

Taylor Hall

George Mason University
Fairfax, VA

Technical Assignment 1

Executive Summary

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Taylor Hall is a freshman dormitory located at George Mason University's main campus in Fairfax, VA. It will house 295 students and will be located in the south eastern corner of campus. George Mason University has been growing rapidly since the 1960's and has taken pride in exuding excellence through a unique brand of building style. Each building's architecture is carefully planned to knit students into distinct communities and intertwine nature with protected open spaces. Taylor Hall is expected to maintain this tradition in every way possible.

Because of university's transition from a commuter campus to a full time student campus, the need for housing has been critical in the past few years. In 2012, the university added a total of 1200 beds through two new dormitories on the north end of campus, but the demand continued. The addition of 295 beds in the southern end of campus will house freshman students in housing area near "President's Park" and "Liberty Square." The current cost is set to be \$16 million and there is a very strict schedule to complete the building by the fall of 2014. The building is made to integrate students into a collaborative atmosphere through two "communities" brought together by common areas and group living rooms. This was portrayed in Taylor Hall as two wings of rooms with group living areas, study lounges, and large bathrooms on each wing. The ground floor of the building has a laundry room, a common room for games and entertainment, and a housing office. George Mason's standards include the goal of LEED Silver, which makes for a healthy and cost efficient lifestyle that will benefit both the university and its' students.

The delivery method is Design – Build with a competitive bid process. Each general contractor manages an architect to create a design that would fit George Mason's requests in a cost effective manner. After a short list is created, University and The Commonwealth of Virginia officials pick the design that most accurately reflects the culture of the university, its surrounding buildings, and fits the budget set forth. Luckily, Balfour Beatty Construction had already made a great impression on university officials upon the recent completion of The Mason Inn, a \$55 million hotel and conference center.

Upon winning the bid, Balfour Beatty quickly assembled a team of talented individuals that had previously worked on George Mason's campus and were familiar with the area. By putting this team together, the university would feel safe knowing that they understood the standards and protocols well and could integrate construction with campus life in the safest way possible.

The project delivery system expanded as the design phase continued. Since the project was fast-tracked, the foundation was in place before the working drawings were approved for a handful of trades. As part of the Design-Build structure, Balfour Beatty managed both the Architect and the sub-contractors performing the work.

The site had already been drilled for core samples and the geotechnical reports noted fair soil properties for a building. Since the building location in south-east campus was part of the university's

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master plan, the nearby utilities were set to accommodate a building of this size. The only utilities needed would be telecom to be trenched in from the nearby Patriot Circle. A 500 kVA transformer due north of the site provides temporary electricity during construction will provide permanent power after construction. The dorm's location is also very close to the campus hot and cold water system, needed for the mechanical and plumbing systems. Critical site constraints are the protection of the trees to the east of the site and a stream that is roughly 375' south of the site. These tree's will serve as a natural noise buffer between the dorm and Robert's Road while the stream serves as an artery for campus nature preserves and cannot be polluted.

The structural system of the dormitory is a steel frame with slabs on metal decks. Column footings and the elevator shaft mark the extent of excavation needed in the shallow foundations. The superstructure is comprised of HSS steel columns and load bearing cold-formed steel walls. Prefabricated concrete shear walls provide for further structural support and fire barriers. This structural system allows for the most efficient layout of dormitory spaces while saving valuable time compared to using a concrete super structure.

Heating in the dorm comes from the provided campus high temperature hot water (HTHW) system. These pipes enter two heat exchangers inside the mechanical room to provide heat for the building's low temperature hot water (LTHW) system which provides 120 degree Fahrenheit heat to all terminal units with a 30 degree temperature differential. For redundancy, there is a backup suction pump to move the water through the building to each ran coil, VAV reheat coil, cabinet unit heater, radiators, and an AHU.

The rooftop AHU is a 100% outside air system and is equipped with an energy saving plate type enthalpy heat exchanger for preconditioning. Since the health of the students is a high priority for GMU, MERV 7 and MERV 13 filters are used in the rooftop unit. The unit provides 70 degree air to vertical risers, through the corridor, to VAV boxes and to individual units. The air handling unit is fed from the campus chilled water system (runs parallel to the HTHW) which provides 48 degree water to the building.

The transformer on the north end of the site provides power which is step down to 120/208V 3-phase, 4-wire power after it enters the building's main electrical room. Each floor is equipped with a distribution panel and branch circuits are set in the concrete floors. Energy-saving lighting systems and occupancy sensors help to optimize the power consumption of Taylor Hall during off-season periods. The expected load of the building is 1200 A and an education display in the lobby will display live building statistics for energy consumption to raise conservation awareness.

Standard running-bond brick makes up the majority of the façade for Taylor Hall. In congregation and study areas, located on each floor and lobby, a curtain wall system is in place to maximize sunlight penetration. These large glass areas are also present in stairwells and frosted glass is

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featured in the bathrooms. The north facing storefront on the ground floor's common room helps to cut down on energy consumption and fits in with the modern look of the near-by Liberty Square. BCOM must approve all architectural plans to ensure that the building "fits in" with its surrounding buildings. This is the same for all state funded institutional buildings in Virginia.

Table 1. Construction Cost Comparison

	RS Means	Actual	% Difference
HVAC	\$ 14.26	\$ 40.00	(3.35%)
Plumbing	\$ 24.40		
Fire Protection	\$ 3.58	\$ 2.90	23.5%
Electrical	\$ 17.38	\$ 20.50	(15.2%)
Structural	\$ 19.98	\$ 30.00	(33.4%)
Construction Cost	\$ 157.01	\$ 157.02	0%
TOTAL PROJECT	\$ 199.81	\$ 228.39	(12.5%)

It was quite clear that, because of its intended use, this building must adhere to a strict schedule base on freshman move-in day. Because of this, the project's preliminary structure and excavation were beginning to be put in place before all shop-drawings were received or working drawings approved. Cost was also a factor for the University, but it appears that fast-tracking the project may have driven the price up quite a bit. In the above table, you can see the difference between the predicted costs per square foot (per RS Means) and the actual cost per square foot. Although the construction cost is nearly identical, I believe that the 12.5% difference in building price is due in-part to the acceleration of the schedule.

With a talented project team familiar with GMU's building traditions and an innovative design team, this highly efficient living area will provide a healthy and memorable first-year experience to incoming freshmen. As George Mason's main campus continues to expand, more dormitories will surely pave the ways of growth and uphold the university's traditions in constructing excellent buildings.