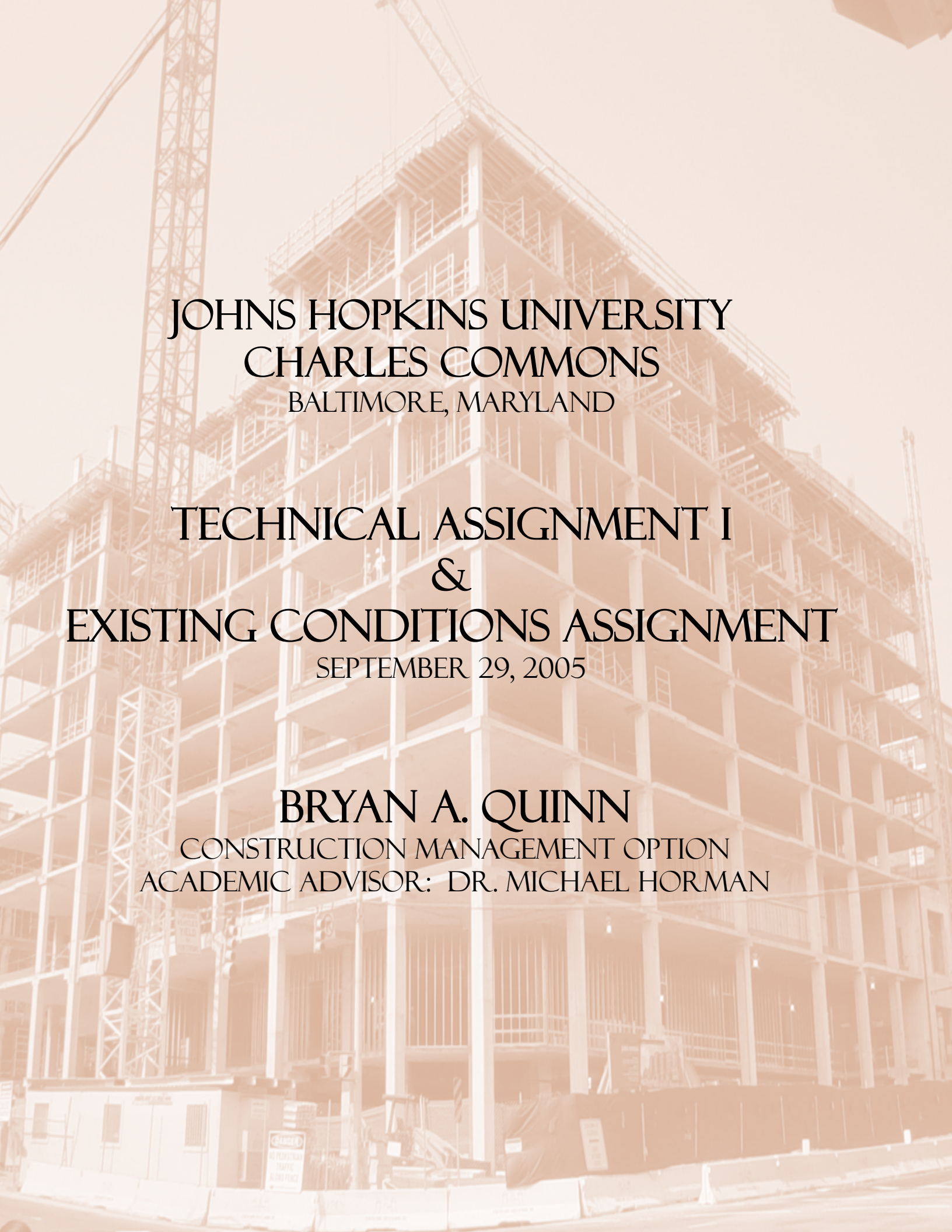

JOHNS HOPKINS UNIVERSITY
CHARLES COMMONS
BALTIMORE, MARYLAND

TECHNICAL ASSIGNMENT I
&
EXISTING CONDITIONS ASSIGNMENT
SEPTEMBER 29, 2005

BRYAN A. QUINN
CONSTRUCTION MANAGEMENT OPTION
ACADEMIC ADVISOR: DR. MICHAEL HORMAN

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Executive Summary

Charles Commons is Johns Hopkins University's $63.5 million dormitory and bookstore addition to its Homewood Campus in Baltimore, Maryland. Situated on the block between 33rd Street , St. Paul Street, and Charles Street; Charles Commons features two buildings that tower 10 and 12 stories above the surrounding neighborhoods and a connecting pedestrian bridge. Charles Commons began May 2004 and must complete before JHU students arrive for classes Fall of 2006.

