAD Files (.dwg format) of Record Drawings on CD	3	1	2
As-Built Sketches	Paper Copy (white bond paper / black lines)	3	1	2
	TIFF files on CD (may be included on CD with record Drawings)	3	1	2
	Auto CAD Files (.dwg format) when available (may be included on CD with Record Drawings)	3	1	2
Contract Specification and Addenda	*PDF on CD	3	1	2
Technical Submittals (approved ONLY)	PDFs on CD	2		2
O&M Manuals including Extended Guarantees and Warranties	*PDF on CD	3	1	2
Equipment Schedules	Excel Spreadsheet on CD	3	1	2
Calculations	*PDF on CD	3	1	2

** Bookmark index to sections/chapters.*



O LEED-NC Version 2.2 Registered Project Checklist



LEED-NC

LEED-NC Version 2.2 Registered Project Checklist

<< enter project name >>

<< enter city, state, other details >>

Yes ? No

			Sustainable Sites	14 Points
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Y			Prereq 1 Construction Activity Pollution Prevention	Required	
			Credit 1 Site Selection	1	
			Credit 2 Development Density & Community Connectivity	1	MA LEED+ 1-Point Minimum Requirement from SS Credits 2, 3, 4.1 or MR Credit 1.1
			Credit 3 Brownfield Redevelopment	1	
			Credit 4.1 Alternative Transportation, Public Transportation Access	1	
			Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	1	
			Credit 4.3 Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles	1	
			Credit 4.4 Alternative Transportation, Parking Capacity	1	
			Credit 5.1 Site Development, Protect or Restore Habitat	1	
			Credit 5.2 Site Development, Maximize Open Space	1	
			Credit 6.1 Stormwater Design, Quantity Control	1	
			Credit 6.2 Stormwater Design, Quality Control	1	
			Credit 7.1 Heat Island Effect, Non-Roof	1	
			Credit 7.2 Heat Island Effect, Roof	1	
			Credit 8 Light Pollution Reduction	1	

Yes ? No

			Water Efficiency		5 Points	
			Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1	MA LEED+ Requirement
			Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1	
			Credit 2	Innovative Wastewater Technologies	1	
			Credit 3.1	Water Use Reduction, 20% Reduction	1	MA LEED+ Requirement
			Credit 3.2	Water Use Reduction, 30% Reduction	1	

Yes ? No

			Energy & Atmosphere		17 Points	
Y			Prereq 1	Fundamental Commissioning of the Building Energy Systems	Required	
Y			Prereq 2	Minimum Energy Performance	Required	
Y			Prereq 3	Fundamental Refrigerant Management	Required	
			Credit 1	Optimize Energy Performance	1 to 10	MA LEED+ 2-Point Minimum Requirement
			Credit 2	On-Site Renewable Energy	1 to 3	
			Credit 3	Enhanced Commissioning	1	MA LEED+ Requirement
			Credit 4	Enhanced Refrigerant Management	1	
			Credit 5	Measurement & Verification	1	
			Credit 6	Green Power	1	

Yes ? No

			Materials & Resources		13 Points	
Y			Prereq 1	Storage & Collection of Recyclables	Required	MA LEED+ 1-Point Minimum Requirement from SS Credits 2, 3, 4.1 or MR Credit 1.1
			Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1	
			Credit 1.2	Building Reuse, Maintain 100% of Existing Walls, Floors & Roof	1	
			Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1	
			Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1	
			Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1	
			Credit 3.1	Materials Reuse, 5%	1	

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.2	Materials Reuse, 10%	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.1	Recycled Content, 10% (post-consumer + ½ pre-consumer)	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.2	Recycled Content, 20% (post-consumer + ½ pre-consumer)	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured Regionally	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured Regionally	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6	Rapidly Renewable Materials	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7	Certified Wood	1

Yes ? No

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Indoor Environmental Quality	15 Points
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1	Minimum IAQ Performance	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1	Outdoor Air Delivery Monitoring	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2	Increased Ventilation	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.1	Construction IAQ Management Plan, During Construction	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.2	Low-Emitting Materials, Paints & Coatings	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.3	Low-Emitting Materials, Carpet Systems	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 5	Indoor Chemical & Pollutant Source Control	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.1	Controllability of Systems, Lighting	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 6.2	Controllability of Systems, Thermal Comfort	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.1	Thermal Comfort, Design	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 7.2	Thermal Comfort, Verification	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

Yes ? No

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Innovation & Design Process	5 Points
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.1	Innovation in Design: Provide Specific Title	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.2	Innovation in Design: Provide Specific Title	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.3	Innovation in Design: Provide Specific Title	1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.4	Innovation in Design: Provide Specific Title	1

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes	?	No

Credit 2 **LEED® Accredited Professional**

1

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Project Totals (pre-certification estimates)

69
Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

MA LEED+ 26-32 points including 6 highlighted points



P Contaminated Soil and Fill Management Evaluation

This section to be replaced at a later date.



