

Ayers Saint Gross Architects & Planners



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December 2008

Ayers Saint Gross Architects & Planners

90-year old firm

140 employees

Studios of Expertise:

Campus Planning

Academic Facilities

Student Life Facilities

Cultural Facilities



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Who we are...

Galen S. Hoeflinger

Mr. Hoeflinger is an Associate at Ayers/Saint/Gross with nine years of experience. Mr. Hoeflinger has been in the forefront of Building Information Modeling software technology since 2000 and has been an active contributor to the movement of integrating BIM into the A/E industry, including a founding member of the RevitDC Executive Board. He has spoken and discussed with numerous facets of the A/E industry, including representatives from the federal government, as to how BIM can be of benefit to them.

Brian Russell

Mr. Russell is the Integrated Practice Manager at Ayers/Saint/Gross and has over 10 years of experience working in the Architecture and Construction fields. He is an expert in Building Information Modeling (BIM), Design Visualization, Virtual Design and Construction, and has been implementing BIM and buildingSMART methodologies at Ayers/Saint/Gross for the last four years.

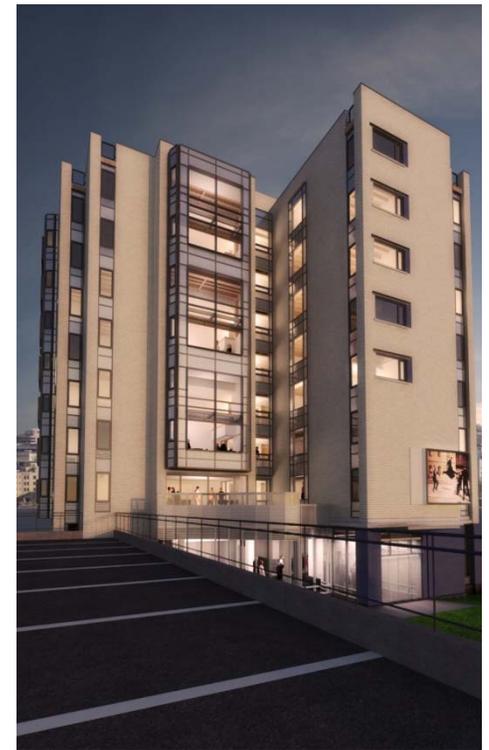
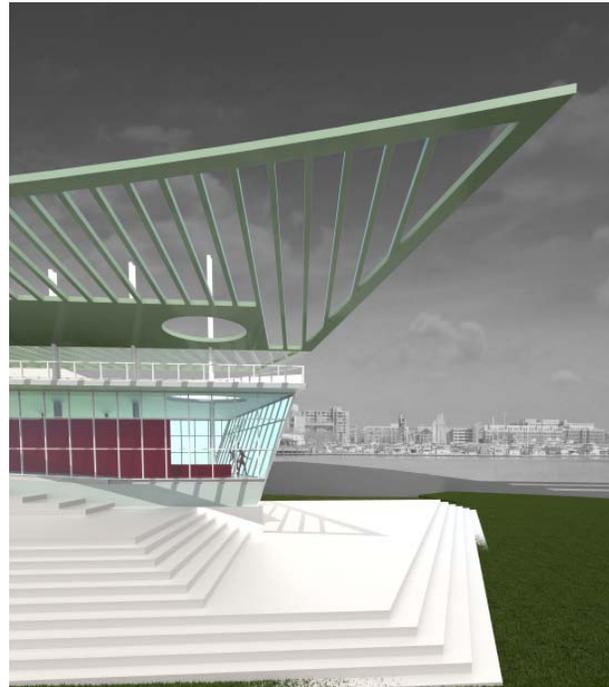
BIM Implementation Ayers/Saint/Gross

The Plan:

- Train two staff
- Use on a small project as a test
- Evaluate BIM after one year and one project

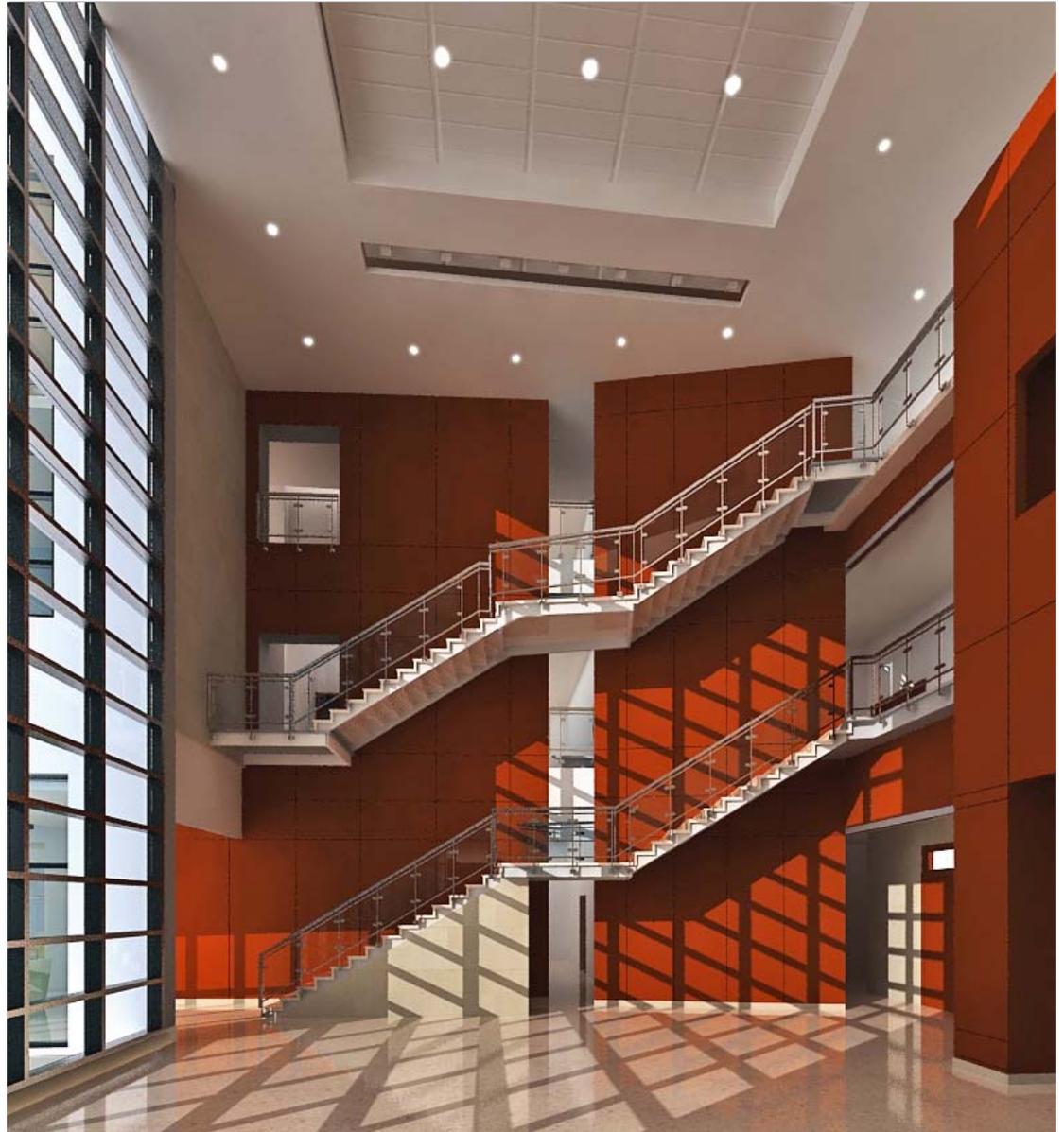
The Reality:

- All staff trained (80+)
- All new projects starting with Revit
- Dramatic improvement with visual images
- Tremendous time savings in CD's



BIM at ASG – What we found...

- Increased speed of delivery
- Better coordination
- Less man-hours spent in repetitive tasks
- Greater productivity
- Better quality design and detailing
- A single database of information
- Educational for young architects



Fee Issues

- Re-thinking the typical **15%-20%-40%-5%-20%** fee breakdown
- ASG proposals are now **25%-25%-25%-3%-22%**
- ASG foresees fees like **35%-23%-20%-2%-20%** in the future



Project Manpower

- Requires more senior-level initial input
- With senior BIM power users, the number of project staff is reduced
- Average hourly rate per phase will go up, but less man-hours needed
- Overstaffing can complicate projects



Thames Street Wharf



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a prominent location on the Baltimore, Maryland waterfront

INTRODUCTION

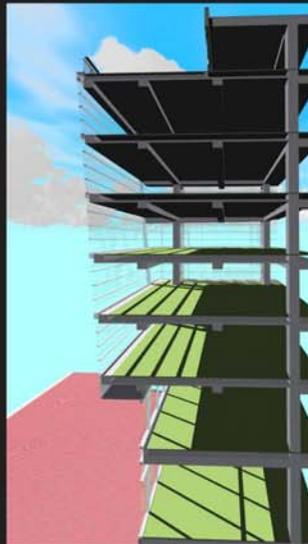
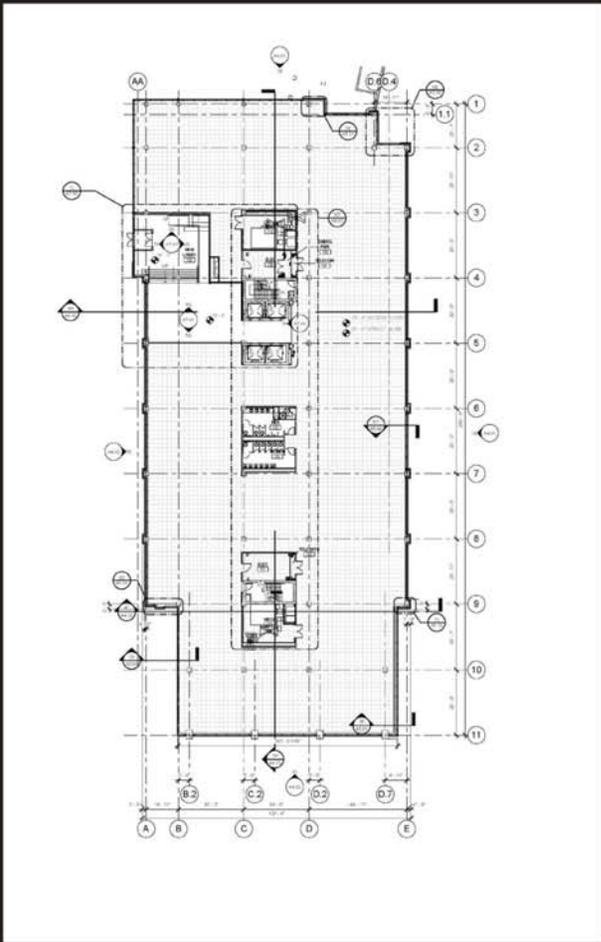
The Thames Street Wharf office building is the cornerstone building of Harbor Point, a planned development on one of the premier remaining sites available for development on the east coast, and a prominent location on the Baltimore, Maryland waterfront. This new 'Class A' office building was designed to recall the old shipyard buildings along the waterfront, but with a more modern take which reflects Baltimore's "Digital Harbor" initiative that continues to transform the city's waterfront. Additionally, Thames Street Wharf is being constructed at the location of an old chromium factory. The site is currently defined by the Environmental Protection Agency as a brownfield site, which adds another level of complexity to the design process.