In order to minimize risk, Johns Hopkins joint-ventured with Struever Brothers, Eccles, & Rouse to develop the property. SBER was also selected as the CM@Risk and awarded a GMP contract. SBER responded by assembling a nine-person project team and an army of experienced subcontractors, like Miller, Long, & Arnold.

Complex logistical issues and schedule delays have hampered the success of the job. After the design was complete, the demolition of the four buildings onsite was delayed by the discovery of asbestos. Local conditions caused construction sequencing to be inflexible and subject to delays during caisson pours and post-tensioning. These delays caused a 168-hour work week schedule and will result in lower productivity due to the impending trade-stacking.

When completed in Fall 2006, Charles Commons will be the first phase of a mult-million dollar expansion as Johns Hopkins University attempts to keep up with the record pace of enrollment at the Homewood Campus. The success of Charles Commons will be crucial to the ten-year development of Johns Hopkins University.

Project Schedule Summary

The schedule for Charles Commons can be divided into five stages: design, procurement, demolition, sitework, and construction. The St. Paul building was to be cleared for sitework first and the Charles building would closely follow. As in a typical Design-Bid-Build, few of these processes overlap, allowing residual setbacks from one stage to another which results in the delay the start of the other processes.

At Charles Commons, there were schedule delays associated with every one of these stages. In order to increase production and attempt to make up for lost time, construction is performed at a 24-hour, 7 day a week pace. Instead of using the traditional 40-hour work week, trades such as the cast-in-place concrete contractor are working shiftwork at an output of 168 hours each week. To speed production, most activities are double-manned, which produces trade-stacking.

In the original schedule, the St. Paul building's sitework is completed first to allow for early foundation work. Secondly, St. Paul's structure is poured by floors at a rate of one week per floor while the Charles building begins construction. However, the first four floors on St. Paul took more than three months to construct and the first few caissons for Charles building had to be poured a second time.

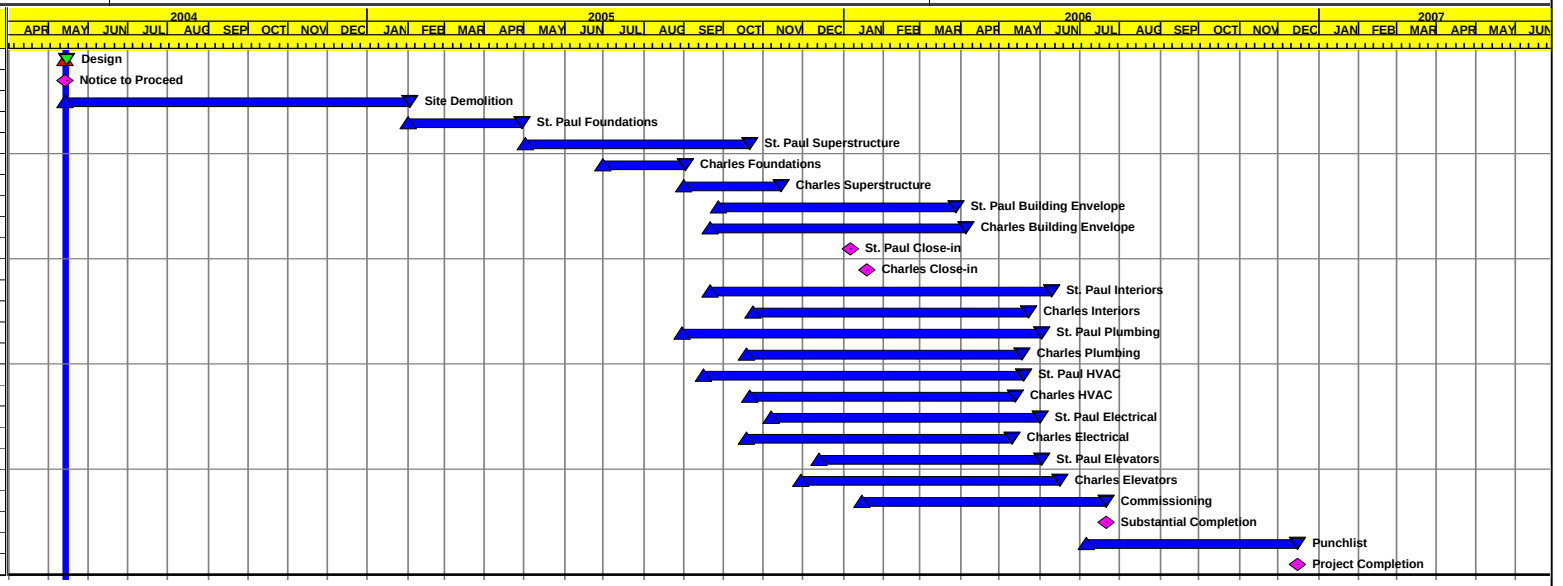
Again, each stage is completed on the St. Paul building before moving onto the Charles building. At the St. Paul building, sequencing starts at the St. Paul Street side and moves toward Lovegrove Street. At the Charles building, sequencing begins at the Charles Street side and moves toward Lovegrove Street additionally. This allows for material and delivery staging adjacent to Lovegrove Street when both of the structures have been completed since temporary lane closures were denied by the City of Baltimore. There is a material hoist placed at the northeast corner of the St. Paul building to enhance accessibility for deliveries.

