



# Loyola/Notre Dame Library Expansion & Renovation

Baltimore, MD



## Existing Conditions



# Loyola/Notre Dame Library, Baltimore, MD

Final Thesis Report

Sandra DiRupo

Construction Management

Dr. Horman

Apr. 9, 2008

*Existing Conditions*

## Project Background



### Loyola/Notre Dame Library Renovation & Expansion Baltimore, MD

Owner: Loyola/Notre Dame Library (Owner's Rep. John McGinty)

Overall Cost Estimate: \$19,604,229

Project Size: 100,000 SF

Project Delivery Method: Construction Management at Risk, GMP Budget

Dates of Construction: October 2006-August 2008

Number of Stories: Four



Mini pile foundations



Concrete slab & column pour



Curtain wall installation

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### Project Background Continued

#### Vicinity Map

#### **Design Architect:**

Hillier Architecture

#### **Architect of Record:**

Amos Bailey Arnold + Associates, Inc.

#### **Structural Engineer:**

Whitney, Bailey, Cox & Magnani, LLC

#### **MEP Engineer:**

James Posey Associates

#### **Lighting Designer:**

Cramptom Dunlop

#### **Construction Manager:**

The Whiting-Turner Contracting Company

#### **Civil Engineer:**

Gower/Thompson, Inc.

#### **Geotechnical Engineer:**

Kozera & Associates



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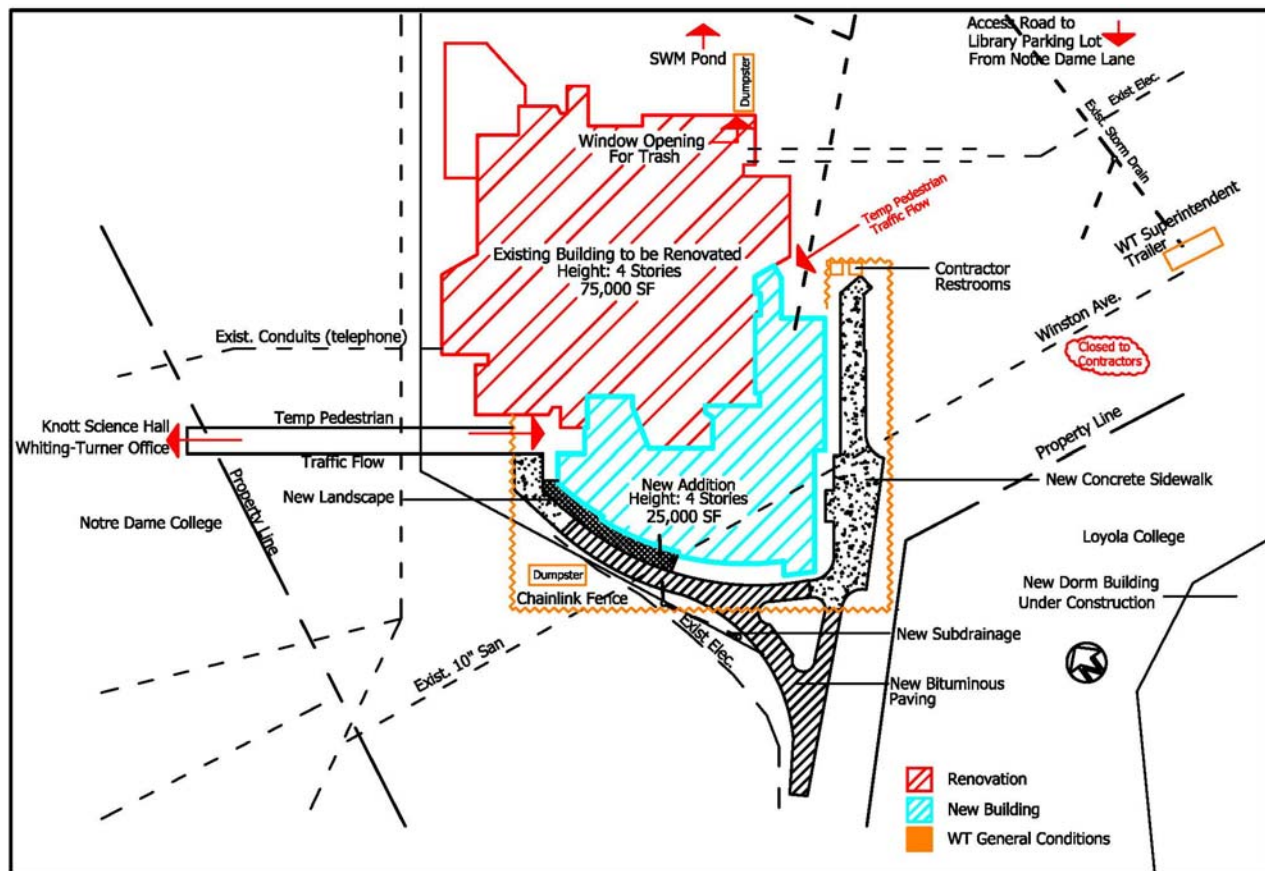
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### Construction Site



