

A Loss Avoidance Study for a Buoyant Foundation Retrofit in Princeville, North Carolina

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Abstract

Princeville, North Carolina holds a special place in American history: believed to be the oldest town chartered by freed slaves, its low-lying topography has survived two 100-year floods in seventeen years - Hurricane Floyd in 1999, and Hurricane Matthew in 2016. Both floods brought water with ease over the town's 37-foot dike, inundating homes that have been proudly occupied for generations. Buoyant Foundations are a long term, feasible solution that will work incrementally with the community create resilient homes and keep the community in place. The foundation retrofits an existing house providing it with the ability to float on the water during flooding but returning it to the ground when floodwater recedes. The system works through buoyancy elements retrofitted to the existing structure with vertical guidance posts that restrict horizontal movement, bringing the house back to its original location.

This paper and presentation will conduct a loss avoidance study on a buoyant foundation retrofit for a standard house and community building in Princeville, North Carolina and prove its economic value by comparing the cost a buoyant foundation retrofit on the house to that of displacement and damage costs to the house due to a flood. A traditional loss avoidance study is calculated using three categories of losses avoided: building repair costs, contents loss, and displacement costs. Building repair costs look at the monetary value of losses that occur through damage to the building, contents losses calculate the monetary value of damage to contents within the building, and displacement costs look at the monetary value of daily costs for the duration of displacement due to flooding. These values are then presented in comparison to the cost of a buoyant foundation retrofit to determine the economic benefits of implementing the foundation, on top of the overwhelming social and environmental benefits.

Keywords: Princeville, North Carolina, Buoyant Foundation Retrofits, Flood Mitigation, At-risk Communities, Climate Change Adaptation, Flood Resilience, Community Resilience, 100-year floods

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