Q MA DEP Notification Required Information

MA DEP Notification Requirements and Procedures

1. Who shall notify MA DEP:
 In the event of a release or threat of release of oil or hazardous material at a DCAM project site, the Resident Engineer shall notify the DCAM Project Manager (hereinafter “PM”). The PM shall notify his/her Deputy Director or Director at DCAM. At no time shall the Resident Engineer contact MADEP directly. **ONLY DCAM DEPUTY DIRECTORS/DIRECTORS SHALL CONTACT MA DEP.**

2. The following tables are to be completed by the Resident Engineer and the PM, as noted at the top of each table. The information below is required by MA DEP when reporting a release, or threat of release.

RESIDENT ENGINEER:

Location:	
Street Name & Number	
City/Town	
Zip Code	
Narrative description of location.	
Date and time of occurrence.	
Name of oil and/or hazardous material.	
Approximate quantity of the substance.	
Source of release.	
Brief description of the release.	
Name and telephone number of a contact person at the site.	
Description of the Immediate Response Action taken or proposed.	
Names of other federal, state or local gov’t. Agencies that have been notified of and/or responded to the site.	

Any other information regarding the site, including without limitation, potential environmental impacts, that is relevant to assessing the degree of hazard posed.	
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DCAM PROJECT MANAGER/DEPUTY DIRECTOR

Name and Telephone Number of caller to MA DEP.	
The set(s) of notification criteria that is the basis for notification.	
The name and telephone number of the owner/operator of the site.	
The name and telephone number of a contact person at the site.	
Names of other federal, state or local gov't. agencies that have been notified of and/or responded to the site.	
Any other information, including without limitation, potential environmental impacts, that is relevant to assessing the degree of hazard posed.	



R *Sample Unit Price Proposal Sheet*

**SAMPLE UNIT PRICE PROPOSAL SHEET
GENERAL CONTRACTOR'S WORK**

[Note to Designer: Submit this sheet loose with specification]

MASSACHUSETTS STATE PROJECT NO. _____ CONTRACT NO. ____

(Project Title)
(Institution)
(Location)

UNIT PRICES

- A. The following unit prices as defined in the specifications are designated for items of work on the basis of quantities estimated by the Designer. These unit prices will be used to add to or deduct from the dollar amounts shown, depending on whether the actual amount is greater or less than the estimated amount.

SECT.	ITEM	ESTIMATED QUANTITY	UNIT MEASURE	UNIT PRICE DOLLARS/CENTS	TOTAL AMOUNT DOLLARS/CENTS
	Ledge or rock open cut		Cubic Yard	\$ _____	\$ _____
	Ledge or rock trench cut		Cubic Yard	\$ _____	\$ _____
	Ledge or rock by hand method		Cubic Yard	\$ _____	\$ _____
TOTAL					\$ _____

- B. The unit prices as requested herein shall include their pro-rata share of all costs for overhead, profit, bond, labor, materials and equipment costs for the blasting, excavation and all other work incidental thereto, including disposal of rock material.
- C. Any unit price proposal that contains a unit price which is unduly high or low may be rejected as unbalanced, and thereby affect the total cost proposal of this contract.
- D. The total amount above shall be included in the amount to be entered in Paragraph D Item 1 - Work of the General Contractor.

**SAMPLE UNIT PRICE PROPOSAL SHEET
FILED SUB-BID WORK**

[Note to Designer: Submit this sheet loose with specification]

MASSACHUSETTS STATE PROJECT NO. _____ CONTRACT NO. ____

(Project Title)
(Institution)
(Location)

UNIT PRICES

- A. The following unit prices as defined in the specifications are designated for items of work on the basis of quantities estimated by the Designer. These unit prices will be used to add to or deduct from the dollar amounts shown, depending on whether the actual amount is greater or less than the estimated amount.