Johns Hopkins University - Charles Commons
Baltimore, MD

Project Schedule Summary
Existing Conditions Assignment

Bryan Quinn
CM Advisor-Dr. Horman

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
A1	Design	1	14MAY04	14MAY04
A11	Notice to Proceed	0	14MAY04A	
A261	Site Demolition	188	14MAY04A	01FEB05A
A21	St. Paul Foundations	64	01FEB05A	29APR05A
A31	St. Paul Superstructure	124	02MAY05A	20OCT05A
A41	Charles Foundations	45	01JUL05A	01SEP05A
A51	Charles Superstructure	53	01SEP05A	14NOV05A
A61	St. Paul Building Envelope	130	27SEP05A	27MAR06A
A71	Charles Building Envelope	140	21SEP05A	04APR06A
A81	St. Paul Close-in	0		05JAN06A
A91	Charles Close-in	0		18JAN06A
A101	St. Paul Interiors	1	21SEP05A	09JUN06A
A111	Charles Interiors	1	24OCT05A	22MAY06A
A121	St. Paul Plumbing	1	31AUG05A	01JUN06A
A131	Charles Plumbing	1	19OCT05A	17MAY06A
A141	St. Paul HVAC	1	16SEP05A	19MAY06A
A151	Charles HVAC	1	21OCT05A	12MAY06A
A161	St. Paul Electrical	1	07NOV05A	31MAY06A
A171	Charles Electrical	1	19OCT05A	10MAY06A
A201	St. Paul Elevators	123	14DEC05A	02JUN06A
A211	Charles Elevators	142	30NOV05A	15JUN06A
A221	Commissioning	135	16JAN06A	21JUL06A
A231	Substantial Completion	0		21JUL06A
A241	Punchlist	115	07JUL06A	14DEC06A
A251	Project Completion	0		15DEC06A



Start Date	14MAY04
Finish Date	
Data Date	14MAY04
Run Date	16SEP05 18:00

Early Bar
Float Bar
Progress Bar
Critical Activity

JHUC
Sheet 1 of 1

Struever Brothers, Eccles, && Rouse

JHU - Charles Commons

Classic Schedule Layout

Date	Revision	Checked	Approved

Building Systems Summary

Demolition

The first work onsite at Charles Commons consisted of the demolition of a concrete parking structure, a concrete-block dormitory hall, and two wood-framed houses. Lead paint was documented throughout the buildings and lead abatement was included in the demolition contracts. However, asbestos was discovered throughout the dormitory hall and slowed demolition considerably. In order to abate the asbestos, shelters were constructed around each asbestos area and abated in a piecemeal fashion. This caused a wholesale delay since the foundation of the St. Paul building was to be completed first.