The Thames Street Building was sited to engage downtown Baltimore and the Inner Harbor, while sensitively responding to the more intimate scale of neighboring Fells Point. The materiality and massing will ultimately set the tone for the quality of architectural development for the balance of the Harbor Point master plan.

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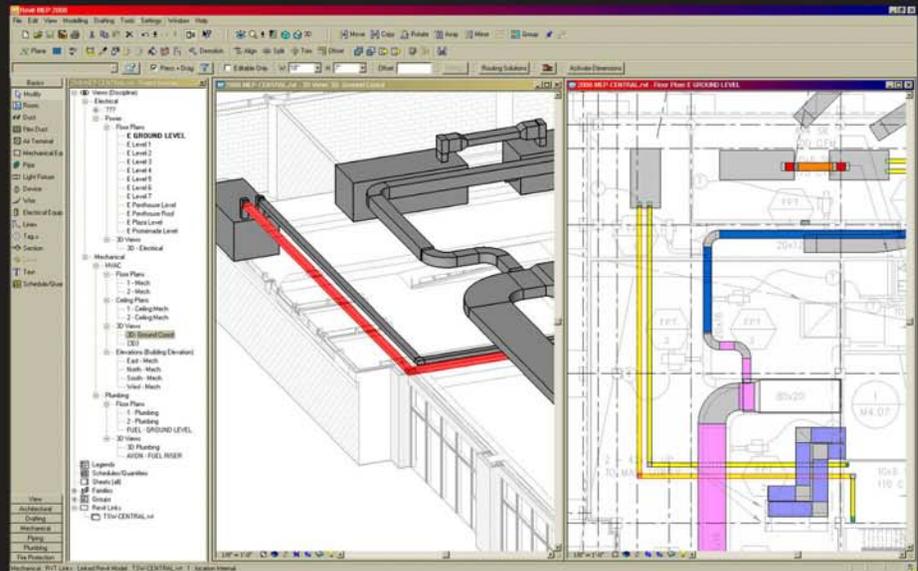
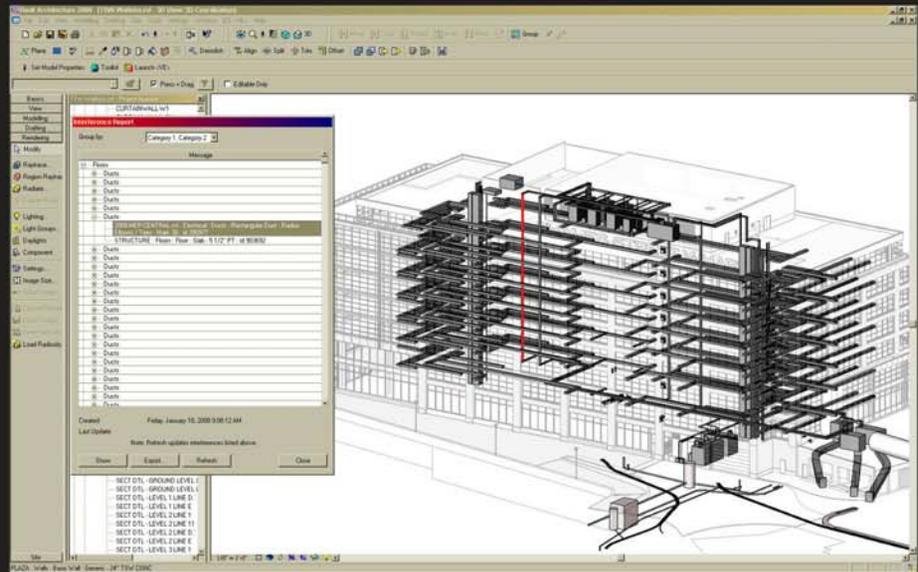


Redundant electrical, telecommunications, emergency power, and cooling water supply systems provide the building's lead tenant with an added level of infrastructure reliability.