SECT.	ITEM	ESTIMATED QUANTITY	UNIT MEASURE	UNIT PRICE DOLLARS/CENTS	TOTAL AMOUNT DOLLARS/CENTS
	8" CMU Wall 8'0" high		Linear Foot	\$ _____	\$ _____
	6" CMU Wall 8'0" high		Linear Foot	\$ _____	\$ _____
	4" CMU Wall 8'0" high		Linear Foot	\$ _____	\$ _____
				TOTAL	\$ _____

- B. The unit prices as requested herein shall include their pro-rata share of all costs for overhead, profit, bond, labor, materials and equipment costs and all other work incidental thereto.
- C. Any unit price proposal that contains a unit price which is unduly high or low may be rejected as unbalanced, and thereby affect the total cost proposal of this contract.
- D. Unit price proposal sheets must be submitted with the respective filed sub-bid form.
- E. Unit price totals above shall be included in the total amount entered on the filed sub-bid form.



S *Sample Alternate Proposal Sheet*

SAMPLE ALTERNATE PROPOSAL SHEET

MASSACHUSETTS STATE PROJECT NO. _____ CONTRACT NO. ____

(Project Title)
(Institution)
(Location)

ALTERNATE NO. (1)

If Alternate No. (1), (_____ *describe alternate* _____), as described in paragraph _____ of section _____ is accepted by the Commonwealth, the proposed contract price shall be revised as follows:

ITEM 1 Work of the General Contractor (being all work other than that covered by Item 2)
ADD \$ _____

ITEM 2 Work of Sub-Contractors (as listed below)

Section	Sub-Division	**Name of Sub-Bidder	ADD / DEDUCT	*Bond Required YES or NO
			\$	
			\$	
			\$	

TOTAL ALTERNATE PRICE:
Sum of items above ADD \$ _____

*Failure to fill in any of all spaces in this column will be construed as entry of word “NO.”

**The General Contractor shall use the same Sub-Bidders for all alternates that were selected for the base bid.



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Definitions & Website Links

Advanced Building	All major renovations on buildings less than 20,000 square feet must comply with the Massachusetts Advanced Buildings requirements. See www.poweryourdesign.com for more details.
Alternate	An area of work that may be added to the contract, if funds are available. At the time of bid the value of all alternates shall be submitted. Alternates must be accepted in sequential order.
Basis of Design	The design parameters used to establish the performance of various building systems and components.
BIM	BIM is a methodology of processes and technology that takes advantage of computable Building Information to support better decision making. As stated by NBIMS, "a Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle from inception onward." Additional information may be found at: http://www.facilityinformationcouncil.org/bim/ and http://www.gsa.gov/bim
Building Cost	The total cost of the building, including all fixed equipment.
CAMIS	The database for: building and component conditions; systems and equipment; the cost and priority for repairing deficiencies; performing preventative maintenance tasks; and site and location information.
Commissioner	The Commissioner of the Division of Capital Asset Management.

Commissioning	<p>The practice of ensuring that all building systems are providing the performance that was expected during the design process. Commissioning also provides training and documentation to allow user agencies the ability to maintain the systems designed and installed at their optimum level of efficiency during their life cycle. Additional information may be found at: http://www.energydesignresources.com/resource/37/</p>
Construction Manager	<p>The Construction Manager (who may also be your owner's project manager) typically coordinates and oversees the construction process, monitors the construction schedule and budget, reviews and approves contractor submissions, inspects completed work, and approves contractor payments. Some jurisdictions contract with the project designer for construction management services during the construction stage of the project; others hire or contract with a professional construction manager rather than including construction management services in the design contract. Bear in mind that the skills required to manage and oversee the construction stage of that project. If you plan to contract with a single design firm for both design and construction management services, make sure that you focus on both sets of skills in evaluating designers for the project. (I suggest this goes in the body of the document at an earlier stage</p>
Designer	<p>The person or firm performing professional services under this contract.</p>
Design Contingency	<p>A percentage of the Fixed Limit of Construction Cost retained by the Designer during the development of the plans for unknown, design related items. This contingency should be incorporated into the FLCC prior to bidding.</p>
Director	<p>The Director of the Office of Planning, Design and Construction Services</p>
ECC	<p>Estimated Construction Cost, the cost of the building, site work and fixed equipment, excluding escalation and design contingency.</p>
Energy Modeling	<p>A simulation of the operation of the mechanical system in a building envelope subjected to all external and internal heating and cooling loads over a period of time. Additional information may be found at: http://doe2.com/</p>
Energy Rebates	<p>Utilities companies offer incentives (rebates) for users to reduce power consumption.</p>

