Division of Capital Asset Management

D·C·A·M

Building for the Commonwealth

Consultants Estimating Manual

Commonwealth of Massachusetts

Division of Capital Asset Management

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Introduction

The Division of Capital Asset Management's (DCAM) Office of Planning, Design and Construction (OPDC) is responsible for the cost throughout all phases of state building projects, from project initiation and Study to final Design and Construction. Architectural and engineering firms that prepare building studies, and develop final design and construction documents, will submit Cost Estimates and participate in cost control activities for each phase.

Rigorous Cost Management is essential throughout each project's planning, design, and construction phase. This Consultants Estimating Manual contains forms and guidelines based on industry standards to enable consistency for DCAM Designers and Consultants in the Cost Management of OPDC projects. Once an initial budget has been established, DCAM will constantly monitor the project budget by employing a series of increasingly precise cost estimating techniques, matching the development of the project design through each phase. Submission formats and processes represent industry standard practices as they apply to DCAM projects.

The reference section includes a list of acronyms, a glossary and all relevant formats. An index is located at the end of the document, and hyperlinks have been provided throughout the electronic version. Intended to be a "Living Document," this manual will undergo periodic updates as procedures change. Naturally, comments from DCAM Consultants are always welcome.

1 Estimating Overview

1.1 Types of Estimates

1.1.1 Preliminary Estimates

Preliminary Estimates are employed in the early planning phases of a proposed project to match client needs, assessed programmatic requirements, and budget constraints in order to establish project scope and quality expectations. Estimate comparisons at this stage are utilized in evaluating the feasibility of strategic alternatives being considered to satisfy current and projected space requirements (e.g., new construction versus renovation, or lease space). Initial estimates may be by Program Unit (e.g., hospital bed) or equivalent order of magnitude accuracy.

1.1.2 Square Foot Estimates and Cubic Foot Estimates

DCAM has developed models for buildings using elemental SF (Square Foot) rates and actively uses this method to balance program needs, specification levels, and budget/time constraints in both Study and Schematic Design phases. Based on historical data, SF Estimates and CF (Cubic Foot) Estimates are methods commonly used to develop preliminary budgets. They are effective in preparing more accurate estimates as the design is developed enough to allow for measurement and calculation of floor areas and volumes of the proposed spaces. Several historical databases support this method of estimating, and provide regularly updated unit costs ($/SF and $/CF). Many large estimating firms and professional organizations maintain their own databases, including DCAM.

Estimates made using this method need to allow for adjustments and additions for regional cost indices, local labor market rates, and interpolation between cost tables. Further adjustments may be made to account for other unique aspects of the design, such as special site conditions or design features being planned. In addition, when developed in UNIFORMAT II™, the estimate can provide overall SF or CF costs for major elements, along with build-out costs of different space types. This structure allows for relative ease in determining the impact that changes will have on the program.

1.1.3 Measured Estimates

Measured Estimates are developed after proceeding with the preferred solution during the latter part of the Study Phase. These estimates maintain accountability for initial budget projections, and are used as a means of evaluating competing alternative construction assemblies, systems and materials. These estimates may be used in project Workshops, at decision points, and as part of the formal submissions to DCAM at the conclusion of each phase. As the design progresses, the estimating contingency can be reduced.

1.1.4 Final Estimates

At the completion of Design Development and during Construction Documentation, a complete pre-bid estimate can be prepared using Unit Price Estimates as described below. The estimate is organized in the same format required of bidders, usually the CSI MasterFormat™, including separate estimates and bids for Filed Sub-Bids under MGL 149. This estimate allows for a comparison of the final estimate with the bids received and may aid in any contract negotiations. The estimating contingency should be reduced to zero. In addition, a final UNIFORMAT II™ format document is prepared from the same detailed information to provide continuity and comparison with previous phase estimates. Data are also used to update the DCAM cost database, providing elemental rates to be used in planning subsequent projects.

1.1.5 Unit Price Estimating

The entire project is divided into small discrete work items, and a “unit price” is established for each item. The unit price is then multiplied by the required quantity to find the cost for the work item. All costs are summed to obtain the total Estimated Construction Cost. For example, the cost to erect a masonry wall can be accurately determined by finding the number of bricks required and estimating all costs related to delivering, storing, staging, cutting, installing, and cleaning the brick, along with related units of accessories, such as, reinforcing ties, weep-holes, flashings, etc. Unit Pricing Estimating within the CSI MasterFormat™ is the most accurate means of ascertaining costs based on materials and labor content.

1.1.6 Schedule of Rates

A project may contain significant quantities of repetitive elements, without the exact amounts being defined. In this instance DCAM may issue the Bid documents as a partial or complete Schedule of Rates contract. A list of items and projected quantities is provided, leaving the bidder the opportunity to provide a rate for each item. The Schedule of Rates submitted by the successful bidder is used as the basis for the final contract measure of each item.

Estimators are required to submit estimated rates for items defined within a Schedule of Rates contract. The rates may be built up from system components if necessary to accommodate a nonstandard format. Items listed in a Schedule of Rates may be contract specific and not follow standard CSF or Uniformat structure.

1.2 Building Design/Construct Phases Estimate Types

The phases used by DCAM are:

- Capital Budgeting
- Study
- Schematic Design
- Design Development
- Construction Drawings & Bid Documentation
- Procurement
- Construction

After Practical Completion:

- Project Close Out and Settlements
- Life Cycle Maintenance Period

Estimate or Cost Category:

1. Program Unit/Order of Magnitude
2. SF/CF & Cost Modeling
3. Uniformat Elemental 1,2
4. Uniformat Elemental 2,33 and CSI Masterformat
5. Uniformat 3 and CSI Masterformat
6. CSI Bids and Proposals
7. Schedule of Rates

Additional Cost Categories:

8. Variations & Settlements
9. Life Cycle Costs

1.3 Estimating Formats

The two most commonly used Unit Price formats are CSI MasterFormat 2004™, which provides a 31-division master list of numbers and titles for arranging products and activities; and ASTM UNIFORMAT II™, which hierarchically groups building elements into 12 "systems based" levels. MasterFormat™ is widely used within the design and construction industry, and is the usual format for construction specifications and most private-sector project-based cost estimating activity. Government and other large institutions also utilize UNIFORMAT II™ for building systems research and building economics analysis, in addition to cost estimating.

1.4 Estimate Type and Accuracy

Estimate Category	Budget	Study	SD	DD	CD	Bid	Const	Close
Order of Magnitude (Functional Unit Measure)	√							
SF and CF Rates	√	√						
Elemental Rates Level 1		√	√					
Elemental Rates Level 2			√	√				
Elemental Rates Level 3				√	√			
CSI Item List and Rates					√	√	√	√
Schedule of Rates						√	√	√
Final Account								√

1.5 Historical Databases

There are several historical databases available that provide current values for estimating costs of the various units of project work. The databases are compiled from records of actual project costs, and are published in the form of books, CDs and computer-based extranets.

1.6 Forms/References

1.6.1 BNI

BNI is a popular publisher of cost estimating guides in the U.S.

1.6.2 R.S. Means

This is the most used and quoted source, with 25 different guides and unit prices for over 20,000 building components. This publisher also offers books on Unit Rate estimates and detailed application to project assessment.

1.6.3 Engineering News Record (ENR)

Engineering News Review magazine publishes monthly updates to major materials and labor costs, plus an historical index with regional modifiers.

2 Developing an Estimate

2.1 Estimate Components

Back-up detailed estimating data may be in any format. As long as the items or work are properly grouped by level 3 account numbers, estimating detail work-ups below level 3 need not be identified by UNIFORMAT account numbers. To ensure that all components of an estimate are allowed for, the following points need to be considered.

- Regardless of format or type, every estimate can be rolled up to provide Total Project Cost (TPC).
- Standard contracts consider only ECC (Estimated Construction Cost) with additional "soft costs" added separately as margins or actual estimated amounts.
- Projects delivered using an RFP, Design-Build, or CM At Risk, have some or all of the "soft costs" built into the estimate, mingling ECC and soft cost components.
- Cost Estimators are required to ensure that all project estimate components and contingency markups are included or specifically noted as being allowed for by others. To ensure that all cost components making up the ECC and TCP are allowed for, DCAM recommends estimates be prepared by specialist cost estimating or consulting firms.

2.2 TPC Components

2.2.1 Construction Costs

- Elemental: Sections A through G plus General Conditions
- CSI: Sections 1 through 49 plus General Conditions
- Insurances, Escalation, Contractors, Overhead and Profit

2.2.2 Non-construction Costs ("Soft" or "Budget" Costs)

- Feasibility Study with supporting studies and reports
- Design Fees and Specialist Consultants
- Site acquisition
- Permits, Certifications and legal fees
- Community allowances, utility or other relocations
- Project administration and overhead (which may include CM fees)
- FFE (furniture, fixtures and equipment)
- Commissioning, relocation and startup costs
- Financing and insurance costs through to startup
- Development fees

2.2.3 Planning the Work

It is important to thoroughly understand the project scope of work and the biddability and constructability aspects of the project being estimated. The Cost Estimator must thoroughly review drawings, specifications and other references to formulate a construction sequence and duration. A site visit for all Consultants is recommended to relate the physical characteristics of the project to the available design parameters and details. Developing a construction sequence as soon as possible is necessary for creating a formalized sequence, to be used throughout the entire cost estimating process as a checklist of construction requirements.

2.2.4 Quantities

The Cost Estimator is responsible for the accuracy of quantity take-offs from drawings and specifications prepared by the Architect or other Consultants.

- The quantity take-off is an important part of the estimate and should be based on all available design data. All quantities should be shown in standard units of measure.
- The detail in which the quantities are prepared for each task is dependent on the Development Phase of the design. Quantity calculations and unit build-ups beyond design detail may be necessary to determine a reasonable price to complete the overall scope of work for the Cost Estimate. Project notes may be added to explain the basis for the quantity calculations, or allowances that have been determined by cost estimating judgment and will be updated as the design progresses.

2.2.5 Unit Pricing

As a general rule, approximately 80 percent of the direct costs of a project are represented by only 20 percent of the estimated work items. Therefore the greatest estimating efforts are concentrated on these elements. The unit rates for each of these items are carefully analyzed and developed as the summation of all direct and indirect costs that will likely be incurred by an experienced and well-equipped Contractor.

When cost data is based on previously completed projects, the Cost Estimator must use judgment to adjust for project conditions to include overhead and price level data adjustments for inflation.

For small and easily identified work noted in the drawings and included in the estimate, lump sum bid items may be used. The cost of the lump sum item should be based on cost data related to the item's total direct and indirect costs.

2.2.6 Bid Schedule

The bid schedule is part of the procurement package and is included with the solicitation for bids. The estimate must show the unit prices, quantities, extension of unit prices, lump sum items, and costs consistent with the schedule provided with the Bid Documents.

2.2.7 Construction Schedule

The Designer and Consultant Team will prepare a construction schedule to support the estimate that is consistent with the plans and specifications for completion of the work. It may be in the form of a GANTT chart or a PERT diagram, but it must identify the sequence and duration of the tasks upon which the Cost Estimate is developed.

2.2.8 Estimate Notes

"Notes" are any explanations necessary to support the development of cost for individual items in the Cost Estimate. This descriptive information covers areas such as manufacturers quotes, overtime requirements, and material availability. These should be entered as notes to the appropriate detail level of the Cost Estimate.

2.2.9 Project Narrative

The narrative defines the parameters upon which the Cost Estimate has been prepared to support the project scope and schedule. It describes the project requirements that must be performed in sufficient detail to give a clear understanding of the scope of work including length, width, height, and slope of primary features the following: special problems that will be encountered in performing the work; site conditions affecting the work, and the reasons for unusually high or low allowances.

Project Narratives are expected to follow the Uniformat II code structure through each Design Phase estimate. Initially, very broad level narratives are provided, increasing in detail as the design is developed. A partial sample of an early stage Uniformat structured Narrative is shown in Appendix A4.

At Construction Documentation and Design Development, the Project Narrative is replaced by the specification that is typically structured in detailed CSI format.

2.2.10 Filed Sub-Bid Work

- MGL 149 requires that specific trades be performed by filed sub-bids be procured by DCAM independently from the General Contractor bid.
- The list of trades determined by MGL 149 is shown in Appendix C. For a detailed cross-reference of the work to be included against the CSI item classification, see the DCAM Standard Specification document.
- Where a CSI bid is required at Design Development or Construction Document Phase, the work to be performed under filed sub-bids shall be identified separately in the estimate.
- The successful low bid amount for each filed sub-bid Contractor is included as a direct lump sum cost to the General Contractor. This amount includes the Subcontractor's costs for direct labor, materials and supplies, equipment, second tier subcontracts, and charges for overhead and profit.
- The General Contractor is deemed to add his margins for General Conditions, Overhead and Profit, and any other loadings to the filed sub-bid contract amounts.
- The Cost Estimator may utilize quotes for the expected filed sub-bid work in preparing the estimate or to verify the reasonableness of independently estimated subcontract work. Subcontractor quotes will be treated as proprietary information and should only be revealed to those who have a need to know.

2.2.11 Estimating Contingencies

To develop appropriate contingency allowances, the Estimator must identify the uncertainty associated with an item of work or task, forecast the risk/cost relationship, and assign a value to this task that will limit the cost risk to an acceptable degree of confidence. Consideration must be given to the details available at each stage of planning, design, or construction for which a Cost Estimate is being prepared.

The following estimating contingency loadings represent an initial guide for the ECC at each phase. The Cost Estimator and Designers must assess the appropriate percentages for each project.

Project Phase	***Restoration***	***New Construction***
Study Phase	20%	15%
Schematic Design Phase	15%	10%
Design Development Phase	10%	5%
Construction Documents Phase	0%	0%

The table provides a guide for estimating contingency development and is not intended to restrict or limit contingencies to these values. If the overall estimating contingency value developed through a detailed analysis as described above exceeds these guidelines, the Designer and DCAM Project Manager should consider further investigation of existing conditions and sufficient development of the design to reduce the uncertainty level.

2.2.12 Overhead

Overhead costs are those costs that cannot be attributed to a single task of construction work. Costs that can be applied to a particular item or work should be considered a direct cost to that item and not be included in overhead costs. The overhead costs are customarily divided into two categories:

- General Conditions, including all Job Overhead, General Site Costs and Field Office Overhead. When estimating items costed over the entire duration of construction, the Cost Estimator should utilize the job schedule.
- OH&P (Home Office Overhead), covering Overhead, Administrative costs, and Profit. OH&P expenses are those incurred by the Contractor in the overall management of business.

The Cost Estimator must be sure that costs are not duplicated between the two categories. Specific considerations must be evaluated for each project. The Cost Estimator must use considerable care and judgment in estimating overhead costs. For the source of pricing, the Cost Estimator must rely on judgment, historical data, and current labor market conditions to establish overhead costs.

The application of a previously determined overhead rate may be used for early design stages, but it is not an accurate or reliable method of forecasting costs. Overhead will vary from project to project and may even vary from month to month within any given project. Job overhead items for the General Contractor should be estimated in detail for all activities at Construction Documents Phase. Detailing of overhead costs for subcontract work is recommended when the impact of these costs is significant.

2.2.13 Profit

Profit is shown as a percentage loading and provides the Contractor with an incentive to perform the work as efficiently as possible. The Cost Estimator must use previous historical data to provide a suitable industry profit loading, modified by an in-depth understanding of marketing conditions likely to impact the current project.