Excavation

The foundation system is made up of 3' to 7' diameter reinforced concrete drilled caissons and a mesh of reinforced cast-in-place concrete grade beams. Excavation was required to complete this work and steel soldier piles with wood lagging were used for this purpose. Excavation depths averaged 15', which was not deep enough to make permanent systems more affordable, such as slurry walls. Dewatering was not required onsite since the construction was miles from the Patapsco River. The groundwater that was discovered was only in pockets above the bedrock since the grade elevation is 200' above sealevel.

Building Envelope

The first two floors of St. Paul and Charles buildings feature architectural precast panels, aluminum curtain walls supporting storefront windows, and canopies framed with anodized aluminum and glass. The other floors have precast concrete cornices and a brick facing. The walls are framed with 6" metal studs and insulated with 6" R19 batting. The penthouse is covered with overlapped metal wall panels and the roof surface is a non-reinforced EPDM membrane mechanically-fastened with aluminum turn-bars. All of these materials will be delivered and hoisted into position by the tower cranes.

Structural

Reinforced cast-in-place concrete columns (varying in strengths from 4000 to 8000 psi) and light-gage metal stud interior shear walls tie the foundation into the post-tensioned concrete floor slabs. All concrete is set by way of a bucket from the tower cranes onsite. Structural steel hoisted from the tower cranes is used to frame the penthouses and bridge between the buildings.

Mechanical

The majority of Charles Commons is served by eight air handling units using chilled water from two 600-ton water-cooled chillers. Ten split-system air conditioning units are used in the Information Technology and Elevator rooms. In addition, one large cooling tower and two gas-fired boilers can be found on the roof of St. Paul building. For water distribution, one hot water generator, one hot water recirculator, and two hot water heaters serve the Charles building. In the St. Paul building, three hot water heaters are used with one hot water generator and one hot water recirculator. In order to circulate fluids to the roof from the basement, a gas booster and two water boosters have been utilized.

Fire Protection

The fire suppression system is a standard wet pipe design with standpipes located throughout the complex. Two fire pumps supply water to the high floors of St. Paul and Charles buildings. An automatic sprinkler system is triggered by an automatic fire detection system and emergency voice alarms. The trigger signals are detected by a fire command center which starts the stand-by power system. All exterior walls are 1-hour fire-rated and some interior walls are 2 and 3-hour fire-rated. The buildings are not required to have emergency escapes and smoke controls per the Baltimore City Fire Codes.

Electrical

Two transformers are located in enclosed areas under the St. Paul building. These feed three 480Y/277V, 3-phase, 4W switchgears rated at 2000A, 2400A, and 3000A, which in turn feed both buildings in Charles Commons. The lighting used in both buildings are recessed fluorescents, pendent fluorescents, and metal halide track lighting. A gas-fired generator adjacent to the St. Paul building provides electrical redundancy for the entire complex.

Project Cost Evaluation

Actual Cost Estimate by Struever Bros, Eccles, & Rouse (July 2004)

Description	St. Paul Costs	St. Paul Unit Costs ($/sf)	Charles Costs	Charles Unit Costs ($/sf)	Total Costs	Total Unit Costs
General Requirement	$1,754,664	$8.64	$950,803	$8.64	$2,705,467	$8.64
Sitework	$2,510,125	$12.37	$1,360,166	$12.37	$3,870,291	$12.37
Concrete	$6,597,439	$32.50	$3,574,966	$32.50	$10,172,406	$32.50
Masonry	$1,777,463	$8.76	$963,157	$8.76	$2,740,620	$8.76
Steel	$683,435	$3.37	$370,334	$3.37	$1,053,770	$3.37
Carpentry	$701,285	$3.45	$380,006	$3.45	$1,081,291	$3.45
Moisture Protection	$655,344	$3.23	$355,112	$3.23	$1,010,456	$3.23
Doors, Windows and Glass	$1,791,738	$8.83	$970,892	$8.83	$2,762,630	$8.83
Finishes	$4,026,671	$19.84	$2,181,939	$19.84	$6,208,611	$19.84
Specialities	$287,678	$1.42	$155,884	$1.42	$443,562	$1.42
Equipment	$825,685	$4.07	$447,416	$4.07	$1,273,101	$4.07
Furnishings	$87,439	$0.43	$47,381	$0.43	$134,820	$0.43
Conveying Systems	$674,764	$3.32	$365,636	$3.32	$1,040,400	$3.32
Mechanical	$5,559,800	$27.39	$3,012,699	$27.39	$8,572,500	$27.39
Electrical	$3,703,288	$18.24	$2,006,707	$18.24	$5,709,996	$18.24
Miscellaneous	$2,661,110	$13.11	$1,441,980	$13.11	$4,103,091	$13.11
Contractor's Fees	$926,044	$4.56	$501,797	$4.56	$1,427,841	$4.56
Building Cost	$35,223,972	$173.52	$19,086,876	$173.52	**$54,310853**	**$173.52**
Design Cost	Withheld at Owner's Request					
Total Project Cost					$63,500,000	$202.88