- The Loyola/Notre Dame Library is shared between the Loyola College of Maryland and The College of Notre Dame of Maryland. The library is also open to the public.
- Location: at 200 Winston Avenue, Baltimore, MD (North of the city)
- During Construction, the library will remain open
- Adjacent construction: New Loyola College dorm building
- Winston Avenue is closed to subcontractors
- Subcontractors to enter and exit site via Notre Dame Lane

### *Existing Conditions*

#### **Building Systems Summary**

**Cast in Place Concrete:** The existing building and expansion are both cast in place concrete systems. The expansion was erected using a concrete truck and pump. Deep foundations made up of mini piles and a retaining wall will carry the 25,000 SF structure. Typical vertical formwork was used for foundation walls, and doka framed formwork was used for horizontal slab placement. By using this new type of formwork, the project was kept on schedule by reducing labor hours and cost.

**Mechanical System:** The mechanical system consists of four air handling units ranging from 2640 to 38,000 CFM. Existing AHU are VAV systems, while the two new AHU are VAV and constant volume air with companion return fans. A constant volume AHU is to serve the special collections room on the third floor (~1000 CFM). A gas-fired cast-iron sectional boiler (~50 BHP) serves heating and plumbing for the building. Existing chiller and cooling tower are to remain since they are adequate capacity to support the addition. Renovation of the existing duct system, new exhaust systems for restrooms and storage rooms, and finned tube radiation are some of the other new mechanical and plumbing features for the new library.

**Electrical System:** Electrical distribution throughout the building consists of two electrical closets on each floor, each with a 480/277 V, 225 amp panel, (2) 45 kVA dry type transformers and (2) 150 amp, main circuit breaker, 208/120 V, 3 phase, 4 wire, and 42 pole panel boards. In the mechanical penthouse, new 480 and 208 V panels were installed as well as a motor control center. Emergency power is produced by a new 480/277 V 150 kW generator.

**Masonry:** The existing building enclosure is primarily a red brick façade over cast in place concrete. Minimal masonry repairs were done inside and outside of the building. The existing building façade is not in need of any repairs. Mechanical and elevator shafts accounted for most of the repair costs after demolition in these areas.

**Curtain Wall:** An aluminum curtain wall makes up the entire façade of the expansion. The types of glass vary for the storefront. Each floor consists primarily of a clear glass wall with a green spandrel glass above and a decorative, fritted glass below, and separated by aluminum mullions. Aluminum sunshades are an additional feature for the curtain wall. The curtain wall design will be sure to attract plenty of daylight for the building occupants.

**Support of Excavation:** Sheet piling with H piles was used at the East side of the building. The auditorium has sloped seating and is about 30 ft. lower than the adjacent road. Wood shoring was removed and piles were cut and left in place when backfilled.

