Client Information

Introduction

Jones Lang LaSalle ("JLL") had been retained by Capital One to serve as its Development Manager to handle the day-to-day administration of the project and facilitate effective communication within the project team. It is in the role as Development Manager that JLL solicit proposals from qualified construction management firms. Due to the unique nature of the Lecture Hall project and the schedule requirements involved, JLL and Capital One desire to engage the services of the Consultant as early as possible in its planning and design process.

Project Overview

Purpose Statement

The primary drive for this project resides in the need to allow Capital One the ability to continue and expand its ongoing utilization of large meetings, currently held off-site at the University of Virginia Darden facility. The creation of an addition to the existing building is seen as an opportunity to create a flexible, multi-functional amenity that supports and facilitates the collaborative culture inherent within the organization. Locating a Lecture Hall facility on the headquarters' campus provides a local venue that offers opportunities for the CEO and other senior executives to meet with staff, both formally in the auditorium or informally in the Garden Atrium.

Summary of Project Program Requirements

Sizing of the new addition is the result of both program needs and the remaining square footage allowable based on the site's floor to area ratio (FAR). Phase I construction has an area of 479,622 ft^2. With an approved FAR of 500,000 ft^2, a 20,378 ft^2 addition to the existing structure is allowed. The level of design is based on a "business class" image that will complement and respect the architecture of the existing office tower.

Critical program requirements presented by Capital One to be incorporated within the new facility include:

- A Lecture Hall with approximately 400 seats, designed to accommodate large meetings, recruiting events, and educational sessions.
- A design that will allow the Lecture Hall to be divided to accommodate smaller meetings while providing a more intimate facility.
- A stage with front-screen projection as well as audio-visual support. Flexible lighting for both the audience chamber and stage that is appropriate for Capital One's methods of presentation, which can include two presenters at the same time.
- A Lecture Hall design with architectural, interior finish and structural properties that shelter the hall from unwanted outside noise while enhancing the acoustical experience within.
- Lecture Hall seating that is comfortable, stadium-style, uni-directional and on one level; seating will facilitate long meetings and a wide range of presentations by including tablet arms, power, and wireless internet access.
- Support space, including a green room, breakout space, a catering pantry, administrative space and two mid-size conference rooms.

Summary of Design Concepts

- Integrate the new structure into the existing headquarters structure and reinforce the strength of the total architectural experience.
- Create an autonomous identity for the Lecture Hall without detracting from the existing headquarters building.
- Provide a garden atrium to create a transitional link between the existing structure and the new facility.
- Create a structure that offers Capital One's staff a multi-functional facility that also reinforces the collaborative culture of the organization by enhancing face-to-face interaction.
- Incorporate sustainable design elements and efficiencies to create a high performance building.