3 Space Estimates

3.1 Database Space Measures

The Designer will provide the Estimator with a space analysis listing the program areas provided for in the concept design, the support areas, and the gross areas. The Designer should strive for high space efficiency that may result in a building with less gross area than the estimated maximum gross area provided by DCAM as the basis for the project.

DCAM will use the space and program areas at each phase as a basis for assessing and cost modeling the building to ensure program and cost budgets are met. During each phase, the Estimator is expected to provide cost information support for the Designer.

Space Measures/ Phase	Budget	Study	SD	DD	CD	Bid	Const
Functional Unit Measure (Accommodation)	√						
Program Area Measures	√	√	√				
Program Area Factors		√	√				
Building Area Factors		√	√				
Program Area Detailed Measures			√	√	√		
Building Area Detailed Measures				√	√	√	√
Building Performance Measures				√	√	√	√

3.2 Building Floor Area Measurements

3.2.1 The Standard ASTM E1836-98

DCAM uses the ASTM E1836-98, "Standard Classification for Building Floor Area Measurements," as a basis for preparation of program areas and support areas to make up the total Gross Floor Area of the project. DCAM's model groups program areas according to the type and nature of the project. The Designer is to liaise with the DCAM Program Manager to establish the appropriate project space measures in each case.

3.2.2 DCAM Space Model for Administrative Building

The table below illustrates a typical space model configuration for an administrative building. Sections A and B are specific to the building function. Sections D, E and F are common to all buildings. Note that Section C, "Assignable Area Loadings," is only applied at preliminary Study Phase, when standardized program areas are utilized to assess the project scope.

A - Assignable Area Direct Functions	A1 – Enclosed Office Areas A2 – Open Plan Work Station Areas A3 – Mission Specific Purpose Areas
B - Assignable Area Indirect Functions	B1 – Conference or Meeting Rooms B2 – Restricted Area Service Rooms B3 – Support Rooms and Wet Areas B4 – Tenant Storage, Workshops, Docks
C - Assignable Area Loadings	C1 – Prestige Level Loading C2 – Occupancy Type Loading C3 – Construction Class Loading C4 – Jurisdiction Loading
D - Net Useable Area Components	D1 – Secondary Circulation D2 – Columns D3 – Partitions and Removable Walls
E - Gross Interior Area Components	E1 – Mechanical and Electrical E1-1 - Mechanical Areas E1-2 - Electrical Areas E1-3 - Telecommunications Areas E1-4 - Vertical Penetrations and Chases E2 – Primary Circulation and Access E2-1 - Primary Circulation E2-2 - Stairwells E2-3 - Elevators E2-4 - Escalators E2-5 - Non-Assigned Public Areas E3 – Facility Common Services E3-1 - Toilet Areas E3-2 - Facility Maintenance Areas E3-3 - Facility Management Areas
F - Gross Exterior Area Components	F1 – External Walls and Projections F2 – Attached External Walkways

3.2.3 Summing the Tabular Model

The diagram below demonstrates how the tabular model shown in Section 3.2.2 is to be summed to match the Gross Floor Area at each phase. The accuracy of measurement is indicated below.

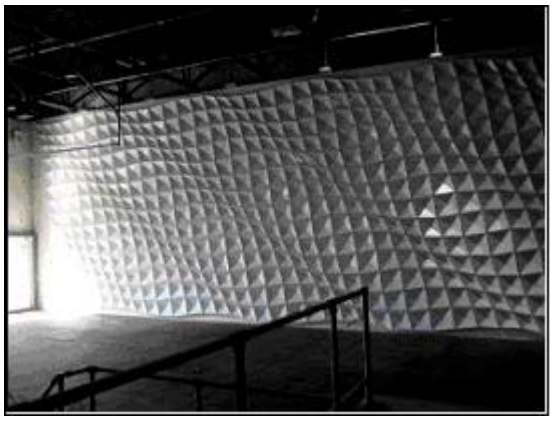
	A	**B**	**C**	**D**	**E**
Study – Preliminary	SF	SF	% loading	combined %	
Study – Preferred Scheme	SF	SF	N/A	combined %	
Schematic Design	SF	SF	N/A	SF	%
Design Detail	SF	SF	N/A	SF	SF
Construction Documents	SF	SF	N/A	SF	SF

3.3 Space Cost Analysis Sample Sheet

Below is a spreadsheet model for an academic building with program adjustment and automatic cost revision calculation. In this example, detailed program areas shown in shaded cells can be adjusted by the user. Total building GFA and project cost are updated and displayed.

ACADEMIC BUILDING PROGRAM

		SF TOTALS	REVISED PROGRAM
Total GFA		**46,878**	**$12,554,738**
PROGRAM AREAS		**27228**	**27228**
Instructional/Studios	Course A	14171	2,011
	Course B		1,202
	Course C		1,000
	Course D		1,216
	Lecture/Presentation		606
	Course E		800
	Graduate		4,137
	Undergraduate		3,199
Workshops/Laboratories	Course A	6627	250
	Course B		812
	Course C		1,001
	Course D-1		1,057
	Course D-2		1,156
	Course D-3		1,548
	Course E		803
Faculty & Staff Space	Studios	2821	2,346
	Offices		475
Storage	Course A	1843	196
	Course B		238
	Course D-1		208
	Course D-2		754
	Lecture/Presentation		113
	General		334
Entry	Lobby/stair	1766	1,766
SERVICE AREAS	**S/F SUBTOTAL**	**19650**	
MEP basement	Basement	4489	4,489
Fixed Services	Common Toilets	2695	675
	Stairs & Lobbies		1,373
	Elevators		647
Fixed Facilities	Kitchen/Lounge	500	121
	Lounge/wash areas		379
Corridors	Main	7724	7,677
	Entries		47
	Exit Stairs		0
Walls & Columns	External @ 6%	4242	2,637
	Internal@ 3%		1,605



4 Phase Cost Estimates

4.1 Cost Estimate Submissions

During each phase, DCAM may require one or more estimate types to be formally submitted. In order to ensure the Project remains within budget at each Phase, the Designer and his team are expected to participate in Cost Modeling and Value Engineering activities as part of their Contract.

Itemized deliverables and activities for each Phase are listed in this section. Most phases have more than one format for submission. Designers and their Consultants, therefore, must plan their estimates to use the appropriate types and formats for each submission.

4.2 Study Cost Estimate

4.2.1 Preliminary Study Cost Planning

During the first half of the Study Phase, the Designer may consider various possible schemes. Higher-level estimates (*see Sections 1.1.1 and 1.1.2*) may be required to support initial cost planning and comparisons.

Designers may use historical square foot rates for these early estimates in accordance with the guidelines below. Generalized total rates from comparable projects should *not* be used to support a specific scheme without adjustments as outlined herein.

4.2.1.1 General Square Foot Rates

- Each scheme presented as a plan or footprint with a defined envelope (number of floors) is to be supported by an expanded square foot rate estimate as shown in Section 4.2.1.3.
- Estimated square foot rates are to be supported by a comparison of rates from similar projects completed in the last five years. Specific square foot rates are expected for the major mechanical services as shown in Section 4.2.1.3 and validated by both the MEP Consultant and the Cost Estimator.

4.2.1.2 Modifications to Standard Rates per Square Foot

Consideration should be given to the following building form factors weighed against comparable projects used to build the square foot rate:

- External wall ratio and complexity to square foot area
- Size scale (larger or smaller) than rates for comparable facilities
- Structural outline, foundations and proposed systems against buildings
- Configuration limitations in the design that may lead to an increase in standard mechanical cost allowances

(A full discussion of modification to square foot rates can be found in: "Square Foot & Assemblies Estimating Methods," Third Edition, by RS Means.)

4.2.1.3 Lump Sum Allowances

Lump sum allowances are expected for site-specific items that are not included in the standardized overall construction rate. A typical list is below:

- Site works, including general preparation, landscaping, profile restoration, required services
- Cost allowance for site slope or access that will increase the standard SF rates
- Parking area costs calculated at per-space costs, plus allowance for access control
- Roadway modifications required by local authorities
- Demolition of existing buildings and site cleaning for construction
- Wetland provisions or restitution costs
- Allowance for compliance with Massachusetts Historical Society requirements
- Diversion of services around the proposed building footprint
- Allowance for rectification of ADA or MAAB noncompliance items, in which the project scope does not specifically cover this work
- Provision of additional services to the new buildings, including work done by utility companies
- Legal or acquisition cost premium for the chosen site
- Need for temporary accommodation, additional time, etc., for the chosen site

4.2.1.4 Uniformat Level 1 Breakdown for Preliminary SF Estimates

Total Program Area		***30,000***	***GFA***	***Raw Rate/ SF***	***Est. Cost***	***% of ECC***	***One-Line Specification or Comments***
Multiplier		**1.60**	***48,000***	***$266***			
A	Substructure		48,000	$20.00	$960,000	8%	Part basement level and standard footings
B	Shell		48,000	$65.00	$3,120,000	26%	Steel frame with masonry cladding
C	Interiors		48,000	$35.00	$1,680,000	14%	Metal/GWB partitions, standard finish
D	Services (not included below)		48,000	$2.00	$96,000	1%	Includes communication & security
D10	Conveying		48,000	$2.00	$96,000	1%	One elevator with three stops
D20	Plumbing		48,000	$10.00	$480,000	4%	Standard quality systems
D30	HVAC		48,000	$40.00	$1,920,000	16%	Above average ventilation requirements
D40	Fire Protection		48,000	$4.00	$192,000	2%	Full building system
D50	Electrical		48,000	$22.00	$1,056,000	9%	Standard quality systems
E	Fittings & Fixed Equipment		48,000	$3.00	$144,000	1%	Custom casework throughout
F	Special Construction & Demolition		48,000	$2.00	$96,000	1%	Existing 10,000 SF building
G	Building Site Work (not included below)		48,000	$0.00	$0	0%	
G10	Site Preparation				$50,000	0%	Removal of carpark
G20	Site Improvements				$100,000	1%	Landscaping allowance
G30	Mechanical Utilities				$200,000	2%	Relocation of major services lines
G40	Electrical Utilities				$100,000	1%	Relocation of distribution feeders
Z	General Conditions and Markups				$1,543,500	15%	Standard
Subtotal ECC Before Contingencies					**$11,833,500**		
Contingencies							
Estimating Contingency				$1,183,350		10%	Standard for this level estimate
Phasing and Temporary Work				$650,843		5%	Phased occupancy allowance
Escalation Contingency				$1,093,415		8%	Midpoint construction end '06
Total ECC with contingencies				$14,761,108			
Total Rate/SF with contingencies				$308			

4.2.2 Estimator Final Study Cost Estimate Deliverables

The Cost Estimate shall be developed using the Uniformat II Elemental Classification to as much detail as the preliminary 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.

The Cost Estimate shall include:

- Cost Estimates for all work of the design scheme to elements at Level 3 of Uniformat II Classification, Sections A through G inclusive. The total for each element shall be built up from individual cost items as prepared by the Estimator. Each cost item shall be self sufficient in description and quantities; no direct reference to the drawings should be used to understand the pricing applied. Any detailed unit rate or custom item cost build-up shall be provided as backup.
- Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds and all other items included in the Bid Documentation Package.
- Estimating Contingency and Escalation Contingency *per Section 5.1.3*.
- 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 derived from the itemized estimate for the GFA and NFA values.
- Unit User Cost as designated by the DCAM Project Manager.

4.2.3 Estimate Date and Shelf-Life

The Estimate shall be current at the date of Document Submission, and include amounts (based on percentage adjustment) for Estimating Contingency and Escalation per Section 5.1.

4.2.4 Space Measurement

At the conclusion of the Study Phase, all program and non-program building areas are to be accurately measured and summed correctly to the building GFA. For support and non-program areas, grossing factors or percentages may be defined if the design is not sufficiently developed to allow proper area measurement. Specific building performance measures may also be required as directed by the DCAM Project Manager.

Where the final Study submission includes a Preferred Solution of a specific building footprint and envelope, use of a single grossing factor based on program area is not sufficient. The non-program areas defined by DCAM must be estimated separately using percentages or direct area measurements.

For a list of typical DCAM elements derived from ASTM 1836-98, *see Section 3*, Space Estimates. The Designer will liaise with the DCAM Program manager to establish the grouping of program areas that make up the total project program.

Use of grossing factors or percentages for any of the specified ASTM elements is not acceptable.

Specific building performance measures may also be required as directed by the DCAM Project Manager. For ASTM elements and sample DCAM input sheets, *see Section 8.3*, Space Measurement.

4.2.5 Estimator Participation

The Estimator will be involved in the preparation of Preliminary Estimates *per Section 4.2.1* and Final Study Cost Estimates *per Section 4.2.2*. During the Study Phase, the Cost Estimator in the Study Consultant's team is expected to participate in at least the following activities:

	Activity	Cost Estimator Participation
1	Attendance at the "B" Conference Kick Off	Understand user agency quality needs, the site and existing building conditions; scope of the project; and provide concept level cost information during the conference.
2	Preliminary high-cost planning comparable data, order of magnitude estimates, existing conditions survey and scope development.	Develop and support cost modeling for Designer to allow high-level comparisons between alternative building footprints, story structure, layouts, site locations and major construction systems.
3	Attendance at Progress and Global Workshops to advise on cost matters for each proposed scheme until the preferred scheme is selected.	Provide cost modeling as above to allow cost comparison between alternative schemes, and to provide costing for requirements established during workshops.
4	Assisting the Designer to develop the preferred scheme layout and specification	Provide cost measurement for all the building elements and components of the Preferred Scheme. This includes consideration of site related costs, life-cycle alternative costs, and any other external factors affecting total project cost. Substantiate any earlier cost assumptions.
5	Submittal Preparation	Formally prepare in Uniformat II format the estimate breakdown in detail for the preferred scheme, as specified for both printed and electronic submittals.
6	Certification Package	Revise and update the Estimate in the presentation format needed for the Certification Package.

4.2.6 MEP Estimates and Allowances

Specific square foot rates or lump sum allowances are expected for major mechanical services as shown:

Mechanical and Electrical Services		**Uniformat II Level 3**		**Pricing Measure**
D10	Conveying	**D1010**	Elevators and Lifts	LS as applicable
		D1020	Escalators	LS as applicable
		D1030	Other Conveying systems	LS as applicable
D20	Plumbing	**D2010**	Plumbing Fixtures	LS or include with D2020 SF rate
		D2020	Domestic Water Distribution	SF rate
		D2030	Sanitary Waste	SF rate or include with D2020 SF rate
		D2040	Rain Water Drainage	SF rate or LS
		D2090	Other Plumbing Systems	LS as applicable
D30	HVAC	**D3010-D3030**	Energy Supply and Generating Systems	LS or included in D3040-D3050
		D3040-D3050	Distribution Systems, Terminal and Package Units	SF rate
		D3060-D3070	Controls, Instrumentation and Systems Testing	Included in D3040-D3050 SF rate
		D3090	Other HVAC systems	LS allowance for venting or other
D40	Fire Protection	**D4010**	Sprinklers	SF rate
		D4020	Standpipes	LS or include with D4010 SF rate
		D4030-D4090	Fire Protection Specialties and other Fire Protection Systems	LS as applicable
D50	Electrical	**D5010**	Electrical Service and Distribution	SF rate
		D5020	Lighting and Branch Wiring	SF rate
		D5030	Communications & Security	SF rate
		D5040	Other Electrical Systems	LS as applicable

4.3 Schematic Design Cost Estimate

4.3.1 Preliminary Schematic Cost Planning

For some projects the Designer may need to develop further alternative designs beyond the preferred solution accepted for Study Certification. An evaluation and selection process is again used to choose the most suitable design option.