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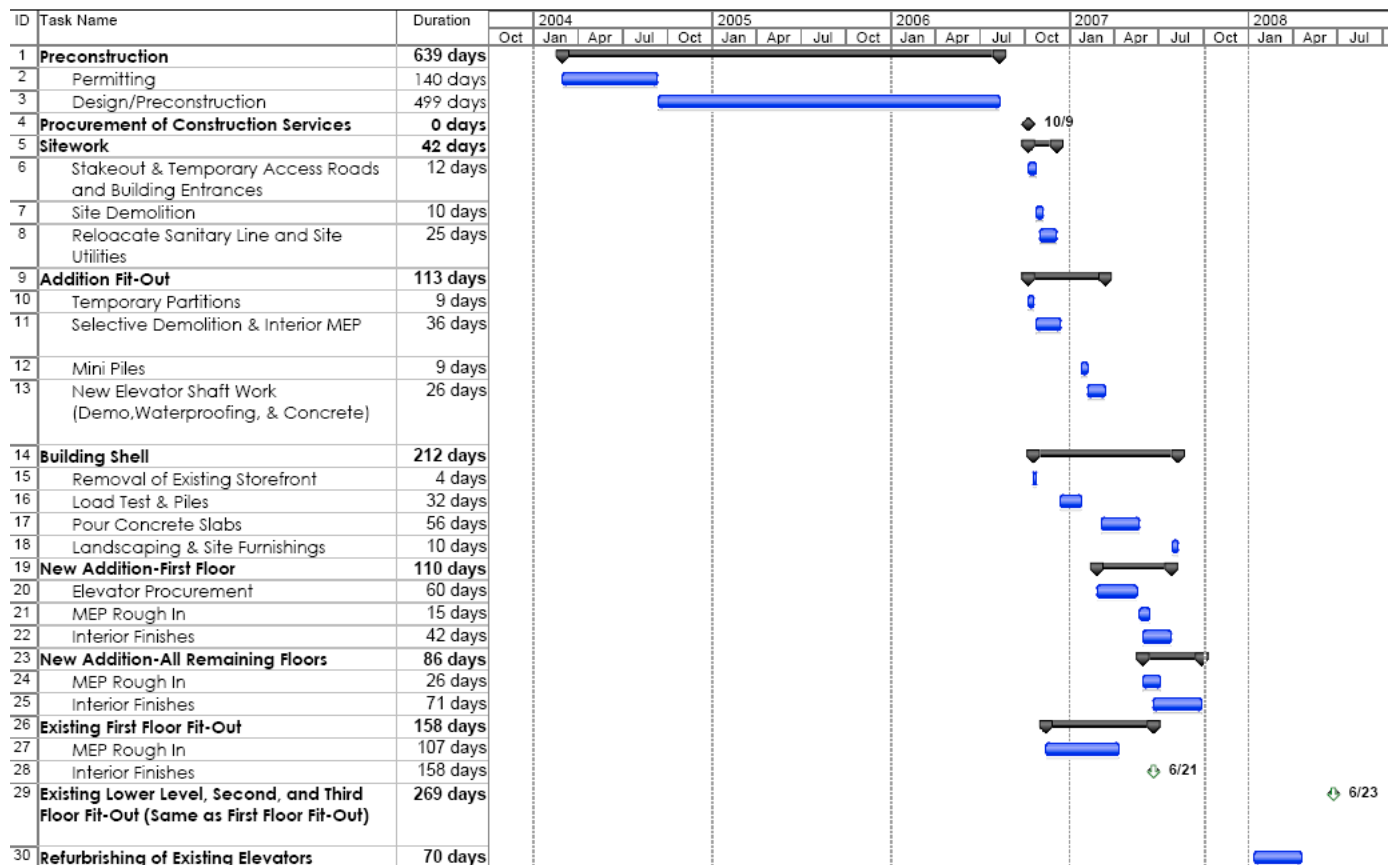
## Existing Conditions

### Project Cost Evaluation

[See detailed cost breakdowns in Appendix A.1-4]

Construction Cost	Total Project Cost	Structural System	Mechanical System	Electrical System
\$12,867,371	<b>\$19,604,229</b>	\$1,515,000	\$3,013,000	\$2,447,247
\$125/SF	\$165.74/SF			

### Construction Schedule Summary



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### Client Information

**Owner Description:** The existing Loyola/Notre Dame Library is owned by the Loyola/Notre Dame Library, not either of the two colleges directly, but a separate entity. John McGinty, director of the library, is the owner's representative for the Loyola/Notre Dame Library.