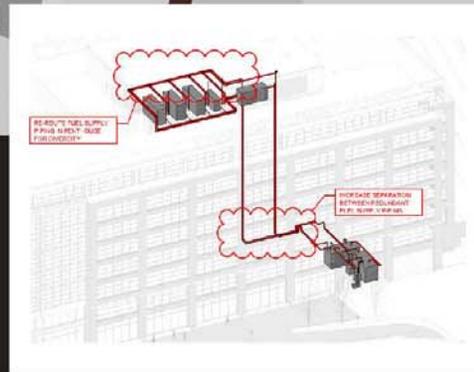
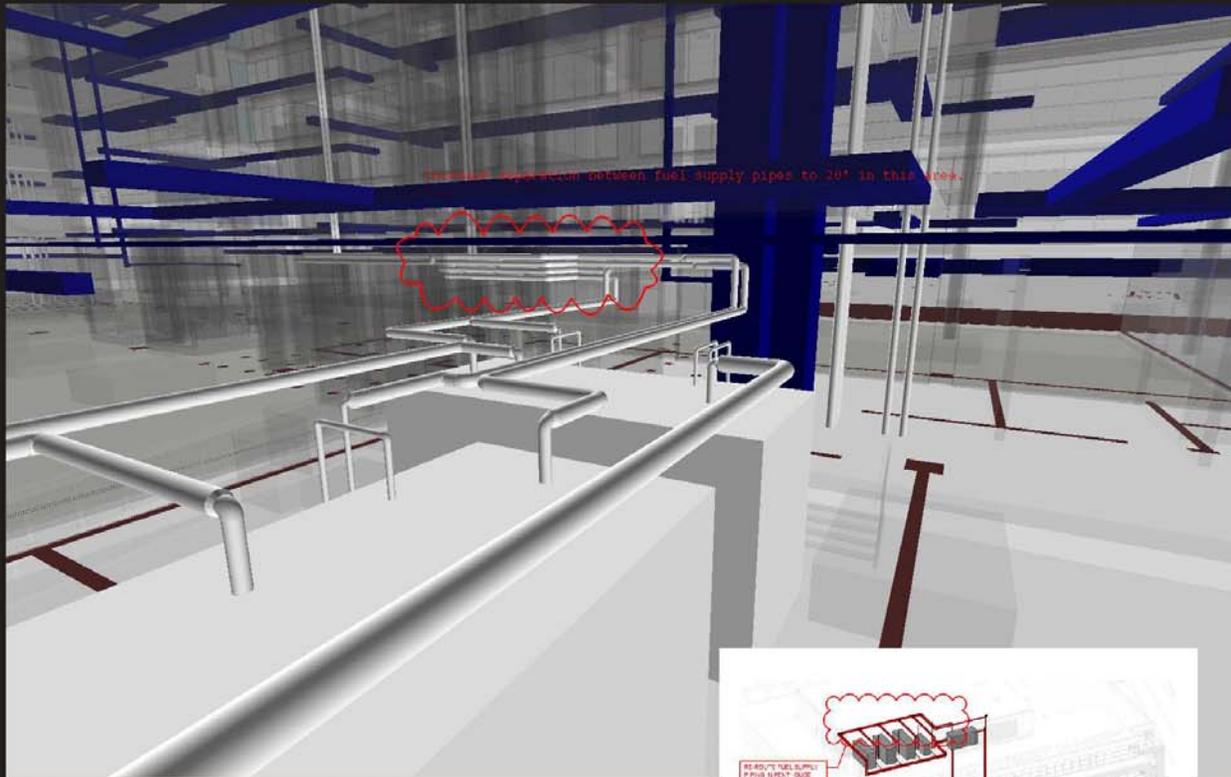
The building is a 'Class A' commercial office building designed to accommodate corporate office tenants on 8 floors with 35,000 GSF floor plates. The concrete structure is entirely land-based, with the southern portion of the building cantilevering over the water. In addition, a pedestrian promenade pier will extend out into the Baltimore Harbor which will allow tall ships and visiting sail boats to dock along its edge.

The facility was designed, and is being constructed, to achieve LEED Silver certification. Some of the building's many sustainable features include a large green roof, high performance, ultra clear glazing, underfloor air distribution, energy recovery and innovative stormwater management strategies.

Coupled with its sustainable features, the building incorporates numerous high performance design features. Redundant electrical, telecommunications, emergency power, and cooling water supply systems provide the building's lead tenant with an added level of infrastructure reliability.

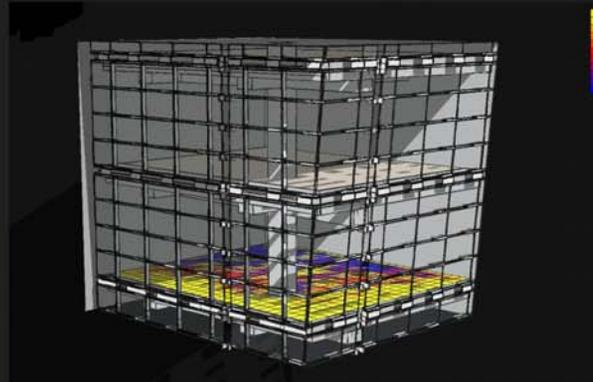
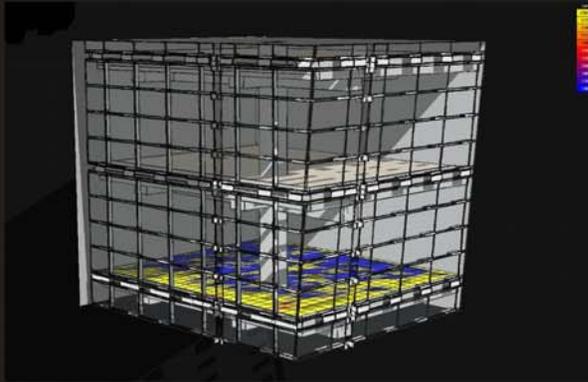
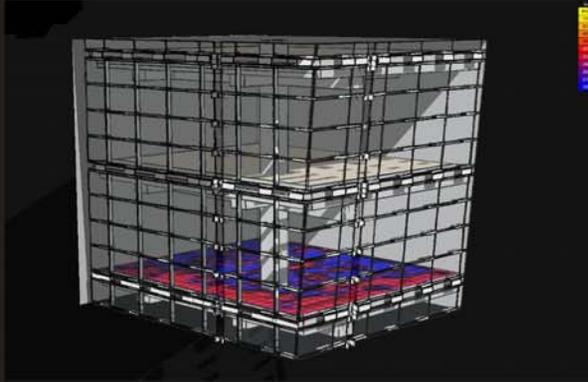


The design team as a whole utilized Revit and Navisworks™ for BIM integration, which was coordinated by the architect. Periodic interference detections were performed which identified potential conflicts between building systems prior to receipt of an RFI from the contractor.



The design team was able to evaluate and monitor the routing of the redundant fuel delivery system...

One of the requirements of the lead tenant was that their mandated redundant systems maintain certain clearances in order to ensure building operations if any of the primary systems become damaged. The design team was able to evaluate and monitor the routing of the redundant fuel delivery system to rooftop generators to accommodate the tenant's requirements for diverse and separate routing of their backup systems.



The amount of glazing desired for the exterior envelope required intensive study to confirm compliance with code requirements for energy performance. During Design Development, the architect and mechanical engineer analyzed numerous glazing systems and configurations to achieve code-required energy goals. Exporting the BIM model to the IES Virtual Environment modules became an ideal method to study glass products and their varied performance values. Ultimately, the envelope performance was confirmed to meet ASHRAE 90.1, the architect was able to meet the energy efficiency goals and identify the best glazing product to confirm code compliance while using ultra-clear glazing on the entire perimeter of the building.