For Design options developed in this manner during the Schematic Phase, high-level estimates are prepared in the same framework as for the Study Phase.

Often during the Schematic Phase, budget issues subsequent to the original Study—particularly due to the escalation impact—cause the need for a scheme redesign. The Designer has to redesign to stay within a specific nominated budget. Close attention must be paid to providing timely and comparable data to support cost modeling.

For directives on the content and level of detail for estimates and the participation expected from the Cost Estimators, *see Section 4.2.1*.

4.3.2 Estimator Deliverables

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.

4.3.3 Cost Estimate Inclusions

The following components and sections shall e included in the Cost Estimate submission:

- Estimates for all building work of the design scheme to 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
- Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds and all other items included in the Bid Documentation Package
- GFA and NFA measurements 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
- Unit User Cost as designated by the DCAM Project Manager
- Reconciliation with the Gross Floor Area and Net Floor Areas determined at the Study Phase, including explanation of significant variances
- Reconciliation with the Uniformat II Cost Estimate done at Study Phase, including explanation of any significant variances, including Unit User Cost

4.3.4 Estimate Date and Shelf-Life

The Estimate shall be current at the date of Document Submission, and include amounts (based on percentage adjustment) for Estimating Contingency and Escalation Contingency *per Section 5.1*.

For updating estimates for submission after specific time periods, *see Section 6.2*, Estimate Shelf Life for DCAM requirements.

4.3.5 Space Measurement

At the conclusion of this phase, all program and non-program building areas are to be accurately measured and summed to match the building GFA.

- The Designer will liaise with the DCAM Project Manager to establish the grouping of program areas that make up the total project program.
- For support and non-program areas, if the design is not sufficiently developed to allow actual area measurement, grossing factors may be defined and allocated to functions.
- For a list of typical DCAM elements derived from ASTM 1836-98, *see Section 3*, Space Estimates.
- Specific building performance measures may also be required as directed by the DCAM Project Manager.

4.3.6 Estimator Processes

	Activity	Cost Estimator Participation
1	Design Iterations following Study Review and the Global Workshop	Develop and support Cost Modeling for the Designer to allow cost comparisons between alternative building footprints, story structure, layouts, site locations and major construction systems.
2	Attendance at regular Progress Workshop meetings to advise on cost matters for each proposed scheme, until the Preferred scheme is selected	Provide Cost Support for the Designer as above to allow cost comparison between alternative detail schemes and costing for requirements established from Workshops.
3	Assisting the Designer develop the Design layout and specifications	Develop Cost Measurement for all building elements and components of the Design. This includes consideration of site related costs, life cycle alternative costs, and any other external factors affecting total project cost. Substantiate any earlier cost assumptions at this time.
4	Submittal Preparation at 60% completion and at final submission	Document in Uniformat II format, the estimate breakdown in detail as specified in both printed and electronic submittals. Integrate costs from other specialist Consultants. Provide appropriate contingencies.

4.4 Design Development Cost Estimate

4.4.1 Estimator Deliverables

The Cost Estimate shall be developed using the Uniformat II Elemental Classification to Level 3 as the drawings and specifications are developed. Designers and Estimators are referred to ASTM Document E1557-97 (NISTIR 6389) for a detailed description of Uniformat II elements and components.

4.4.2 Cost Estimate Inclusions

- 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
- The same estimate shall also be prepared in are CSI MasterFormat 2004™ format, with particular attention to the estimates for each of the Trade Bid packages under MGL 149
- Cost Estimates for General Conditions of Contract, Contractor's Overhead and Profit, Insurances, Bonds and all other items included in the Bid Documentation Package
- GFAs and NFAs 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
- Unit User Cost as designated by the DCAM Project Manager
- Reconciliation with the Uniformat II Cost Estimate done at Schematic Phase, including an explanation of any significant variances

4.4.3 Estimate Date and Shelf-Life

The Estimate shall be current at the date of Document Submission, and include amounts (based on percentage adjustment) for Estimating Contingency and Escalation Contingency *per Section 5.1*.

For DCAM requirements on updating estimates for submission after specific time periods, *see Section 6.2*, Estimate Shelf Life.

4.4.4 Space Measurement

At the conclusion of this phase, all program and non-program building areas are to be accurately measured and correctly summed to match the building GFA. Use of grossing factors or percentage loadings for any of the specified ASTM elements is not acceptable.

For the list of typical DCAM elements derived from ASTM E1836-98, *see Section 3*, Space Estimates.

Specific building performance measures may also be required as directed by the DCAM Project Manager.

4.4.5 Cost Estimator Participation

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

	Activity	Cost Estimator Participation
1	Attendance at regular Design Workshop meetings to advise on cost matters for each element or section of work	Provide cost data and advice to the Designer and other Consultants for an accurate indication of the cost of each designed element and major specification item.
2	Attendance at Design Workshop meetings to advise on cost matters for LEED and Life Cycle costs	Provide cost data and advice related to Life Cycle cost analysis, LEED evaluation, and specialist costs.
3	Assisting the Designer achieve the required cost budget within design and specification requirements, including scheduling needs	Provide 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.
4	Estimate Review in accordance with Appendix 3A and Final Submittal Preparation	Formally document in Uniformat II and CSI MasterFormat 2004™ the complete estimate breakdown in detail as specified for both printed and electronic submittals. Integrate costs from other specialist Consultants. Provide allowances where appropriate, including Escalation in accordance with Section 6.

4.5 Construction Document Cost Estimate

4.5.1 Estimator Deliverables

As the final drawings and specifications are developed the Cost Estimate shall use the Uniformat II Elemental Classification to Level 3 and provide it for review at 60% completion of Construction Documents. 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 in CSI Masterformat, cross referenced to the Uniformat II. Both estimates shall be of the same total and percentage allowances for OH&P, and any further allowances for escalation or other contingencies.

For final submission the estimator shall complete Summary Estimate DCAM Form "Appendix K" of the "C11 Bid Package," which includes the filed sub-bids breakdown sheet. For the format of "Appendix K," *see Appendix A5*.

4.5.2 Cost Estimates Inclusions

- 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.
- The same estimated costs and sum totaled structured in CSI MasterFormat 2004™, including the value of work of each of the filed sub-bid trades listed under MGL 149.
- GFA and NFA measurement for the design scheme, in accordance with DCAM's ASTM pro forma.
- Unit Rates shall be derived for the GFA and NFA values for both Uniformat II and Masterformat CSI formats.
- Reconciliation with the Gross Floor Area and Net Floor Areas determined at the Design Development Phase, including explanation of significant variances.
- Reconciliation with the Uniformat II Cost Estimate done at Design Development Phase, including explanation of any significant variances.

4.5.3 Estimate Date and Shelf-Life

The Final Estimate shall be current at the date of Document Submission, and include amounts (based on percentage adjustment) for Escalation Contingency *per Section 5.1*.

For updating estimates for submission after specific time periods, *see Section 6.2*, Estimate Shelf Life for DCAM requirements.

4.5.4 Space Measurement

At the conclusion of this phase, all program and non-program areas are to be accurately measured and summed correctly to match the building GFA. Any differences with areas derived at Design Development Phase are to be reconciled.

For the list of typical DCAM elements derived from ASTM E1836-98, *see Section 3*, Space Estimates.

4.5.5 Cost Estimator Participation

During the entire Construction Documentation Phase, cost verification and if necessary Value Engineering will be required to ensure that the design as developed remain within the Project Budget. The Cost Estimator in the Designer's team is expected to participate in at least the following activities:

	Activity	Cost Estimator Participation
1	Attendance at regular Design 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.
2	Attendance at Design Workshop meetings to advise on cost matters for LEED and Life Cycle costs	Cost data and advice related to Life Cycle cost analysis, LEED evaluation, and specialist costs
3	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.
4	Estimate Review in accordance with Appendix 3A and Final Submittal Preparation	Formally document in CSI MasterFormat 2004™ the complete estimate breakdown in detail for both printed and electronic submittals. Integrate all costs from other specialist Consultants and external works to be included in the contract. The final estimate is to be prepared also in Uniformat II format as previously detailed.
5	Bid Reconciliation	Provide Cost Estimate support to the Designer as required by DCAM in his evaluation of the Bid.

5 Inclusions/Exclusions

5.1 Basis for Pricing

Each estimate should reflect the fair construction value for the construction of the project and should not be a prediction of low bid. DCAM's target for the estimate is the second to lowest bid if three or more bids are received. The following must be considered:

- Pricing assumes a procurement process with competitive bidding for every portion of the construction work, and assumes a minimum of three bids, including each filed sub-bidder.
- The basis of procurement should be noted. This may be competitive bidding under MGL Ch. 149, or using CM/GMP procurement. Any general markups or allowances for the procurement type should be identified.
- Subcontractor's markups should be included in each line item unit price. Markups cover the cost of field overhead, home office overhead and Subcontractor's profit.
- General Contractor's general conditions cost may be calculated on a monthly basis or a percentage at early design phases. The basis for this cost should be noted. General Contractor's overhead and fees should be based on a percentage of the total direct (trade) costs plus general conditions. The Contractor's permits, bond and insurances may be included or noted separately.
- Unless identified specifically, the cost of such items as shift premiums, and allowances for temporary occupancy permits, police details or street/sidewalk permits are deemed to be included in item rates.
- The Estimating Contingency should be identified (a percentage to cover cost increases that will occur during design elaboration or unforeseen design issues). As the design develops, the estimating contingency is to be reduced, and is eliminated at the final Construction Document estimate.
- Construction Contingencies should be excluded in the estimate.

5.1.1 Additional Items and Allowances

Detailed estimates are expected for site-specific items that are not included in the standardized overall construction rate. A typical list is below:

- Site works including general preparation, landscaping, profile restoration, required services
- Cost allowance for site slope or access which will add extra to standard SF rates
- Parking area costs calculated at per-space costs, plus allowance for access control
- Roadway modifications required by local authorities
- Demolition of existing buildings and site cleaning for construction
- Wetland provisions or restitution costs
- Allowance for compliance with Massachusetts Historical Society requirements or time impact
- Diversion of services around the proposed footprint
- Provision of additional services to the new buildings, including work done by utility companies.
- Legal or acquisition cost premium for the chosen site
- Need for temporary accommodation, additional time, etc. for the chosen site.

5.1.2 Included General Conditions and Markups

Percentage based or calculated allowances are expected for the General Contractor's additions to the work items described in the Uniformat II system. These are to be taken in accordance with normal industry standards and added to the subtotal of all work described with Uniformat II items, shown on a line by line increment as follows:

- General Conditions of the Contract
- Fees and Permits
- General Contractor's Overhead and Profit

A subtotal is expected at this stage to give the current value of the project's ECC.

5.1.3 Contingency Allowances Inclusions

Percentage based or calculated allowances are expected on a line-by-line basis as below, to provide the total ECC estimated to the mid-point of the projected construction period.

- ***Estimating Contingency***
  An allowance is a percentage of the total ECC for the detailed development of the design to CD level, including all details and specifications not complete at the time of estimate. This contingency specifically excludes changes due to design scope changes.

- ***Phasing and Temporary Work***
  An allowance is a percentage or calculated additional cost for the execution of the project in particulars outside of a standard, fully available site to the Contractor. This will include additional costs for split phases, provision of temporary works outside those reasonably expected to build the works, provision of services to relocate and return the building users, provision of temporary accommodation for the users, and the provision of additional supervision or security to work in an occupied environment.
- ***Escalation Contingency***
  An allowance is a compounded percentage to bring all estimated costs to the projected mid-point of the construction project. The percentage used is expected to be derived from current industry publications and recent estimates, and does not rely on extrapolation of previously published annual figures. The projected project design and construction time must be estimated for this purpose.

The total project ECC is to be summed to include these line items.

5.2 Specific Inclusions and Exclusions

5.2.1 Items Not Included in a Typical Estimate

- Land acquisition, feasibility, and financing costs
- All professional fees and insurance
- Site or existing conditions surveys investigations costs, including determining subsoil conditions
- Items identified in the design as Not In Contract (NIC)
- Owner supplied and/or installed items (e.g., draperies, furniture and equipment)
- Tel/data, security and AV networks, equipment or software (unless identified otherwise)
- Rock Excavation; special foundations (unless indicated by design engineers)
- Hazardous materials investigations and abatement
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks (except as noted in this estimate)
- Construction or occupancy phasing or off hours' work (except as noted in this estimate)
- Owners Construction Contingency for scope changes

5.2.2 Items that May Affect Typical Estimates

- Modifications to the scope of work subsequent to the preparation of this estimate
- Unforeseen subsurface conditions
- Special requirements for site access, off-hour work or phasing activities

- Restrictive technical specifications, excessive contract or non-competitive bid conditions
- Sole source specifications for materials or products
- Bid approvals delayed beyond the anticipated project schedule

5.2.3 Job Overhead Activities (Structuring Estimates Insert)

Job overhead costs are those costs at the project site that occur specifically as a result of a particular project. Some examples of job overhead costs are:

1. Job supervision and office personnel
2. Engineering and shop drawings
3. Site security
4. Temporary facilities, project office
5. Temporary utilities
6. Preparatory work and laboratory testing
7. Transportation vehicles
8. Supplies and maintenance facilities
9. Temporary protections and OSHA requirements
10. Telephone and communications
11. Permits and licenses
12. Insurance (project coverage)
13. Schedules & reports
14. Quality control
15. Cleanup
16. Taxes
17. Equipment costs not chargeable to a specific task

6 Escalation

6.1 Escalation Provisions and Calculations

6.1.1 Escalation Indices

Estimators are expected to be familiar with the major industry escalation indices, such as the following:

- R.S. Means
- BSI
- Engineering News Review

6.1.2 Industry Trends and Projected Escalation Rates

Estimators are expected to be current with industry trends and projected escalation rates. They may use data from both publications and their own expertise and experience to derive an appropriate escalation contingency percentage to reach midpoint of project construction.

6.1.3 Explaining the Escalation Contingency

A brief explanation of the derivation of the escalation contingency is expected. Short-term or abnormal market pressures should be noted.

6.2 Estimate Shelf Life

Due to current levels of market volatility, DCAM will require that all submitted Estimates will need to be reviewed as follows, when the date of submission is not concurrent with the date of estimate preparation:

Project ECC	Under $5M	$5M or over
Under 3 months	Apply Escalation percentage (if any)	Apply Escalation percentage (if any)
3 – 6 months	Apply Escalation percentage	Apply Escalation percentage
Over 6 months	Apply Escalation percentage	Rate review of all items
Over 12 months	Rate and Peer Review of whole estimate	Independent Estimate and reconciliation with original

6.3 DCAM Escalation Index Table

DCAM has developed a provisional level table with averaged escalation factors as a starting point for initial estimates and analysis of earlier benchmark projects. This table is provided for this purpose, and Estimators are expected to provide and justify future projections for their submitted estimates.

(The escalation table below was effective as of June 2005, and is used solely as an example. Estimators will need to verify current rates for each new project.)

