



UPPER CAMPUS HOUSING PROJECT

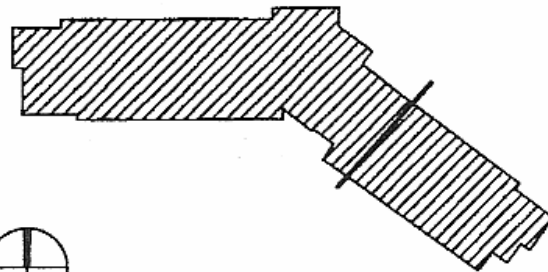
NICOLE HAZY
Structural
Advisor: Dr Hanagan

Project Background

The University of Pittsburgh is currently constructing a dormitory facility on its upper campus. This building is approximately 161,600sf and 9 stories above grade plus one ground level. The Upper Campus Housing Project will house approximately 512 students. It is located on Stadium Drive, not far from The Peterson Events Center.

The main entrance to the building is on the South side. Here, a large staircase leads into the Lobby/Café area. The building façade consists

of brick wall containing windows of tempered insulated spandrel and vision glass. The brick façade consists of different shades of light brown, complimenting the surrounding structures.



KEY PLAN

Construction on the Upper Campus Housing Project began in May of 2005 and is expected to end in July of 2006. The overall cost of the dormitory building is approximately 33 million dollars.



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Project Team

Owner: The University of Pittsburgh

Construction Manager: P.J. Dick Incorporated

Architect: Perkins Eastman Architects PC

Civil/Site/Landscape Engineers: The Gateway Engineers, Inc.

Structural Engineer: Atlantic Engineering Services

MEP Engineer: Elwood S. Tower Corporation

Building Codes

International Building Code

ASTM

ACI 318 (Requirements for Structural Concrete)

ACI 530 (Requirements for Masonry Structures)

AISC (Specifications for Structural Steel Buildings)

ASCE7-02 (Lateral and Loading Code)



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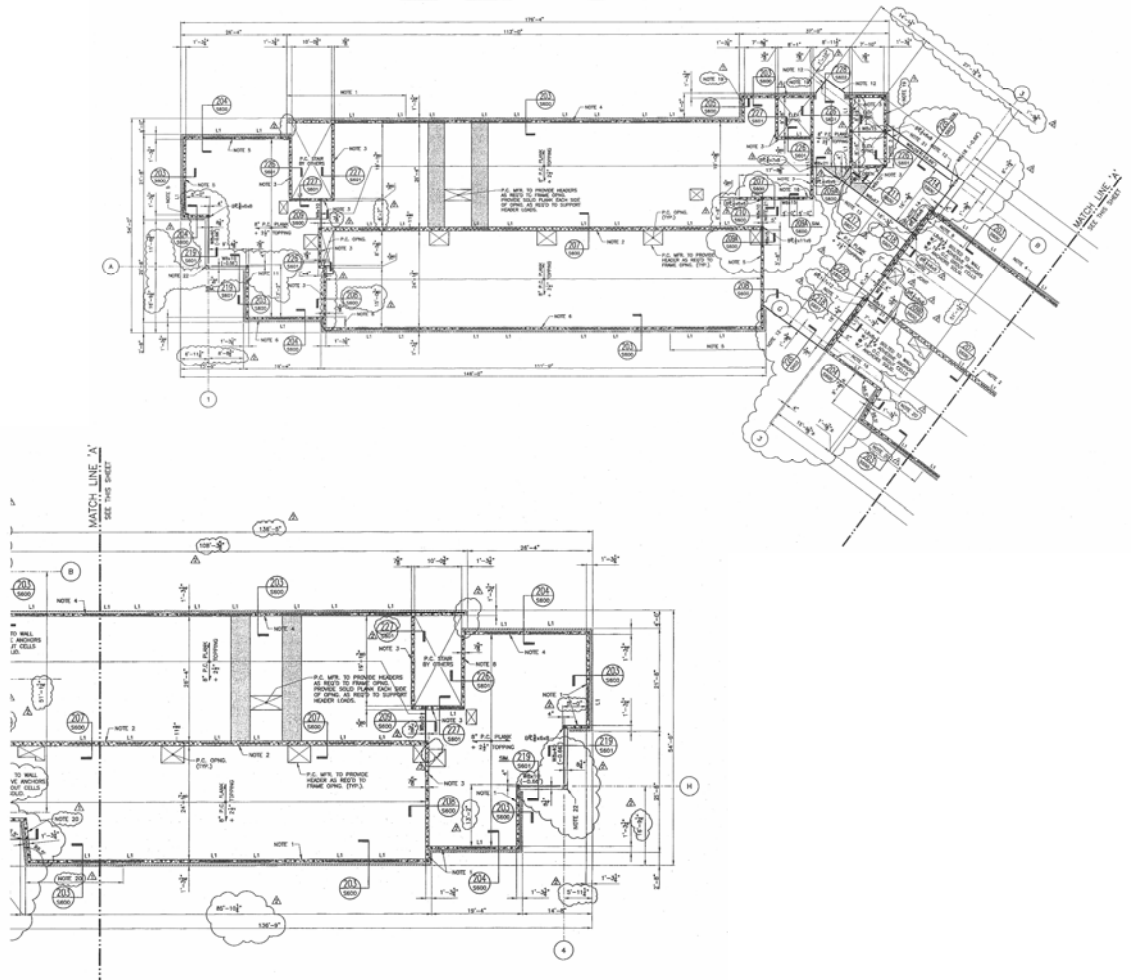
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Existing Conditions

Structural

The existing structural system for the Upper Campus Housing Project is one-way 8" hollow-core concrete plank plus a 2 1/2" topping with reinforced masonry bearing walls. The plank will be filled in solid where needed. Shown below is a typical framing layout for the existing system.