**Reason for Building this Facility:** The main reason that The College of Notre Dame and Loyola College in Maryland have decided to undertake a joint \$19.6 million library expansion and renovation project is due to growing curricular enrollment demands and improvements in information technology.

**Expectations for the Project:** The goal of the new student-centered facility is to enhance teaching and learning by creating a library for the 21st century. The current 75,000-square-foot building will be enlarged to 100,000-square-feet, offering enhanced spaces for teaching, personal and group study, scholarly and cultural programming and informal gatherings. The new Library will be a welcoming place with a new glass façade enclosing the four story addition.

**Cost expectations:** Like most building owners, the library hopes to complete the project according to the original budget with minimal change orders or exceptions. However; efficiency is also a top priority. New building systems are expected to operate at peak efficiency and lowest cost.

**Sequencing Issues:** The library will remain open during construction, so turning over each floor is an important milestone at the end of each phase; so that office and library space is not sacrificed during the school year. Bathrooms must remain open on each floor during construction. (With an exception of the floor being renovated) These are two of the more important sequencing issues to be strictly enforced among the affected subcontractors.

**Phased Occupancy Requirements:** Since the library is to remain open during all construction and renovations, phasing is an integral part of the construction process. While school was still in session at the start of construction in October 2006, demolition and the four story addition began phase 1 of the project. Once school let out in May, the existing first floor renovations began. The entire first floor and principal site work was a main concern for the owner and building occupants since school was back in session at the end of August.

**Keys to Completing the Project to Owner's Satisfaction:** In order to complete the project to the owner's satisfaction, the library will monitor the construction processes with great care. The library's top priority is to manage the building project effectively and efficiently through completion and first year occupancy.