...an ideal method to study glass products and their varied performance values...



In the early stages of construction, the construction manager requested that the design team work with the plumbing contractor to minimize the amount of stormwater piping installed in trenches under the building. Any excavation and removal of existing contaminated soils posed a significant cost impact to the project. During a meeting to review the piping options, it became apparent in the multi-discipline BIM model that numerous coordination problems and head clearance issues would have been created if we had chosen to relocate the underground stormwater piping up into the ceilings. Visualizing the problems with any alternatives, the team collectively elected to maintain the current design.

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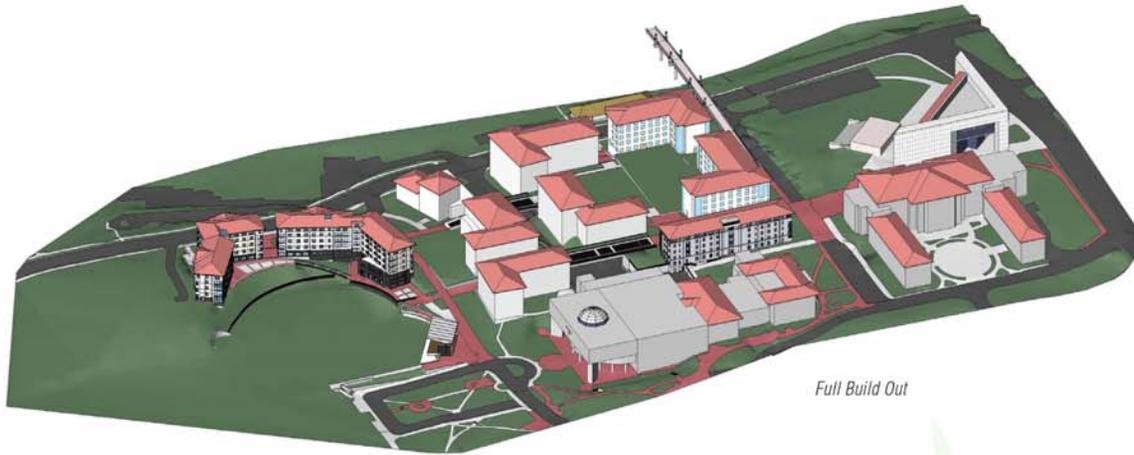
The Thames Street Wharf Building is currently under construction with anticipated completion by January 2010. All building systems were fully integrated and modeled using an array of BIM software virtually eliminating conflicts and expediting pre-construction sequencing and cost estimates.

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Emory Housing Phase I & II



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Full Build Out



Phase 2



Phase 3

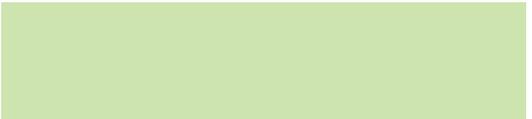


Phase 4



Phase 5

Introduction
The architect was hired to develop a housing master plan to replace 1,445 beds of freshman housing at Emory University. The architect was also selected to design the first two phases of the master plan, working within the architectural context of the campus to achieve a sustainable design.





The design for Phase II began during the construction of Phase I. This phase includes 2 new residence halls totaling 293 beds with unit types, community sizes, cluster concept and amenities similar to those provided in Phase I. In addition, it provides spaces intended to serve the Emory community at large, including a welcome desk, smart classrooms, work rooms, offices, demonstration kitchen, student work rooms, seminar and multi-purpose rooms, an academic advising suite and a learning community support suite.

This project is pursuing LEED Gold through a variety of strategies including:

- Treatment and retention of stormwater on site using visible components of the landscape design.
- Reuse of collected rainwater and condensate water for toilet flushing.
- Photovoltaic glass powers the pumps that send the harvested water back into the building.
- Low flow plumbing fixtures and dual flush water closets for water efficiency.
- High performance envelope and mechanical systems for energy efficiency.
- Metering and display of energy use to increase student awareness of sustainability issues.

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Glazing Diagram

■ South and West exposures received solar heat glazing where potential solar heat gain is greatest



Glazing Diagram

■ Double rooms and public spaces with larger windows for effective daylighting
 ■ Single rooms and bathrooms with smaller windows for effective daylighting

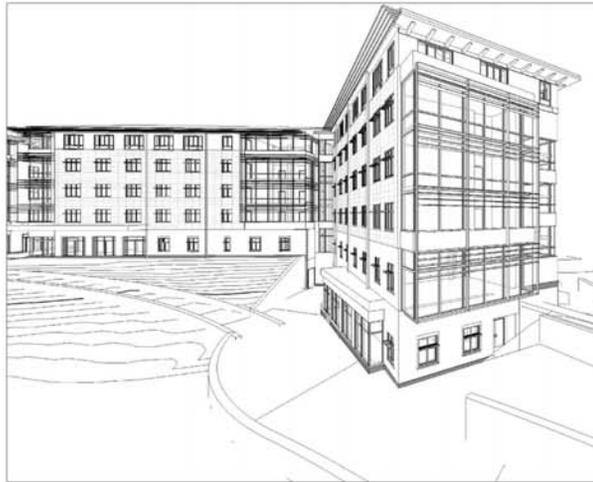


1. Demonstration of how the Design Result Changed in Response to Sustainability Objectives

The architect was able to take the lessons learned during the delivery of Phase I to implement and enhance design solutions for Phase II. The architect implemented a strategy for Simulation, Design Response, and Performance Assessment on several areas but most notably for:

- Rainwater Harvesting
- Window selection in terms of daylighting and views
- Glazing Performance
- Roofing Tile Performance