% Change	Year	2000	2001	2002	2003	2004	2005	2006	2007
1.02	2000	1.00	1.02	1.04	1.06	1.17	1.25	1.31	1.38
1.02	2001		1.00	1.02	1.04	1.14	1.22	1.29	1.35
1.02	2002			1.00	1.02	1.12	1.20	1.26	1.32
1.02	2003				1.00	1.10	1.18	1.24	1.30
1.10	2004					1.00	1.07	1.12	1.18
1.07	2005						1.00	1.05	1.10
1.05	2006							1.00	1.05
1.05	2007								1.00

7 Special Estimates

7.1 RFPs

Reserved

7.2 Peer Review

Reserved

7.3 Change Orders

Reserved

7.4 ADA/MAAB Work

Reserved

8 Electronic Formats

8.1 DCAM Uniformat II Elemental Entry

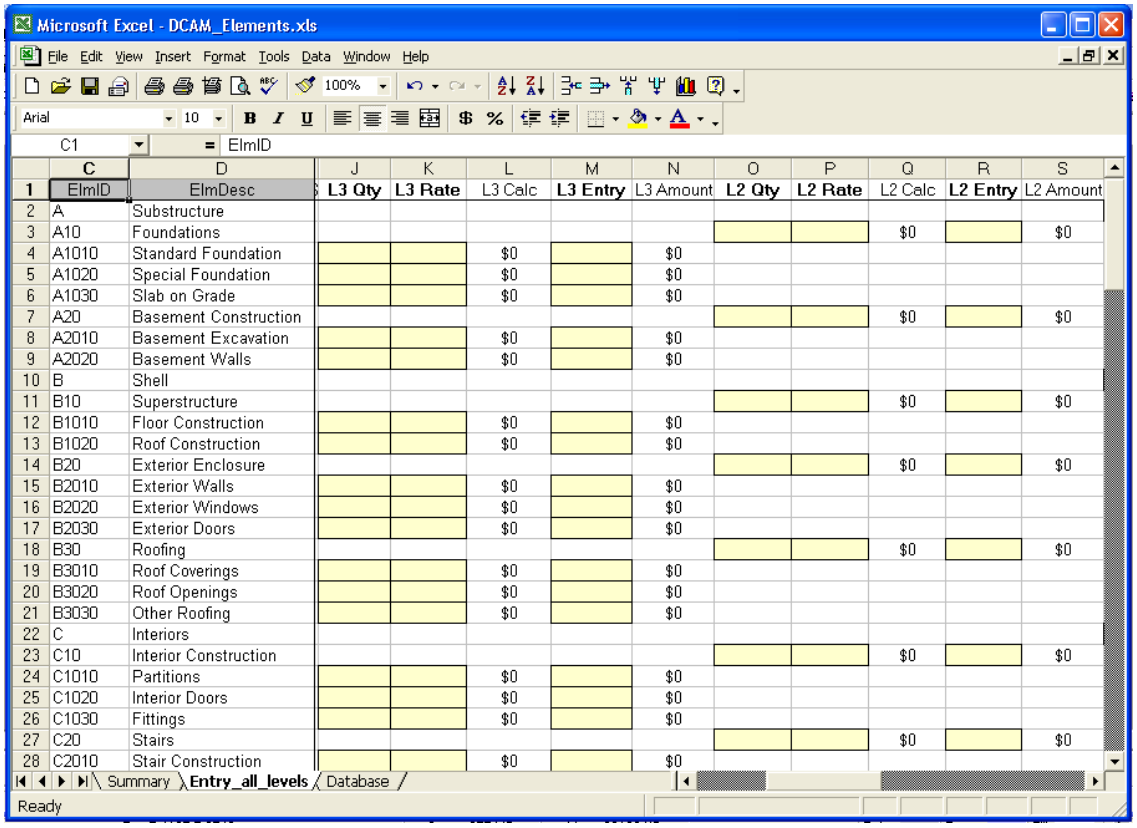
ELEMENTAL COST ITEM ENTRY

Project Number:		**Level 1 total**	**$0**
Project Phase:		**Level 2 total**	**$0**
Estimator Initials:		**Level 3 total**	**$0**
Estimating Contract Id:		**Database Entry**	**$0**
Estimate Date:			

INSTRUCTIONS TO ESTIMATOR

1. This spreadsheet is to enter elemental cost information for DCAM projects using Uniformat II structure and standard elements.
2. Cost data may be entered at Levels 1, 2 or 3 according to Project Phase and Estimating Contract requirements.
3. Cost data at any level may be entered as a lump sum per element or entered as a elemental quantity and unit rate. Entry of (quantity x rate) takes precedence over a lump sum entry. Zero out quantity or rate to enter a lump sum.
4. Cost data entry may be made at any level. However, entry at a lower level will always take precedence over entry at the next higher level. Therefore, relevant lower level elements must be cleared of values to input higher level data.
5. Each hierarchy and sub-hierarchy of elements is independent, so that data entry may be made at different elemental levels for different elemental groups. It is the Estimator's responsibility to ensure that the total of all elemental costs at each level matches through the whole project when the estimate is complete. The spreadsheet will automatically add each element hierarchy upwards to level 1. To balance the totals at each level, an “unassigned” element group is provided as group “U” which is to be used to balance the totals at each level. This is necessary if not all elemental groups have costs detailed down to level 3. A fully broken down cost table to level through for all groups will not need to use “U” values.

6. Each estimating contract will specify the level of estimate accuracy required and if qty x rate is required.
7. A field is provided for each element for comments or specifications, to be used for non-standard rates or costs.
8. Data may only be entered into yellow-framed fields, on the sheets for Level 1, Level 2 and Level 3, also this front sheet.
9. Not every element will be necessary for each project—leave unused elements blank and do not try to delete them.
10. Do not alter the formatting, row or column count, or add or delete columns in this spreadsheet.
11. Project number will be provided by DCAM as an integer number for the Cost Database. Leave blank if not assigned.
12. Data entry must be done using or loading the yellow cells only of the worksheet "Entry_all_levels." The worksheet "Database" will show the totals that are formatted to load directly into DCAM's database.
13. Entry of line items making up each Uniformat Level 3 element is not required.



	C	D	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					

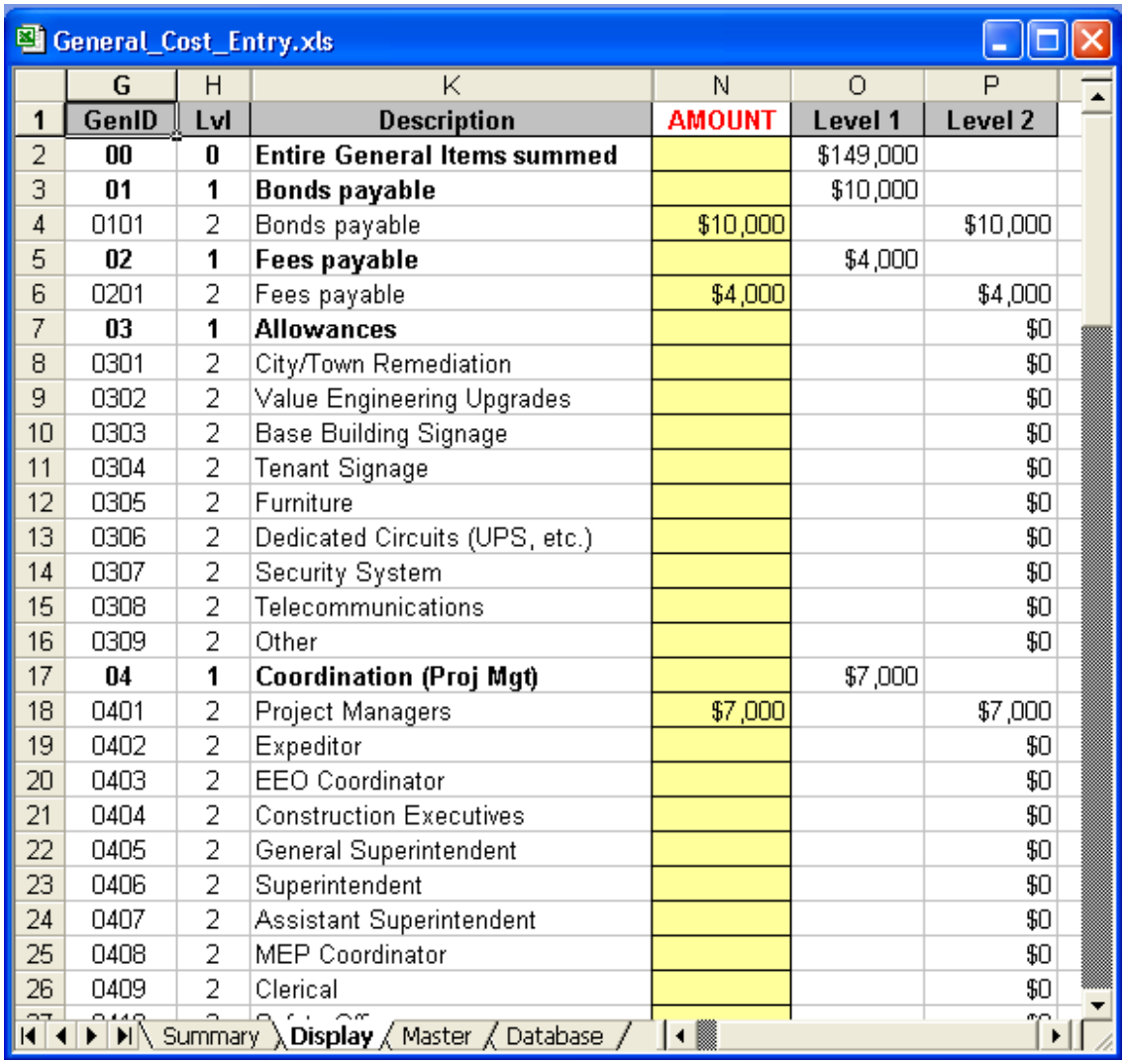
8.2 General Conditions

GENERAL CONDITIONS COST ITEM ENTRY

Project Number:		**Level 0 total**	**$0**
Project Phase:		**Level 1 total**	**$0**
Estimator Initials:		**Level 1 total**	**$0**
Estimating Contract Id:			
Estimate Date:		**Database Entry**	**$0**

INSTRUCTIONS TO ESTIMATOR

1. This spreadsheet is to enter General Conditions cost information for DCAM projects using standard codes.
2. General data may be entered at Level 1 or 2 according to Project Phase and Estimating Contract requirements.
3. General cost data may be entered at Level 0 as one lump sum, at Level 1 as major divisions, or Level 2 as detailed.
4. General cost item entry at a lower level will always take precedence over entry at the next higher level. Therefore, hierarchical lower level items must be set to 0 to allow input of higher-level data.
5. Each hierarchy and sub-hierarchy of items is independent, so that data entry may be made at a different level for different groups. The Estimator is responsible for ensuring that the total of all general costs at each level matches through the whole project when the estimate is complete. The spreadsheet will automatically add each hierarchy upwards to level 0. To balance the totals at each level, an "unassigned" item group is provided as "90," to be used to balance the totals at each level. This is necessary as not all item groups have costs detailed down to level 2 for each estimate. When the spreadsheet is correct, all values above in blue cells will be the same.
6. Each estimating contract will specify the level of estimate accuracy required for each phase.
7. A field is provided for each general item for explanatory comments (not available for this version).
8. Data may only be entered into yellow-framed fields, on the Master or Display sheet, and also identification information onto this Summary sheet.
9. Not every item will be necessary for each project - leave unused items blank and do not try to delete them.
10. Do not alter the formatting, row or column count, or add or delete columns in this spreadsheet. Resizing columns for convenience is acceptable.
11. Project number will be provided by DCAM as an integer number for the Cost Database. If not available, leave blank.
14. Data entry must be done using or loading the yellow cells only of the worksheet "Display" or "Master." The worksheet "Database" will show the totals, which are formatted to load directly into DCAM's database.
15. Entry of detail of unit buildup for each DCAM entry item is not required.



General_Cost_Entry.xls

	G	H	K	N	O	P
1	GenID	Lvl	Description	AMOUNT	Level 1	Level 2
2	**00**	**0**	**Entire General Items summed**		$149,000	
3	**01**	**1**	**Bonds payable**		$10,000	
4	0101	2	Bonds payable	$10,000		$10,000
5	**02**	**1**	**Fees payable**		$4,000	
6	0201	2	Fees payable	$4,000		$4,000
7	**03**	**1**	**Allowances**			$0
8	0301	2	City/Town Remediation			$0
9	0302	2	Value Engineering Upgrades			$0
10	0303	2	Base Building Signage			$0
11	0304	2	Tenant Signage			$0
12	0305	2	Furniture			$0
13	0306	2	Dedicated Circuits (UPS, etc.)			$0
14	0307	2	Security System			$0
15	0308	2	Telecommunications			$0
16	0309	2	Other			$0
17	**04**	**1**	**Coordination (Proj Mgt)**		$7,000	
18	0401	2	Project Managers	$7,000		$7,000
19	0402	2	Expeditor			$0
20	0403	2	EEO Coordinator			$0
21	0404	2	Construction Executives			$0
22	0405	2	General Superintendent			$0
23	0406	2	Superintendent			$0
24	0407	2	Assistant Superintendent			$0
25	0408	2	MEP Coordinator			$0
26	0409	2	Clerical			$0

Summary | Display | Master | Database

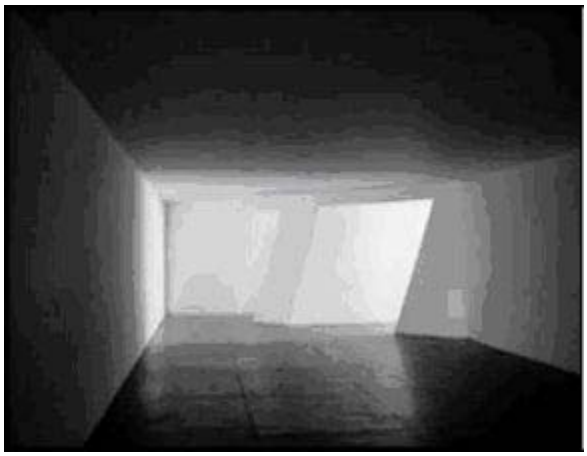
8.3 Space Measurement

1. The template provides for entry of program areas, one sheet for each phase.
2. At Program and Design Development, non-program areas can be entered as percentages (using grossing factors) to cumulatively add to the total GFA.
3. At Design Development, it is expected that all building areas will be dimensioned and the entire space can be added as individual areas to sum to the GFA.
4. Data entry must be done using or loading the yellow cells only of the worksheet “Program”, “Schematic” or “DesignDevt.” The worksheet “Summary” and “Graphics_3” will show and display the totals.
5. (reserved)

Space_Measurement_Entry.xls

	C	D	E	F	G	H	I	J	K	L
2					SF	PCT	SubtotPCT	CalcSF	SubtotSF	CumSF
3	**A - Assignable Area Direct Functions**								40,000	40,000
4		A1 - Enclosed Office Areas			10,000	n/a		10,000		
5		A2 - Open Plan Work Station Areas			22,000	n/a		22,000		
6		A3 - Mission Specific Purpose Areas			8,000	n/a		8,000		
7										
8	**B - Assignable Area Indirect Functions**								17,700	57,700
9		B1 - Conference or Meeting Rooms			12,000	n/a		12,000		
10		B2 - Restricted Area Service Rooms			1,000	n/a		1,000		
11		B3 - Support Rooms and Wet Areas			2,500	n/a		2,500		
12		B4 - Tenant Storage, Workshops, Docks			2,200	n/a		2,200		
13										
14	**C - Assignable Area Loadings**				**% Loading on B**		7%	4,039	4,039	61,739
15		C1 - Prestige Level Factor			n/a	4%				
16		C2 - Occupancy Type Factor			n/a	1%				
17		C3 - Construction Class Factor			n/a	1%				
18		C4 - Regulatory Factor			n/a	1%				
19										
20	**D - Net Useable Area Components (NFA)**				**% Loading on C**		27%	16,670	16,670	78,409
21		D1 - Secondary Circulation				22%				
22		D2 - Columns				2%				
23		D3 - Partitions and Removeable Walls				3%				
24										
25	**E - Gross Interior Area Components**				**% Loading on D**		31%	24,307	24,307	102,715
26		E1 - Mechanical and Electrical				10%	10%			
27			E1-1 - Mechanical Areas							
28			E1-2 - Electrical Areas							
29			E1-3 - Telecommunications Areas							
30			E1-4 - Vertical Penetrations and Chases							

