Thesis Project Portfolio

Biscuit Run Park Phase 2 Development

(Technical Report)

No Place Like Home:

Strategies for Building Sustainable Communities and Equitable Green Spaces

(STS Research Paper)

An Undergraduate Thesis

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Executive Summary

Although civil engineering is not typically associated with social justice, the two fields are inextricably linked. Biscuit Run Park near Charlottesville, Virginia is currently under construction, and for our capstone project, our team worked to design select Phase 2 site elements including athletic fields, paved trails, and stormwater best management practices (BMPs). Site conditions, engineering standards, and construction phasing were all considered in iterative designs that coalesced into a final sheet set and technical report. For my STS thesis, I investigated the efforts to combat green gentrification in Southwood, a vulnerable community that directly borders Biscuit Run. Through early intervention and continued community involvement, Southwood was able to successfully protect current residents from displacement. While it is important that the design of Biscuit Run Park is accessible, functional, and environmentally sustainable, the park does not exist inside a vacuum, and its development will have broader economic and cultural effects on neighboring communities such as Southwood. Public parks are undoubtedly an invaluable shared resource, and it is the engineer's responsibility to collaborate with other agencies and engage with local community members to ensure the benefits are felt equitably.

Biscuit Run Park, located just south of Charlottesville in Albemarle County, is currently in development to provide recreational facilities and preserve natural resources. At 1,190 acres, it will be the largest park in the county by far and will include walking and cycling trails, athletic fields, pavilions, play areas, and scenic views of Carter Mountain. Phase 1 of construction was completed in December 2024, including a paved entrance to the park and the first section of an entrance road to a trailhead parking lot. Phase 2 is currently underway and proposes extended roads, parking lots, terraced sports fields, and a trail system. Our team first evaluated the

progress made in Phase 1, then designed a portion of Phase 2 using Civil3D. Two athletic fields with an underwater rainwater collection system, paved trails in accordance with ADA standards, bioretention and tree planting BMPs for stormwater management, and all necessary cost estimates, erosion and sediment control plans, and construction phasing plans were designed. The final deliverable consists of a sheet set developed from Civil3D drawings and Excel calculations. By simulating an authentic park development project, with emphasis placed on inclusivity and environmental protection, our team gained immense hands-on experience with the software, standards, and iterative processes of civil engineering design.

While researching my STS thesis, I learned about how green space development and the subsequent rise in property values can harm or even displace low-income residents. Those who can afford to stay lose their social networks and the essence of their community. As a result, these residents often feel excluded from the new park, impacting their physical and mental health. The issue of affordable housing must therefore be addressed with deliberate, multidisciplinary strategies from the very beginning of any new greening project, a theory that is brilliantly illustrated by the work being done in the Southwood Community. Southwood is a low-income community of color that borders Biscuit Run. In partnership with the Habitat for Humanity of Greater Charlottesville, Southwood is currently being redeveloped to build safe, permanent, mixed-income housing with the ultimate goal of zero displacement. This means that any resident who wishes to stay in Southwood will be able to do so, regardless of any economic strain stemming from the development of Biscuit Run Park. In this thesis, green gentrification solutions such as those being applied in Southwood are better understood through an extensive literature review and local interviews, while their complexities are assessed through the application of care ethics and an STS framework known as actor-network theory.