Meadow Creek Water Management Plan

(Technical Report)

Green Infrastructure: A Means for Community Agency

(STS Research Paper)

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Sociotechnical Synthesis

Stormwater management in the United States of America (U.S.) remains dominated by grey infrastructure, or curb and gutter systems that collect runoff and convey it through pipes to nearby waterbodies. The typical goal of these systems is to transport runoff as quickly away from a site as possible. However, in today's context, when municipalities are continuing to develop while climate change intensifies storms and storm frequency, this infrastructure fails, resulting in frequent flooding events, as well as erosion and pollution of the receiving waterbodies due to increased runoff. Without a resilient, multi-faceted solution, growth of the built environment will perpetuate these environmental concerns, and grey infrastructure will continue to disintegrate. One such solution is green infrastructure, which broadly refers to systems that mimic natural conditions, such as green roofs, bioretention systems, or parks. This type of infrastructure often provides other co-benefits to host communities, like increasing sense of place, improving air quality, and increasing aesthetic appeal. Therefore, a path forward could be the interweaving of green and grey to form an adaptable and sustainable system with sufficient redundancy to combat the problems stemming from and now confronting human civilization. To do so, comprehensive analyses of existing watersheds must occur in conjunction with implementation efforts that employ an appropriate equity lens, as green infrastructure can initiate displacement of low-income, minority populations through gentrification if there are no prevention measures in place. My capstone project attempts environmental and social characterization of Meadow Creek watershed, located in Charlottesville, Virginia, and provides recommendations for cost-effective types of green infrastructure within the identified target area. Additionally, a community survey was conducted to ensure that public concerns and desires are adequately incorporated into future designs for this area. The STS portion of my thesis subsequently takes the relationship between green infrastructure and community a step further by analyzing the actor network which enables green infrastructure implementation. This network is used to determine power disparities and possible solutions for balancing agency through mutually beneficial means. These solutions were determined by conducting semi-structured interviews with heavily-involved actors, such as government officials, environmental non-profit personnel, and engineering and architecture consulting firms. By engaging with existing watersheds and listening to actor perceptions, the results of my thesis collectively prove the intersectionality of environmental and social issues and provide footholds, whether they be design concepts or pathways to promote valuable collaboration with communities, to spur restoration of sociotechnical landscapes at the local and national scale.