Escalation	The amount of estimated increase in the bid price from the time the estimate is prepared. This percentage is normally calculated to the mid-point of construction.
Filed Sub-Bid	Areas of work required by MGL, if over \$20,000 in value that must be bid separately, as filed sub-bids. Examples are electrical, HVAC, plumbing, etc.
Filed Sub Sub-Bid	Areas of specialized work, not performed by the file Subcontractor, which DCAM determines to be bid as filed sub sub-contracts. Examples are, temperature controls, ductwork, balancing and mechanical insulation.
FLCC	The Fixed Limit of Construction Cost, the maximum estimated cost of construction, including escalation to the mid-point of construction, established by DCAM as set forth in the Notice of Selection letter and any amendments.
Furnishings	Any moveable equipment not secured to either the wall or floor, without permanent utility connections, including tables, chairs, couches, computer equipment, etc.
General Conditions	The General Conditions of the Contract provided by DCAM are a description of general requirements for all DCAM construction projects.
General Contractor	The company or corporation providing the lowest responsible bid price, approved by DCAM to construct the project. Also referenced as the Contractor.
Global Workshop	A meeting which occurs at three intervals during the design process; the final third of the Study Phase; at the completion of the Schematic Design Phase; and at the mid-point of the Design Development Phase. It is the intent of these meetings to validate the decisions made by the Designer, the User Agency and DCAM by the inclusion of other experienced individuals. These workshops should be included in the Work Plan and are optional in projects of limited scope and budget.
Building Gross Square Feet	The floor area of a building for all levels that are totally enclosed within the building envelope, including basements, mezzanines, or penthouses. Compute Building Gross Area: Measure to the outside face of exterior walls, disregarding cornices, pilasters, and buttresses, that extend beyond the wall face. The building gross area of basement space includes the area measured to the outside face of basement foundation walls.

House Doctors	Designers chosen by the Designer Selection Board to study, review, or prepare plans for various repair and renovation projects.
LCC	Life Cycle Cost is an economic analysis of a product or piece of equipment to determine the total cost for purchase, fuel, and salvage value, for its estimated life.
LEED	The Leadership in Energy and Environmental Design Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria. DCAM minimum standard is LEED plus for buildings over 20,000 square feet. Additional information may be found at: www.USGBC.org .
Net Assignable Square Feet	Net Assignable Area or Net Area: The area required to accommodate a function, equipment, an occupant, or an occupant group. Net assignable area includes interior walls, building columns, and projections. Net assignable area excludes exterior walls, major vertical penetrations, building core and service areas, primary circulation, and secondary circulation. Compute the Net Assignable Area: Measure to the inside surface of the exterior building walls, to the finished surface of walls surrounding major vertical penetrations, building core areas, and service areas, and to the center of partitions separating net assignable area adjoining net assignable areas and from secondary circulation space.
NET USABLE SQUARE FEET (NSF)	Net Useable Area: The floor area of a building assigned to occupant groups or available for assignment. Usable area includes net assignable areas of interior walls, building columns and projections, and secondary circulation. Usable area excludes exterior walls, major vertical penetrations, primary circulation, building core, and building service areas. (Departmental Gross Area is the same as Net Useable.) Compute the Usable Area: Measure to the inside finished surface of the exterior building walls, to the finished surface of the walls surrounding major vertical penetrations and building core and service areas, and to the center of the walls dividing the space from adjoining usable areas.
PMAS	DCAM's Project Management and Accounting System. A web-based database used by DCAM and the Designer to store and access all project related information.

Progress Workshops	Meetings that occur on a monthly basis or as determined by the PM during the progress of the project. These include members of the User Agency, DCAM, the Designer and the Designer's consultants. These workshops should be included in the Work Plan.
Quality Control Drawings	Drawings prepared by the Designer during the Contract Document Phase to coordinate the work of their consultants to maintain quality control. These are not coordination drawings that are prepared by the general Contractor.
Substantial Completion	Less than one percent (1%) of all contract work, including change orders, remains to be done, and that none of the remaining work will affect health, safety, or function
Subcontractor	Any company or individual under contract to the general Contractor to perform a specific area of work, not a filed Subcontractor.
Supplemental General Conditions	Additional general requirements provided by the Designer that are specific to the project. Examples are: construction phasing, security, hours of work, etc.