Project Teams

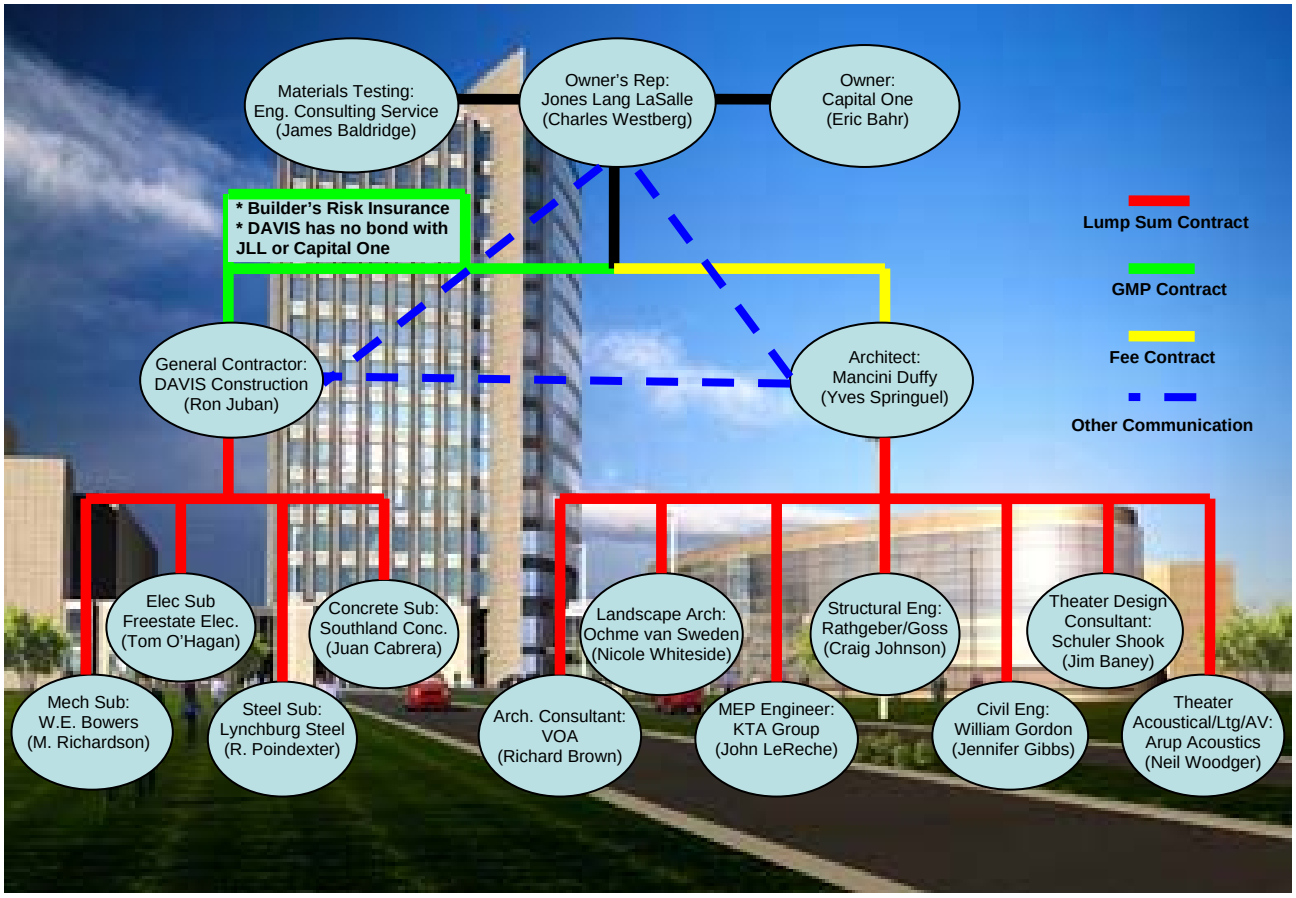

Figure 1. Lecture Hall Project Team Schematic

Delivery System

Starting at the earliest recorded actions of the Lecture Hall Addition project on June 23, 2004, Capital One has had countless decisions to make. During this time it was in their best interest to release a design team to further advance the development of the project and a civil engineer to develop a preliminary site plan. With the help of JLL and Engineering Consulting Services ("ECS") performing existing soils tests, project procurement was on the way. Mancini Duffy was awarded a "Fee" contract with JLL because of other smaller projects occurring on site and their involvement with them. Although the Lecture Hall is the main focus for Mancini Duffy, they can utilize their "Fee" capabilities since Capital One and JLL have had additional design requests affecting the overall site.

With the design phase in full swing, another consultant and landscape architect were assigned to the Lecture Hall with a lump sum because of their familiarity with the base building. Between mid-July and early September of 2004, the remaining portion of the Architectural and Engineering Team was mobilized. Rathgeber/Goss Associates came under a lump sum contract with Mancini Duffy during this time. An MEP Engineer was soon to follow and the KTA Group was awarded its own contract. Theater Design assistance from Schuler Shook and Arup Acoustics began once the two firms signed their lump sum agreement with Mancini Duffy.

These lump sum contracts between the architect, engineers, and designers are fairly standard in the industry when projects are not incredibly technical. The ability to maintain lump sum drawings make it more convenient for the architect in sustaining an accurate "Fee" with JLL.

