Executive Summary

As stated in the proposal, 3 additional stories are to be added to the top of the Biomedical Research Building, the top most to be of double height, with 22' from floor to ceiling, and make this addition a viable option through HVAC requirements, lighting design and acoustical management. Also to be explored are the effects of the 3 additional stories, with a total height of about 50', on the existing structure, and testing the hypothesis that the columns currently existing in the building are indeed designed for additional stories should the need arise in the future.

After designing a viable 3 story expansion based on the existing structure for compatibility, the existing structure was analyzed for any exceeded design values, and after reiteration, was found that the existing structure is sufficient for the additional 3 stories, both under gravity and lateral loads. After this, it was simply a matter of creating a usable space for HVAC, lighting and acoustics, to provide students with plenty of work space to do research and recreation without disruption.

HVAC was found to require a system that provides an additional 86000 CFM and approximately 5.5 million BTU/HR for both heating and cooling, with improved insulation and special glazing. Lighting requirements for the 500 lux recommended, necessitated the use of 200 T8 58W flourescent luminaries over 18 21' by 35' bays in addition to indirect lighting for the ceiling to be illuminated yet not create shadows with the mid height bracing beams. Acoustic management found the balance between noise reduction and prevention of creating an uncomfortably quiet space, as well as prevention of echoes. Cost was also computed to compare the addition to the cost of the existing structure, showing the return is just as good, if not better, should inflation be factored in, per story.