Program / Schematic / DesignDevt / Other_Measures / Element_List / Element_Diagram / IFMA_Mode



9 Appendix–Reference Documents List

A A1— A5

- UNIFORMAT II Estimates
- General Conditions
- Submissions
- To be inserted
- DCAM Estimate Summary Sheet

B NIST Uniformat II, Level-3 Element

C CSI Division Numbers and Titles

D CSI Detailed Divisions

E ASTM STANDARD E1557 UNIFORMAT II

F ASTM–Measurement of Buildings

Appendix A1 – Checklist for UNIFORMAT II Estimates

CHECKLIST FOR PREPARING AN ESTIMATE 06.04.03

Project/Location:_____

Date:_____

A. SUBSTRUCTURE

A10 Foundations

A1010 Standard Foundations

☐ Reinforced Concrete ☐ Masonry ☐ Other_____

Soil Conditions_____ Bearing cap._____

Frost Depth_____

Grade Wall Type: ☐ Concrete ☐ Masonry

A1020 Special Foundations

Unusual Subsurface Conditions_____

Piling: ☐ Concrete ☐ Steel ☐ Caissons ☐ Mat ☐ Other_____

Depth of Piling:_____ft

A1030 Slab on Grade

☐ Structural ☐ Non-Structural

Thickness_____in

A20 Basement Construction

A2010 Basement Excavation

Water Problems_____

Depth_____ ft

A2020 Basement Walls

☐ Reinforced Concrete ☐ Brick ☐ Other_____

☐ Waterproofing ☐ Damp proofing

B. SHELL

B10 Superstructure

B1010 Floor Construction

B1020 Roof Construction

Type: ☐ Cast-in-place ☐ Pre-Cast Concrete ☐ Steel ☐ Composite

☐ Wood ☐ Other_____

☐ Load Bearing Walls ☐ Other

Fireproofing: ☐ Columns ☐ Beams ☐ Other

Stairs: ☐ Metal ☐ Concrete ☐ Special

Liveload: Floor_____lbs/sf Roof_____lbs/sf

Typical Bay Size_____ Other_____

B20 Exterior Enclosure

B2010 Exterior Walls

☐ Brick ☐ Concrete Block ☐ Cast-in-place Concrete ☐ Pre-Cast Concrete

☐ Stone ☐ Metal Panels ☐ Wood Siding ☐ Other

B2020 Exterior Windows

☐ Windows ☐ Curtain Wall: Type_____

Frames: ☐ Aluminum ☐ Wood ☐ Plastic ☐ Steel

Glazing: ☐ Sheet ☐ Float/plate ☐ Solar ☐ Other

☐ Single ☐ Double ☐ Clear ☐ Reflective

B2030 Exterior Doors

☐ Wood ☐ Metal ☐ Glass

☐ Special Entrance ☐ Single (%)_____

☐ Vestibule (%) _____ ☐ Revolving (%)_____

☐ Overhead (%)_____

B30 Roofing

B3010 Roof Coverings

☐ Built-up ☐ Fluid Applied ☐ Elastic Sheet ☐ Composite Shingles

☐ Sheet Metal ☐ Other

Color:_____ ☐ Light ☐ Dark

B3020 Roof Openings

☐ Skylights ☐ Access Hatches

B3090 Other Roofing

Type: ☐ FIat ☐ Pitched

Insulation: ☐ Rigid ☐ Lightweight

Thickness_____"U" Factor_____☐ Other

C. INTERIORS

C10 Interior Construction

C1010 Partitions

Masonry (%) _____Stud (%)_____Glazed (%)_____

Demountable (%)_____Folding/sliding (%)_____Other_____

☐ Toilet Partitions: Type_____

C1020 Interior Doors

Door Frames: ☐ Wood ☐ Metal

Doors: ☐ Wood (%)_____ ☐ Metal (%)_____ ☐ Glass (%)_____

☐ Other (%)_____

C1030 Fittings

Hardware: ☐ Brass ☐ Chrome ☐ Other_____

☐ Washroom Accessories: Type_____ Other_____

C20 Stairs

C2010 Stair Construction

C2020 Stair Finishes

C30 Interior Finishes

C3010 Wall Finishes

Walls: Plaster (%)_____Drywall (%)_____Tile (%)_____

Paint (%)_____Wall Covering (%)_____Spec. Ctgs. (%)_____

Other (%)_____

C3020 Floor Finishes

Floors: Resilient (%)_____Carpet (%)_____Tile & Terr.(%)_____

Concrete Finish (%)_____Wood (%)_____Raised Fir(%)_____

Other (%)_____

C3030 Ceiling Finishes

Ceilings: Suspended (%)_____Applied (%)_____Unfininished (%)_____

Plaster (%)_____Drywall (%)_____Integrated (%)_____

Acoustical: Unrated (%)_____Rated (%)_____Other_____

D. SERVICES

D10 Conveying

D 1010 Elevators & Lifts

Elevators: Type_____No._____Speed/Cap_____LO/ea._____
Type_____No._____Speed/Cap_____LO/ea._____
Elevators: No._____Width_____Cap_____
Lifts: Type_____No._____Other_____

D1020 Escalators & MovingWalks

D1090 Other Conveying Systems

D20 Plumbing

D2010 Plumbing Fixtures

Fixtures: Standard: No._____Special No._____

D2020 Domestic Water Distribution

Domestic Hot Water Heaters: Type_____Capacity_____

D2030 Sanitary Waste

D2040 Rain Water Drainage

☐ Roof Drains: Drains per roof_____sf ☐ Interior ☐ Exterior

D2090 Other Plumbing Systems

Drinking Fountains ☐ No._____

D30 HVAC

D3010 Energy Supply

Energy Recovery_____Controls_____No. of Zones_____

D3020 Heat Generating Systems

Heating Capacity_____mbh Type_____

D3030 Cooling Generating Systems

Ventilation Req's_____cfm Air Conditioning_____(%)
Cooling Capacity_____tons Type_____
Cooling Tower: Type_____ Location_____

D3040 Distribution Systems

Air Distribution_____cfm Type_____

D3050 Terminal & Package Systems

D3060 Controls & Instrumentation

D3070 Systems Testing & Balancing

D3090 Other HVAC Systems & Equipment

Equipment Load_____w/sf People Load_____

D40 Fire Protection

D4010 Sprinklers

☐ Hazard Type: Light_____(%) Ordinary_____(%) Extra_____(%)
Type_____

D4020 Standpipes

☐ Extinguishers ☐ Special

D4030 Fire Protection Services

D4090 Other Fire Protection Systems

☐ Water Storage: Capacity_____gals Location_____

D50 Electrical

D5010 Electrical Service and Distribution

KVA Demand _____ Primary Voltage_____
Connected watts/sf_____ amps_____
Transformers: Utility_____ Owners_____
Voltage: Main distribution_____V Secondary Distribution_____
☐ Bus duct ☐ Motor Control Center

D5020 Lighting & Branch Wiring

☐ Under floor duct ☐ Raised Floor ☐ Raceway ☐ Undercarpet
Intensity (in fc) _____ Watts/sf for Lighting_____
Receptacles_____
HVAC_____
Elevators_____
Spare_____
Connected Motor hp_____

Type: ☐ Fluorescent ☐ Incandescent ☐ HPS
☐ Metal Halide ☐ Mercury Vapor ☐ Other_____

D5030 Communications & Security

☐ PA/Sound ☐ TV ☐ Telephone ☐ Lighting
☐ Security

D5040 Specials Mechanical Systems

☐ Special Piping: Type_____
☐ Special Systems: Dust & Fume Collection_____
☐ Other: Type/Quantity_____

D5090 Other Electrical Systems

☐ Electric Heating ☐ Fire alarm ☐ Clock

E. EQUIPMENT & FURNITURE

E10 Equipment

E1010 Commercial Equipment
E1020 Institutional Equipment

E20 Furnishings

E2010 Fixed Furnishings

☐ Loading Dock: Equipment_____
☐ Other_____

E2020 Movable Furnishings

☐ Artwork: Type_____

E2090 Other Furnishings

☐ Window Treatment: Type/size_____
☐ Seating: Type_____

F. SPECIAL CONSTRUCTION & DEMOLITION

F10 Special Construction

F1010 Special Structures
F1020 Integrated Construction
F1030 Special Construction Systems

☐ Vaults: Type/Size:_____
☐ Other_____

F1040 Special Facilities
F1050 Special Controls and Administration

F20 Selective Building Demolition

F2010 Building Elements Demolition
F2020 Hazardous Components Abatement

G BUILDING SITE

G1010 Site Preparation

G1010 Site Clearing

☐ Borrow (quantity)_____ ☐ Dispose (quantity)_____

G1020 Site Demolition

☐ Demolition Amount_____ ☐ Clearing Amount_____

G1030 Site Earthwork

☐ Retaining Walls (length))_____ ☐ Paved/Plaza Area (size)_____

G1040 Hazardous Waste Remediation

G20 Site Improvements

G2010 Roadways

☐ Roads: Size/Type_____ ☐ Fences: Length_____

G2020 Parking Lots

☐ Parking Lots: Size/Type_____ ☐ No. Cars_____

G2030 Pedestrian Paving

G2040 Site Development

G2050 Landscaping

☐ Landscaping: Seeding Area_____ ☐ Ground Cover: Area_____

☐ Trees: Number_____ ☐ Planters: Number_____

☐ Other_____

G30 Site Mechanical Utilities

G3010 Water Supply

☐ Water: Size/Length_____Irrigation: Size/Type_____

G3020 Sanitary Sewer

☐ Sanitary Sewer: Size/Type_____

☐ Process & acid waste system: Size/Type_____

☐ Combined Drainage & Sewer System: Size/Length_____

G3030 Storm Sewer

☐ Storm drainage: Size/Type_____

G3040 Heating Distribution

☐ Heating System: Size/Type_____

G3050 Cooling Distribution

G3060 Fuel Distribution

☐ Natural Gas: Size/length_____Other Gas System_____

G3090 Other Site Mechanical Utilities

G40 Site Electrical Utilities

G4010 Electrical Distribution

☐ Overhead Power: Size/Type_____

☐ Underground Power: Size/type_____

G4020 Site Lighting

☐ Exterior Lighting: Type/Area_____

G4030 Site Communications & Security

☐ Snow melting system: Size/Type_____

G4090 Other Site Electrical Utilities

☐ Snow melting system: Size/Type_____

G90 Other Site Construction

G1090 Service and Pedestrian Tunnels

G9090 Other Site Systems & Equipment

Appendix A2 – Checklist for General Conditions

General Item	Level	Description	√
00	**0**	**Entire General Items summed**	
01	**1**	**Bonds payable**	
0101	2	Bonds payable	
02	**1**	**Fees payable**	
0201	2	Fees payable	
03	**1**	**Allowances**	
0301	2	City/Town Remediation	
0302	2	Value Engineering Upgrades	
0303	2	Base Building Signage	
0304	2	Tenant Signage	
0305	2	Furniture	
0306	2	Dedicated Circuits (UPS, etc.)	
0307	2	Security System	
0308	2	Telecommunications	
0309	2	Other	
04	**1**	**Coordination (Proj Mgt)**	
0401	2	Project Managers	
0402	2	Expeditor	
0403	2	EEO Coordinator	
0404	2	Construction Executives	
0405	2	General Superintendent	
0406	2	Superintendent	
0407	2	Assistant Superintendent	
0408	2	MEP Coordinator	
0409	2	Clerical	
0410	2	Safety Officer	
0411	2	Miscellaneous Laborer	
0412	2	Accountant	
0413	2	Legal	
0414	2	Payroll Taxes, Benefits, Ins.	
0415	2	Pre-construction Services	
0416	2	Mobilization/Demobilization	
0417	2	Other Coordination	
05	**1**	**Cutting and Patching**	
0501	2	General Cutting and Patching	
06	**1**	**Scheduling**	
0601	2	Schedule of Values	
0602	2	CPM Scheduling	
0603	2	Progress Reports	

General Item	Level	Description	√
0604	2	Estimating	
0605	2	Other Scheduling	
07	**1**	**Submittals**	
0701	2	Shop Dwgs, Prod. Data, Samples	
0702	2	Printing and Mailing Service	
0703	2	Other Submittals	
08	**1**	**Construction Photos**	
0801	2	Ground Level Photographs	
0802	2	Aerial Photographs	
0803	2	Other Photographs	
09	**1**	**Quality Control**	
0901	2	Field Engineering	
0902	2	Engineering Supplies	
0903	2	Other Engineering	
10	**1**	**Field Inspection, Testing**	
1001	2	Certified Testing Services	
1002	2	LSP	
1003	2	Other Testing	
11	**1**	**Temporary Facilities, Utl**	
1101	2	Temporary Electric	
1102	2	Winter Conditions, Temp. Heat	
1103	2	Temporary Telephone	
1104	2	Temporary Water	
1105	2	Temporary Toilets	
1106	2	Temporary Sewer	
1107	2	Protection and Safety	
1108	2	Rubbish Chute	
1109	2	Dumpsters	
1110	2	Temporary Enclosures	
1111	2	Stairs, Ladders, Ramps etc.	
1112	2	Temporary Fence and Barricades	
1113	2	Snow Removal	
1114	2	Water Control	
1115	2	Project Identification	
1116	2	Staging	
1117	2	Field Offices – GC	
1118	2	Office Equipment – GC	
1119	2	Field Office – DCAM	
1120	2	Office Equipment – DCAM	
1121	2	Vehicles and Parking	
1122	2	Emergencies	
1123	2	Dust Mitigation	
1124	2	Noise Control	

General Item	Level	Description	√
1125	2	Pollution Control	
1126	2	Cleaning During Construction	
1127	2	Security Guard Service	
1128	2	Police Services	
1129	2	Electric Company Backcharge	
1130	2	Gas Company Backcharge	
1131	2	Other Temporary Services	
12	**1**	**Material, Products, Equipment**	
1201	2	Material, Products Equipment	
13	**1**	**Project Closeout**	
1301	2	Final Cleaning	
1302	2	Glass	
1303	2	Record & As-Built Drawings	
1304	2	Operations & Mainten. Manuals	
1305	2	Instructions	
1306	2	Requirements & Submittals	
1307	2	Guarantees & Warranties	
1308	2	Other Project Closeout	
1309	2	Legal Handover Procedures	

Appendix A3 – Checklist for Submissions

1. Validate rates to be current immediately before any submission date.
2. Ensure filed sub-bid work is accurately identified and separable for bid comparison.
3. Review all lump sum allowances provided in the Estimate and ensure that any work that has been subsequently designed in detail has been priced out in detail.
4. For CSI estimates, all Subcontractor margins are included with their particular trade.
5. Complete review of the final specification to ensure consistency with the Estimate.
6. Complete review of the exact scope of works as specified for the Bid.
7. Validate that the size of the final design (GFA) is consistent with the Estimate.
8. Validate that the Construction Period is consistent with the Estimate.
9. Validate the Escalation Rate to be applied with DCAM prior to final submission.