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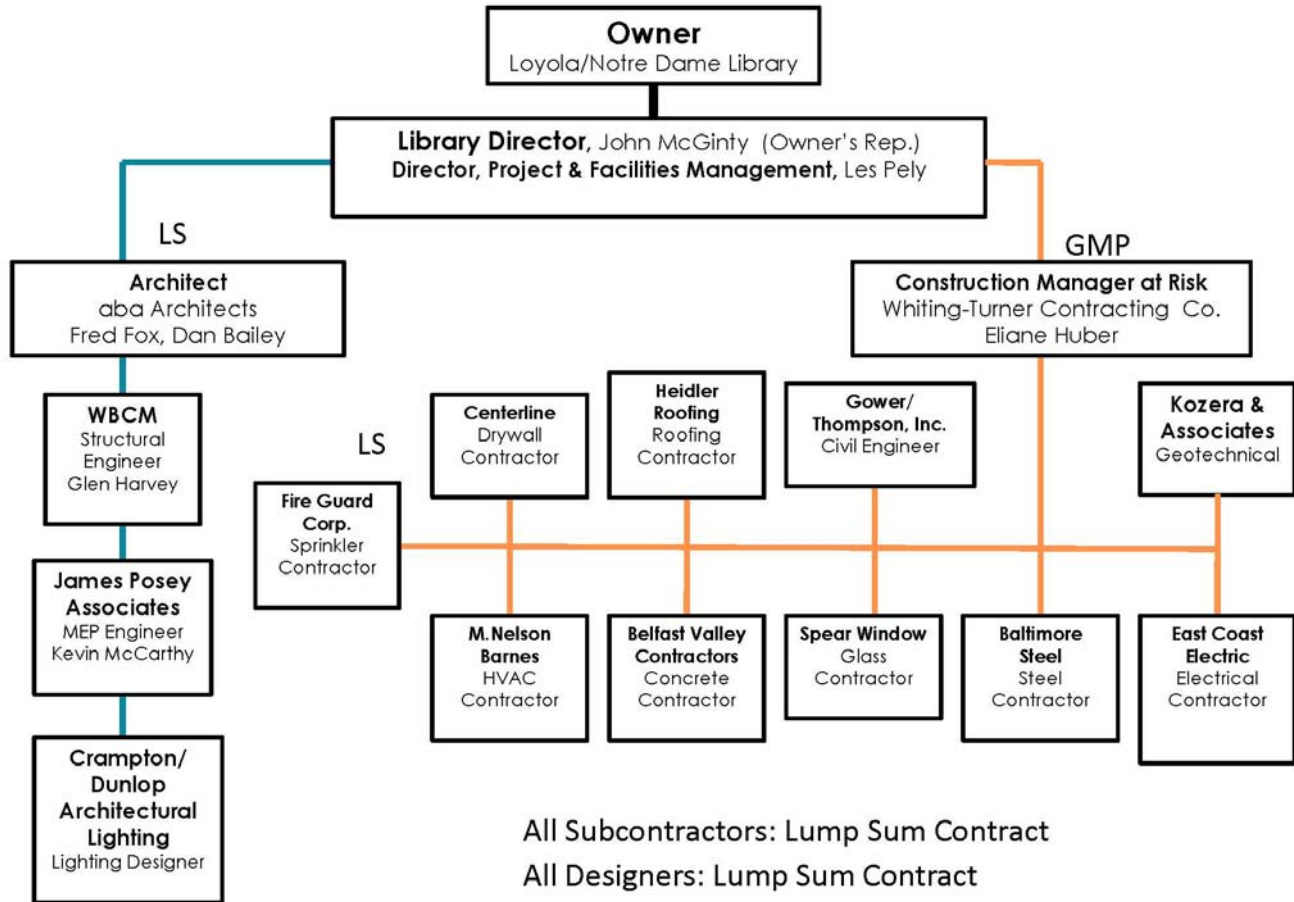
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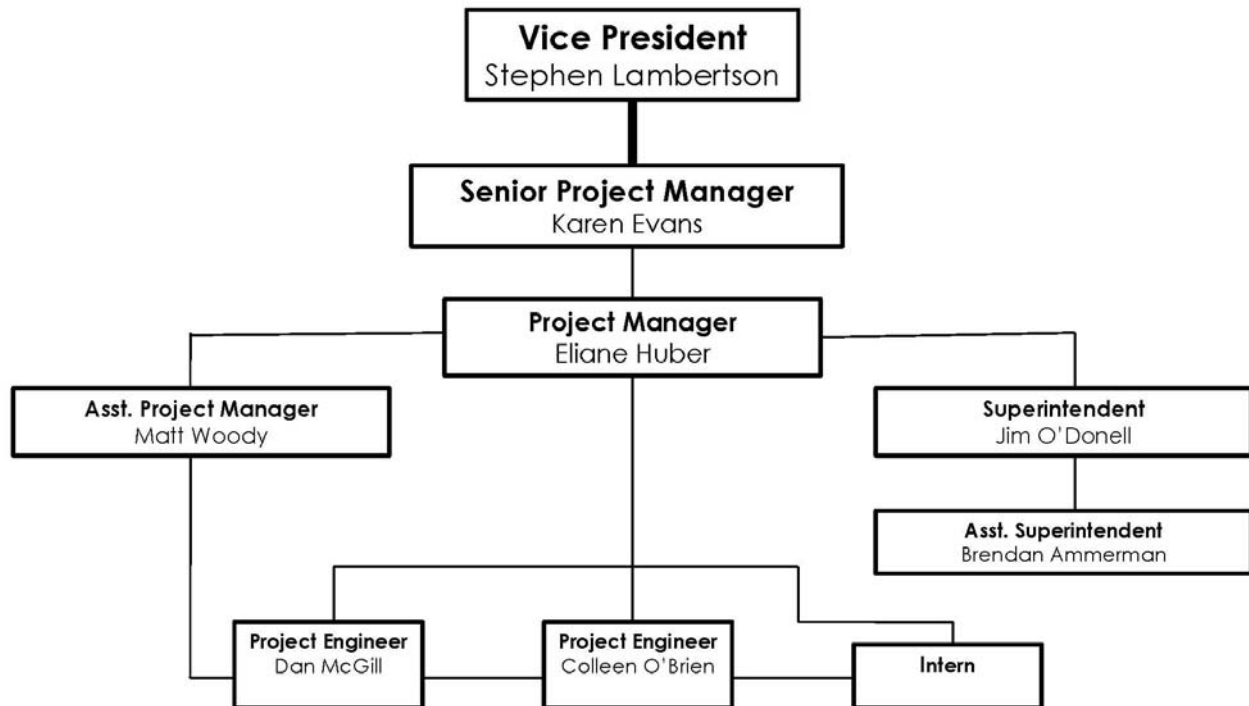
### Project Delivery System





