

**Thesis Project Portfolio**

**Site Design for a Hotel on Pantops, Charlottesville**

(Technical Report)

**Impact of Augmented Reality on the Methods, Professionals, and Overall Field of  
Construction**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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## **Executive Summary**

The beauty of Augmented Reality (AR) is that it has the potential to be beneficial to almost any industry, including construction and land development. The technical problem, or Capstone project, I am working on this year is to design and develop a set of construction documents for a private developer who would like to build a hotel in the Pantops area of Charlottesville. Land development is a crucial step in the construction process because it will provide a general contractor with all the information necessary to get a parcel of land ready to be built on. The sociotechnical topic I am addressing in my STS research is how AR is changing the methods, professionals, and overall field of construction. This is important because as AR technologies advance, they are becoming more and more prevalent in the construction industry, so I want to understand the effects these AR technologies are having and will have on the industry. While AR has very limited applications in the land development field, land development is the first step in a construction project, so AR could be used to help implement the land development construction documents in the field. When the site/civil general contractor is performing their scope of work, it mainly involves moving dirt and working underground, so AR would have many benefits to help the contractor visualize where elements of the plans need to go in the field.

My technical research will provide a set of construction drawings to a contractor to enable a hotel to be built on a specific site. Without the land development drawings, this hotel would not be able to be built, considering that land development is the first step in the building process. Our methods to how we created this set of drawings were guided by the project constraints given and the local codes and regulations.

Throughout the year, we submitted 25%, 50%, and finally 100% design documents for the new hotel in Pantops. Many layout iterations were considered at the beginning of the project, and throughout the design process, we created completed sheets for the layout, grading, utilities, stormwater, demolition, and erosion and sediment control that all adhered to local and federal codes and regulations.

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I found that there is ample opportunity for AR technologies to impact the construction industry, specifically through improving safety, efficiency, and communication. As AR becomes more popular on construction sites, it will force changes in the traditional construction methods and for the professionals who are using the technology. However, in order for AR to reach its potential impact, it must be used across the industry at a large scale, which will be its greatest challenge.