R.S. Means Square Foot Estimate

Building	Funct. Type	Desig.	Area (ft2)	Base Unit Costs	Base Height (ft)	Height Adj.	Adj. Unit Costs	Location Adj.	Total Costs
St. Paul	College Dorm	M.140	203000	$125.75	72	75.4	$201.15	0.93	$37,975,109
Charles	College Dorm	M.140	110000	$125.75	72	133	$258.75	0.93	$26,470,125
Both Buildings			313000						**$64,445,234**

D4 Cost Estimate

Description	Total Costs	Total Unit Costs	Donnelly Hall	Donnelly Hall Unit Costs	Bachelor's Officers Quarters	Bachelor's Officers Quarters Unit Costs
General Requirements	$651,701	$5.57	$62,251	$0.30	$589,450	$5.27
Sitework	$1,987,075	$13.54	$1,006,547	$4.77	$980,528	$8.77
Concrete	$8,778,180	$55.30	$5,522,388	$26.19	$3,255,792	$29.12
Masonry	$30,000	$0.14	$30,000	$0.14	$0	$0.00
Steel	$153,898	$0.95	$101,151	$0.48	$52,747	$0.47
Carpentry	$252,271	$1.21	$249,351	$1.18	$2,920	$0.03
Moisture Protection	$314,733	$1.76	$250,267	$1.19	$64,466	$0.58
Doors, Windows and Glass	$1,101,194	$7.29	$607,767	$2.88	$493,427	$4.41
Finishes	$2,757,978	$16.87	$1,855,981	$8.80	$901,997	$8.07
Specialities	$163,849	$0.98	$115,763	$0.55	$48,086	$0.43
Furnishings	$1,031,476	$6.69	$602,570	$2.86	$428,906	$3.84
Conveying Systems	$460,235	$2.67	$343,820	$1.63	$116,415	$1.04
Mechanical	$3,996,029	$24.74	$2,616,779	$12.41	$1,379,250	$12.33
Electrical	$1,946,105	$11.71	$1,354,245	$6.42	$591,860	$5.29
Building Construction Cost	**$23,624,724**	**$149.44**	$14,718,880	$69.80	$8,905,844	$79.64

Cost Estimate Conclusions

The estimates that have been compiled compare SBER's data, R.S. Means' data, and D4 Cost software data. In order to achieve greater accuracy with D4 Cost software and R.S Means, the estimates were broken into St. Paul and Charles buildings. Finally, the total construction cost of the overall project was calculated from the separate building estimates. SBER's estimate was $54.3 million, R.S. Means' estimate was $64.4 million, and D4 Cost resulted in $23.6 million.

The R.S. Means Square Foot Estimate is the most similar to the actual estimate performed by SBER. Although the costs could not be associated to divisions, the building type that is chosen is consistent with the actual use as a college dormitory. The height adjustments, caused by a small site, increase the costs by 150% from the standard assumption by R.S. Means of six stories. As a result, the R.S. Means estimate is only 19% higher than SBER's estimate.

The D4 Cost Estimate is the least comparable with SBER's estimate and, indirectly, with actual costs associated with Charles Commons. The closest association with Charles Commons were two 8+ story, reinforced-concrete, residential apartments referred to as Donnelly Hall and Bachelor's Officers Quarters. Both projects were housing for students attending the local colleges and were most similar in square footage to the St. Paul and Charles buildings. The most important variation that affected the cost was the project completion date, for which both projects were completed in the late 80's. This is unacceptable to estimate construction in 2005, especially when there have crucial steel and concrete price increases in the past few years. Nevertheless, the D4 estimate is 230% of SBER's estimate and should not be relied on for accuracy.