As major design teams got involved in the Lecture Hall project, Capital One also needed to find itself a General Contractor. Following suit with the base building, James G. Davis Construction had a slight advantage over other GC's in obtaining the work.

With the relatively short project duration and cost in comparison to the base building, DAVIS does not hold a bond with JLL. Their minute chance of going out of business and their great reputation with Cap One has allowed them to do this. Although, DAVIS has purchased Builder's Risk Insurance to insure the Lecture Hall while it is under construction and decrease liability. This insurance is provided for loss resulting from accidental direct physical damage to the structure.

Key communication lines are also represented between the three major players involved in this project. The Owner holds weekly meetings with the Architect, GC, and Engineers. Any changes made by the Owner are passed onto Mancini Duffy, which then travel to the engineers for review and re-submission. Once resubmitted and approved by the Architect, the GC obtains the documents to be passed to the subcontractors for their review. In order to keep a well informed construction staff, the DAVIS holds weekly meetings with subcontractors. Any changes in cost or scope of work will be evaluated by DAVIS and sent to JLL and Mancini Duffy. Final submittals are always passed onto Capital One and JLL from DAVIS.

Given the fast-track of the project, JLL and Capital One entered into a Guaranteed Maximum Price (GMP) contract with a general contractor. Such a contract will be between Capital One and James G. Davis Construction Company.