*Existing Conditions*

Staffing Plan



## Loyola/Notre Dame Library

<b>Construction Cost (CC)</b>				
<b>Div</b>	<b>Description</b>	<b>CC/SF</b>	<b>% of CC</b>	<b>Total CC</b>
3	Concrete	\$15.15	11.77%	\$1,515,000
4	Masonry	\$1.25	0.97%	\$125,000
5	Metals	\$4.34	3.37%	\$434,093
6	Wood & Plastics	\$3.41	2.65%	\$341,030
7	Moisture Protection	\$6.12	4.76%	\$612,030
8	Doors & Windows	\$14.47	11.25%	\$1,447,060
9	Finishes	\$17.70	13.75%	\$1,769,535
10	Specialties	\$0.82	0.63%	\$81,600
11	Equipment	\$0.41	0.31%	\$40,500
12	Furnishings	\$0.25	0.19%	\$24,620
13	Special Construction	\$2.91	2.26%	\$291,400
14	Conveying Systems	\$3.69	2.87%	\$369,240
15	Mechanical	\$30.13	23.42%	\$3,013,000
16	Electrical	\$24.47	19.02%	\$2,447,247
	IT Infrastructure		2.77%	\$356,016

**Total CC**                    **\$12,867,371**  
**Total CC/SF**                **\$125.11**

<b>Total Cost</b>			
<b>Description</b>	<b>TC/SF</b>	<b>% of TC</b>	<b>Total CC</b>
General Conditions	\$15.88	8.10%	\$1,588,063
Sitework	\$15.14	7.72%	\$1,513,631
Insurances	\$1.33	1.24%	\$243,294
Construction Contingency	\$7.43	3.79%	\$743,444
AE Fees		7.51%	\$1,473,088
Furnishings		4.98%	\$975,338
Library Shelving		1.02%	\$200,000
AV/IT Equipment			
Escalation (6.5%)			
Construction Cost	\$125.11	65.64%	\$12,867,371

**Total TC**                    **\$19,604,229**  
**Total TC/SF**                **\$165.74**

03 31 Structural Concrete								
03 31 05 - Normal Weight Structural Concrete								
Reference	Description	Qty	Unit	Mat	Labor	Equip	Total	Cost
03 30 53 Concrete in Place - Foundations								
1200	Mini Piles: Deep foundation, augured (16" dia)	197	CY	\$465.00	\$400.00	\$39.50	\$904.50	\$178,186.50
5900	Spread Footings: Pile caps, under 5 CY, pumped	207	CY	\$160.00	\$76.00	\$0.46	\$236.46	\$48,947.22
1950	Perimeter Footings, Incl. Grade Beams: Continuous, shallow, pumped	155	CY	\$133.00	\$85.50	\$0.51	\$219.01	\$33,946.55
4200	Foundation Wall: 8" thick, 8' tall	248	CY	\$177.00	\$166.00	\$16.45	\$359.45	\$89,143.60
1950	Interior Footings, Incl. Grade Beams: Continuous, shallow (24"x12")	30	CY	\$133.00	\$85.50	\$0.51	\$219.01	\$6,570.30
6200	Retaining Wall: 10' high	68	CY	\$133.00	\$61.00	\$6.05	\$200.05	\$13,603.40
4050	Mat Slab: Over 20 CY	62	CY	\$173.00	\$72.50	\$0.44	\$245.94	\$15,248.28
GRADE BEAMS, RETAINING WALLS, CONTINUOUS FOOTINGS, AND A 1'-6" MAT SLAB IN THE AUDITORIUM								
03 30 53 Concrete In Place - Columns & Slabs								
1440	Columns: 24" thick, pumped, Max Reinforced	219	CY	\$685.00	\$420.00	\$41.00	\$1,146.00	\$250,974.00
2750	Two Way Slabs: 25' span	1020	CY	\$216.00	\$222.00	\$21.00	\$459.00	\$468,180.00
* SLABS ARE TYP. FOR 1ST, 2ND, 3RD FLOORS, AND ROOF SLAB *SF/FLR DETERMINED FROM 25,000 SF EXPANSION DIV. BY FOUR FLOORS=6250 SF/FLR *SINCE BAYS AND BUILDING GEOMETRY ARE NOT TYPICAL, I HAVE UTILIZED THE AREA TOOL ON CAD TO FIND SF/FLR								