NORTH CHARLES STREET

CHARLES AND BLACKSTONE APARTMENTS, LLC
3333 NORTH CHARLES STREET

WOLMAN HALL
JOHNS HOPKINS UNIVERSITY
3339 NORTH CHARLES STREET

SAND FILTER

SUPERINTENDENT'S TRAILER

NEW GAS METER

MATERIAL HOIST

2 STORY BRICK PARKING GARAGE (HOMEWOOD)
JOHNS HOPKINS UNIVERSITY
3330 SAINT PAUL STREET

ST. PAUL BUILDING

SAINT PAUL STREET

LOVEGROVE STREET

24LF 7'x5' PRECAST
CONCRETE BOX CULVERT

3 STORY BRICK BUILDING

3 STORY BRICK &
FRAME BUILDING

CHARLES BUILDING

5 STORY BRICK BUILDING (IVY HALL)
JOHNS HOPKINS UNIVERSITY
10-12 EAST 33RD STREET

SAND FILTER

150' TOWER CRANE

200' TOWER CRANE

FENCE

MAIN CONSTRUCTION ENTRANCE

64" TRANSMISSION WATER MAIN
MONTICELLO TUNNEL

33RD STREET

N

SCALE: 1"=20'
0 10 20 30 40

PROJECT LOCATION

LEGEND

- PROPERTY LINE
- EX. BUILDING
- ELECTRIC UTILITY
- WATER UTILITY
- CATV UTILITY
- SEWER UTILITY
- STORM UTILITY
- GAS UTILITY
- TELECOM UTILITY
- STORM INLET
- UTILITY MANHOLE

JOHNS HOPKINS UNIVERSITY
CHARLES COMMONS
BALTIMORE, MARYLAND

HOPKINS

BRYAN A. QUINN

CONSTRUCTION MANAGEMENT

ADVISOR: DR. HORMAN

SEPTEMBER 29, 2005

Local Conditions

The construction market in Baltimore, Maryland has grown at record rates the past few years. Spurred by an incredible residential boom, the Johns Hopkins University institutions have spent more than $200 million on building or renovation projects each year. Two houses, a dormitory hall, and a parking garage needed to be demolished before site work for Charles Commons is to begin, which is highly typical in Baltimore.

Union vs. Tradesmen
Unions have a strong presence in Baltimore and Charles Commons is not an exception. However, some small projects in Baltimore hire tradesmen.

Steel vs. Concrete
Most new construction projects in Baltimore are steel construction since there are no clear height limitations. However, there are local groups that affect the outcome of the project approvals and height is a crucial issue to these watchdogs. At Charles Commons, the Historic Charles Street Association (www.charlesstreet.net) vocally opposed a building taller than the surrounding six-story structures and a compromise was attained by SBER and JHU.

Parking
The lack of parking in Baltimore City is one of its largest dilemmas. A parking garage located on St. Paul Street was demolished to make way for the St. Paul building. In order to improve the parking situation, Johns Hopkins has promised to construct a new parking garage nearby. No on-street parking will be permitted on the block of 33rd Street between Charles Street and St. Paul Street at the end of construction. Delivery trucks are allowed to park along 33rd Street, however, all other personnel must find parking elsewhere. SBER employees use a parking lot a few blocks south of the construction site on 30th Street.

Recycling and tipping fees
The landfill tipping fees are $67 per ton (including a $7.50 surcharge). Recycling fees amount to approximately $54 per ton. The waste disposal at Charles Commons is being performed by Baltimore Refuse Energy Systems Company (BRESCO), an indirect subsidiary of Waste Management Inc.

Subsurface Conditions

St. Paul Building

The proposed floor grades are 195.5' to 200.5', with soil excavation up to 13'. The water table was typically found trapped in the disintegrated rock above the bedrock formations at depths from 10' to 14'.