Staffing Plan

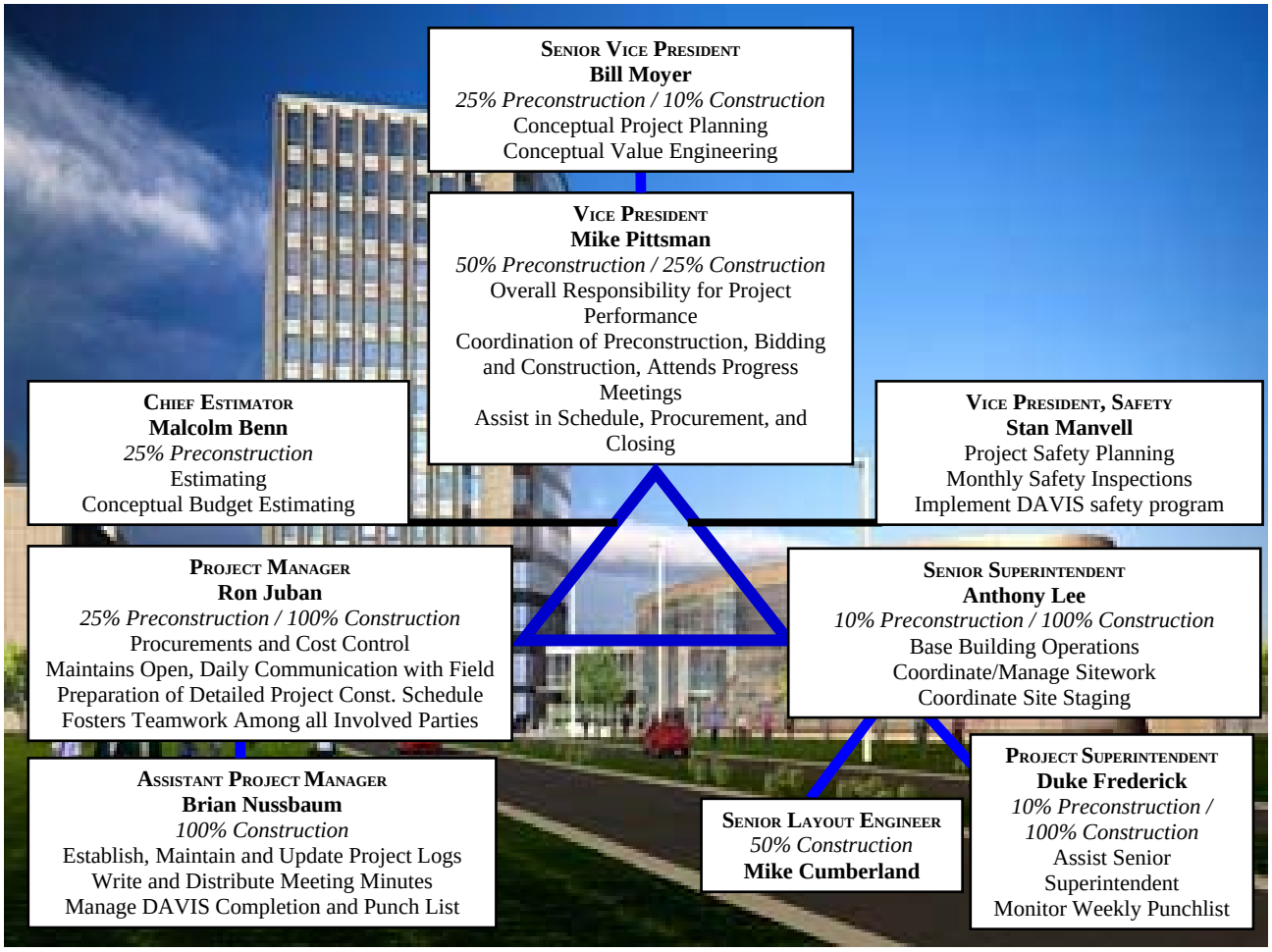

Figure 2. DAVIS Staffing Plan Schematic
*As of 23 September 2005

In order to maximize productivity and minimize excess General Conditions costs throughout the Lecture Hall Addition, DAVIS developed the employee organization chart that can be seen above. The percentages below each name, accompanying the preconstruction and construction processes, account for the amount of their time devoted to the project during that phase.

A majority of the preconstruction work is to be split between 6 of the 9 team members listed. As the Senior Vice President and Vice President of DAVIS, it was the job of Bill Moyer and Mike Pittsman to do a majority of the initial project engineering and planning. Once DAVIS generated an appropriate cost estimate, the project manager and site superintendents needed to become more accustomed to the existing site conditions and the proposed design development.

With the construction phase of the Lecture Hall being in full swing, both superintendents and the two project managers have been spending all of their hours on this project. In order to keep everyone on this team at DAVIS up-to-date with construction progress, a free flow of information is required between the Vice President, Project Managers, and Superintendents. To lighten some of the tasks requested of the Senior Superintendent, the Senior Layout Engineer develops site layouts and helps to resolve some preliminary trade coordination issues. Throughout the entire project, Stan Manvell oversees the work being performed on site and executes safety checks to make sure everything is in order to reduce the chance of accidents.

Existing Construction Conditions

Local Conditions

With all of the construction going on in the Virginia and Washington, D.C. area, all work must follow local laws and zoning requirements. One point of interest is the height restriction law enacted by Congress in 1899 which ensures that no private structure in Washington, D.C., will extend higher than the Capitol. Although the Capital One Lecture Hall is in Virginia, this law is only for the District of Columbia and does not affect the surrounding counties.

The project site is located north of and adjacent to the existing Capital One Building in Tysons Corner, Fairfax County, Virginia. Within the 29 acre plot of land, construction parking and deliveries are not a concern. A separate access road has been constructed at the end of Scott's Crossing Road and contains around 20 temporary parking spaces.

A typical soil profile in this area consists of a thin layer of clayey silt or silty clay near the ground surface, where weathering is more advanced. The near surface clay soils transition to more granular, less weathered soil with depth. The density of the soils generally increases with depth as a result of the reduced extent of the weathering process. It is not unusual to find lenses and boulders of hard rock and zones of decomposed rock within the soil mantle well above the general bedrock level.

Fairfax County Soils Mapping indicates that the surface soils in the eastern half of the site are Glenelg soils, which occur in the high elevations or areas of the site. Meadowville soils, a type B soil, are mapped in the western half of the site, in the low, concave bottom slope and drainage areas. Both of these soils are described as silts and clays overlaying silty and sandy decomposed rock.