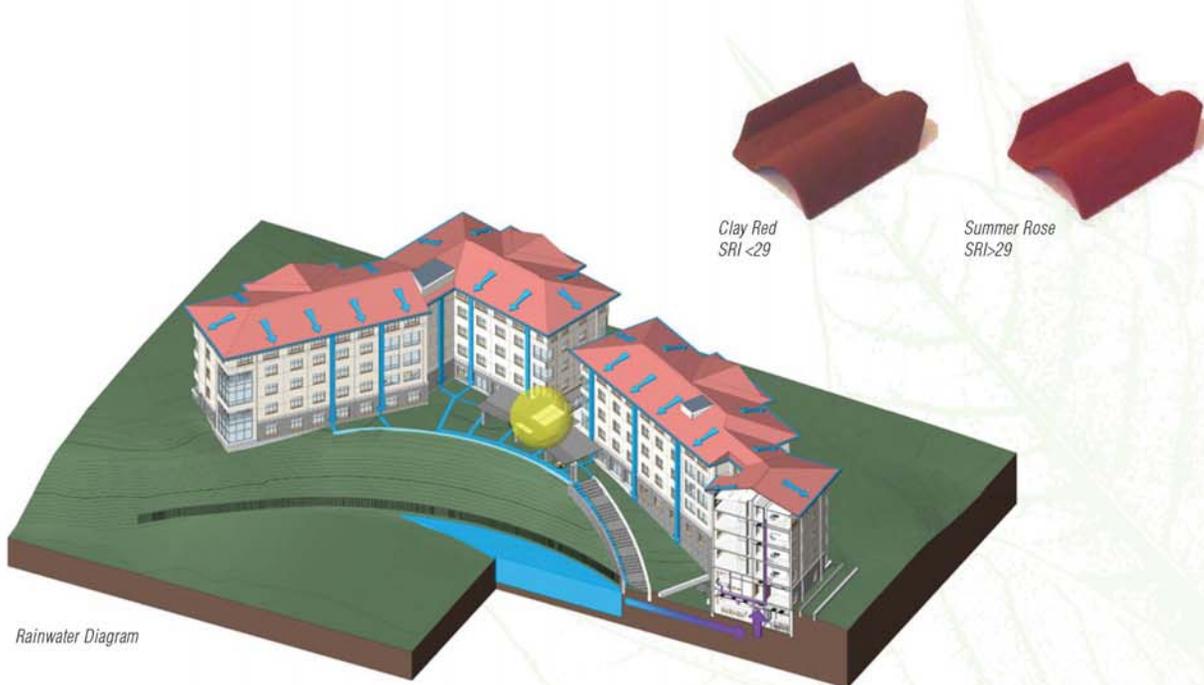
For example, the Solarban 60 high performance glazing that was used throughout Phase I was analyzed and through value engineering, the architect demonstrated that the building would gain additional efficiencies by using Solarban 70 at the south and west exposures while keeping Solarban 60 at north and east.



Preliminary Concept



Final Design



Rainwater Diagram



Clay Red
SRI <29



Summer Rose
SRI >29

At the outset of Phase I, the architect developed a model for the overall housing master plan showing phasing and site opportunities. As a result, the architect was able to take advantage of the site conditions for Phase II to create a bioswale to filter and collect rainwater for reuse in building toilets, dramatically increasing the water efficiency in the new building.

The architect investigated window and fenestration alternatives to achieve maximum energy efficiency while maintaining the integrity of the campus context.

Early on in Phase II the architect investigated the value in providing exterior light shelves for maximum penetration of natural light and realized that in order for the light shelves to be truly effective they would need to extend into the building. The team was able to conclude that there was more value in moving forward with high performance glazing to meet energy efficiency requirements. Furthermore, the team utilized energy modeling data to select glazing types at each solar exposure for maximum value and efficiency.

Clay tile roofing is an architectural hallmark and a defining element of the campus. During Phase I, there was no test data available to verify that the clay tiles would comply with requirements for the LEED Heat Island credit. Following Phase I, the CM brought the manufacturer test data and the architect selected a color that fit the surrounding context and reduced overall heat absorption. The architect also investigated the schemes through a rendering process utilizing the BIM. These complex roof forms and systems were studied and analyzed in BIM, identifying issues up front and allowing for timely resolution.



In support of Emory's commitment to improving building performance and raising awareness of sustainability issues on campus, metering tools were included in the design to facilitate the display of real-time energy usage in the building. The energy usage data is available through a user friendly display known as the "building dashboard" and is accessible via touch screen monitors in the foyer of each residence hall and on the internet at <http://buildingdashboard.com/clients/emory/turman/>. The breakdown of energy usage by floor allows for friendly competition between communities to reduce their environmental impact and carbon footprint.



Hershey Center for Applied Research - Building Two



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Hershey Center for Applied Research - Building Two