Stratum	Average Depth(ft)	Description	Standard Penetration Resistance (blows/ft)
A	1-3	Fill: Sand, clay, gravel, brick, cinder fill	3
B	2.5-14	Residual soils: Lean clay (CL), Silt (ML,MH), and Sand (SP,SM,SC)	9
C	8.5-23.5	Disintegrated rock	35
D	10-25	Gneiss bedrock (James Run Formation)	>100

Charles Building

The proposed floor grades are 198.5' and 203.5', which will create soil cuts up to 15' deep. The water table was found to be trapped in the disintegrated rock above the bedrock formations at depths from 15' to 23'.

Stratum	Average Depth(ft)	Description	Standard Penetration Resistance (blows/ft)
1	1-5	Fill: Sand, clay, gravel, brick, cinder fill	4
2	1-18.5	Residual soils: Lean clay (CL), Silt (ML,MH), and Sand (SP,SM,SC)	10
3	14.5-23.5	Disintegrated rock	39
4	23.5-29	Gneiss bedrock (James Run Formation)	>100

Client Information

The Johns Hopkins University opened Feb. 22, 1876, with the inauguration of its first president, Daniel Coit Gilman. "What are we aiming at?" Gilman asked in his inauguration address. Gilman answered:

"The encouragement of research... and the advancement of individual scholars, who by their excellence will advance the sciences they pursue, and the society where they dwell."

Johns Hopkins is an unusually sophisticated university that expects only the best from their students, teachers, and facilities. The main campus, Homewood, has nearly 4,000 full-time undergraduates and nearly 1,400 full-time graduate students in two schools, the Krieger School of Arts and Sciences and the Whiting School of Engineering. Johns Hopkins expects to enroll an additional 5,000 students at the Homewood Campus in the next ten years and has taken steps to create a masterplan. The first phase of the masterplan is Charles Commons, which will house more than 500 students and will provide the amenities expected in state-of-the-art dormitories.

As typical in other construction projects, Johns Hopkins expects Charles Commons to be completed at the highest quality, lowest cost, and completion in time for classes in Fall 2006. A value engineering analysis was implemented by Struever Bros, Eccles, & Rouse to provide the highest quality and lowest cost. Johns Hopkins also hired Heery International to check SBER's estimates to ensure the lowest cost possible. In addition, SBER hired HCI CPM Consulting for complex schedule planning.