Site Layout and Utility Plan

Please view the Existing Site and Utility Plan within **Appendix A**.

Building Systems Summary

Demolition

Being an addition to Capital One's base building, the Lecture Hall project entailed demolition to the recently completed work. In total, two conference rooms and a coffee shop contained on the end of two separate floors had to be completely removed. The mechanical and electrical systems were cut and are to be re-routed in these spaces until the Lecture Hall is complete and can be tied back in. Structurally, all of the steel and post-tensioned slabs were knocked down. In order to maintain a structurally stable second floor slab, an additional beam was connected between an existing concrete column and steel column. The removal of lead paint or asbestos was not a problem in the demolition work of the new base building. Other than the countertops in the coffee shop, light fixtures, and concrete pavers in the patio, everything was eliminated.

Figure 3. Base Building Demolition

Structural Steel Frame

Due to the abnormally shaped building and large open spaces, the Lecture Hall had to be custom designed by the structural engineer. The elliptically shaped configuration prevents the use of repetitive steel sizes and typical bay dimensions. With the two large open spaces of the auditorium and garden atrium, the steel system had to be designed with moment connections. Cross bracing can only be found in the trusses for the roof. A 40-ton truck mounted crane from Link Belt has been used to place the regular steel pieces, but a larger undetermined crane will be needed for the roof trusses.

Figure 4. Garden Atrium Space

Cast-in-Place Concrete

The Lecture Hall is supported by a foundation with 14" thick shear walls and concrete column footings. Also, the facility utilizes slab on grade and concrete slabs on each floor level. The 5" slab on grade at the basement is reinforced with 6x6 – W2.0xW2.0 WWF on 6" No.57 stone. For the auditorium slab on grade, a similar system is used, except that it is a stepped concrete slab to conform to the seating elevation layout.

Figure 5. Ulma Forms in Staging Area

Figure 6. Ulma Forms

On this job there were multiple concrete placement methods as well as formwork types. Although all the shear walls were poured with the help of a 1.5 yard bucket attached to a 40-ton mobile crane, two different framing types were used. For the curved wall along the north end of the basement, special metal Ulma forms were used. A majority of the remaining shear walls were framed with wood forms constructed by hand on site. The wood forms allowed the concrete subcontractor to re-use them for multiple pours once the wall had set and forms taken down. All of concrete used for the slab on grade pours had been pumped.

Pre-cast Concrete

Besides the intricate glazing system designed and fabricated in Italy, the exterior of the Lecture Hall is mainly comprised of pre-cast concrete panels around the nose of the building. All of these panels which are to match the existing base building will be cast at the subcontractor's site in Virginia. Arban & Carosi will create the finished panels from their own concrete forms. Once they are complete, all of the pre-cast panels will be delivered to the site in sections 40' in height. One 70-ton hydraulic truck crane from Link Belt, model HTC-8670, will be used to maneuver the panels into place. The upper portions of the pre-cast have welded/bolted connections to the steel above to keep it from moving in and out. At the ground level, the panels are to be welded to plates on the concrete wall.

Figure 7. Installation of Pre-cast Panels

Mechanical System

The two mechanical rooms within the Lecture Hall are located in the basement. Mechanically, Capital One's lecture hall is supported by 3 air handling units and 2 boilers. While the air handing units supply the VAV boxes located throughout the building, the two 4,100 pound boilers will be utilized for heating and hot water. The base building supports the lecture hall system with a pair of 6" cold water supply and return runs. AHU-1,-2 and -3 respectively have 4,800 CFM, 19,200 CFM, and 10,725 CFM supply fans.

In the event of a fire, the Lecture Hall is equipped with a wet pipe sprinkler system with alarm indicators, check valve, tees, and all associated piping. Concealed sprinkler heads are located in all public areas, while pendent heads are in the storage and equipment rooms.