Appendix A4 – Sample Uniformat Structured Narrative (for Preliminary Design)

A10	**Foundations**	
A1010	Standard Foundations	Standard continuous perimeter foundation Isolated interior footings for columns
A1030	Slab on Grade	6” slab on grade, with gravel base, rigid insulation, barrier
B10	**Superstructure**	
B1010	Floor construction	Metal deck on steel bar joists
B1020	Roof Construction	Metal deck on bar joists
B20	**Exterior Enclosure**	
B2010	Exterior Walls	Brick veneer on galvanized metal stud backup wall systems, 20% of wall area to be 1” insulated curtain walling
B2020	Exterior windows	Aluminum double glazed windows other than curtain walling area
B2030	Exterior doors	Entry doors: Narrow stile aluminum glass doors Other doors: Hollow metal in welded steel frames
B30	**Roofing**	
B3010	Roof coverings	Modified bitumen on flat roofing
B3020	Roof openings	Smoke hatch where required, access hatch with ship’s ladder
C10	**Interior Construction**	
C1010	Partitions	Skim coat on blueboard on metal studs; CMU to core only
C1020	Interior doors	Typical 3’x7’ solid core wood, clear finish, in welded steel frames
C1030	Fittings	
C20	**Stairs**	
C2010	Stair construction	Steel pan on channel stringers
C2020	Stair finishes	Sealed concrete
C30	**Interior Finishes**	

C3010	Wall finishes	Offices, conference areas: Painted skim coat on blueboard, vinyl base Toilet rooms: full height ceramic tile on wet walls, painted GWB elsewhere.
C3020	Floor finishes	Offices, conference areas: Carpet Toilet rooms: Ceramic Tile Kitchens and labs: VCT
C3030	Ceiling finishes	Suspended acoustical tile in small rooms and offices, exposed structure in open office areas
D10	Conveying	Two stop fully accessible passenger elevator
D20	Plumbing	Copper distribution system, gas HWS, cast iron sanitary waste
D30	HVAC	Fully distributed VAV system; 150 ton water-cooled rooftop chiller; gas fired water boiler; 48000CFM air handling unit
D40	Fire Protection	Standard sprinkler system throughout, one 4” standpipe.
D50	Electrical	Service, board panel and feeder, 2000 amps. Standard office lighting and power distribution. Fire detection system and control center. Conduit for telco and data systems.
E10	Equipment	Kitchen stove and wash equipment; gym equipment in 400 sqft training room
E20	Furnishings	Custom display cabinets, 50’ in total length; vertical venetian blinds to all external windows.
G10	Site Preparation	Site area 1 acre to be stripped and reduced to levels. Existing single story timber dwelling approximately 4000 SF to be demolished.
G20	Site Improvements	Car parking for 100 cars, unsecured, lined and lighted. Trees, shrubs, lawn and hydraulic watering system. Rainwater underground dispersion tank to suit area. Two roadway entry ramps
G30	Site Mechanical Services	Storm sewer 24” connection, sanitary sewer 10” connection, water supply 4” connection, gas connection, all at street area. Diversion of sanitary sewer and provision of manholes.
G40	Site Electrical Services	Electrical underground conduit and cabling, with manhole. Duct bank for teleco cabling. Exterior lighting to car park.
Z10	General Conditions	No site access restrictions or normal working hours restrictions. No existing tenant requirements. Site security at standard level.

Appendix A5 – DCAM Estimate Summary Sheet

"APPENDIX K"

DCAM ESTIMATE SUMMARY SHEET

MASS. STATE PROJECT NO. _____ CONTRACT NO._____

_____

TITLE AND LOCATION OF PROJECT

_____ _____ _____

DESIGNER ESTIMATOR DATE SUBMITTED

_____ _____

CONSTRUCTION DURATION ANTICIPATED BID DATE

	BASE BID	ALTERNATES 1 2 3
1. SITE COST	$ _____	
2. BUILDING COST	$ _____	
3. ESTIMATED BID COST (INCLUDE OVERHEAD AND PROFIT)	$ _____	___ ___ ___
4. ITEM 1 WORK OF GENERAL CONTRACTOR	$ _____	___ ___ ___
5. ITEM 2 WORK OF FILED SUB-BIDS -- TOTALED	$ _____	___ ___ ___
6. GROSS SQ. FT. AREA OF BUILDING	$ _____	
7. GROSS SQ. FT. COST OF BUILDING	$ _____	
8. NET SQ. FT. AREA OF BUILDING	$ _____	
9. ET TO *GROSS* SQ. FOOTAGE	_____ %	
10. UNIT USER COST (PUPIL, BED)	$ _____	
11. GENERAL CONTRACTOR'S OVERHEAD AND PROFIT	$ _____	___ ___ ___

[Note to Designer: If alternates are used, line numbers 3,4,5 & 11 shall be filled in for each alternate.]

"APPENDIX K" (continued)

FIELD SUB-BIDS BY SECTION

		BASE BID	ALTERNATES 1	2	3
04101	MASONRY	$			
05101	MISC. & ORN. IRON	$			
07101	WPFG., DAMP. & CAULKING	$			
07201	ROOFING & FLASHING	$			
08501,	METAL WINDOWS	$			
08801	GLASS & GLAZING	$			
09201	LATHING & PLASTERING	$			
09301	TILE	$			
09401	TERRAZZO	$			
09501	ACOUSTICAL TILE	$			
09601	MARBLE	$			
09701	RESILIENT FLOORS	$			
09901	PAINTING	$			
14201	ELEVATORS	$			
15301	FIRE PROTECTION	$			
15401	PLUMBING	$			
15501	HVAC	$			
16101	ELECTRICAL WORK	$			
	TOTAL OF ITEM 2 WORK	$_____	$__	$___	$__

BREAK-OUT OF SUB-SUB-BIDS

PLUMBING: INSULATION	$_____
(OTHER)	$_____
HVAC: TEMPERATURE CONTROLS	$_____
SHEET METAL	$_____
INSULATION	$_____
BALANCING	$_____
ELECTRICAL: -- SYSTEM	$_____
(OTHER)	$_____

Appendix B – NIST Uniformat II, Level-3 Element

(Inclusions & Exclusions)

The following lists show what items are included and excluded at Level 3 in the 1997 version of the ASTM Standard Classification for Building Elements and Related Sitework. Note that the listings of inclusions and exclusions are not intended to be an exhaustive listing. Rather, they provide a general outline of what to expect in each element consistent with the selection criteria outlined in section 2.2. Exclusions are listed to help users find items quickly. For example, a user might place exterior load bearing walls under B2010 Exterior Walls or B1010 Floor Construction. UNIFORMAT II puts them under B2010 Exterior Walls based on technical judgment and current practice. Putting under B1010 Floor Construction a cross-reference to B2010 Exterior Walls directs the person who looks first under Floor Construction to the appropriate element, Exterior Walls.

Description of Building Elements

General	Specific	Inclusions	Exclusions
A 10 Foundations	**A 1010 Standard Foundations**	• wall & column foundations • foundation walls up to level of top of slab on grade • pile caps • backfill & compaction • footings & bases • perimeter insulation • perimeter drainage • anchor plates • dewatering	• general excavation to reduce levels (see section G 1030, Site Earthwork) • excavation for basements (see section A 2010, Basement Excavation) • basement walls (see section A 2020, Basement Walls) • under-slab drainage and insulation (see section A 1030, Slab on Grade)
	A 1020 Special Foundations	• piling • caissons • underpinning • dewatering • raft foundations	• pile caps (see section A 1010, Standard Foundations) • rock excavation (unless associated with Special Foundations) (see section A 1010, Standard Foundations & section A 2010, Basement Excavation) • grade beams • any other special foundation conditions
	A 1030 Slab on Grade	• standard • structural • inclined slabs on grade • trenches • pits • bases • under-slab drainage • under-slab insulation	• applied floor finishes (see section C 3020, Floor Finishes) • hardeners & sealers to the slab (see section C 3020, Floor Finishes)

General	Specific	Inclusions	Exclusions
A 20 Basement Construction	**A 2010 Basement Excavation**	• additional excavation required for construction of basement • backfill & compaction • excavation support system	• general grading to reduce levels over site (see section G 1030, Site Earthwork)
	A 2020 Basement Walls	• basement wall construction • moisture protection	• walls above grade that enclose basements • (see section B 2010, Exterior Walls) • perimeter drainage (see section A 1010, • Standard Foundations)
B 10 Super-structure	**B 1010 Floor Construction**	• floor structural frame • interior structural walls	• exterior load bearing walls (see section B 2010, Exterior Walls) • floor slabs & decks • inclined & stepped floors • expansion & contraction joints • balcony construction • suspended ramps • exterior stairs and fire escapes • other floor construction (e.g., catwalks, space frames, etc.) • applied & suspended ceiling & floor finishes (see section C 3020, Floor Finishes & section C 3030, Ceiling Finishes) • stair construction (see section C 2010, Stair Construction) • balcony walls & railings (see section B 2010, Exterior Walls)
	B 1020 Roof Construction	• roof structural frame • structural interior walls supporting roof • roof decks, slabs & sheathing • canopies • other roof construction	• roof coverings (see section B 3010, Roof Coverings) • skylights & roof openings (see section B 3020 Openings) • stair construction (see section C 2010, Stair Construction)
B 20 Enclosure	**B 2010 Exterior Walls**	• Includes • exterior wall construction with facing • materials, exterior applied finishes, • back-up construction, framing, wallboard, • parapets, insulation & vapor retarders, • sheathing, wallboard • exterior load-bearing wall construction • exterior louvers & screens • exterior sun control devices • balcony walls & railings • exterior soffits	• Excludes • applied finishes to interior faces of • exterior walls (see section C 3010, Wall Finishes) • columns and beams in exterior walls (see section B 10, Superstructure) • Venetian blinds (see section E 20, Furnishings) • other interior sun control devices (see section E 20, Furnishings) • roof eaves and eaves soffits (see section B 3010, Roof Coverings) • glazed curtain walls (see section B 2020, Windows)

General	Specific	Inclusions	Exclusions
	B 2020 Exterior Windows	• windows • storefronts • curtain walls • exterior painting of windows • wall opening elements such as lintels, sills, flashings, etc.	• window treatments (see section E 20, Furnishings)
	B 2030 Exterior Doors	• personnel doors • revolving doors • overhead doors • other doors (e.g., hanger doors, blast-resistant doors, etc.)	
B 30 Roofing	**B 3010 Roof Coverings**	• roofing membranes • traffic coatings • waterproof membranes below paving • expansion joints • vapor retarder • roof & deck insulation • roof fill • flashings & trim • gutters & downspouts • eaves & eaves soffits	• roof openings (see section B 3020, Roof Openings) • roof drains (see section D 2040, Rain Water Drainage) • parapets (see section B 2010, Exterior Walls)
	B 3020 Roof Openings	• skylights • area glazing • roof hatches • gravity roof ventilators • smoke vents	• powered & ducted ventilators (see section D 3040, Distribution Systems)
C 10 Interior Construction	**C 1010 Partitions Includes**	• fixed partitions • demountable partitions • retractable & movable partitions • operable partitions • interior balustrades & screens • interior window & storefronts • Though not in standard, C1010 includes field constructed toilet partitions	• stair balustrades (see section C 2010, Stair Construction) • interior load bearing & shear walls (see section B 10, Superstructure) • applied wall finishes (see section C 3010, Wall Finishes) • Fabricated toilet partitions (see section C1030, Fittings) •
	C 1020 Interior Doors	• standard swinging doors • glazed doors • sliding & folding doors • fire doors • other doors • door frames • door hardware • door opening elements • door painting & staining • hatches & access doors	• vault doors (see section E 10, Equipment) • operable partitions (see section C 1010, Partitions)

General	Specific	Inclusions	Exclusions
	C 1030 Fittings	• chalk & tack boards • identifying devices • lockers • toilet & bath accessories • storage shelving • handrails & ornamental metals • fabricated toilet partitions • fabricated compartments and cubicles • closet specialties	• equipment (see section E 10, Equipment) • furniture (see section E 20, Furnishings) • special construction (see section F 10,Special Construction) • fire extinguishers (see section D 4030, Fire Protection Specialties) • manufactured case work (see section E 20, Furnishings)
C 20 Stairs	**C 2010 Stair Construction**	• Includes • stair treads, risers and landings • handrails and balustrades	• Excludes • steps in structural slabs (see section B 1010, Floor Construction)
	C 2020 Stair Finishes	• finishes to treads, risers, landings & soffits • finishes to handrails & balustrades	
C 30 Interior Finishes	**C 3010 Wall Finishes**	• concrete wall finishes • wall plastering • wallboard • tile & terrazzo • painting • wall-coverings • acoustic wall treatment • other coatings & finishings	• wallboard integral to interior walls & • partitions (see section C 1010, Partitions, B2010, Exterior walls)
	C 3020 Floor Finishes	• floor toppings and traffic membranes • hardeners & sealers • tile, terrazzo, wood & resilient flooring • carpeting • masonry & stone flooring • other flooring (e.g., conductive, armored) • painting & staining • access pedestal flooring	• stair finishes (see section C 2020, Stair Finishes)
	C 3030 Ceiling Finishes	• exposed concrete finishes • plaster ceiling finishes • wallboard ceiling finishes • acoustic ceiling tiles & panels • painting & staining • metal strip ceilings • other ceilings • all suspended systems	• finishes to stair soffits (see section C2020, Stair Finishes) • finishes to exterior soffits (see section B 2010, Exterior Walls)
D 10 Conveying	**D 1010 Elevators and Lifts**	• passenger elevators • freight elevators • people lifts • wheel chair lifts	• elevator pits (see section A 1030, Slab on Grade)

General	Specific	Inclusions	Exclusions
	D 1020 Escalators and Moving Walks	• escalators • moving walks	
	D 1090 Other Conveying Systems	• hoist & cranes • conveyors • dumbwaiters • pneumatic tube systems • linen, trash & mail chutes • turntables • operable scaffolding • transportation systems (for example, baggage handling and aircraft loading systems)	
D 20 Plumbing	**D 2010 Plumbing Fixtures**	• Includes • water closets • urinals • lavatories • sinks • showers • bathtubs • drinking fountains • bidets	• Excludes • domestic hot water heaters (see section D 2020, Domestic Water) • hose bibbs (see section D 2020, Domestic Water) • other equipment (see section D 2090, Other Plumbing Systems)
	D 2020 Domestic Water Distribution	• pipes & fittings • valves, hydrants & hose bibbs • water heaters • domestic water supply equipment • insulation	• plumbing fixtures (see section D 2010, Plumbing Fixtures)
	D 2030 Sanitary Waste	• waste pipe & fittings • vent pipe & fittings • floor drains • sanitary waste equipment • insulation	
	D 2040 Rain Water Drainage	• pipe & fittings • roof drains • insulation	• gutters & downspouts (see section B3010, Roof Coverings)
	D 2090 Other Plumbing Systems	• other piping systems • gas distribution • acid waste systems • pool equipment • fountain piping systems & devices	
D 30 HVAC	**D 3010 Energy Supply**	• oil, gas, & coal supply • steam, hot & chilled water supply • solar energy supply • wind energy supply	• electrical energy supply systems (see section D 5090, Other Electrical Systems, and section D 5010, Service & Distribution)