03 30 Cast-In-Place Concrete								
Reference	Description	Qty	Unit	Mat	Labor	Equip	Total	Cost
03 31 05.70 Concrete in Place - Slab on Grade								
4650	Slab on Grade: 4" thick, not incl. finish, pumped	72	CY	\$122.00	\$55.00	\$0.41	\$177.41	\$12,773.52
* SLAB ON GRADE DOES NOT INCLUDE STAIRWELLS OR CONCRETE STEPS IN AUDITORIUM ON LOWER LEVEL								

03 30 03 Concrete in Place - Reinforcemnet								
0010	Concrete in Place: including forms, reinforcing steel, concrete, placement, and finishing unless otherwise indicated beams, 5 k/L.F.,							
0020								
0050								
0300	10' span	2278	CY	\$315.00	\$490.00	\$48.50	\$853.50	\$1,944,273.00

<b>Assemblies Estimate - Loyola/Notre Dame Library</b>						
<b>B20 Exterior Enclosure (Excluding CIP Retaining Wall)</b>						
<b>Reference</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Mat</b>	<b>Inst</b>	<b>Total</b>
<b>System Components</b>						
B2020 210 1750	Joints for tube frame, 90° clip type	2000	Ea.	\$2.10		\$4,200.00
B2020 220 1250	Caulking/sealants, polysulfide	8250	L.F.	\$0.17	\$1.72	\$15,592.50
B2020 210 1750	Alum framing for insulating glass, One Intermediate horizontal	10500	S.F.	\$16.30	\$13.25	\$310,275.00
<b>Curtain Wall Panels &amp; Doors</b>						
B2020 210 1750	Aluminum sunshades (use same data from alum framing)	8250	L.F.	\$16.30	\$13.25	\$243,787.50
B2020 220 2600	Glazing panel, insulating, 3/4" th, clear	5325	S.F.	\$28.00	\$25.00	\$282,225.00
B2020 220 2650	Tempered (Fritted glass)	2380	S.F.	\$32.50	\$25.00	\$136,850.00
B2020 220 3000	Spandrel Glass, panels, 1/4" plate glass, insulated, 1" th	2745	S.F.	\$13.20	\$7.30	\$56,272.50
B2030 110 7650	Alum. & glass, automatic	4	Opg	\$32,300.00	\$3,725.00	\$132,925.00
B2030 220 3350	Hollow Metal, 3'-0"x7'-0"	2	Opg	\$1,200.00	\$258.00	\$2,916.00
<b>Misc Costs</b>						
	Delivery Fees (approx 4 trips)	250	Miles	\$0.40		\$400.00
<b>TOTAL</b>						<b>\$1,185,043.50</b>