Electrical System

The Lecture Hall power distribution originates from the base building. By removing one existing 3 phase – 400A circuit breaker and replacing it with a new 3 phase – 1200A circuit breaker, the two main distribution panels can be supplied with power. Both main panel boards are specified to be 227/480V, 800A, 3 phase, 4 wire. MDP-A and MDP-B have a total connected/demand load of 464KVA / 397KVA and 280KVA / 280KVA respectively. The remaining secondary surface mounted panels are either 120/208V or 277/480V, 3 phase, 4 wire. In the event of an emergency, one 800KW life-safety generator and one 1750KW standby generator will supply power to the Lecture Hall.

Curtain Wall

Figure 8. Future Curtain Wall Location

At the front entrance of the building, it will be impossible not to notice the impressive glass screen wall spanning a width of around 180'. The entire glazing and support system, including the screen printed detailing, shall be manufactured in Italy. Steel rods that are to be anchored into the precast have four small wedges at the end of them to act as a sleeve for the corners of the class to be inserted in.

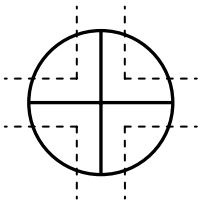

Figure 9. Glazing Sleeve on Rod

Project Schedule

The detailed project schedule included in **Appendix B** contains around 220 activities, each separated into its own respective portion of work. The construction phase of the Capital One Lecture Hall began on 03-May-05 and is projected to continue until 23-Aug-06. Seeing as though the proposed facility is only around 20,400 ft^2 and there is not an abundance of repetitive spaces, dividing the subcontracted work into short intervals would not be appropriate.

The breakdown in this schedule presented to Capital One and Jones Lang LaSalle consists of three major activities. These include base building construction from 5/3/05-4/11/06, site work from 3/21/06-6/6/06, interior construction from 8/23/05-8/3/06, owner occupancy between 7/14/06-7/31/06, and project closeout from 7/25/06-8/23/06. Since base building and interior construction are very large portions of this project, each of these activities is further broke down into smaller subdivisions.

Base building construction is separated into site preparation, demolition, concrete structure, waterproofing and backfill, steel structure, fire proofing, MEP rough-in, façade and roof, and elevators. Interiors are broken down into existing building, cellar, bathrooms, auditorium, 1st floor, 2nd floor, and planters and water fountain. Although not in chronological order, it is easier to track the work in each of these larger, non-repetitive spaces.

Project Cost Summary

Actual Project Summary

The table on the following page is a breakdown of the contracts awarded to each subcontractor and their respective work. These numbers were presented to the owner as a part of DAVIS' GMP proposal in August 2005. In reference to the FAR mentioned in the **Project Overview,** a building size of 20,400 ft^2 has been assumed for the Lecture Hall.

- Total Building Construction Cost (CC): **$13,270,291**
  - CC per ft^2: **$650.50/ft^2**
- Total Project Cost (TC): **$15,095,988**
  - TC per ft^2: **$740.00/ft^2**
- Mechanical System (HVAC & Plumbing): **$1,612,900**
  - Mechanical System per ft^2: **$79.06/ft^2**
- Electrical System: **$1,208,536**
  - Electrical System per ft^2: **$59.24/ft^2**
- Structural System (Concrete & Steel): **$2,012,944**
  - Structural System per ft^2: **$98.67/ft^2**
- Interior/Exterior Glass and Glazing: **$2,074,355**
  - Glass and Glazing System per ft^2: **$101.68/ft^2**

Parametric Estimate (Using D4 Cost 2005)

Using similar fine performing arts centers, the Lecture Hall was estimated to have a Total Building Cost of $4,782,000.

RS Means Square Foot Estimate

Considering the space is a lecture hall with a large garden atrium space in the lobby, comparable auditorium and commercial greenhouse rooms were used to calculate the square foot estimate. With a Fairfax, Virginia location factor of 0.91, the Lecture Hall was estimated to cost $3,123,000.