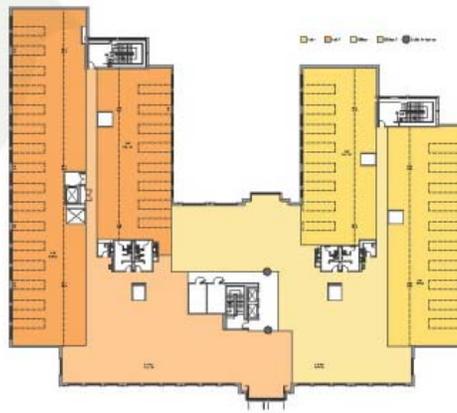


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Area Analysis



Building Two - 1st floor

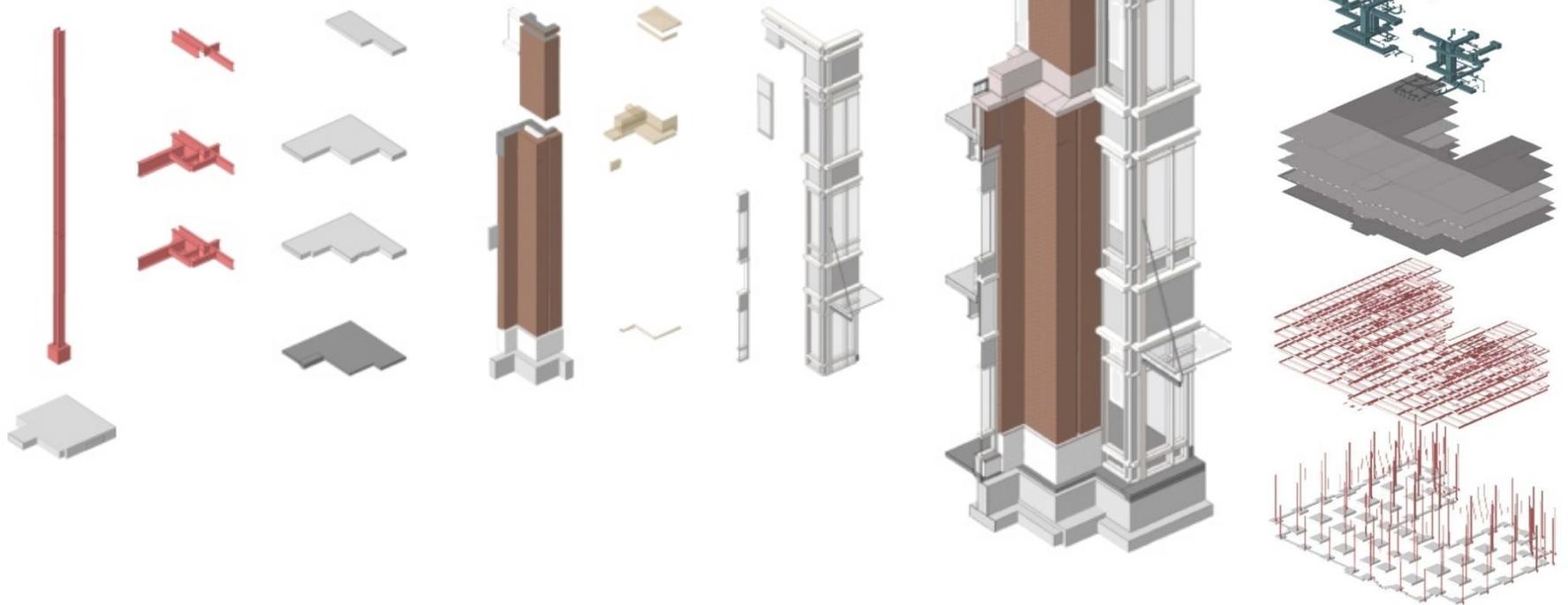


Building Two - 2nd floor



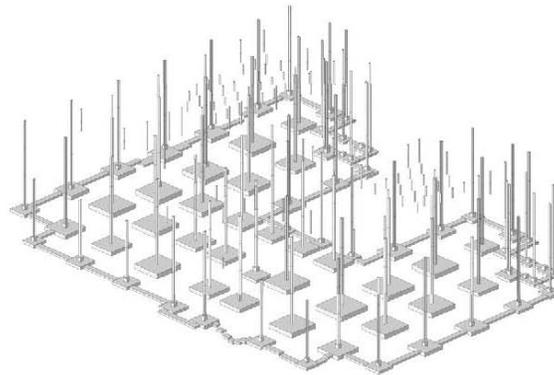
Building Two - 3rd floor

Virtual Building

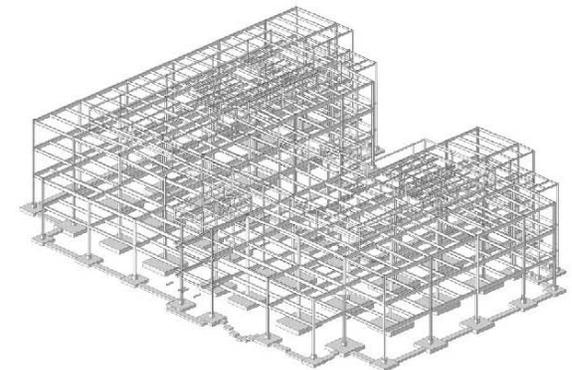


Structural Design / Fabrication

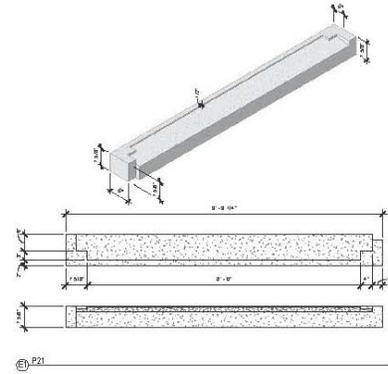
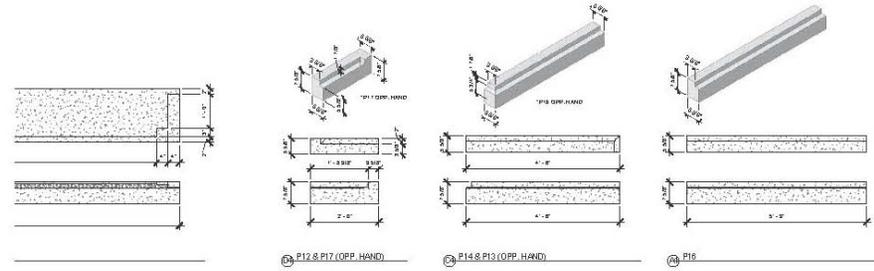
Documentation
vs
Analysis
vs
Modeling
vs
Construction