General Conditions Estimate							
		PH I	PH II	PH III	PH IV	PH V	TOTALS
<b>1</b>	<b>Mobilization</b>						
	Move in/out Equip	\$10,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$10,000.00
	Move in/out Trailers	\$0.00	\$0.00	\$0.00	\$5,000.00	\$0.00	\$5,000.00
<b>2</b>	<b>Tools and Equipment</b>						
	Small Hand Tools	\$1,500.00	\$1,500.00	\$1,500.00	\$0.00	\$0.00	\$4,500.00
	Misc. Supplies	\$3,200.00	\$2,400.00	\$2,400.00	\$0.00	\$0.00	\$8,000.00
	WT Yard Rental	\$2,500.00	\$2,500.00	\$2,500.00	\$0.00	\$0.00	\$7,500.00
<b>3</b>	<b>Plans &amp; Permits</b>						
	Drawings & Specifications	\$7,500.00	\$7,500.00	\$7,500.00	\$0.00	\$0.00	\$22,500.00
<b>4</b>	<b>Supervision</b>						
	Senior Project Manager (50%)	\$55,000.00	\$55,000.00	\$55,000.00	\$0.00	\$0.00	\$165,000.00
	Project Manager (100%)	\$95,000.00	\$68,000.00	\$68,000.00	\$0.00	\$0.00	\$231,000.00
	Asst. Project Manger (100%)	\$0.00	\$0.00	\$66,000.00	\$62,000.00	\$62,000.00	\$190,000.00
	Project Engineer 1 (100%)	\$48,000.00	\$48,000.00	\$48,000.00	\$0.00	\$0.00	\$96,000.00
	Superintendent (100%)	\$95,000.00	\$76,000.00	\$76,000.00	\$0.00	\$0.00	\$247,000.00
<b>4</b>	<b>Incidental Construction</b>						
	Restore Construction Area	\$5,000.00	\$5,000.00	\$5,000.00	\$0.00	\$0.00	\$15,000.00
	Barricades	\$2,500.00	\$2,500.00	\$2,500.00	\$0.00	\$0.00	\$7,500.00
	Dust/Weather Protection	\$3,500.00	\$3,500.00	\$3,500.00	\$0.00	\$0.00	\$10,500.00
	First Aid	\$1,000.00	\$1,000.00	\$1,000.00	\$0.00	\$0.00	\$3,000.00
	Pedestrian Barricades	\$20,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$20,000.00
	Fall Protection	\$7,500.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,500.00
<b>5</b>	<b>Temporary Facilities</b>						
	Telephones	\$7,500.00	\$3,000.00	\$3,000.00	\$0.00	\$0.00	\$13,500.00
	Temp Water	\$800.00	\$600.00	\$600.00	\$0.00	\$0.00	\$2,000.00
	Trailer Furniture	\$500.00	\$0.00	\$0.00	\$0.00	\$0.00	\$500.00
	Office Equipment	\$3,300.00	\$3,000.00	\$2,250.00	\$0.00	\$0.00	\$8,550.00
<b>6</b>	<b>Clean Up</b>						
	Daily Clean Up	\$18,600.00	\$32,550.00	\$32,550.00	\$0.00	\$0.00	\$83,700.00
	Final Clean Up	\$5,000.00	\$5,000.00	\$5,000.00	\$0.00	\$0.00	\$15,000.00
	Dumpsters	\$22,500.00	\$37,500.00	\$37,500.00	\$0.00	\$0.00	\$97,500.00
<b>7</b>	<b>Procedures</b>						
	Professional Photos	\$0.00	\$2,500.00	\$0.00	\$0.00	\$0.00	\$2,500.00
<b>8</b>	<b>Closeout</b>						
	Paperwork	\$0.00	\$0.00	\$5,000.00	\$0.00	\$0.00	\$5,000.00
	O & M Manuals	\$0.00	\$0.00	\$2,500.00	\$0.00	\$0.00	\$2,500.00
	Punchlist	\$0.00	\$0.00	\$15,000.00	\$0.00	\$0.00	\$7,500.00
<b>9</b>	<b>Totals</b>						
	Without CM at Risk Fee	\$415,400.00	\$357,050.00	\$442,300.00	\$67,000.00	\$62,000.00	\$1,288,250.00
	With 2% Fee	\$8,308.00	\$7,141.00	\$8,846.00	\$1,340.00	\$1,240.00	\$392,084.58

Fee	\$490,105.73
Subtotal	\$1,288,250.00
Budgeted GC's and Fee	\$1,778,355.73