Total Project Bid Summary

CSI	Description	Recommended Subcontractor	IGMP
02200	General Excavation	PARRECO	$410,236
02250	Dewatering	DAVIS	$10,000
02510	Asphalt Paving	ALLOWANCE	$10,000
02560	Site Utilities	FRANK JOY	$71,415
02620	Site Concrete & Pavers	ALLOWANCE	$65,450
02815	Water Fountain System	DELTA FOUNTAIN	$72,220
02900	Landscaping & Irrigation	SUNSET HILLS	$158,179
02950	Site Development	DAVIS	$115,000
02951	Surveying	DAVIS	$0
02952	Demolition	NECO	$314,929
03300	Concrete	SOUTHLAND	$1,122,817
03450	Precast	ARBAN & CAROSI	$479,150
04200	Masonry	N/A	$0
04400	Stone	LORTON	$314,300
05120	Structural Steel	LYNCHBURG	$890,127
05500	Miscellaneous Metals	MISC. METALS	$359,728
06100	Carpentry	DAVIS	$103,035
06400	Millwork	PATELLA	$852,801
07100	Waterproofing	ADVANCED	$91,875
07250	Spray-on Fireproofing	DIAMOND	$86,700
07500	Roofing	PROSPECT	$147,661
07900	Caulking	CAULKING APPL.	$30,974
08110	Doors, Frames, & Hardware	ATLANTIC BUILDERS	$64,650
08800	Exterior Glass & Glazing	TSI / ARCHIGLAZE	$1,620,530
08801	Interior Glass & Glazing	TSI	$453,825
09250	Drywall & Ceilings	TRISTATE	$842,801
09310	Ceramic Tile & Stone Countertops	NICHOLAS TROIANO	$59,060
09680	Floor Finishes	EASTERN FLOORING	$136,500
09900	Painting & Wall covering	MILLER PAINTING	$62,300
09950	Stretched Fabric Panels	Z-BEST	$88,654
10160	Toilet Partitions & Accessories	ACCESSIBLE	$28,920
10200	Louvers	E.F. RODGERS	$2,100
10425	Interior Signage	ALLOWANCE	$10,000
10520	Fire Extinguishers	N/A	$0
10650	Operable Partition	SURFACE & SYSTEM	$15,280
11060	Lecture Hall Room Divider	AE MITCHELL	$125,000
11132	Projection Screens	MATERIAL DIST	$68,800
12000	Window Treatment	DIRECT PATH/SUN	$68,030
14200	Elevators	OTIS	$100,936
14430	Wheelchair Lift	ACCESS LIFTS	$20,000
15000	HVAC & Plumbing	W.E. BOWERS	$1,612,900
15300	Fire Protection	ECFP	$179,522
16000	Electrical	FREESTATE	$1,208,536
16720	Security	N/A	$0
18000	Auditorium Chairs	FIGUERAS	$795,350
	Expansion Joints	TBD	$0
	Total Direct Cost		**$13,270,291**
	General Conditions		$826,927
	Subtotal		**$14,097,218**
	Fee		$455,000
	Virginia Gross Receipts Tax (0.12%)		$17,463
	General Liability Insurance (0.40%)		$58,279
	Builder's Risk Insurance (0.25%)		$36,570
	Contingency (2%)		$431,458
	Performance % Payment Bond		$0
	GMP TOTAL		**$15,095,988**

Table 1. Project Bid Summary

Cost Evaluation

As you can see, both estimates fail to grasp the numerous unique features contained within Capital One's Lecture Hall Addition design. This space was designed to be a high end "upper-class, white collar" facility. In addition to the auditorium space, other architectural and building systems contribute to the challenging task of accurately estimating from known averages. Some of these distinct spaces which are not normally found in an auditorium include; a garden atrium and water features inside the lobby, medium-size conference rooms with audio-visual support, wireless internet throughout the auditorium space, a large skylight, and a glass screen wall system from Italy.

Afterword

The purpose of this background section was to familiarize the reader of Capital One's Lecture Hall project. As you proceed to read through this document, please consider the owner's desire to have a highly valuable Lecture Hall with a reasonably priced contract. With a better understanding of the client, general contractor, and the building systems, hopefully you may agree with the recommendations and analyses to follow.