General	Specific	Inclusions	Exclusions
	D 3020 Heat Generating Systems	• boilers, including electric • piping and fittings adjacent to boilers • primary pumps • auxiliary equipment • equipment & piping insulation	• electric space unit heaters & baseboard, fuel-fired unit heaters, furnaces (see section D 3050, Terminal & Package Units) • controls & instrumentation (see section D 3060, Controls & Instrumentation)
	D 3030 Cooling Generating Systems	• chillers • cooling towers & evaporative coolers • condensing units • piping & fittings • primary pumps • direct expansion systems • equipment & piping insulation	• secondary chilled water pumps (see section D 3040, Distribution Systems) • distribution piping (see section D 3040,Distribution Systems) • controls & instrumentation (see section D3060, Controls & Instrumentation)
	D 3040 Distribution Systems	• supply & return air systems, including air-handling units with coils (electric included) • filters, ductwork, & associated devices such as VAV boxes, • duct heaters, induction units & grilles • ventilation & exhaust systems • steam, hot water, glycol & chilled water distribution • associated terminal devices including convectors • fan-coil units, & induction units, but not water & steam unit heaters • heat recovery equipment • auxiliary equipment such as secondary pumps • heat exchangers, sound attenuation, & vibration isolation • piping, duct, & equipment insulation	• electric, gas, or oil fired unit heaters (see Ssection D 3050, Terminal & Package Units) • furnaces (gas or oil) (see section D 3050,Terminal & Package Units) • floor, ceiling, & rooftop package units(see section D 3050, Terminal & Package Units) • controls & instrumentation (see section D3060, Controls & Instrumentation)
	D 3050 Terminal and Package Units	• electric baseboard • electric or fossil fuel fired unit heaters, • unit ventilators, & radiant heaters • window or through-the-wall air • conditioners, with or without heating of any type	• piping & accessories (see section D 3040,Distribution Systems) • hydronic or steam convectors, fan-coil units (see section D 3040, Distribution Systems) • cooling towers, remote air-cooled condensers, • evaporative coolers (see section D3030, Cooling Generation Systems)

General	Specific	Inclusions	Exclusions
	D 3050 Terminal and Package Units	• reverse-cycle, water- or air-cooled, • terminal heat pumps • wall sleeves where required • electric or fossil fuel fired air-handling units or furnaces • self-contained, air- or water-cooled, • floor, ceiling, & rooftop air conditioners, & heat pumps • ductwork and accessories, including flue stacks • factory-integrated controls	• air-handling units with only hydronic heating or steam coils (see section D 3040, Distribution Systems) • air-handling units with chilled water or direct expansion cooling coils (see section D 3040, Distribution Systems)
	D 3060 Controls and Instrument-ation	• heating generating systems • cooling generating systems • heating/cooling air handling units • exhaust & ventilating systems • terminal devices • energy monitoring & control • building automation systems	• factory-installed controls, when an integral part of terminal & package units (see section D 3050, Terminal & Package Units)
	D 3070 Systems Testing and Balancing	• Includes • piping systems testing & balancing • air systems testing & balancing	
	D3090 Other HVAC Systems and Equipment	• special cooling systems and devices • special humidity control • dust and fume collectors • air curtains • air purifiers • paint spray booth ventilation systems • general construction items associated with mechanical systems	
D 40 Fire Protection	**D 4010 Sprinklers**	• water supply equipment • piping valves & fittings • sprinkler heads & release devices	
	D 4020 Standpipes	• water supply equipment • piping valves & fittings • cabinets & hoses	
	D 4030 Fire Protection Specialties	• fire extinguishers • fire extinguisher cabinets	
	D 4090 Other Fire Protection Systems	• carbon dioxide systems • clean agent systems • foam generating systems • dry chemical systems • exhaust hood systems	

General	Specific	Inclusions	Exclusions
D 50 Electrical	**D 5010 Electrical Service and Distribution**	• primary transformers • secondary transformers • main switchboard • interior distribution transformers • branch circuit panels • enclosed circuit breakers • motor control centers • conduit and wiring to circuit panels	• outdoor transformers (see section G 4010,Electrical Distribution) • emergency power (see section D 5090,Other Electrical Systems) • branch wiring (see section D 5020,Lighting & Branch Wiring)
	D 5020 Lighting and Branch Wiring	• branch wiring & devices for lighting fixtures • lighting fixtures • branch wiring for devices & equipment • connections • devices • exterior building lighting	• under-floor raceways (see section D 5090,Other Electrical Systems) • exterior site lighting (see section G 4020,Site Lighting)
	D 5030 Communications and Security	• fire alarm systems	• other electrical systems (see section D5090, Other Electrical Systems) • call systems • telephone systems • local area networks • public address & music systems • intercommunication systems & paging • clock & program systems • television systems • security systems
	D 5090 Other Electrical Systems	• emergency generators • UPS • emergency lighting systems • power factor correction • lightning & grounding protection systems • raceway systems • power generation systems •	• electric baseboard (see section D 3050,Terminal & Package Units) • electric coils & duct heaters (see section D 3040, Distribution Systems) • building automation & energy monitoring systems (see section D 3060, Controls & Instrumentation) • communications & security systems (see section D 5030, Communications & Security)
E 10 Equipment	**E 1010 Commercial Equipment**	• security and vault equipment • teller and service equipment • registration equipment • checkroom equipment • mercantile equipment • commercial laundry and dry cleaning equipment • vending equipment • office equipment	

General	Specific	Inclusions	Exclusions
	E 1020 Institutional Equipment	• ecclesiastical equipment • library equipment • theater and stage equipment • instrumental equipment • audio-visual equipment • detention equipment • laboratory equipment • medical equipment • mortuary equipment	
	E 1030 Vehicular Equipment	• vehicular service equipment • parking control equipment • loading dock equipment	
	E 1090 Other Equipment	• maintenance equipment • solid waste handling equipment • food service equipment • residential equipment • unit kitchens • darkroom equipment • athletic, recreational, and therapeuticequipment • planetarium equipment • observatory equipment • agricultural equipment	
E 20 Furnishings	**E 2010 Fixed Furnishings**	• fixed artwork • fixed casework • window treatment • fixed floor grilles and mats • fixed multiple seating • fixed interior landscaping	
	E 2020 Movable Furnishings	• Includes • movable artwork • furniture and accessories • movable rugs and mats • movable multiple seating • movable interior landscaping	
F 10 Special Construction	**F 1010 Special Structures**	• air-supported structures • pre-engineered structures • other special structures	

Appendix B – CSI Division Numbers and Titles

CSI Division Numbers and Titles

Procurement and Contracting Requirements Group

Division 00 Procurement and Contracting Requirements

General Requirements Subgroup

Division 01 General Requirements

Division 02 Existing Conditions
Division 03 Concrete
Division 04 Masonry
Division 05 Metals
Division 06 Wood, Plastics & Composites
Division 07 Thermal & Moisture Protection
Division 08 Openings
Division 09 Finishes
Division 10 Specialties
Division 11 Equipment
Division 12 Furnishings
Division 13 Special Construction
Division 14 Conveying Equipment
Division 15 *Reserved*
Division 16 *Reserved*
Division 17 *Reserved*
Division 18 *Reserved*
Division 19 *Reserved*

Facility Services Subgroup

Division 20 *Reserved*
Division 21 Fire Suppression
Division 22 Plumbing
Division 23 Heating, Ventilating & Air Conditioning
Division 24 *Reserved*
Division 25 Integrated Automation
Division 26 Electrical
Division 27 Communications
Division 28 Electronic Safety & Security
Division 29 *Reserved*

Site and Infrastructure Subgroup

Division 30 *Reserved*

Division 31 Earthwork
Division 32 Exterior Improvements
Division 33 Utilities
Division 34 Transportation
Division 35 Waterway & Marine Construction
Division 36 *Reserved*
Division 37 *Reserved*
Division 38 *Reserved*
Division 39 *Reserved*

Process Equipment Subgroup

Division 40 Process Integration
Division 41 Material Processing & Handling Equipment
Division 42 Process Heating, Cooling & Drying Equipment
Division 43 Process Gas & Liquid Handling, Purification & Storage Equipment
Division 44 Pollution Control Equipment
Division 45 Industry Specific Manufacturing Equipment
Division 46 *Reserved*
Division 47 *Reserved*
Division 48 Electrical Power Generation
Division 49 *Reserved*

Appendix C – CSI Detailed Divisions

CSI MasterFormat 2004 Structure

1. **Groups, Subgroups, and Division—** the highest levels of organization:
   - Quantity of divisions increased from 16 to 34 active divisions (plus 16 reserved for expansion).
   - For continuity, Divisions 03 through 14 (building construction work) remain basically the same.
   - New divisions allow more flexibility for specifying civil, process, and other engineering work.
2. **Section Numbers and Titles:**
   - Numbers generally have three pairs of numbers (6 digits, each pair defining a level of specificity.
   - An optional fourth pair of numbers (Level 4) is used for when greater specificity is required.
   - Additional numbers and letters can be added (Level 5) for user-assigned numbers.
   - Spaces between pairs are optional and should be made with word processing "hard space" function.
   - Titles are work results when practical: "Painting" not "Paints," "Lighting" not "Luminaries."

Scope (Old Terms)	**Levels**	**MF 1995**	**MF 2004**
Division	Level **1**	**11**234	**11** 22 33
Broad Scope	Level **2**	11**2**34	11 **22** 33
Medium Scope	Level **3**	112**3**4	11 22 **33**
Narrow Scope (If Needed)	Level **4**	1123**4**	11 22 33.**44**
User Defined (If Needed	Level **5**	Not Used	11 22 33.44**55ABC**

3. **Unassigned Numbers:** Unassigned numbers can be user defined. Divisions should not be used.

CSI Detailed Divisions

DIVISION OF CAPITAL ASSET MANAGEMENT
THE COMMONWEALTH OF MASSACHUSETTS
STANDARD SPECIFICATIONS

Designers and Cost Estimators are referred to the above DCAM publication for a comprehensive listing of the classification of work according to CSI MasterFormat 2004™. These detailed estimates are only required at the end of Design Development and during Construction Documents phases. Particular attention should be paid to the breakup of the Estimate for each Filed Sub Bid under MGL 149. Clauses for this breakup are identified in this index with an * where applicable. Some clauses are included with others for the purpose of MGL 149 and these are noted. The exact scope for work in each clause is described in detail in each section of the DCAM manual.

The Estimator must also take account of the General Provisions specification (Summary Section 011000) for any project specific or unusual conditions and requirements which may influence the estimate.

DETAILED CSI BREAKDOWN SECTIONS FOR SPECIFICATION AND ESTIMATE

DIVISION 01 - GENERAL REQUIREMENTS

Section 011000	Summary
Section 012200	Unit Prices
Section 012300	Alternates
Section 013100	Project Management, Coordination and Commissioning
Section 013200	Construction Progress Documentation
Section 013300	Submittal Procedures
Section 014000	Quality Requirements
Section 014200	References
Section 014325	Testing Agency Services
Section 015000	Temporary Facilities and Controls
Section 015716	Temporary Pest Control
Section 016000	Product Requirements
Section 017419	Construction Waste Management and Disposal
Section 017700	Contract Closeout
Section 018113	Sustainable Design Requirements

DIVISION 02 - EXISTING CONDITIONS

Section 023000	Subsurface Investigation
Section 024100	Demolition

DIVISION 03 - CONCRETE

Section 033000 Cast-In-Place Concrete

DIVISION 04 - MASONRY

Section 040001 * Masonry Work
Section 042000 Unit Masonry (part of 040001 FSB)
Section 044200 Exterior Stone Cladding

DIVISION 05 - METALS

Section 050001 * Miscellaneous and Ornamental Iron
Section 051200 Structural Steel Framing
Section 052100 Steel Joist Framing
Section 053100 Steel Decking
Section 054000 Cold-Formed Metal Framing
Section 055000 Metal Fabrications (part of 050001 FSB)
Section 055100 Metal Stairs (part of 050001 FSB)

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES

Section 061000 Rough Carpentry
Section 061600 Sheathing
Section 064023 Interior Architectural Woodwork

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 070001 * Waterproofing, Damp-proofing and Caulking
Section 070002 * Roofing and Flashing
Section 071113 Bituminous Damp-proofing (part of 070001 FSB)
Section 071326 Self-Adhering Sheet Waterproofing (part of 070001 FSB)
Section 071413 Hot Fluid-Applied Rubberized Asphalt Waterproofing (part of 070001 FSB)
Section 071613 Polymer Modified Cement Waterproofing (part of 070001 FSB)
Section 071616 Crystalline Waterproofing (part of 070001 FSB)
Section 072100 Thermal Insulation
Section 072713 Modified Bituminous Sheet Air Barriers (part of 070001 FSB)
Section 074213 Metal Wall Panels
Section 075216 SBS Modified Bituminous Membrane Roofing (part of 070002 FSB)
Section 075323 EPDM Roofing (part of 070002 FSB)
Section 075400 Thermoplastic Membrane Roofing (part of 070002 FSB)
Section 076200 Sheet Metal Flashing and Trim (part of 070002 FSB)
Section 077200 Roof Accessories
Section 078100 Applied Fireproofing
Section 078413 Penetration Firestopping
Section 078446 Fire-Resistive Joint Systems
Section 079200 Joint Sealants (part of 070001 FSB)
Section 079500 Expansion Control

DIVISION 08 - OPENINGS

Section 080001 *	Metal Windows
Section 080002 *	Glass and Glazing
Section 081113	Hollow Metal Doors and Frames
Section 081416	Flush Wood Doors
Section 083323	Overhead Coiling Doors
Section 083326	Overhead Coiling Grilles
Section 083613	Sectional Doors
Section 084113	Aluminum-Framed Entrances and Storefronts
Section 084413	Glazed Aluminum Curtain Walls
Section 085113	Aluminum Windows (part of 080001 FSB)
Section 085200	Wood Windows
Section 086300	Metal-Framed Skylights
Section 087100	Door Hardware
Section 088000	Glazing (part of 080002 FSB)
Section 089000	Louvers and Vents

DIVISION 09 - FINISHES

Section 090001 *	Lathing and Plastering
Section 090002 *	Tile
Section 090003 *	Acoustical Tile
Section 090004 *	Marble
Section 090005 *	Resilient Floors
Section 090006 *	Terrazzo
Section 090007 *	Painting
Section 092116	Gypsum Board Assemblies
Section 092117	Gypsum Board Shaft Wall Assemblies
Section 092400	Portland Cement Plastering (part of 090001 FSB)
Section 093000	Tiling (part of 090002 FSB)
Section 095113	Acoustical Panel Ceilings (part of 090003 FSB)
Section 096340	Stone Flooring
Section 096519	Resilient Tile Flooring (part of 090005 FSB)
Section 096600	Terrazzo Flooring (part of 090006 FSB)
Section 096816	Sheet Carpeting
Section 097510	Marble Facing (part of 090004 FSB)
Section 099000	Painting and Coating (part of 090007 FSB)

DIVISION 10 - SPECIALTIES

Section 101100	Visual Display Surfaces
Section 101400	Signage
Section 102113	Toilet Compartments
Section 102213	Wire Mesh Partitions
Section 102226	Operable Partitions
Section 102813	Toilet Accessories
Section 104400	Fire-Protection Specialties
Section 105113	Metal Lockers

DIVISION 11 - EQUIPMENT

Section 113100 Appliances
Section 114000 Foodservice Equipment
Section 115213 Projection Screens

DIVISION 12 - FURNISHINGS

Section 122213 Horizontal Louver Blinds
Section 124813 Entrance Floor Mats and Frames

DIVISION 14 - CONVEYING EQUIPMENT

Section 140001 * Elevators
Section 142400 Hydraulic Elevators (part of 140001 FSB)
Section 144200 Wheelchair Lifts (part of 140001 FSB)

DIVISION 21 - FIRE SUPPRESSION

Section 210001 * Fire Protection

DIVISION 22 - PLUMBING

Section 220001 * Plumbing

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

Section 230001 * Heating, Ventilating and Air-Conditioning

DIVISION 26 - ELECTRICAL

Section 260001 * Electrical Work

DIVISION 31 - EARTHWORK

Section 311000 Site Clearing
Section 312000 Earth Moving
Section 312500 Erosion and Sedimentation Controls

Appendix D – ASTM STANDARD E1557 UNIFORMAT II

ASTM E1557, UNIFORMAT II, defines a standard classification for building elements and related sitework. The classification was the direct responsibility of Subcommittee E-06.81 on Building Economics.