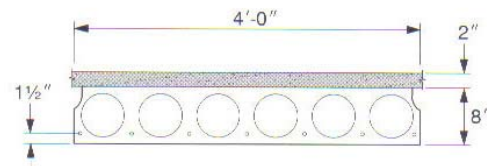
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Framing Information		
Floor	Typical Framing	Typical Span
First	8" PC Plank + 2 1/2" Topping	24'-1 7/8" to 29'-4"
Second-Eight	8" PC Plank + 2 1/2" Topping	24'-1 7/8" to 29'-4"
Ninth	8" PC Plank + 2 1/2" Topping	24'-1 7/8" to 29'-4"
Roof	8" PC Plank w/o Topping	24'-1 7/8" to 29'-4"
	HSS6x6x3/8 Galv. Vert. Tube	Roof Column
	HSS6x6x1/4	10'
	Galv. 3 1/2" Dia. Std. Pipe	Roof Column
	Galv. W10x22	5' to 8'-7"

The hollow-core plank for this building is designed with a 15psf load added for topped members, a 25psf superimposed dead load, and the required live load.

There are also five steel columns in this building (1A, 2F, 2J, 3B, 4H). They are all HSS6.625x0.500. Two of these



columns (2F and 2J) only span from the ground floor to the first floor ($L = 12' - 6''$). Two other columns (1A and 4H) span all the way to the ninth floor. Also, the last of the five columns (3B) spans the entire height of the building. Column 1A sits on a W8x31 transfer girder, which transfers the load from the column into the foundation. Columns 3B and 4H sit on concrete piers at the second floor level.

Also in this building there are four 20" dia. concrete piers located at column lines 3C, 3D, 3E, 3G. Each of these concrete piers span from SOG to the second floor level.



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Minimum Design Compression Strength ($f'c$) at 28 days for Reinforced Concrete:

Foundations 3000psi

Walls 5000psi

Slab on Grade 4000psi

Interior Slabs 4000psi

Exterior Slabs 4000psi

Structural Slab and Elevated Slab (Ext.) 5000psi

Structural Slab and Elevated Slab (Int.) 4000psi

Foundation System

The foundation system of this building begins with 71 -drilled concrete caissons. As stated above, each concrete caisson has a concrete strength ($f'c$) = 3000psi. The diameters of these caissons range from 36"-66". All caissons are designed to bear on either limestone/sandstone bedrock or shale/sandstone bedrock per geotechnical report dated December of 2004.

The foundation system also includes 78 concrete grade beams, which sit on the concrete caissons. The concrete strength of this concrete is also specified at 3000psi. All grade beams have a width = 24", except for GB 67 which has a width = 30". The depths of the grade beams range from 36"-60". The concrete masonry walls then sit directly on the grade beams. At each connection between a concrete masonry wall and a grade beam there is a key and waterstop. The key is provided to prevent sliding between members. Existing foundation details are located in the Appendix of this report on page 35.



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Mechanical

Pitt Dormitory building is supplied by a CAV system. This system includes three types of units. The first unit (AHU-1) is a 5400cfm unit. This building also has rooftop units (RTU-1). These rooftop units are rated at 24,250cfm. In this building each resident director is supplied with his or her own electric furnace. Each of these furnaces (AHU-2) is 755cfm. AHU-2's have DX cooling and an electric heating coil.

Lighting/Electrical

There are many different types of lighting used in this building. The first floor lobby has indirect/direct, 120V, 160W pendant mounted lights. In other lounge and lobby areas of the building there are fluorescent downlights. In the dorm rooms there are ceiling mounted polycarbonate bowl fixtures. Other important areas to look at are the corridors. In the corridors there are recessed static fluorescent troffers with prismatic lenses.

This building's electrical system is supplied by 57 208Y/120V, 3PH, 4W panelboards. These panelboards are located on floors ground-ninth. There are also 2 480Y/277V, 3PH, 4W panelboards (1 for the roof and 1 for the penthouse).

Plumbing

The Upper Campus Housing Project's domestic water supply is maintained by a domestic water booster system. 752gal domestic hot water tanks power this system. Located in the mechanical room is a 2" Diaphragm Compression Tank



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with a capacity of 211 gal. There are also 2 140-degree water heaters located there. Each resident director room is supplied with a 3/4" Diaphragm Compression Tank with a capacity of 2gal.

Fire Protection

This building is protected by a number of different sprinkler types. The hallways and common areas make use of the concealed pendent sprinklers. The corridor outside of the service areas has semi-recessed pendent sprinklers. Service areas are equipped with upright sprinklers. Dorm rooms have both concealed sidewall sprinklers and concealed pendent sprinklers. A 6" combined standpipe/sprinkler riser is located in the stairwells. The fire department connection and check valve with ball drip are located on the southeast side of the building (outside of the tenant locker room).