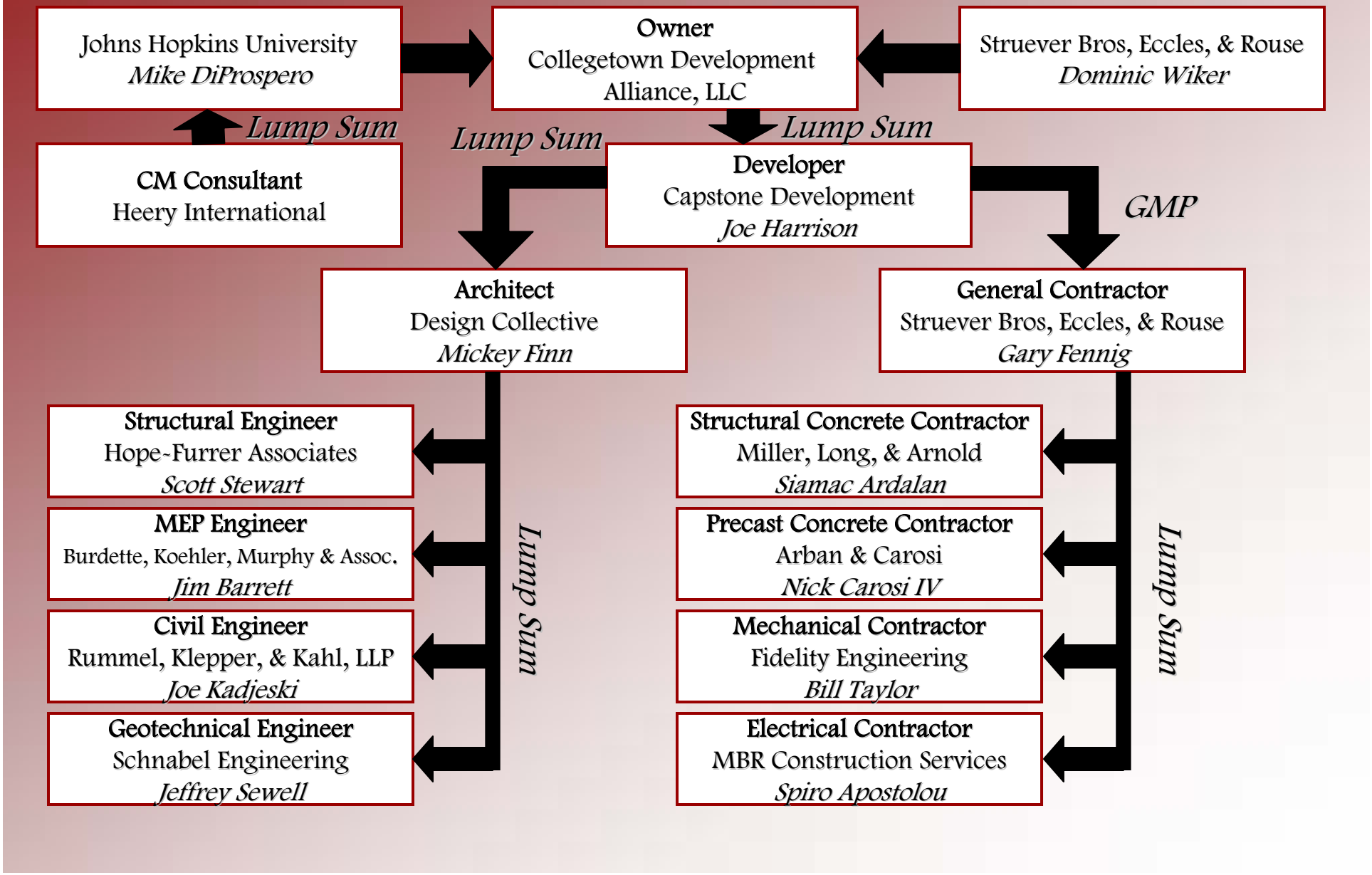
Project Delivery System

Struever Bros, Eccles, & Rouse is delivering the project to Johns Hopkins University as the Construction Manager at Risk. Struever Bros, Eccles, & Rouse typically acts as a General Contractor, however, they have subcontracted nearly all of the work to specialty contractors to avoid risking the project to their inexperience at new post-tensioned construction. SBER is also assisting Johns Hopkins University by joining with JHU in a joint venture by creating Collegetown Development Alliance, LLC. A separate developer, Capstone Development, was employed to by CDA to oversee the construction, since SBER would have a conflict of interest if SBER were to provide their development services.

During preconstruction, Johns Hopkins University asked SBER to provide value engineering and cost reduction to decrease the construction costs by one-third. SBER completed three rounds of value engineering and could not reduce construction to $54 million. In response, JHU hired Heery International to check SBER's estimates as the Owner's CM consultant. Heery confirmed SBER's estimate and the contract awarded for $63.5 million to SBER.

SBER bought-out Charles Commons as a Design-Bid-Build project, which is typical for SBER's previous work. However, design delays would have made the Design-Build process more attractive. Collegetown Development Alliance hired consultants on a lump sum basis, since construction was performed at a Design-Bid-Build basis. This allowed the consultants to accurately assess their office costs upfront to prepare JHU for the design costs associated with their flagship complex.

CHARLES COMMONS ORGANIZATION PLAN



STAFFING PLAN FOR SBER PROJECT TEAM

Project Executive
Gary Fennig (100%)
Negotiates with Owner and Subcontractors
Manages personnel and cash flow

Quality Control Manager
Jack Eckstrom (10%)
Makes recommendations to uphold high quality standards

Project Manager
Bill Reed (100%)
Vince Cole (100%)
Bid-out work
Processes change orders
Supervises MEP coordination
Manages schedule
Compile budgets

Superintendent
Pat Irwin (100%)
Tom Smith (100%)
Supervises onsite work
Coordinates emergency action
Supervises adherence to schedule
Documents progress

Project Engineer
Ally Diaz (100%)
Processes submittals and RFI's

Safety Manager
Cheryl Ambrose (100%)
Oversees adherence to OCIP and OSHA safety standards

Administrator
Teresa Setzer (100%)