

**Thesis Project Portfolio**

**Site Redesign at Crozet Elementary**

(Technical Report)

**An Analysis of Overcrowding in Northern Virginia Public Schools**

(STS Research Paper)

An Undergraduate Thesis

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

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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## **Executive Summary**

The Capstone project and STS research paper presented within this portfolio are directly connected by the same issue: overcrowding in public schools. The research paper discusses one way that school districts in Northern Virginia commonly deal with overcrowding: renovating or constructing additions to an existing school in order to increase capacity. The Capstone project stems from the exact same kind of decision being made by the Albemarle County School Board in response to the overcrowding of elementary schools in the town of Crozet. The research paper does also look more broadly at the causes of overcrowding and what long-term solutions exist, whereas the Capstone project is just the development of one, more short-term solution. However, the main topic of the research and the motivation for the technical work in the Capstone project are one and the same.

The Albemarle County School Board made the decision to construct an additional academic wing at Crozet Elementary School in order to accommodate an upcoming rise in the school's student population as a result of redistricting. It was determined that the entire campus of the school would need to be redesigned as well to increase the available parking, improve the overall circulation throughout the site for cars, buses, and pedestrians, and provide more playground space. The Capstone project detailed in this portfolio proposes a new design for the site that achieves these broad goals, satisfies other more specific requests that were made by the school, and complies with all applicable local, state, and federal codes. The technical work necessary for the completion of the project included grading, stormwater management, utilities, and erosion control. All these elements have been put together to create the final deliverable for the project: a set of construction documents. The plan set enables a contractor to construct the design so that the parents, teachers, students, and administrators will have a better experience at the school.

The subject of the STS research paper is the debilitating amount of overcrowding that public school districts across Northern Virginia have struggled to deal with for years. The paper looks specifically at the network of organizations that have impacted the situation and aims to provide an answer for exactly how each actor has contributed to the problem. The framework that gives structure to the exploration of the dilemma is Actor-Network Theory. Network analysis is used to examine the actions and interactions of the various relevant institutions in regard to this issue. The research provides important insights for the personnel and governing bodies in the fields of urban planning and education, both in Northern Virginia and potentially other parts of the country facing similar circumstances, so that changes can be made to mitigate the level of overcrowding that currently exists. Overcrowding is a danger to the quality of education that a student receives and the quality of life that they experience, which makes this research incredibly important for the future success of the public school systems in Northern Virginia.

Completing both projects simultaneously created a firmer belief in the conclusion drawn from the research paper that broadscale changes need to be made to the actions taken by the groups that impact overcrowding in order to truly get a handle on the problem. Experiencing firsthand the amount of time and effort that goes into redesigning the campus of an elementary school, let alone that of a middle school or high school, made it clear that Northern Virginia school districts will continue to be in serious trouble if they need to keep relying on renovations and additions to deal with overcrowding. Especially considering the fact that construction often takes a substantial amount of time as well. Many schools in Northern Virginia are already behind when it comes to beginning projects like the one at Crozet Elementary. Working on that kind of undertaking drove home the conviction that more than just construction needs to be done to

combat overcrowding because it is impossible for architects, engineers, and contractors to keep up.