DCAM Elemental Estimates are to be submitted in accordance with the structure below, except that the whole of the Major Group Elements are to be summed before margins and allowances are added in accordance with instructions in this document. DCAM does not require Sitework Elements to be separated.

ASTM UNIFORMAT II Standard Classification for Building Elements E1557-97
98.07.29

Level 1 Major Group Elements	**Level 2 Group Elements**	**Level 3 Elements**
A. SUBSTRUCTURE	A10 Foundations	A1010 Standard Foundations A1020 Special Foundations A1030 Slab on Grade
	A20 Basement Construction	A2010 Basement Excavation A2020 Basement Walls
B. SHELL	B10 Superstructure	B1010 Floor Construction B1020 Roof Construction
	B20 Exterior Enclosure *	B2010 Exterior Walls B2020 Exterior Windows B2030 Exterior Doors
	B30 Roofing	B3010 Roof Coverings B3020 Roof Openings
C. INTERIORS	C10 Interior Construction	C1010 Partitions C1020 Interior Doors C1030 Fittings *
	C20 Stairs *	C2010 Stair Construction C2020 Stair Finishes
	C30 Interior Finishes	C3010 Wall Finishes C3020 Floor Finishes C3030 Ceiling Finishes
D. SERVICES	D10 Conveying *	D1010 Elevators & Lifts * D1020 Escalators & Moving Walks D1090 Other Conveying Systems *
	D20 Plumbing	D2010 Plumbing Fixtures D2020 Domestic Water Distribution D2030 Sanitary Waste D2040 Rain Water Drainage D2090 Other Plumbing Systems *

ASTM UNIFORMAT II Standard Classification for Building Related Sitework E1557-97
98.07.29

Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Elements
G. BUILDING SITEWORK	G10 Site Preparation	G1010 Site Clearing G1020 Site Demolition and Relocations G1030 Site Earthwork G1040 Hazardous Waste Remediation
	G20 Site Improvements	G2010 Roadways G2020 Parking Lots G2030 Pedestrian Paving G2040 Site Development G2050 Landscaping
	G30 Site Mechanical Utilities *	G3010 Water Supply * G3020 Sanitary Sewer G3030 Storm Sewer G3040 Heating Distribution G3050 Cooling Distribution G3060 Fuel Distribution G3090 Other Site Mechanical Utilities *
	G40 Site Electrical Utilities	G4010 Electrical Distribution G4020 Site Lighting * G4030 Site Communications & Security * G4090 Other Site Electrical Utilities *
	G90 Other Site Construction *	G9010 Service and Pedestrian Tunnels* G9090 Other Site Systems *

Level 1 Major Group Elements	Level 2 Group Elements	Level 3 Elements
* Changes to previous E1557-96 Standard	D30 HVAC	D3010 Energy Supply D3020 Heat Generating Systems D3030 Cooling Generating Systems D3040 Distribution Systems D3050 Terminal & Package Units D3060 Controls and Instrumentation D3070 Systems Testing & Balancing * D3090 Other HVAC Systems & Equipment *
	D40 Fire Protection	D4010 Sprinklers * D4020 Standpipes * D4030 Fire Protection Specialties D4090 Other Fire Protection Systems *
	D50 Electrical	D5010 Electrical Service & Distribution D5020 Lighting & Branch Wiring D5030 Communication & Security * D5090 Other Electrical Systems *
E. EQUIPMENT & FURNISHINGS	E10 Equipment	E1010 Commercial Equipment E1020 Institutional Equipment E1030 Vehicular Equipment E1090 Other Equipment *
	E20 Furnishings	E2010 Fixed Furnishings E2020 Movable Furnishings
F. SPECIAL CONSTRUCTION & DEMOLITION	F10 Special Construction	F1010 Special Structures F1020 Integrated Construction F1030 Special Construction Systems F1040 Special Facilities F1050 Special Controls and Instrumentation
	F20 Selective Building Demolition	F2010 Building Elements Demolition F2020 Hazardous Components Abatement

Appendix E – Building Floor Area Measurements

Appendix F — Bibliography

ASTM Standard E1557 UNIFORMAT II

ASTM–Measurement of Buildings

BNI_____

CSI Master Format _____

GSA _____

DCAM Designers Procedures Manual

DCAM Project Management Manual

DCAM Standard Specifications

NIST Uniformat II, Level-3 Element

R.S. Means_____

Appendix G — Acronyms

ADA	Americans with Disabilities Act
AMP	Affirmative Market Program
ANF	(*Executive Office for*) Administration and Finance
APSA/PSAA	Account information
CAMIS	Capital Asset Management Information System
CF	Cubic Foot
CCR	Clarification Change Request
CM	Construction Manager
DCAF	DCAM Commissioner Approval Form
DCAM	Division of Capital Asset Management
DPS	Department of Public Safety
DSB	Designer Selection Board
ECC	Estimated Construction Cost
FFE	Furniture, Fixtures and Equipment
FPE	Facility Performance Evaluations
GFA	Gross Floor Area
GMP	Guaranteed Maximum Price
HEFA	Health and Education Finance Authority (Federal Government)
IPC	Information Processing Center
ISA	Interagency Service Agreement
LEED	Leadership in Energy and Environmental Design program.
MAAB	Massachusetts Architectural Access Board
MADEP	Massachusetts Department of Environmental Protection
MBE	Minority Business Enterprise
MEPA	The Massachusetts Environmental Policy Act

MGL	Massachusetts General Law
MOU	Memorandum of Understanding
MSA	Master Services Agreement
NFA	Net Floor Area
NOI	Notice of Intent
OFA	Office of Finance and Administration
OFM	Office of Facilities Maintenance
OGC	Office of the General Counsel
OH&P	Home Office Overhead
OPDC	Office of Planning, Design and Construction
OSD	Operational Services Division
P-3	Primavera Version 3 Scheduling Software
PCO	Potential Change Order
PMAS	Project Management and Accounting System
PMT	Procurement Management Team
PNF	Project Notification Form
PV	Payment Voucher form
QRS	Quick Response Survey
RE	Resident Engineer
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualifications
RFR	Request for Response
ROF	Reservation of Funds
SF	Square Foot
SRC	State Records Center

TPC	Total Project Cost
WBE	Women's Business Enterprise

Appendix H — Glossary

801 CMR 21	Regulations for procuring a good or service.
Appropriations	Funds made available through acts of the state legislature, which stipulate the use of funds.
As-Built Drawings	Drawings of the project based on information provided by the Contractor.
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.
Capital Spending Plan	The plan, submitted by DCAM and approved by ANF, that lists projects and their associated spending projections.
CF Estimate	Construction Estimate expressed as a cost rate in $ per CF of floor area of the building.
Change Orders	These are issued to initiate changes to the project during construction.
Client Agencies	The agencies for which DCAM provides projects and services. These include agencies in the Executive Branch, Higher Education, the Judiciary and counties.
Commissioning	The process of ensuring that the project's design intent has been met at the conclusion of Construction.
Construction Manager	Construction Industry Contractor, or consulting firm, engaged by DCAM to manage projects using "CM at Risk" procurement as defined in MGL 193.
Commissioning Agent	The person who works with the Designer to establish the standards a project must meet and to develop testing procedures that will measure whether the standards are achieved.
Comm-Pass	The state's electronic procurement system.
Compliance Office in OGC	The office charged with ensuring that Contract provisions relative to MBE/WBE participation, minority workforce and prevailing wages are met.
Construction Control Affidavits	Certification that the state construction project followed the Designer's documents and the Massachusetts State Building code.
Construction Phase	Formal stages for bidding, contract award, construction and project completion as defined in DCAM's Designers Procedures Manual.
DCAF	The DCAM Commissioner Approval Form describes a project, estimates costs associated with each major phase, identifies the funding source and forecasts project spending by fiscal year. It also indicates the Fixed Asset

	ID number.
Design Fees	The fees payable to the Designer under contract for preparation of the scheme through all Design Phases, for providing Specialist Sub-consultant services, and management during the Construction Phase.
Design Phase	Formal stages of design work through the project life-cycle as defined in DCAM's Designers Procedures Manual.
Direct Payments	Filed sub-bidders, approved MBEs/WBEs or entities previously approved by DCAM for the specific project can request direct payments; they are processed through OGC.
Estimated Construction Cost	The estimated cost of all work described in the Construction Documents that is included in the Bid Package and contract.
Emergency Waiver	Sets aside certain provisions of the public procurement laws to allow for expedited procurement to correct situations that pose an imminent threat to the health and safety of people or property. It is authorized by OGC.
Estimated Construction Cost	The estimated cost to construct a project. Does not include related project development costs.
Facility Performance Evaluations	Conducted within several years after occupancy, these may result in guidelines for building types, revisions to standard specifications, changes to project management procedures, and considerations for planning and design.
Filed Sub-Bids	Subcontractor work to be performed by filed sub-bidders when the cost in any 17 statutorily defined categories of work is estimated to exceed $20,000.
Fixed Asset Database	Tracks improvements to state assets to allow for accurate reporting by the State Comptroller
Forms Library	OPDC project documents are located in one of two central repositories – in PMAS or on OPDC's dedicated electronic directory. These forms should be used as the basis for project-generated correspondence.
General Contractor	Performs work on both new construction and building repair projects.
Global Workshops	These ensure DCAM staff members and, as requested, other parties with specific subject-matter expertise have an opportunity to comment on the project during the Design Phase.
Horizontal Construction/ Chapt. 30 Projects	Covers such construction as site work or roadways, very similar to other DCAM-administered projects without requiring designer selection through the DSB, filed sub-bids or Contractor certification.
House Doctors	Engineering/architectural firms hired by DCAM to assist in support of ongoing new construction/major renovation projects or in smaller repair or renovation projects.

IPC, Information Processing Centers	Central receiving areas in OPDC for boxes for mail, distribution (including copying), travel reimbursements, vacation requests and other general needs.
Kickoff Meeting	This meeting helps to establish points of contact, set expectations and review the project requirements.
LEED	The US Green Buildings Council's Leadership in Energy and Environmental Design program.
Lessons Learned Database	Established by DCAM, it is an internal communication system, including a database, for disseminating knowledge/experiences.
Liquidated Damages	Damages incurred as a result of delays in completing the work.
Massets	A Geographic Information System that contains information on all land and buildings in a mapping program.
Master Oversight Form	A form completed at the beginning and end of the transferred projects by Client Agencies to provide summary project information to OPDC.
Monthly Oversight Form	Forms provided during the implementation of the transferred projects that Client Agencies use to report project progress.
Monthly Progress Workshops	Provides for timely decisions on Design Phase items, ensures that project goals are met, and keeps the project on schedule.
MSA, Master Services Agreement	This is developed between a number of environmental consulting and geotechnical engineering firms and DCAM. OPDC Environmental staff provides and administer these contracts.
Notice to Proceed	Official written notice to Contractors from DCAM authorizing work to begin as of the date specified therein.
OFA	Office of Finance and Administration
OH&P	Home Office Overhead covers Overhead, Administrative costs, and Profit.
OPDC Manager	The Program Manager or Project Manager that is the lead on a project at a particular point in the job.
Owner-Contractor Agreement	Boilerplate component of Construction Contracts.
Partnering Meeting	Construction Phase kick-off meeting at which all parties meet to agree on project goals and objectives.
Plan Holders List	A list of individuals that request and receive bid packages, including plans and specifications; it is maintained in the Bid Room.
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.
PNF	A Project Notification Form submitted to the Massachusetts Historical Commission.
Preliminary Estimate	Also known as Budget Estimates, these are prepared prior to any conceptual design or site selection. The basis for measurement and pricing is the client's requirements and previous historical cost information.
Program Manager	The Lead in the Study Phase of projects. After the Design Contract has been executed, the lead of the project may be transferred to a Project Manager with architectural, engineering or construction experience. However, it is not unusual for the Program Manager to become the Project Manager.
Project Manager	The Project Lead after the Design Contract has been executed.
Project Number	An intelligent number that denotes the Client Agency, the current fiscal year, a sequential assignment, the contract type and project phase.
Project Oversight Checklist	A list provided to Client Agencies to which project control and supervision is delegated. It identifies major procurement elements and activities. The Deputy Director completes the Checklist during or immediately following a site visit to check on the status of the project.
Project Team	A Project Team is comprised of Program Managers, Project Engineers, Energy Team staff, Project Managers and Deputy Directors; a Resident Engineer is part of the Project Team during the Construction Phase.
Punch List	A list of items still outstanding when a project is 99% complete.
PV	A state-issued Payment Voucher Form on which all Consultants, Contractors or Suppliers must submit payment requests.
Quick Response Surveys	These are intended to capture feedback about building performance so that necessary adjustments can be made within the warranty period for systems and materials.
Record Drawings	Drawings prepared by the Designer upon completion of a Construction project, based on As-Built Drawings provided by the General Contractor.
RE, Resident Engineer	The RE is DCAM's on-site project representative during Construction.
Retainage	Percentage of project construction cost that is held by DCAM until the project is completed.
ROF (Reservation of Funds)	Form to secure approval to fund non-contractor services associated with a project. (Changes to Contractor services are authorized via Change Orders.)

Schedule of Values	Serves as the basis for monthly payment requests
SF Estimate	Construction Estimate expressed as a cost rate in $ per SF of floor area of the building.
Study Certification	Certification validates the Study as corresponding to the current needs of the agency and its long-term capital facilities development plan. The certificate identifies the funding source for the project.
Study Certification Checklist	This goes to the Client Agency that is seeking delegation of the Study Phase of a project to ensure the Study contains the necessary information for certification.
Substantial Completion	The point in a project when less than one (1) percent of the contract value, including Change Orders, remains to be finished and all work associated with health, welfare and building function is complete.
Sustainable Design Checklist	Indicates the measures considered and included in the Study and in the Design.
Total Project Cost	The ECC plus all soft costs, management costs, and other service costs making up the total cost of a project to DCAM.
Transfer Project/Delegation	The process by which the DCAM Commissioner may delegate control and supervision of building projects up to $1 million to Client Agencies for implementation.
Use/Occupancy Certificate	Certifies the project or portions of the project are determined safe to occupy per the building code.

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