Screen Wall - High					Screen Wall - High
472' 4"					472' 4"
Screen Wall - Low					Screen Wall - Low
465' 2"					465' 2"
Roof Framing Plan					Roof Framing Plan
459' 10"					459' 10"
3rd Floor Framing Plan					3rd Floor Framing Plan
445' 0 1/2"					445' 0 1/2"
Stair Landing 2					Stair Landing 2
438' 0"					438' 0"
2nd Floor Framing Plan					2nd Floor Framing Plan
430' 4 1/2"					430' 4 1/2"
Stair Landing 1					Stair Landing 1
423' 8"					423' 8"
Foundation Plan					Foundation Plan
412' 0"					412' 0"
Column Locations	L-8.7	L-10	M-6	M-7	

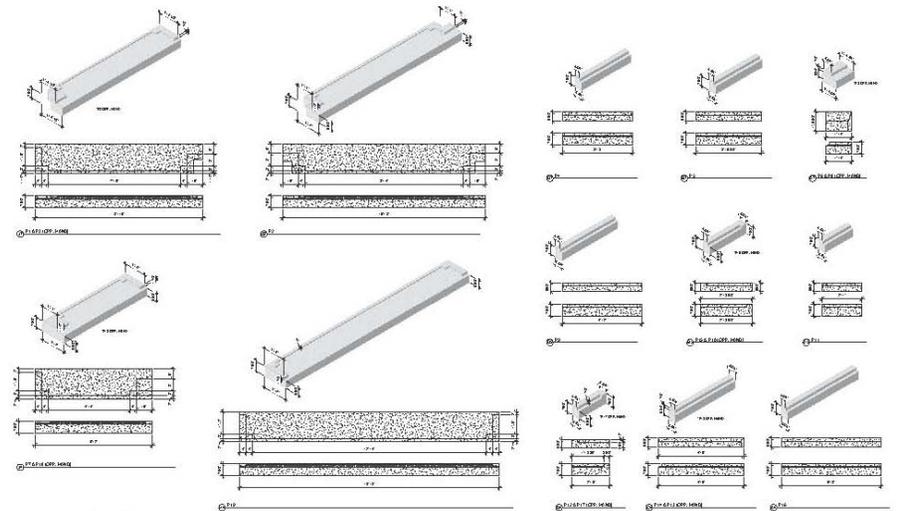


Precast



Precast Schedule				
Type Mark	Quantity	Length	Width	Height
P1	16	8'-10"	1'-7"	0'-7.56"
P2	10	10'-8"	1'-7"	0'-7.56"
P3	15	8'-10"	1'-7"	0'-7.56"
P4	14	2'-8"	0'-5.56"	0'-7.56"
P5	5	0'-0"	0'-0"	0'-0"
P6	3	1'-4"	1'-0.56"	0'-7.56"
P7	1	6'-2"	1'-7"	0'-7.56"
P8	3	1'-4"	1'-0.56"	0'-7.56"
P9	1	0'-0"	0'-0"	0'-0"
P10	1	2'-8.56"	0'-5.56"	0'-7.56"
P11	1	0'-0"	0'-0"	0'-0"
P12	1	2'-0"	0'-5.56"	0'-7.56"
P13	1	4'-6"	0'-5.56"	0'-7.56"
P14	1	4'-4"	0'-5.56"	0'-7.56"
P15	1	2'-8.56"	0'-5.56"	0'-7.56"
P16	1	0'-0"	0'-0"	0'-0"
P17	1	2'-0"	0'-5.56"	0'-7.56"
P18	1	6'-2"	1'-7"	0'-7.56"
P19	2	10'-8"	1'-7"	0'-7.56"
P20	15	8'-3.14"	0'-11"	0'-7.56"
P21	2	9'-3.14"	0'-11"	0'-7.56"
P22	1	4'-5.56"	0'-11"	0'-7.56"
P23	1	4'-5.56"	0'-11"	0'-7.56"
P24	5	4'-10"	2'-0"	0'-7.56"
P25	5	0'-0"	0'-0"	0'-0"
P26	11	4'-4"	2'-0"	0'-7.56"
P27	2	1'-8"	0'-5.56"	0'-7.56"

Precast Schedule				
Type Mark	Quantity	Length	Width	Height
P28	1	2'-11.66"	2'-3.56"	0'-7.56"
P29	1	4'-6.78"	1'-6"	0'-7.56"
P30	1	4'-6.78"	1'-6"	0'-7.56"
P31	1	2'-11.66"	2'-3.56"	0'-7.56"
P32	4	1'-0.56"	0'-8.56"	0'-7.56"
P33	40	7'-0"	10'-5"	1'-4"
P34	15	6'-4"	10'-5"	1'-4"
P35	2	9'-3"	10'-5"	1'-4"
P36	1	4'-3"	10'-5"	0'-7.56"
P37	1	2'-0"	11'-7.56"	0'-7.56"
P38	1	4'-10"	10'-0"	0'-7.56"
P39	2	12'-4"	10'-5"	1'-4"
P40	2	4'-4"	10'-5"	1'-4"
P41	1	2'-0"	11'-7.56"	0'-7.56"
P42	2	6'-11"	10'-3.16"	0'-5"
P43	2	4'-2"	10'-5.56"	0'-7.56"
P44	1	4'-3"	11'-5"	0'-5"
P45	1	2'-11"	11'-6"	0'-5"
P46	1	4'-11"	11'-6"	0'-5"
P47	1	4'-3"	11'-5"	0'-5"
P48	1	6'-1.12"	2'-0"	0'-5"
P49	1	6'-1.12"	2'-0"	0'-5"
P50	1	4'-8"	11'-6"	0'-5"
P51	1	4'-8"	11'-6"	0'-5"
P52	13	4'-4"	11'-6"	0'-5"
P53	3	4'-4"	11'-6"	0'-5"
P54	3	4'-4"	11'-6"	0'-5"



Precast Schedule

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Questions?